The Journal of American Science

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Department of Agricultural Machinery, Faculty of Agricultural Engineering and Technology, University of Tehran, Karaj, Iran. *mahmoodsoltani39@yahoo.com

Abstract. In this paper, some physical and mechanical properties of banana fruits at different level of ripeness were investigated. Relation between various stages of ripeness and these properties were determined and correlation coefficients were calculated. The color of the fruit skin was measured as $L*$, $a*$ and $b*$ in *CIELAB* system. The mechanical properties were extracted from plotted force-deformation curve. A significant difference at 5% level was found between the level of ripeness and these properties. Duncan's multiple range test was conducted and results were reported. Results showed that changes in $L*$, $b*$ and C was similar, also variation of color index (CI) was similar to $a*$. The firmness, rupture energy and hardness decreased as banana fruit ripened. All measured physico-mechanical properties of banana fruit except deformation had High correlation with stage of ripeness. Result of deformation analysis showed no significant difference at various stages of ripeness. The correlation between deformation and stage of ripeness was obtained as 0.2.

[Mahmoud Soltani, Reza Alimardani, Mahmoud Omid. Changes in physico-mechanical properties of banana fruit during ripening treatment. Journal of American Science 2011;7(5):14-19]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Banana fruit, Physical, Mechanical, Ripening

Neural Network and Wavelet Transform For Classification and Object Detection

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Full Text

Abstract: The practical utilization of object detection and classification, in high-performance structural mine detection or proximity fuses is somewhat impeded due to some complicated phenomena such as: existence of multiple wave modes, jamming, high susceptibility to diverse interferences, bulky sampled data, clutters and difficulty in signal interpretation. An intelligent signal processing approach using the wavelet transform and artificial neural network algorithms was developed; this was actualized in a signal processing package. The intelligent signal processing technique comprehensively functions as signal filtration, data compression and pattern recognition, capable of extracting essential features from acquired raw wave signals and further assisting in structural mine detection or proximity fuses evaluation. For validation, the algorithm was applied to the detection and classification of 10 different objects.

[Afshin Shaabany, Fatemeh Jamshidi. Neural Network and Wavelet Transform For Classification and Object Detection. Journal of American Science 2011;7(5):20-25]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Wavelet; Classification; Mine detection; intelligent signal processing

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Pharmacokinetic of florfenicol (Water soluble formulation) in healthy and Pasteurella infected broiler chickens

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Full Text

Abstract: Florfenicol has been approved in the European Union for use in cattle and pigs as an injectable solution for treatment of respiratory diseases in cattle through injection .But now, it was introduced in some countries as an oral solution for the treatment of several poultry diseases. **The aim** of the present study is to describe the Pharmacokinetics of florfenicol (water soluble formulation)in broiler chickens after either a single intravenous and oral administration (by a dose of 30 mg/kg^{-1} body weight). Meanwhile, comparing its disposition in control healthy and *Pasteurella*-infected broilers. Following the IV

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administration of the drug in healthy and diseased birds, the drug plasma concentration declined in a biphasic pattern. The maximum plasma concentration of florfenicol in control healthy and diseased was reached one hour after its oral administration. But the peak level detected in control broilers was higher than that detected in infected birds. **Conclusion:** Data of the present study showed that volume of distribution, total body clearance in infected birds were higher than that determined in healthy ones. On the other hands, systemic bioavailability were significantly lower (F %,55.6 %) in diseased broiler compared to values determined in healthy ones (F % ,71.5).

		Full Text

Rural women participation in extension activities

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Abstract: In all communities, rural women are considered as an important factor in achieving rural development goals and in fact are half of the manpower needed for rural development. However, in the rural community of Iran, there are gaps between the ruling class (capital owners) and villagers, between literate and illiterate, and between men and women. Especially in villages women have fewer possibilities in terms of investment and less power and credit. Role of rural women, over of men, is more influenced with different economic, social, cultural and ecologic factors. Rural women are considered as a noticeable potential in the community either directly (crops production, livestock, handicrafts, cottage industries) or indirectly by helping the agricultural sector (as labor).

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Effect of Oleozon on Healing of Exposed Pulp Tissues

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Abstract: Objective: To compare the healing effect of Oleozon and calcium hydroxide on experimentally exposed pulp tissue. **Method:** Direct pulp exposures were conducted in nine dogs, i.e., three dogs were prepared for each experimental period of 7, 30 and 90 days. In each dog the upper and lower canines of the right side were capped with calcium hydroxide (Dycal), while those of the left side were capped with ozonated olive oil (Oleozon). After the observation periods, the teeth were prepared for histomorphological examination. **Results:** The tissues capped with Oleozon revealed inflammation with dilated blood vessels and hemorrhages at 7 days, a slight inflammatory response at 30 days, and the increase of collagen fibers and fibroblast with dilated blood vessels at 90 days. While, the tissues capped with calcium hydroxide exhibited medium degree of inflammation and necrosis adjacent to the exposure site at 7 days, remarkable absorption of necrotic tissues with few collagen fibers and fibroblast at 30 days, and a localized connective tissue capsule with depositions of reparative dentin at 90 days. **Conclusion:** Based upon the results and the limitations of the study, it was concluded that direct pulp capping with Oleozon induced less degrees of

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	irritation to the dental pulp compared to that with Dycal. **Clinical significant:** The application of Oleozon paste for direct capping to exposed pulp could have a possibility to serve as a therapeutic method to enhance pulp tissue healing. [Rania Sayed Mosallam; Amany Nemat; Ahmed El-Hoshy and Shiro Suzuki. **Effect of Oleozon on Healing of Exposed Pulp Tissues.** Journal of American Science 2011;7(5):38-44]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** Experimental pulp exposure, pulp capping, Calcium Hydroxide, Oleozon,histopathological examinations		
8	**Assessing Advantages and Disadvantages of Distance Learning** [1] Ali Badragheh, [2] Mohammad Abedi [1, 2] Department of Agricultural Extension and Education, Varamin Branch, Islamic Azad University, Varamin, Iran *Corresponding author: abedi114@yahoo.com **Abstract:** most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority. You receive individual attention, and you work at your own pace. In recent years, technology has played a significant role in transforming the traditional distance education school into a dynamic, interactive distance learning method using toll-free telephone lines, as well as a diverse array of personal computers, video devices, CD and DVD ROMs, online courses over the Internet, interactive devices, and other modern technological innovations. The future for distance study promises to be exciting. [Ali Badragheh and Mohammad Abedi. **Assessing Advantages and Disadvantages of Distance Learning.** Journal of American Science 2011;7(5):45-51]. (ISSN: 1545-1003). **Keywords:** Distance Learning, education	Full Text	8
9	**Relationship between civic engagement and level of people's participation in local government** * Seyed Hamid Mohammadi, ** Sharifah Norazizan, *** Zahid Emby * Department of Social and Development Sciences, Faculty of Human Ecology, Putra University, Malaysia Tel: 60-17-2118806 E-mail: hmd_mohamadi@yahoo.com ** Department of Social and Development Sciences, Faculty of Human Ecology, Putra University, Malaysia E-mail: sharifah@putra.upm.edu.my *** Department of Social and Development Sciences, Faculty of Human Ecology, Putra University, Malaysia E-mail: Zahid@putra.upm.edu.my **Abstract:** This paper attempts to identify the relationship between civic engagements of local people and level of their participation in local government of Torbat-Heydarieh, Iran. The paper is based on the study carried out among 400 citizens of Torbat-Heydarieh. The analysis of data uses Pearson correlation to determine the relationship between variables involved. The findings reveal that two levels of participation (tokenism and citizen-power) have positive and significant relationship with civic engagement, while there is no significant relationship between non-participation level and civic engagement. The findings of the study imply that those respondents who engage more in civic activities would participate in high level of participation in local government. [Seyed Hamid Mohammadi, Sharifah Norazizan, Zahid Emby. **Relationship between civic engagement and level of people's participation in local government.** Journal of American Science 2011;7(5):52-59]. (ISSN: 1545-1003). http://www.americanscience.org.	Full Text	9

	Use of Medicinal Plants in the Treatment of Premenstrual Syndrome: A Review	

Use of Medicinal Plants in the Treatment of Premenstrual Syndrome: A Review

Nahid Golmakani [1], Samira Ebrahimzadeh Zagami [2]

[1,2.] Instructor of Midwifery, School of Nursing and midwifery, Mashhad University Of Medical Science, Mashhad Iran. ebrahimzadehzs@mums.ac.ir

Abstract: Premenstrual syndrome is a common condition in women and includes a range of emotional, psychological, and physical symptoms triggered by the menstrual cycle. Complementary and alternative medicine use is more prevalent in the treatment of diseases, and many women use medicinal plants without a physician's prescription. Modified diet and use of herbal medicine may be one effective method in the treatment of premenstrual syndrome. The purpose of this study was to collect information about medicinal plants used in the treatment of premenstrual syndrome. This review studied articles obtained from data bases, *Pubmed, Science Direct, MD Consult, Inter Science,* and *Iran Medex* from 2000-2010. Several studies and trials have shown a reduction of premenstrual syndrome symptoms after consumption of *Hypericum perforatum*, *Vitex agnus castus*, saffron, ginkgo, and soy rather than the placebo group. Medicinal plants can be used in the treatment of premenstrual syndrome if certain precautions are followed. More studies are needed about these and other plants.
[Nahid Golmakani, Samira Ebrahimzadeh Zagami. **Use of Medicinal Plants in the Treatment of Premenstrual Syndrome: A Review.** Journal of American Science 2011;7(5):60-64]. (ISSN: 1545-1003). http://www.americanscience.org.

Effect of Green Tea Extract on the Rat Liver; Histoarchitectural, Histochemical and Ultrastructural Studies

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Abstract: Green tea consumed worldwide since earliest time considered beneficial to human health due to its specific metabolic activity along with antioxidant effect. This study was headed for investigate the effect of green tea on histoarchitecture and histochemistry as well as the fine structure of rat liver. For this purpose, male albino rats (*Rattus norvegicus*); 3 months age weighing between 100 –120 g were used. The animals group-housed six for each in wire mesh cages fed ad libitum divided into two groups: control and experimental group. The latter was divided into three subgroups; 1%, 1.5% and 3% green tea extract feeding animals. Green tea was received instead of drinking water for 25 days using feeding bottles. After the experimental period, the animals were sacrificed and liver pieces were prepared for both light and electron microscopic examination. The results depicted hypertrophied hepatocytes associated with cloudy swelling. There were some pyknotic and karyorrhectic hepatic nuclei in comparison to the control. Blood vessels appear congested and Blood sinusoids contracted. There was an indication of few collagen fibrils in the hepatic stroma. Hepatocytes had PAS positive deposits in their cytoplasm. Furthermore, hyalinization of the hepatocytes was distinct in the animal's liver feeding on higher doses. The ultrastructural results revealed destructed hepatocytic organelles as well as hypertrophied and irregular contoured hepatocytic nuclei. Moreover, many lipid droplets, few profiles of granular endoplasmic reticulum and destructed mitochondria in the hepatocytes cytoplasm were apparent especially after higher doses of treatment. Though, it was fulfilled that green tea consumption induced an alteration in the liver tissues and its fine structure as well as carbohydrate metabolism. Consequently, another aspect was providing into the cellular response of rat liver toward green tea extract property. It must be carefully using for it's harmfully outcome on long term.

	[Amal A.A. El Daly. **Effect of Green Tea Extract on the Rat Liver; Histoarchitectural, Histochemical and Ultrastructural Studies**. Journal of American Science 2011;7(5):65-73]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Green tea extract, Histoarchitecture, Histochemistry, Ultrastructure, Liver, Rat		
12	**Disadvantages of Online Education: Drawbacks to Consider** Ali Badragheh Department of Agricultural Extension Education, Islamic Azad University, Garmsar Branch, Garmsar, Iran *Corresponding author: badraghehali@yahoo.com **Abstract:** Distance education delivers classes (live or pre-taped) to students in their home, office, or classroom. It is used by K-12, higher education, continuing education and business. As the cost of delivering quality education increases, institutions find that limited resources prevent them from building facilities, hiring faculty, or expanding curricula. They are using distance education to maximize resources and are combining their assets with others to produce programming. Distance education is offered internationally, nationally, regionally, and locally over all forms of conferencing technology. Distance learning is expanding and examples of it are increasing dramatically. Fewer than 10 states were using distance learning in 1987; today, virtually all states have an interest or effort in distance education. Distance learning systems connect the teacher with the students when physical face-to-face interaction is not possible. Telecommunications systems carry instruction, moving information instead of people. The technology at distant locations are important and affect how interaction takes place, what information resources are used, and how effective the system is likely to be. [Ali Badragheh. **Disadvantages of Online Education: Drawbacks to Consider.** Journal of American Science 2011;7(5):74-80]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Online Education, distance education	Full Text	12
13	**Pros and Cons of Online Classes: Advantages and Disadvantages of Online Courses** Ali Badragheh Department of Agricultural Extension Education, Islamic Azad University, Garmsar Branch, Garmsar, Iran *Corresponding author: badraghehali@yahoo.com **Abstract:** Distance education can be used for some aspects of most disciplines. For example, several institutions of higher education already have developed certificate programs, undergraduate programs, and graduate programs in health and physical education that are delivered using distance education methods. Eastern Oregon University, Emporia State University, Kutztown University, LaSalle University, the Medical College of Wisconsin, University of Wisconsin at Stevens Point, and Virginia Tech are among institutions integrating distance technology into their physical education programs. Traditional programs that are heavily based in skill development and demonstration or require laboratory work can be offered in a distance education framework using interactive video interfaced with computers to facilitate a hands-on learning approach at a distance. Classes that use lecture and laboratory experiences are easily adapted to a distance education situation. Course materials, including animals for dissection, are sent to class participants with video and written instructions and assignments. [Ali Badragheh. **Pros and Cons of Online Classes: Advantages and Disadvantages of Online Courses**. Journal of American Science 2011;7(5):81-87]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Online Classes, distance education	Full Text	13
14	**Private extension: functions and duties**	Full Text	14

[1] Molouk Gharibpanah, [2] Azita Zamani
[1, 2] Mahabad Branch, Islamic Azad University, Mahabad, Iran
*Corresponding author: fereshteh12150@yahoo.com

Abstract: Diverse agricultural extension funding and delivery arrangements have been undertaken since the mid-1980s by governments worldwide in the name of "privatization." When agricultural extension is discussed, privatization is used in the broadest sense – of introducing or increasing private sector participation, which does not necessarily imply a transfer of designated state-owned assets to the private sector. In fact, various cost-recovery, commercialization, and other so-called privatization alternatives have been adopted to improve agricultural extension. The form and content of decentralization has dominated development discourse and public sector reform agenda in Kenya in the last two decades. The evolution of public agricultural extension arrived at a worldwide turning point in the 1980s, one that represented the end of a major phase in the growth of publicly funded extension in both the developed and developing world. Agricultural extension increasingly has become defined as one or other of (apparently) differentiated activities of technology transfer or rural development. In many situations, the transfer of technology, heretofore considered the purview of public sector systems, has been reconceived. Such changes suggest a refocussing of paradigms for the delivery of public sector extension.
[Molouk Gharibpanah and Azita Zamani. **Private extension: functions and duties.** Journal of American Science 2011;7(5):88-93]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: private extension

Using Information and communication technologies (ICT) in extension education

Azita Zamani [1] and Nahideh Erfanirad [2]
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Abstract: The concept of development of the rural, today, is not just project initiatives and governance; it is much more beyond that. This paper uncovers a whole plethora of ICT emergence as a technology of the new millennium. Against the backdrop of the ongoing ICT boom, this paper makes an attempt towards studying its applications and usage planning process and policy making for the rural communities focusing on how it helps in aligning the key factors and reduce the problems of alienation, fragmentation and dislocation of knowledge. Policy makers and service providers have increasingly come to view information and communication technologies (ICT), and particularly the Internet, as an important tool in providing disadvantaged groups and areas with access to information, services and markets that would otherwise be inaccessible. The concept of development of the rural, today, is not just project initiatives and governance; it is much more beyond that.
[Azita Zamani and Nahideh Erfanirad. **Using Information and communication technologies (ICT) in extension education.** Journal of American Science 2011;7(5):94-97]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: information and communication technologies (ICT), agricultural extension

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Water Scarcity and Need for Sustainable Water Use

Ahmad Reza Ommani[1] and Azadeh N. Noorivandi[2]

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Full Text

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Abstract: Availability of water is the most limiting factor for agricultural sector. More than 90% of the renewable water in the country is used for agriculture, but the sector still cannot provide enough production to meet the demand of the population. On the other hand, with the current conditions the total agricultural

	products from irrigated farming are 56 million ton and total water used for irrigated agriculture is 83 bm^3, therefore water productivity is 0.7 kg/ m^3. For the supply of food for the year 2020 the agricultural production should increase to 160 million ton. Therefore the water productivity should increase to 1.6 kg/ m^3. Therefore, focus on efficient use of water through irrigation efficiency and improvements in management of water use will be the major challenges in the coming years. [Ahmad Reza Ommani. **Water Scarcity and Need for Sustainable Water Use**. Journal of American Science 2011;7(5):98-105]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** water, agricultural products, Extension expert		
17	**Agricultural Extension and Sustainable Water Resources Management in Agriculture** Ahmad Reza Ommani[1] and Azadeh N. Noorivandi[2] [1]Assistant Professor Department of Agricultural Management, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran, Ommani75451@yahoo.com [2] Department of Agricultural Management, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran, noorivandi_a@yahoo.com **Abstract:** Agricultural extension is a public service for human resource development (HRD) in the agricultural sector. Multiple studies in Iran showed that, although extension services has played a positive role in agricultural development of Iran, but there are difficulties, barriers, misunderstandings, and weaknesses in the transfer of new technology and information to farmers**.** Lacking the suitable linkage between extension and research organizations has been a barrier for transfer of appropriate new technology to farmers. This problem exists in water sector of agriculture. The major consumer of water in Iran is the agriculture sector. Identifying suitable extension mechanisms have important role to developing extension system. Therefore, identifying extension mechanisms for supporting sustainable water resources management in agriculture of Iran is the one of the major approaches needs to be carefully thought and accurately implemented for the extension system development. [Ahmad Reza Ommani. **Agricultural Extension and Sustainable Water Resources Management in Agriculture**. Journal of American Science 2011;7(5):106-112]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Water, Extension mechanisms, Agriculture sector	Full Text	17
18	**The Speed of light - A Fundamental Retrospection to Prospection** Narendra Katkar* Author – Investigator – Analyst, Founder-Chair International Research Center for Fundamental Sciences (IRCFS) 4-158/41, Plot Nr.41, Sai Puri, Sainikpuri, Secunderabad, 500094: Andhra Pradesh, INDIA Tel: 91-40-9948425413 Webpage: https://sites.google.com/site/ircfsnk/home; Email: Narendra.katkar@gmail.com **Abstract:** Speed of light can not be achieved independently by any Body even a Photon, unless it has a source, a thrust of that speed. Further, no amount of radiation or light form can be produced *freely*, unless some amount of (mass) rest energy is converted to dynamic liberated energy. With the investigation of above query and retrospection in mass- energy relation, a paradigm shift in understanding fundamental nature of Energy and Universe is presented. [Narendra Katkar. **The Speed of light - A Fundamental Retrospection to Prospection.** Journal of American Science 2011;7(5):113-127]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** Light Speed, photon, electron positron interaction, Energy, Universe	Full Text	18
19	**Waste management in rural areas of Iran**	Full Text	19

Mortaza tavakoli [1], sadegh afrasiyab rad[2]

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Abstract: The most important role of health is providing physical and mental well-being for people of society. Today, the waste problem is focused less than any other environmental hazards such water and air pollution. Purpose of this study is recognition review and analysis state of waste production resources in rural areas of central rural sub city areas of Shiraz and Zabol counties. Research method in this study based on field observation, interviews, obtains data, from the questionnaire, and analyze data by SPSS software. Findings show that most produced rubbish in rural of Shiraz is paper and textile with 63%, maximum street rubbish is animal stool with 42%, and most market waste is vegetable with 69%. In comparing with rural of Zabol, maximum domestic waste is paper 38% and major rubbish production research is dust with 64%, maximum market rubbish is vegetables 58% and major amount of street rubbish is paper with 54%. There is a significant relationship between waste production amount and rural distance to city and between waste component and method of dispose it and distance to city. the studies done in the waste management in studied rural level, shows great part of human and finance resources spend collecting and transport and no action don in the fields of production, storage, recycling and disposal.
[Tavakoli mortaza, afrasiyabiy rad sadegh. Waste management in rural areas of Iran. Journal of American Science 2011;7(5):128-135]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Environmental health; Waste production; Rural; How disposal; Iran

20	**Key Characteristics of Adult Education and Literacy Programs** [1]Ali Badragheh, [2]Mohammad Abedi [1, 2] Department of Agricultural Economic, Islamic Azad University, Marvdasht Branch, Marvdasht, Iran *Corresponding author: abedi114@yahoo.com **Abstract:** A distinguishing characteristic of adult education programs is that program content and language must be suitable and respectful of adult clients. For example, instead of using the word "student" which may imply a traditional teacher/student relationship where a student is subservient to the teacher, all state program materials use the word "learner" or "customer." Using this type of language acknowledges the adults' existing knowledge and real-world experience and makes them the focus of the program. The Pennsylvania Adult Basic and Literacy Education Indicators of Program. Quality emphasize the importance of customer satisfaction and learner progress on individualized goals One quality area explicitly states that "program staff and learners jointly develop, regularly evaluate, and update an instructional plan that incorporates the individual's learning styles and preferences" . This is just one example of how learners and staff are equals and collaborate on the learners' participation in the program. [Ali Badragheh and Mohammad Abedi. **Key Characteristics of Adult Education and Literacy Programs.** Journal of American Science 2011;7(5):136-141]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** adult education, Literacy	Full Text	20
21	**Learning styles in adult education** [1] Mohammad Abedi, [2] Ali Badragheh [1, 2] Department of Agricultural Economic, Islamic Azad University, Marvdasht Branch, Marvdasht, Iran. *Corresponding author: abedi114@yahoo.com **Abstract:** In the best of all possible worlds, you would incorporate all three learning styles into each of	Full Text	21

	your lessons. However, this is just not possible in the real world of teaching. In truth, it is often not hard to include both auditory and visual learning styles in your lessons. For example, you can have instructions written on the board and say them out loud. However, it is not always as easy to include the tactile/kinesthetic learning style into your lessons. The sad truth is that many students have this as their strongest learning style. It is best to not force the issue but instead find natural places to include kinesthetic learning. If your class warrants it, you could include simulations, role-playing, debates, or the use of manipulative. [Mohammad Abedi and Ali Badragheh. **Learning styles in adult education.** Journal of American Science 2011;7(5):142-146]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** learning styles, adult learning		
22	**Advances of biological taxonomy and species identification in Medicinal Plant Species by DNA barcodes** Chong Liu [1] Zhengyi Gu[1] Weijun Yang [1]* Li Yang [2] Dilnuer[1] [1.]Xinjiang Institute of Materia Medica/Key Laboratory of Xinjiang Uygur Medicine Urumqi 830004 China liu_chong02@163.com [2.] Pharmacy school of Xinjiang Medical University Urumqi 830004 China **Abstract:** Medicinal Plant Species taxonomy is authenticated according to morphological features. It is a long-standing problem of mixing authentic species with their adulterants in medicinal preparations. However, DNA barcoding is a new technique that uses a short DNA sequence as a molecular diagnostic for species-level identification, Our purpose is to briefly expose DNA Barcode of Life principles, relevance and universality. Barcode of life framework has greatly evolved, giving rise to a flexible description of DNA barcoding and a larger range of applications. Similarly, a variety of single locus or combined loci have been propose as DNA barcodes for the plant identification, which are the coding regions or non-coding regions in plastids or the nuclear genome, such as $rbcL$, $matK$, $rpoB$, $rpoc1$, $psbA$-$trnh$, ITS and $rbcL+psbA$-$trnH$. [Chong Liu Zhengyi Gu Weijun Yang Li Yang Dilnuer. **Advances of biological taxonomy and species identification in Medicinal Plant Species by DNA barcodes.** Journal of American Science 2011;7(5):147-151]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** DNA barcoding; ITS2; matK; psbA-trnH	[Full Text](#)	22
23	**Analysis situation of Activity Status in Urban and Rural Area Population of Iran** Mortaza tavakoli PhD, Faculty Member; Department of Geography, University of Zabol, zabol, Iran tavakoli@uoz.ac.ir or tavakoly52@gmail.com **Abstract**: The study has looked into the population of Iran aged 10 and above by activity status and sex including the urban and the rural areas. An analysis of the country's population and activity status could explain the economic and social situations of the state and its people. The increasing unemployment and reduction of goods and productive services may cause some detrimental effects in the society and country's economy. Through the study's assessment on the country's population and activity status, the collaboration of the government and its various sectors can set forth to strengthen human development by investing in human resources and employment. A significant increase in the population rate of male and female students in the rural areas and with the decrease in the rate of homemakers for both sexes is a good sign. This implies that these individuals have seen the potentials of education in empowering them to develop their skills and abilities and obtain necessary knowledge of making a living and becoming a productive individual. Population growth forms formidable barriers to a country's progress and development and this phenomenon is usually attributed to socio-cultural, religious and environmental	[Full Text](#)	23

	factors but with a better understanding of its occurrence will help regulate and control its growth. [Tavakoli mortaza. Analysis situation of Activity Status in Urban and Rural Area Population of Iran. Journal of American Science 2011;7(5):152-157]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** activity status; rural and urban area, Iran		
24	**Physical and Mechanical Properties of beans** Alireza Shirneshan Mechanical Engineering Group, Faculty of Engineering, Islamic Azad University, Najafabad Branch, Iran arshirneshan@yahoo.com **Abstract:** Food properties are needed and play a significant role to predict and define the quality and behavior of seeds. In this study physical (dimension, weight, volume, sphericity, static coefficient of friction) and mechanical (maximal impact deformation, dynamic coefficient of friction) properties of four common beans are reported. As static coefficient of friction is equal to tangent of slip angle, a suitable apparatus was constructed and static coefficient of friction for four genotypes Daneshkadeh and Dehghan (white color) Naz and Sayyad (Red color) on three surfaces (rubber, tarpaulin and steel galvanized) were measured. Also dynamic coefficient of friction was determined at surface moving velocities of 4, 8 and 12 m/min. Mechanical behavior under impact load were determined in terms of average rupture force in pendulum impact, that is design and constructed. Randomize complete block design showed that, static and dynamic coefficient of friction had major difference between beans genotypes, surfaces and velocity. Mean values showed that the lowest static coefficient (0.32) occurred with steel galvanized surface and highest (0.44) on tarpaulin surface. The lowest dynamic coefficient of friction (0.24) occurred with steel galvanized surface and highest (0.385) on tarpaulin surface. It was observed that the magnitudes of physical damage in Sayad beans were higher than Naz, Daneshkadeh and Dehghan respectively. The average loss of germination to beans decreased with increasing impact energy. Naz and Dehghan had minimum mean volume and weight and Daneshkadeh had maximum sphericity and geometric mean. [Alireza Shirneshan. **Physical and Mechanical Properties of beans.** Journal of American Science 2011;7(5):158-164]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Bean, friction, Dynamic, Impact, physical attributes	Full Text	24
25	**Stimulation effect of some bioregulators on flowering, chemical constituents, essential oil and phytohormones of tuberose (*Polianthes tuberos L.*).** [1] Lobna, S. Taha and [2] Rawia, A.Eid Department of Ornamental Plant and Woody Trees.National Research Centre,Dokki, Cairo, Egypt * Corresponding author, emil, lobnasalah82@yahoo.com **Abstract:** Bulbs of tuberose plants were soaked (24h) or sprayed with solutions of spermidine and ATP at 50, 75 or 100ppm for each. Both bioregulators (especially at 100 ppm) augmented plants bulblets and flowering characteristics (No. of bulblets, fresh and dry weights of bulblets, no of days to flowering, No of florets/spike, spike length, length of rachis and fresh and dry weights of spike) Spermidine was more effective than ATP for bulblets parameters but ATP was preferred for flowering parameters, photosynthetic pigments (Chl a, b and carotenoides), chemical constituents of plants (Indoles, phenols and total carotenoides). Essential oil content of flowers was significantly improved by soaking or spraying of ATP at 50, 75 or 100ppm. The highest amount of endogenous GA3 produced with ATP at 100ppm. However, spermdine (100ppm) caused the highest amount of cytokinins. Using ATP as soaking or spraying treatment at 75 or 100ppm resulted in the highest amount of ABA. [Lobna, S. Taha and Rawia, A.Eid. **Stimulation effect of some bioregulators on flowering, chemical constituents, essential oil and phytohormones of tuberose (*Polianthes tuberos L.*).** Journal of American Science 2011;7(5):165-171]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** Spermidine, ATP, flowering, chemical constituents, essential oil, phytohromones, tuberose	Full Text	25

26	**Lens Protein Changes Associated With Cigarette Smoking** Eman M.Aly * and Eman S. Elabrak Biophysics and Laser Science Unit, Research Institute of Ophthalmology, Giza, Egypt. *e.Aly@hotmail.com **Abstract: Purpose**: Smoking is an independent risk factor that has dose-response effect. The goal of the present work is to study the biophysical and biological effects of smoking on the crystalline lens of the rabbits. **Materials and methods**: Twenty New Zealand albino rabbits used in this study were classified into five groups in which group I (n=4) served as control. The other groups were exposed to different durations of cigarette smoke (five cigarettes per day). Animals were decapitated after 2, 4, 6 and 8 weeks and soluble lens proteins were separated and the following measurements were carried out: estimation of total soluble protein, refractive index measurement, sodium dodocyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) and determination of sodium, calcium and potassium concentrations. **Results**: The results showed that, exposure of the animals to cigarette smoke resulted in decrease of the protein concentration and potassium content that was accompanied by an increase in the refractive index of the soluble lens proteins and an increase in sodium and calcium content. In addition, there were changes in the molecular structure of soluble lens proteins demonstrated by SDS-PAGE. **Conclusion**: smoking causes morphological and functional changes to the lens that may lead to cataract. [Eman M.Aly and Eman S. Elabrak. **Lens Protein Changes Associated With Cigarette Smoking.** Journal of American Science 2011;7(5):172-177]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** Ultrasound, Rabbits, Lens, Refractive index, Proteins, SDS	Full Text	26
27	**Effect of prophylactic antibiotics (Cephalosporin versus Amoxicillin) on preventing post caesarean section infection** Walaa H. Ibrahim [1], A. M. Makhlouf [2], Mervat A. Khamis[1], and Entisar M.Youness*[1]. **[1]Department of Obstetrics and Gynecological Nursing, Faculty of Nursing, Assuit University** [2]Obstetrics & Gynecological Medicine Dept., Faculty of Medicine, Assuit University *entisarmohamedyones@yahoo.com **ABSTRACT:** Prophylactic antibiotics have been shown to be effective in reducing the incidence of febrile morbidity associated with cesarean section after labor. However, the relative effectiveness of different single antibiotics has been studied infrequently. Several new broad spectrum antibiotics are now available, and any further benefit from more traditional antibiotics for surgical prophylaxis remains untested. A randomized clinical trial for testing the efficacy of cephalosporin versus Amoxicillin in preventing post cesarean section infection, and to identify the role of health education about wound care in reducing post cesarean section wound infection. This study conducted at emergency unit of the Obstetrics &Gynecological department, Woman's Health Center, Assuit University Hospital, between 2008 to 2009. Women's undergoing emergency and elective cesarean section were recruited into the study and given either drug as prophylaxis. The sample comprised 200 pregnant women. 100 pregnant women received Amoxicillin and the other 100 pregnant women received Cephalosporin as a prophylactic antibiotic. For each group, 50 women received routine hospital wound care and the other 50 women received health education about wound care. Random assignment was done by computer generated tables. Concealed envelopes containing the random number made to be opened after deciding to include the case in the study. the -present study reported that the percent of surgical site infection (SSI) of elective cesarean section was 2.5% (0.5% in Amoxicillin group and 2% in cephalosporin group) with no significant difference between both groups. We can concluded that use of Amoxicillin as a prophylactic antibiotic as effective as Cephalosporin in preventing post cesarean section wound infection. And women that received health education about wound care are less likely to expose to wound infection than those who receive only routine hospital care, in spite that the comparative results are not significant.	Full Text	27

	[Walaa H. Ibrahim, A. M. Makhlouf, Mervat A. Khamis, and Entisar M.Youness. **Effect of prophylactic antibiotics (Cephalosporin versus Amoxicillin) on preventing post caesarean section infection.** Journal of American Science 2011;7(5):178-187]. (ISSN: 1545-1003). http://www.americanscience.org. **Key Words:** Prophylactic antibiotics, Wound infection, Cesarean section.		
28	**Role of Fine Needle Aspiration Cytology in Diagnosis of Soft Tissue Tumors** Hassan A.Maher Wael[1], Khamis N.Nehal[1] and Hammam M. Makram[1] [1.] Pathology Department, Faculty of Medicine, Suez Canal University, Ismailia, Egypt wael_hassan2@med.suez.edu.eg, **Abstract:** Fine needle aspiration cytology has many advantages that make it a first-choice diagnostic approach in many tumors. However, its role in diagnosing soft tissue tumors has been debated and at times discouraged. The aim of the study is to review the role of fine needle aspiration cytology in diagnosing soft tissue tumors and to establish cytological criteria for the most encountered soft tissue tumors. The databases were searched up to 2010 and a comprehensive review of the relevant literature was performed, focusing on the followings: utility and limitations of fine needle aspiration cytology in the diagnosis of soft tissue tumors, diagnostic efficacy of fine needle aspiration cytology in the diagnosis of soft tissue tumors, the cytological features of the most commonly encountered soft tissue tumors, the role of fine needle aspiration cytology in differentiating benign soft tissue tumors from soft tissue sarcomas and its role in grading and exact subtyping of soft tissue sarcomas. The findings of this review showed that fine needle aspiration cytology in conjunction with ancillary studies, especially immunohistochemistry, along with the clinical and/or radiographic data can approach a diagnostic accuracy of 95% for the diagnosis of soft tissue tumors. Also, placing the sarcoma into one of the five cytomorphological group (pleomorphic, spindle, myxoid, small round/ovoid and epithelioid) is useful to reach a confident diagnosis of benignity or malignancy and to suggest a type-specific diagnosis. However, subtyping or grading spindle cell sarcomas as well as lipomatous tumors are often challenging and the use of immunohistochemistry is mandatory for proper diagnosis of these tumors. [Hassan A.Maher Wael, Khamis N.Nehal and Hammam M. Makram. Role of Fine Needle Aspiration Cytology in Diagnosis of Soft Tissue Tumors. Journal of American Science 2011;7(5):188-199]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words**: Fine needle aspiration cytology, soft tissue tumors, cytological criteria, immunohistochemistry	Full Text	28
29	**Behavioral Responses of Castrated Buck Kids at Different Ages By Using Different Methods of Castration** **Souad A. Ahmed and Essam A. Ahmed** Department of Animal Hygiene, Behavior and Management, Faculty of Veterinary Medicine, Benha University. Egypt. *souadahmed45@yahoo.com **Abstract:** To evaluate the behavioral responses of kids to castration by burdizzo (Bur), rubber ring (RR) or control handled, 90 buck kids were used. Behavioral responses of kids throughout the 180 minutes after castration or control handled were assessed by using a video camera Castration of younger kids (7 and 21 days) took significantly shorter time than 42 days old. RR produced the highest values of active pain behavior, frequency of elimination, less frequently suck, teat seeking or nibble at feed. The scrotal sloughing was delayed in older kids. Results of questionnaire indicated that most castrations were done at the farm; castration failure was only in some of Burdizzo especially those older than 8 weeks. It was concluded that kids castration must be done as early as possible to reduce the total pain response and for achievement of animal welfare, and Burdizzo method is the preferable technique for castration of kids at all ages. [Souad A. Ahmed and Essam A. Ahmed. **Behavioral Responses of Castrated Buck Kids at Different Ages By Using Different Methods of Castration.** Journal of American Science 2011;7(5):200-209]. (ISSN: 1545-1003). http://www.americanscience.org.	Full Text	29

	Key words: kids age, castration, Bur, RR, behavior.		

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Synthesis of Some New Annulated Thieno Pyridine,Pyrazolopyridine and Pyrido Pyridine Derivatives

F.F. Mahmoud, Nadia T.A. Dawood, Nahed F. Abdel-Ghaffar

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Abstract: The reaction of arylidenemalonitrile with cyanothioacetamide afforded pyridine derivatives. Thus compound 1 reacted further with different nucleophilic and electrophilic reagents yielding different products which were confirmed via spectroscopic analysis.
[F.F. Mahmoud, Nadia T.A. Dawood, Nahed F. Abdel-Ghaffar. **Synthesis of Some New Annulated Thieno Pyridine,Pyrazolopyridine and Pyrido Pyridine Derivatives.** Journal of American Science 2011;7(5):210-218]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Arylidene malononitriles,Dihydropyridines,Antimicrobial activity.

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Diagnosis of Nutrient Status in Balady Mandarin Orchards of a Newly Reclaimed Area in Egypt

Khalifa, R. Kh. M.; El-Fouly, M.M.; S.H.A. Shaaban[*] and H.A. Hamouda

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Abstract: The present work aimed to determine the nutritional status of Balady mandarin orchards, through soil testing and leaf analysis, in order to work out a proper fertilization programs. A field study was conducted at El-Tall El-Kepeer, Ismailia governorate, covering 19 Balady mandarin orchards grown on sandy soils under drip irrigation. These soils are of poor fertility. However, fertilization of these orchards still depends upon the grower's inherited knowledge and in very small scale on the extension information. The trees were fifteen years old. The orchard soils had very high pH values, low to high level of EC and Na and were low in total $CaCO_3$ and very low in O.M. The values for available nutrients in soil were found to be as very low of P, Fe, Mn, Zn and Cu. Values of K, Mg ranged between very low to medium levels. However values of Ca ranged between medium to high levels. The leaf macronutrient values were low in N, ranged between optimum to high in P and Mg, ranged between low to high in K, However values of Ca was ranged between low and optimum. The leaf micronutrient contents were as follow, Fe ranged from optimum to high; Mn, Zn and Cu were ranged from low to the beginning of optimum levels. The nutrient correlations of the leaves revealed some antagonisms between K and Ca, Mg and both of Mn and Zn. Also, the nutrient correlations of the leaves and fruits revealed some antagonisms between N in leaves and Zn in fruits, P and K in leaves and Mn in fruits, K in leaves and N, Cu in fruits, Ca in leaves and K in fruits.
[Khalifa, R. Kh. M.; El-Fouly, M.M.; S.H.A. Shaaban and H.A. Hamouda. **Diagnosis of Nutrient Status in Balady Mandarin Orchards of a Newly Reclaimed Area in Egypt.** Journal of American Science 2011;7(5):219-226]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Mandarin, sandy soil, nutrient diagnostics, nutrient uptake

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Using Condition Monitoring to Estimate Repair and Maintenance Costs of Tractors in Iran

Ahmad Mohammadi [1], Morteza Almasi[2], Alireza Masoudi[3], Saeed Minaei [4], Hamid Mashhadi Meighani[5]

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Abstract: One of the most aspects of managing of agricultural machinery is control and estimating of repair and maintenance costs. So, this is necessary to introduce mathematical methods to define repair time and machine condition. It reduces repair costs and increases the chance of machine service. In this research, condition monitoring was established to introduce this mathematical model for tractors in Iran. The study was done on MF285 and MF399 as the most conventional tractors in Iran. 120 tractors were selected randomly and their repairing and maintenance costs as well as working time were recorded. The costs for usual methods and control monitoring methods were compared by F test in SPSS software. Results show that the effects of CM can reduce costs in comparison with usual method significantly (Sig=0.002). Finally by assuming cumulative working time (X) as independence and cumulative costs based on definite percent of initial price (Y) as dependence variable a mathematical model was introduced. Powered regression introduced this model as $Y=0.0028\ X^{0.981}$ which can used to estimate repairing and maintenance costs for selected tractors.
[Ahmad Mohammadi, Morteza Almasi, Alireza Masoudi, Saeed Minaei, Hamid Mashhadi Meighani. Using Condition Monitoring to Estimate Repair and Maintenance Costs of Tractors in Iran. Journal of American Science 2011;7(5):227-231]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Condition monitoring, Tractor, Repair and maintenance, Model

33	**Characteristics of educators in adult education** [1] Mohammad Abedi, [2] Ali Badragheh [1, 2] Department of Agricultural Economic, Islamic Azad University, Marvdasht Branch, Marvdasht, Iran. *Corresponding author: abedi114@yahoo.com **Abstract:** Complex role of adult learning and training process is significant, his role gradually changed from the donor information and active for many years will assume that the principles and techniques that are used in teaching children to contribute equally in the adult learning process On the other hand is effective in children for adult education teachers were employed. Later that person was well trained (ie the experts), who could well slow or a group leader to manage the program, was selected as an adult educator. Thus learners directly in adult education programs that are based on experience were used, and adult As a mature child which has its own characteristics and is unique is that the principles and techniques of the different techniques used for the education of children is needed. As a result the role of adult educator gradually from non-skilled person without the expertise of individual specialists and trained to be changed and Instructors for training and educational opportunities were provided at all levels are therefore unable to work for educators from institutions with short-term training courses for users of the guidance program (project leaders) through summer workshops for professional leaders through programs Training of Master and PhD levels in schools of higher education courses were provided. [Mohammad Abedi, Ali Badragheh. **Characteristics of educators in adult education.** Journal of American Science 2011;7(5):232-236]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords**: Distance education, adult education	Full Text	33
34	**The role of indigenous knowledge for sustainable development** Khatereh siyar Department of Agricultural Economic, Islamic Azad University, Qaemshahr Branch, Iran *Corresponding author: khaterehsiyar@yahoo.com	Full Text	34

Abstract: Indigenous knowledge is local knowledge that is restricted to one specific culture and/or certain society. Indigenous knowledge is different with scientific knowledge that was established by universities and scientific communities. This knowledge is basis for decision making at field of agriculture, health, education, food and natural sources . Indigenous knowledge is set of all knowledge and skills that people enjoy in one geographical area (in one environmental conditions) that most of their skills and knowledge be transmitted to next generation , and new generation would be adapted with them and add to it . Many experts believe that for making a sustainable development, Indigenous and modern knowledge should be combined. Nowadays, so much efforts have done to make use of Indigenous knowledge but main part of these efforts were done for derivation and making it scientific.

35	### Socio-economic analysis of foreign immigrants in South East Iran Mortaza tavakoli PhD, Faculty Member; Department of Geography, University of Zabol, zabol, Iran tavakoli@uoz.ac.ir or tavakoly52@gmail.com **Abstract:** Beginning of immigration refer to age of times that human lives on the earth. The first human for keep from damage and problem's choosing immigrant as a solution. In between international immigrant with notice to it effect's in era and destination is the most important. Analytic Situation of Pakistani immigrant to Iran is the main goal of this research. The all of society that use in this research is N=1350 person from Pakistani immigration that lives in Konarak and Chabahar that the 219 person with simple Random Sampling method chosen and for analytic this data and information use from Excel and Spss 16 software's. The results show the main reason of immigrant Pakistani to these two cities is finding job and suitable work. Two stimulant consist of economic and other reason such local convenience, better life, more security has direct effect on other behavioral this reason has most important in between other reason. [Tavakoli mortaza. Socio-economic analysis of foreign immigrants in south east Iran. Journal of American Science 2011;7(5):242-250]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** International immigrant's, Pakistani immigrants, Southern East of Iran	Full Text	35
36	### Clinical value of transforming growth factor beta as a marker of Fibrosis in adolescents with Chronic Liver Diseases Elham Abdel Ghaffar, Bahaa El-Din Hassanin, Mona EL-Tokhy* Pediatric & Clinical Pathology* Depart., Faculty of Medicine, Benha University **Abstract: Background:** Hepatic fibrosis is the final common path of liver injury in most chronic liver diseases and can lead to cirrhosis, which is responsible for the majority of clinical complications. Our aim is to asses the clinical value of serum Transforming growth factor (TGF) as a fibrogenesis marker in adolescents with chronic Liver Diseases**. Methods:** We measured serum levels of TGF- in 25 adolescents with chronic liver disease and 25 healthy controls, and determined their relationship to frequently used liver function tests and liver biopsy findings. **Results:** Serum Transforming growth factor was significantly higher in patients than in controls as (P < 0.001). Significant positive correlation between TGF and TSB as r is 0.4682 and p is < 0.05. High significant positive correlation between TGF and (stage, grade of liver fibrosis, PT and duration of illness)as p is < 0.001and r is 0.9409, 0.7447, 0.5293 and 0.5952 respectively. Highly significant negative correlation with prothrombin concentration (PC) and serum albumin level as p is < 0.01 and r is -0.6460 and -0.5371 respectively. Sensitivity of TGF in diagnosis of fibrosis was 65% , specificity 94% and area under curve (AUC) was 0.812.The cut-off value of TGF used to discriminate significant fibrosis was 22.6 ng/ml and it was a dependant predictor factor for diagnosis of fibrosis with positive predictive value 75.5% and negative predictive value 90.4 %.	Full Text	36

	Conclusions: TGF- had the ability to discriminate patients with significant fibrosis. and may be useful in reducing but not replacing the need for liver biopsy. [Elham Abdel Ghaffar, Bahaa El-Din Hassanin, Mona EL-Tokhy. **Clinical value of transforming growth factor beta as a marker of Fibrosis in adolescents with Chronic Liver Diseases.** Journal of American Science 2011;7(5):251-259]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Liver fibrosis; Hepatitis C virus; Hepatitis B virus; Liver fibrosis; TGF-		
37	**Codification of the Strategy Map in Small, Auto-parts Manufacturing Companies (Case Study: Sahand Khodro Company of Tabriz)** [1] Samad Khabbaz Bavil * and [2] Armin Rajabzadeh and [3] Mohammad Behravesh [1] MSc of Management (MBA), lecturer of Management, Department of Social Science and Economics, Payam Noor University, Ahar Branch, Ahar City, East Azerbaijan, Iran. E-mail: s_khabbaz@pnu.ac.ir. [2] MSc of Management (MBA), lecturer of Management, Faculty of Social Science, Department of Marketing Management, Payam Noor University, Varzeghan Branch, Varzeghan City, East Azerbaijan, Iran. E-mail: a_rajabzadeh@pnu.ac.ir. [3] MSc Student of Industrial Engineering, Department of Industrial Engineering, University of Amirkabir Technology, Tehran, Iran. E-Mail: behravesh@aut.ac.ir. **Abstract:** One of the issues which hinder the execution of strategies in organizations is that it remains in a general level of actions and orientations. In response to this problem, the strategy map attempts to illustrate the organization strategies in terms of cause-effect relations and show how these strategies can change into measurable objectives and specified operations which must be followed by organizational units and also employees. By translating its strategy into the logical structure of the strategy map, Sahand Khodro Company created a common, tangible reference point for all its employees and personnel. In this study, we have translated the strategy of Sahand Khodro Company into operational objectives and evaluators from four aspects of the strategy map. By codifying the strategy map, Sahand Khodro Company was able to achieve greater profitability and better response in relation to all the beneficiaries involving customers, employees, director and owner of the company and the society. [Samad Khabbaz Bavil and Armin Rajabzadeh and Mohammad Behravesh. **Codification of the Strategy Map in Small, Auto-parts Manufacturing Companies (Case Study: Sahand Khodro Company of Tabriz).** Journal of American Science 2011;7(5):260-267]. (ISSN: 1545-1003). http://www.americanscience.org. **Key Words:** Strategy, Strategy Map, Auto-Parts Manufacturing Industry, Small Companies, Tabriz.	Full Text	37
38	Prediction of Traditional Climatic Changes Effect on Pomegranate Trees Under Desert Condition in EL-Maghara, Egypt **Seidhom, S.H. and Abd-El-Rahman, G.** ater Requirements and Meteorology Unit, Chemistry and Soil Physics Department, Desert Research Center, El-Matareya, Cairo, Egypt. **Abstract:** The main aim of this study is to combat and forecasting climate changes, with some soil managements in El-Maghara Research Station at North Sinai, Egypt, on pomegranate trees. The applied treatments were irrigation intervals and soil mulching with drip irrigation in the desert sandy soils and its impact on the water use efficiency and saving of irrigation water. A field experiment was carried out through split plot design during the three seasons 2008, 2009 and 2010 with pomegranate trees have 9 years age, planted at distances 3.6 X 3.6 meters (324 tree/fed). Experiments included 72 test unit consists of three irrigation intervals (2, 4 and 6 days) and three soil mulching practices under the trees (control without mulch, bitumen mulch and olive pomace mulch) and four replicates each have two trees, as the	Full Text	38

amount of irrigation water was calculated according to Penman - Monteith equation for data the last 10 years of the meteorological data of the region. The results were analyzed statistically, which were as follows: (1) There is a detected local climatic change for the main meteorological data of the site compared either with 10 or 30 years recorded data. These changes are partially caused by the global climatic change in one hand and to the local Oasis effect in the site in the other hand. These changes play a positive role in enhancing the yield of pomegranate trees referring to the horticulture references. (2) A significant increase of the values of pomegranate fruit yield, crop water use efficiency, water economy, water saving, total revenue and total profit by increasing of air temperature and humidity of the atmosphere and increasing the irrigation period to 6 days. Olive pomace mulch under the trees, gave a higher yield than bitumen mulch, and without mulch. (3) Significant decrease values of water consumptive use, crop coefficient of pomegranate, irrigation water use efficiency coefficient and environmental stress coefficients by increasing the irrigation period to be 6 days. Olive pomace mulching under the trees gave a higher yield than bitumen mulch and then without mulch. (4) The highest for the application of economic olive pomace mulch under irrigation with a period of 6 days. In all cases, the applied treatments get higher investment ratios (IR) than the traditional one (2.25 LE/IL). The study recommends with using drip irrigation every 6 days by the amount of irrigation water calculated according to Penman-Monteith equation without addition leaching requirements, with plants residues mulch such as olive pomace under the trees, which gave the highest return of one pound investment with ~ 3.07 LE., taking into account the vulnerability of the study area to the phenomenon of the Continental and Oasis effect, under conditions similar to the study area.
[Seidhom, S.H. and Abd-El-Rahman, G. Prediction of Traditional Climatic Changes Effect on Pomegranate Trees Under Desert Condition in EL-Maghara, Egypt. Journal of American Science 2011;7(5):268-280]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: climate change, irrigation intervals, mulching, pomegranate, water use efficiency, environmental stress coefficient.

Deterioration and Diffusion Studies of Radioactive Wastes from the Concrete Matrix by Dynamic Method

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Abstract: In designing radioactive waste repositories, it is necessary to predetermine the degree of cement performance change due to leaching degradation. Cement is a porous material and consists of solid phases in contact and in equilibrium with a pore water solution. The progress of degradation can be expressed in terms of water exchange cycles or speed of diffusion of ions in the pore solution. Cementitious materials are fundamentally unstable in water and will change properties with time. High pH conditions of aqueous solutions in a radioactive waste repository can be brought about by dissolution of cementitious materials. In order to clarify the mechanisms involved in maintaining this high pH for long time, the dissolution phenomena of cement hydrate was investigated. In the present research, leaching tests on powdered cement hydrates were conducted by changing the ratio of mass of leaching water to mass of cement hydrate Ordinary Portland cement hydrate was contacted with pour water and placed in a sealed bottle. After a predetermined period, the solid was separated from the solution. Calcium hydroxide is one of the main reaction products resulting from the hydration of Portland cement with water. It is also one of the more soluble phases found in hydrated cement systems. Study's the influence of calcium hydroxide dissolution and its effect under the dynamic leaching system .From the results of XRD analysis on the solid phase and the calcium concentration in the aqueous phase, it was confirmed that Ca (OH) $_2$ was preferentially dissolved when the liquid/solid ratio was 30 to 35 %, and that C–S–H gel as well as Ca (OH) $_2$ were dissolved when the liquid/solid ratio was 45% or larger. The crystalline phases were identified using X-ray diffraction .The leaching of ^{137}Cs was carried out according to the ANSI/ ANS -16.1.
[A. El- Dakroury. **Deterioration and Diffusion Studies of Radioactive Wastes from the Concrete Matrix by Dynamic Method.** Journal of American Science 2011;7(5):281-290]. (ISSN: 1545-1003). http://www.americanscience.org.

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	Keywords: deterioration ; diffusion ;solubility; cement hydrate; C–S–H gel		
40	Journal of American Science 2011;7(5):291-298]. (ISSN: 1545-1003). http://www.americanscience.org. 8	Full Text	40
41	**Serum Fetuin-A levels in type 2 diabetes patients with early diabetic nephropathy: Its relation to diabetes control** Ayman Ramadan[1], Amira Shoukry[1], Mabrouk Ibraheim Ismail[1], Maher Borai[2] [1]Internal Medicine and [2]clinical Pathology Departments, Zagazig University, faculty of medicine, Zagazig, Egypt. Aymedman@yahoo.co.uk **Abstract: Background and objective:** Fetuin-A is a circulating calcium-regulatory glycoprotein that inhibits vascular calcification. In the present study, serum fetuin-A was studied as a novel risk factor for the development of diabetic nephropathy and the relation between its levels with the state of diabetes control. **Patients and Methods:** 50 patients with type 2 diabetes mellitus (DM) and early diabetic nephropathy, 25 patients of them have well controlled diabetes on treatment (the first group), the other 25 patients have uncontrolled diabetes (the second group), and another 25 healthy volunteers (control group)) were enrolled in this cross sectional study. Serum fetuin-A, Fasting plasma glucose(FP glucose) , glycated hemoglobin A1c, lipid profile (total cholesterol, HDL, triglycerides), Serum creatinine, Glmerular filtration rate (GFR), Albumin excretion in urine were measured. **Results:** There was a significant reduction in Serum fetuin-A levels in controlled diabetic patients (314 ± 66.8) and uncontrolled diabetic patients (252.4 ± 55.6) patients compared to control group (478.6 ± 74.4). A significant decrease was also detected in uncontrolled diabetic patients when compared to controlled diabetic patients ($P<0.001$). A strong inverse correlation was found between serum fetuin-A and each of F P glucose , glycated HBA1c, serum creatinine,and albumin excretion in urine ($P<0.001$). whereas; GFR was significantly positively associated with serum fetuin-A levels ($r = 0.53$, $P<0.001$). **Conclusion:** The results of this study demonstrate that diabetic nephropathy, especially with uncontrolled diabetes, is linked to low fetuin-A which represents a novel risk factor for the development of vascular complications. This factor could be responsible for the development and progression of accelerated nephropathy especially with uncontrolled diabetes. [Ayman Ramadan, Amira Shoukry, Mabrouk Ibraheim Ismail, Maher Borai. **Serum Fetuin-A levels in type 2 diabetes patients with early diabetic nephropathy: Its relation to diabetes control.** Journal of American Science 2011;7(5):299-302]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Diabetic nephropathy; fetuin-A; Glycated hemoglobin A1c; diabetes mellitus; and control	Full Text	41
42	**Parameter Estimation and Dynamic Simulation Of Gas Turbine Model In Combined Cycle Power Plants Based On Actual Operational Data** H. Emam Shalan *, M. A. Moustafa Hassan **, A. B. G. Bahgat *** * El-Kureimat Power Station, Ministry of Electricity, University, Cairo, Egypt, hanyemam1980@yahoo.com ** Electrical Power Department, Faculty of Engineering, Cairo University, Giza, Egypt, mmustafa@eng.cu.edu.eg *** Electrical Power Department, Faculty of Engineering, Cairo, Giza, Egypt, agbahgat@hotmail.com *Abstract:* Gas turbines are very important nowadays for electric power generation specially that used in the *Combined Cycle Power Plants (CCPPs)*. For this electric power generation, the dynamics of the gas turbine and parameters estimation are very essential. In this article, a simple procedure is used for estimating the parameters of Rowen's model for HDGTs in dynamic studies for analysis purposes. The parameters of Rowen's model for a 265-MW HDGT are derived and several simulated tests using Matlab/Simulink are presented. The way of obtaining the parameters are based on simple physical laws. It	Full Text	42

	explains briefly how to extract the parameters of the model using the operational and performance data. The obtained results via simulations using Matlab/Simulink are highly matched with the involved scientific articles that published in different literature. Furthermore, the obtained results verifies the operational results of the considered HDGT. However, the procedure here is applied on a practical HDGT. The same procedure could be applied for any scale (size) of gas turbines. [H. Emam Shalan, M. A. Moustafa Hassan, A. B. G. Bahgat. **Parameter Estimation and Dynamic Simulation Of Gas Turbine Model In Combined Cycle Power Plants Based On Actual Operational Data.** Journal of American Science 2011;7(5):303-310]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Combined Cycle Power Plant (CCPP), Dynamic Simulation, Gas Turbine, Mathematical Modeling, Thermodynamic Process.		
43	**Risk Factors And Impacts Of Pre-Eclampsia: An Epidemiologicl Study Among Pregnant Mothers In Cairo, Egypt** Essam A. El-Moselhy; Hamed O. Khalifa; Soliman M. Amer; Khadra I. Mohammad* And Hani M. Abd El-Aal** Departments of Community Medicine and Obstetric & Gynecology**,** Faculty of Medicine, Al-Azhar University. dr_elmoselhy@hotmail.com **ABSTRACT: Introduction**: Pre-eclampsia (PE) represents a major cause of morbidity and mortality in mother, fetus and infant in many parts of the world. **Objectives**: The aim of this study was to investigate the behavioral, socio-demographic and clinical risk factors of PE among pregnant mothers and to define the impact of PE on health of the fetuses and neonates. **Subjects and methods**: A case-control, hospital based study design was used. All the cases and controls were interviewed and examined; clinically and laboratory. **Results**: Multiple gestations, rural residence, mothers married more than once, inter pregnancies' interval <3 years, primi-gravida, low social level and maternal age group 26-30 years were significant socio-demographic and personal risk factors (OR=9.79, 4.16, 4.0, 2.73, 2.16, 2.16 and 1.98, respectively). Further, much salty diet intake, no adequate fresh fruits/vegetables and much fat were significant dietary risk factors (OR=1.99, 1.85 and 1.83, respectively). Also; urinary tract infection, vaginal infection/ vaginosis, asymptomatic bacteriuria, polyhydraminos, diabetes and stress were significant medical and obstetric/gynecologic risk factors (OR=5.59, 4.41, 3.62, 3.59, 3.35 and 2.98, respectively). Fetal growth restriction, preterm labor, neonate birth weight <2.5 kg and neonate intensive care admission were more common in pre-eclamptic mothers compared to controls with statistically significant differences (P=0.00, 0.04, 0.03 and 0.02, respectively). The mean of 1- and 5-minute Apgar scores were significantly lower in newborns of pre-eclamptic mothers compared to controls (P=0.00 for each of them). Also, the mean Hb level was significantly lower in newborns of PE cases compared to controls (P=0.00). **Recommendations**: Improving ante-natal care for pregnant mothers in Egypt. Population based studies are needed in different areas in Egypt and on large numbers of mothers to understand the full epidemiology of PE. [Essam A. El-Moselhy; Hamed O. Khalifa; Soliman M. Amer; Khadra I. Mohammad* And Hani M. Abd El-Aal. **Risk Factors And Impacts Of Pre-Eclampsia: An Epidemiologicl Study Among Pregnant Mothers In Cairo, Egypt.** Journal of American Science 2011;7(5):311-323]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Risk Factors; Impacts Of Pre-Eclampsia; Epidemiologicl Study; Pregnant	Full Text	43
44	**Amniotic Fluid Selenium And Maternal Biochemical Findings Among Pre-Eclamptic Women In Cairo, Egypt** Essam A. El-Moselhy; Hesham H. Amin* And Hani M. Abd El-Aal** Departments of Community Medicine, Clinical Pathology* and Obstetric & Gynecology**,** Faculty of Medicine, Al-Azhar University. dr_elmoselhy@hotmail.com	Full Text	44

ABSTRACT: Introduction: Pre-eclampsia (PE) is a multi-factorial and a multi-system disease. Selenium (Se) may be one of the disease causes. **Objectives**: The aim of this study was to find out the mean level of amniotic fluid selenium and the biochemical profile among the pre-eclamptic mothers and controls in Cairo, Egypt. **Subjects and methods**: A case-control, hospital based study design was used. All the cases and controls were examined laboratory. **Results**: The mean amniotic fluid Se level was lower among pre-eclamptic cases; total, mild and severe compared to controls with a statistically significant differences ($P=0.00$, 0.00 and 0.00, respectively). Further, the difference was statistically significant between mild and severe cases ($P=0.00$). Also, the mean hemoglobin level, mean hematocrit percent and mean platelet count were lower among pre-eclamptic cases compared to controls with statistically significant differences ($P=0.00$ for each of them). While; the mean lipid profile (except SHDL- cholesterol), mean liver enzymes levels, mean blood urea level, mean fasting blood glucose level and indicators of infections and/or inflammatory processes, mean total leucocytic count and mean C-reactive protein level were higher among pre-eclamptic mothers compared to controls with statistically significant differences ($P=0.00$ for each of them). On the other hand, the mean serum createnine level was higher among pre-eclamptic cases compared to controls with a statistically insignificant difference. Further, these differences were also present between the mild and severe PE cases. Lastly, the most important significantly correlated factors of severe PE were low amniotic fluid Se, high total leukocytic count, high fasting blood glucose and C-reactive protein levels ($P=0.01$, 0.02, 0.02, 0.03, respectively). **Recommendations**: Early ante-natal care, including health education, and treatment of pre-eclamptic women are recommended. Se supplementation may be a way to prevent PE. Population based studies are needed in different areas in Egypt on large number of pregnant women to determine their biochemical profile and to find out other possible trace element deficiencies that might be risk factors for PE.

Keywords: Amniotic Fluid Selenium; Maternal Eclamptic Women; Cairo; Egypt

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EFFECTS OF THIOPURINE S-METHYLTRANSFERASE GENETIC POLYMORPHISM ON MERCAPTOPURINE THERAPY IN PEDIATRIC ALL

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Abstract: Background: Mercaptopurine is one of the most important drugs used in cancer treatment. Its elimination depends mainly on the enzyme Thiopurine S-methyl Transferase (TPMT). A number of known genetic polymorphisms can affect the activity of this enzyme. **Aim of the work**: to study the pattern of TPMT polymorphisms in a cohort of Egyptian patients with ALL and its impact on response to therapy and toxicity. **Patients and methods**: the study included 52 low-risks pediatric ALL patients treated by (PNCI XIII LR Protocol). TPMT genotype was done for common mutations using polymerase chain reaction-based assays. Clinical follow-up, documentation of events, and 6-MP dose reductions were performed throughout the maintenance phase in a double blinded fashion. **Results:** TPMT genotyping showed that 40 patients (76.9%) have the wild type and 12 patients (23.1%) have the mutant type, two (3.85 %) of which were homozygous for G238C and ten were heterozygous (19.25%). TPMT mutant patients, especially homozygous, were at greater risk of 6-MP toxic effects and needed more frequent dose reductions. Mean duration of missed therapy was 50.250 weeks for the mutant patients vs. 25.825 weeks for wild-type patients (**P < 0.001**). **Conclusion:** TPMT heterozygous and homozygous patients require lower doses of 6-MP.These results justify performing TPMT genotyping before initiating 6-MP therapy in all children with ALL to minimize consequent toxicity through dose modifications.

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	[Sherif A Aboul Naga, Gamal T Ebid, Hisham M Fahmi, Manal F Zamzam, Hafez F Hafez and Azza M Kamel. **EFFECTS OF THIOPURINE S-METHYLTRANSFERASE GENETIC POLYMORPHISM ON MERCAPTOPURINE THERAPY IN PEDIATRIC ALL.** Journal of American Science 2011;7(5):337-346]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** Pharmacogenetics, Thiopurine S-methyl Transferase, TPMT, Mercaptopurine, 6-MP, Pediatric Acute Lymphoblastic Leukemia, ALL		
46	**Assessing of Adult Learning Principles** Ali Badragheh Department of Agricultural Extension Education, Garmsar Branch, Islamic Azad University, Garmsar, Iran *Corresponding author: badraghehali@yahoo.com **Abstract:** Transfer of learning is the result of training and is simply the ability to use the information taught in your program but in new settings and contexts. As with reinforcement, both types of transfer: positive and negative should be used in the program approach. Positive transference, like positive reinforcement, occurs when the learner uses the skill learnt in your program. It is very important for any learner's orientation to the new skills they develop that they can practice in their own situations. Using knowledge from financial literacy training to work out the best way to use (or not use) credit in their lives is an important tool that many participants could use immediately. Participants can check how much credit debt they have, what interest they are paying and what alternatives there may be. Negative transference, again like negative reinforcement, occurs when the learners applying the skill do not do what they are told not to do. This also results in a positive (desired) outcome. This means it's important to find out what the participants in your program have been using their new skills for. Check to see if they are applying the techniques properly or whether they have misunderstood a key aspect of the program. Once wrong information is absorbed and used again and again it simply becomes another bad habit that could make financial decision-making worse instead of better. [Mohammad Abedi, Ali Badragheh. **Assessing of Adult Learning Principles.** Journal of American Science 2011;7(5):347-353]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords**: adult education, Adult Learning	Full Text	46
47	**Principles of Adult Learning in agricultural education** Ali Badragheh Department of Agricultural Extension Education, Garmsar Branch, Islamic Azad University, Garmsar, Iran *Corresponding author: badraghehali@yahoo.com **Abstract:** As we know reinforcement is a very necessary part of any teaching/learning process. Through it, trainers encourage correct modes of behaviour and performance and discourage bad habits. Your program should use both reinforcement techniques throughout. Positive reinforcement is normally used when participants learn new skills. As implied, positive reinforcement is "good" and reinforces "good" (or positive) behaviour. Negative reinforcement is useful in trying to change bad habits or inappropriate modes of behaviour. The intention is extinction -- that is, the trainer uses negative reinforcement until the "bad" behaviour disappears or the learner understands why past practice is not beneficial to them. Examples could be ensuring participants always compare different rates of interest available to them before signing up for any new debt (a positive reinforcement) and not considering credit purchases that leave them with no income safety net for unforeseen circumstances (negative reinforcement). [Ali Badragheh, Mohammad Abedi. **Principles of Adult Learning in agricultural education.** Journal of American Science 2011;7(5):354-361]. (ISSN: 1545-1003). http://www.americanscience.org.	Full Text	47

Development Partnership in Practice: The Sawah Technology

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Abstract: This paper examines the process of technology development and dissemination with respect to sawah rice production. The term sawah refers to man-made environment for rice production that includes levelling and bunding of rice fields with inlet and outlet connecting irrigation and drainage. It has been hypothesized that sawah rice production technology holds the ace to the expected green revolution in West Africa as a yields of 5t/ha have been obtained. The process of sawah rice technology development and dissemination is exploring strategic synergy and partnership among Japanese institutions, research institutes, Ministry of agriculture, extension agencies, farmers groups, Millennium Village and Universities in Nigeria and Ghana which can be described as an emerging innovation system for rice production in West Africa. The partnership was empirically ascertained in terms of involvement, kind of involvement and intensity of involvement of the various stakeholders in the areas of joint problem identification (JPI), joint priority setting and planning (JPSP), collaborative professional activities (CPA), joint On- farm Adaptive Research (OFAR), dissemination of knowledge (DK), joint demonstration trials (JDTR), joint field days (JFD), joint seminar and workshop (JSW), evaluation survey (ES), and evaluation meeting (EM). A structure questionnaire was used to elicit information from a list activities identified among the stakeholders. Data collected were subjected to percentage distribution and one way analysis of variance to determine differences in the involvement of each of the actors. The results show varying degrees of involvement, types of involvement and different levels of intensity. While Japanese institutes are very prominent in funding and training, scientists and farmers are prominent in problem identification and joint demonstration trials. The implications of the results are discussed and pragmatic suggestions made for a proactive revamping of the process of technology development and dissemination for rice production in West Africa.

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Electrodeposition and characterization of Nickel from Gluconate baths in presence of Some Additives

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Abstract: Electrodepsition of nickel from solutions containing nickel sulfate, boric acid, ammonium sulfate and sodium gluconate on copper substrate has been investigated. The study dealt with the influence of bath composition, current density, pH and temperature on cathodic current efficiency as well as the effect of urea, aniline sulfate and chloramine B as additives on the corrosion behavior using Potetiodynamic polarization curve and morphology of the deposited nickel using scanning electron microscopy (SEM). The optimum conditions for producing nickel deposits from the free additives baths were: 0.2 mol/l $NiSO_4.6H_2O$, 0.2 mol/l sodium gluconate, boric acid 0.4 mol/l, ammonium sulfate 0.4 mol/l, pH 8,current density of 2.5 A/dm^2 and at 25 ^{0}C. The same conditions were used in the presence of

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additives, under these conditions the cathodic current efficiency was 96.5% which decreased sharply with increasing temperature. These coatings have high corrosion resistance in comparison with Cu-substrate. However the surface morphology of the deposits varies from spherical grain to columnar in the absence and presence of additives, respectively.

[ALI ELTOUM M. S., Baraka A. M, Hassan ELfatih. A. **Electrodeposition and characterization of Nickel from Gluconate baths in presence of Some Additives** Journal of American Science 2011;7(5):368-377]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Electrodeposition of nickel, copper substrates, additives, potentiodynamic polarization, cathodic current efficiency.

| 50 | ## Empowerment: An Approach for Development in Rural Areas of Iran | Full Text | 50 |

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Abstract: The main objective of this study provides a strategy for rural development. Empowerment of rural areas has emerged as an important issue in recent times. The economic empowerment of rural is being regarded these days as a sine-quo-non of progress for a country; hence, the issue of empowerment of rural areas is of paramount importance to community developers, social scientists and social reformers. Empowerment can enable the local people to participate in the economic, political and social sustainable development of the rural communities. The findings of this investigation can assist rural developers in the implementation of rural development strategies based on rural empowerment.

[Fatemeh Allahdadi, **Rural Empowerment: An Approach for Development in Rural Areas of Iran**. Journal of American Science 2011;7(5):378-381]. (ISSN: 1545-1003). http://www.americanscience.org.

| 51 | ## Noise Level of Two Types of Tractor and Health Effect on Drivers | Full Text | 51 |

Mansoor Behroozi Lar[1], Zahra Khodarahm Pour[2], Mehrzad Payandeh[3], Jahangir bagheri [4]

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Abstract: "Noise" or "unwanted sound" is one of the major sources of discomfort to the workers which affects human both psychologically and physically. The present investigation was conducted in Iran during the period from September to November 2010. The noise pollution caused by tractor and load were measured in open field with no obstruction and at the driver ear and by stander in accordance with NIOSHA standards. A ITM 399 (without cab) and Valtra T170 (with cab closed and open) and mold board plow and disk plow were used. Unloaded tractor noise was also measured. The data analyzed for different engine speed and gears. Results showed that the Sound Pressure Level (SPL) in the driver ear for the tractor without cab in all cases were more than NIOSH allowable 85 dB(A) criteria for eight hour of operation. The SPL of the tractor with open windows cab was also higher than the standards but lower than the tractor without cab. It was concluded that the driver should either stay on driving for less than 2 hours with tractors without cabin or open window cabin or the only best way, tractors should be equipped with factory made cabins. Even with the latter type of tractors, drivers should avoid opening the window very often for say checking the operation of the machinery behind the tractor or in case the air conditioner malfunctions.

[Mansoor Behroozi Lar, Zahra Khodarahm Pour, Mehrzad Payandeh, Jahangir Bagheri

	Moghadas. Noise Level of Two Types of Tractor and Health Effect on Drivers. Journal of American Science 2011;7(5):382-382]. (ISSN: 1545-1003). http://www.americanscience.org. **Keyword:** sound level, noise measurements, tractors, cabin, driver's ear		
52	**Review definitions and principles relating to Andragogy** [1] Mohammad Abedi, [2] Ali Badragheh [1,2] Department of Agricultural Extension and Education, Varamin Branch, Islamic Azad University, Varamin, Iran. *Corresponding author: abedi114@yahoo.com **Abstract:** Learners must retain what the program delivers to them in order to benefit from the learning. In order for participants to retain the information taught, they must see a meaning or purpose for that information. They must also understand and be able to interpret and apply the information in their own real life contexts. Understanding includes their ability to assign the correct degree of importance to the material and its application in the future. The amount of retention is always directly affected by the degree of original learning. In other words if the learners did not learn the material well initially, they will not retain it well either. Retention by the participants is directly affected by their amount of practice during the learning. After the students demonstrate they can apply new financial skills, they should be urged to practice in their own time and for their own personal needs to retain and maintain the desired performance. [Mohammad Abedi, Ali Badragheh. **Review definitions and principles relating to Andragogy.** Journal of American Science 2011;7(5):388-393]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords**: adult education, adult learning	Full Text	52
53	**Lateral Tarsal strip technique for correction of lower eyelid Ectropion.** Mohamed A. Marzouk* , Ayman A. Shouman , Ehab S.Elzakzouk and M.Tarek A.Elnaggar Research Institute of Ophthalmology – Giza – Egypt. *marrzouk@hotmail.com **Abstract: Purpose:** Lateral tarsal strip technique is a simple procedure that can be used in the presence of lateral canthal tendon laxity or malposition. The technique was used in this study on cases of involutional , paralytic, and cicatricial ectropion .The surgical outcome from different types of ectropion was compared and evaluated. **Patients and methods:** This retrospective study reviewed records of 30 patients who had undergone lateral tarsal strip from January-2008 to December-2010. All records were examined to determine the indication, management, outcome, postoperative complications and success rate. **Results:** A total of 17 males and 13 females made up the study groups. The mean age of the cohort was 59.15 +\- 6.2 yrs (range 4- 65 years).The average follow up was 24 weeks (6 months).The patients were divided into 3 groups:Group A: 10 patients with bilateral involutional ectropion (20 lids). Group B: 10 patients with unilateral paralytic ectropion (10 lids). Group C: 10 patients with cicatricial ectropion 9 unilateral and 1 bilateral (11 lids). Most common presenting feature was persistent tearing, which was seen in all patients, others included lid laxity, lagophthalmos and unacceptable cosmesis. Thirty-five lids obtained satisfactory correction of eyelid ectropion with a simple LTS surgical procedure, while six lids required additional intra operative ancillary procedures to correct the remaining skin laxity, scleral show and residual ectropion. Common ancillary procedures used were excision of skin and muscle strip, lateral tarsorraphy and scar revision in severe cicatricial ectropion. Good aesthetic and functional results were achieved in all cases.**Conclusions**: Lateral tarsal strip is a simple technique, which can be used in different types of eye lid ectropion. The technique is directed at correcting the anatomical defect, preserving the natural anatomy and maintaining the integrity of tear passage and outflow, rendering excellent cosmetic and functional results. The ancillary procedures used in our study are suggestive of a very specific role for lateral tarsal strip as a sole treatment in correcting various types of eyelid ectropion. [Mohamed A. Marzouk , Ayman A. Shouman, Ehab S.Elzakzouk and M.Tarek A.Elnaggar. **Lateral Tarsal strip technique for correction of lower eyelid Ectropion.** Journal of American Science	Full Text	53

54

Preferred Educational Strategies and Critical Thinking Dispositions among Nursing Students

Full Text

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Abstract: Thinking dispositions are characterological in nature, and like many human character traits, they develop in response to immersion in a particular cultural milieu. The cultural milieu that best teaches thinking dispositions is a culture of thinking environment that reinforces good thinking in a variety of explicit ways. The effective program for teaching thinking dispositions, therefore, should create a culture of thinking in the educational system. Critical thinking is a desirable outcome; so to develop and practice critical thinking; educators need to re-consider course content and curricular strategies used to develop critical thinking. The study aimed to determine nursing students' preferences of educational strategies and their critical thinking dispositions. This study was conducted at the Faculty of Nursing, University of Alexandria. The subjects of this study consisted of (50%) of the total number of students of each academic level comprising 630 students. The students' total score of critical thinking dispositions had significant relation with nine preferred educational strategies out of twenty four. They strongly preferred the following educational strategies: role play, demonstration, portfolio computer assisted instruction/e- learning and panel discussion. While they moderately preferred the following educational strategies: interactive lecture, case study, questioning and nursing round. Finally, they never preferred written assignment. Based on the finding of this study annual assessment of students' CTDs using the CCTDI is carried to select educational strategies that reinforce the positive dispositions and change the negative and ambivalent ones towards the positive inclination.

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Effects of strengthening adult education in agricultural development

Full Text

55

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Abstract: adult education in the local agricultural education program is an essential component of the "total" program. Offering adult education programs helps to keep farmers and agribusiness employees better informed of current trends and provides them with opportunities to learn new skills and improve existing ones. Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture. Adults in agriculture use a number of sources to gain new information that can be used to help them solve problems. Persons employed in agriculture utilize newspapers, magazines, newsletters, radio, television, government publications, internet, and meetings to gather information which can be directly utilized in their business activities. In many communities, the agriculture teacher is the primary source of agricultural information.

56	**Evaluation of Canopy Cover of Street Trees in Urban Forests Using by Satellite Data** Seyed Armin Hashemi Department of Forestry, Lahijan Branch, Islamic Azad University, Iran. hashemi@iau-lahijan.ac.ir **Abstract:** Information on structure of city forest such as species composition and canopy cover density is a prerequisite for planning, design and management of vegetation in cities in local and regional scale. For this purpose in present study, different inventory methods Including 100% inventory by using 20meters transects and aerial images (1:8000 scale) and spot satellite image were compared for evaluating canopy cover surface of street trees with 1 kilometer length is Sep2009 , to develop an optimum and suitable method to evaluate canopy cover of these trees. In 100% inventory considered as the basis for comparing with various methods, canopy surface of these trees was calculated in each 15m transect. Results of paired –T test indicated that results of 100% inventory and aerial photos ($p = 0.52$, $t = 0.809$, $df = 23$) and satellite image ($p = 0.48$, $t = 0.847$, $df = 23$) don't differ significantly. Regression results indicated that using aerial images ($R^2 = 0.92$) and spot images ($R^2 = 0.89$) is relevant to evaluate street trees canopy cover. [Seyed Armin Hashemi, Department of Forestry, Lahijan Branch ,Islamic Azad University, Lahijan, Iran. Journal of American Science 2011;7(5):423-426]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** canopy cover, street trees, inventory, aerial photograph, spot images.	Full Text	56
57	**Anionic Schiff Base Amphiphiles: Synthesis, Surface, Biocidal and Antitumor Activities** **Nihal O. Shaker; [*]Fatma H. Abd El-Salam; Bahyia M.El-Sadek; Eman M. Kandeel and Sharbat A. Baker** Chemistry Department, Faculty of Science (girl's branch), Al-Azhar University, Nasr City, Cairo, Egypt, B.O. 11754. [*]prof_drfatma@yahoo.com **Abstract:** A series of anionic surfactants containing schiff base group was synthesized and their chemical structures were confirmed using elemental analyses, FTIR, ^{1}H-NMR, and mass spectroscopy. The surface activities of these amphiphiles were determined based on the data of surface and interfacial tensions. Thermodynamics of adsorption and micellization processes of these surfactants in their solutions were also calculated. It was found that these compounds have tendency towards adsorption at the interface and also micelle formation at lower concentrations. Also, these schiff bases amphiphiles have been evaluated for their biocidal activity against bacterial and fungi species and their antitumor activity against three human tumor cells such as $HEPG_2$ (liver), HCF_7 (breast) and HCT116 (colon). [Nihal O. Shaker; Fatma H. Abd El-Salam; Bahyia M.El-Sadek; Eman M. Kandeel and Sharbat A. Baker Anionic Schiff Base Amphiphiles: Synthesis, Surface, Biocidal and Antitumor Activities. Journal of American Science 2011;7(5):427-436]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Schiff base amphiphiles; surface activity, biocidal activity; antitumor activity; potent action.	Full Text	57
58	**The study of relation between biodiversity indices of woody species and growing stock in natural forest stands** Seyed Armin Hashemi [1] [1.] Department of Forestry, Lahijan Branch, Islamic Azad University, Lahijan, Iran. hashemi@iau-lahijan.ac.ir **Abstract:** In order to determine the relationship between diversity indices of woody species and growing stock per hectare in natural beech (*Fugus orientalis Lipsky*) Forests, Twenty sites specially at middle	Full Text	58

	elevations were studied including three plots per each site . The dimension of each plot was 50 ×100 meters. The method of surveying was selective sampling. Results indicated there are positive linear regression between the biodiversity indices and growing stock per hectare. The best equation were obtained from the relationship between Brillouin index and growing stock per hectare(r =0.95). **Key words:** Biodiversity indices of woody species , Growing stock , Beech , Natural forest stands		
59	Gene Action Studies of Different Traits in Maize (*Zea mays* L.) Under Heat stress and Normal Conditions Zahra Khodarahmpour Assistant Professor of Department of Agronomy and Plant Breeding, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran Zahra_khodarahm@yahoo.com **Abstract:** The present study was carried out to determine the type of gene action, genetic parameters of yield and other quantitative traits by crossing eight diverse maize inbred lines in partial diallel fashion. Seeds of F_1 population along with their parents were evaluated in year 2010 in Shoushtar City (Khuzestan province in Iran) using a randomized complete block design with three replications. Genotypes planted at two dates, 6 July (to coincide heat stress with pollination time and grain filling period) and 27 July (as normal planting). Estimation gene effects and some of genetic parameters and graphic plot drawing to Hayman – Jinks method revealed statistics a and b significant for all traits in two conditions. Considering the average dominance degree and Hayman graphical plot, dominant effects for hektolitr weight trait under heat stress condition and for grain yield under normal condition, over dominance as well as partial dominance for other traits, were revealed. **Key words**: Maize; heat stress; genetic parameters; grafic plot	Full Text	59
60	Genetic Analysis of Yield and Qualitative Traits in Maize (*Zea mays* L.) Under Heat stress and Normal Conditions Zahra Khodarahmpour Assistant Professor of Department of Agronomy and Plant Breeding, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran Zahra_khodarahm@yahoo.com Abstract: The present study was carried out to determine the type of gene action and genetic parameters of yield and qualitative traits by crossing eight diverse maize inbred lines in partial diallel fashion. Seeds of F_1 population along with their parents were evaluated in year 2010 in Shoushtar City (Khuzestan province in Iran) using a RCBD with 3 replications. Inbred lines and hybrids planted in two separate experiment at two dates, 6 July (to coincide heat stress with pollination time and grain filling period) and 27 July (as normal planting). Diallel analysis to Griffing᾿s method 4 and model II were performed. Also estimation gene effects and some of genetic parameters to Hayman – Jinks method revealed. Grain yield in stress condition of the highest ratio GCA/SCA was enjoyed that show additive effect role important. But; other traits of ratio GCA/SCA low were enjoyed. Hybrid K18×K166B of positive and significantly combining in two conditions for grain yield were enjoyed. Analysis of variance of F_1 data showed significant differences for statistics a and b, suggesting the presence of both additive and	Full Text	60

dominance genetic effects in the expression of all traits. The average dominance degree for grain yield trait under normal condition and grain protein percent in heat stress, over dominance as well as partial dominance for other traits, were revealed.

| 61 | **Introduction the medicinal species of *Asteraceae* family in Ilkhji region and Sharafaldin regions of Esat Azarbaijan in Iran** | Full Text | 61 |

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Abstract: As medicinal plants are suitable alternatives for synthetic and chemical drugs (Idu and Osemwegie) also because of medical and nutritional importance and valuable protein contents of Asteraceae species, all plants of *Asteraceae* family are collected in Ilkhji and sharafaldin regions during growth seasons of 2007-2009. Plants were collected in 2 regions according to the classical method of regional floristical studies. Collected plants were recognized by valid references (Parsa and Reshinger). Then medical species are chosen by using pharmacopeias. The results of the current study demonstrated that at Ilkhji region 31 species belong to 24 genuses and at Sharafaldin region 25 species belong to 20 genuses that all of them belong to Asteraceae family. Among these species, 19 species at Ilkhji and sharafaldin region had medicinal properties. Medicinal species of these 2 regions consist of: Achillea tenuifolia, Achillea vermicularis, Achillea millefolium, Arctium lappa, Acroptilon repens, Cardus pycnocephalus, Carthamus oxyacantha, Centaurea aggregate, Cichorium intybus, Cirsium ravens, Cnicus benedictus, Cousinia calcitrapa ,Lactuca scarioloides, Lactuca serriola, Onopordon leptolepis, Senecio mollis, Sonchus oleraceus, Tragopogon marginatus, Xanthium spinosum. The results of this study showed that the region has a great potential for producing respective medicinal plants species belong to those families. Medicinal plants recently become more important because of their medicinal uses and in addition they are valuable source of protein.

| 62 | **Manifestation of Existential Issues As a Brilliant Function for Quality of Matrimony** | Full Text | 62 |

Seyed Mohammad Kalantarkousheh[1], Siti Aishah Hassan[2], Rusnani Abdul Kadir[2], Mansor Abu Talib [2]

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Abstract: There are some important issues in marital counselling which are discoursed in Existential thought. These issues are freedom, time, human communication, meaning of life, and anxiety, which are shared by the existential counsellors and philosophers. Even though there are full potentials of the existential issues to be applied during counselling sessions, most of them are ignored by couple counsellors. The purpose of this article is to highlight these issues as the key concepts in four different counselling theories of Existential thought. We found that, each theory used only certain issues as the key concepts. Therefore, this study gathers all of the applied existential issues for a future comprehensive marital counselling model. Applying these issues together seems to be a brilliant function for quality of matrimony.   Journal   of   American   Science   2011;7(5):459-465].   (ISSN: 1545-1003).

63	**Verbal Abuse and Coping Behaviors Directed to Operating Room Nursing Staff at University Hospitals** Hala A. Abdou Nursing Administration Dept. Faculty of Nursing, Alexandria University, Egypt h_abdou_eg@yahoo.com **Abstract:** Verbal abuse is a most common form of workplace violence in the operating room settings. It affects operating room nurses personally and professionally. Such effects have a major implication for nursing profession in term of retention, satisfaction, and quality of care. So, the occurrence of verbal abuse depends on a great extent of coping behaviors among nurses working in the operating room environment. Thus this study aimed to determine the relationship between verbal abuse and coping behaviors directed at operating room nursing staff at university hospitals. This study was conducted in all operating room (n = 65) in five major governmental hospitals affiliated to University hospitals, Egypt. The subjects consisted of 206 operating room nursing staff categorized into operating room head nurses (n=16) and operating room nurses (n=190) working in the above mentioned settings. The participants completed a questionnaire includes the verbal abuse scale (VAS) , this questionnaire consisted of a five section related to frequency and stressfulness of incidence of verbal abuse , strength of feeling, similarity of thought, severity of long term negative effects, and coping behaviors. The finding of this study shows that 40% of operating room nursing staff reported that they had been abused by surgeons followed by another nurses 27.7%. The average number of reported incidents during the year was at least once a month or less episodes of verbal abuse. Judging and criticizing, abusive anger as well as blocking and diversity were the most frequent and stressful forms of verbal abuse. The most severe, long term effect of verbal abuse was reported to be its impacts on the physical health, relationship with other nurses as well as patient care outcomes. Threatened was the most intense of emotional reactions, indifferent and frustration. In addition the operating room nursing staff identified with a variety of adaptive and maladaptive coping behaviors and rated the similarity and effectiveness of these coping behaviors in responses to verbally abusive episodes. Conclusion, the need of nursing administrators for empowering operating room nurses to develop the formal protocols for adequately supported dealing with and prevent incidence of verbal abuse from surgeons against them. Also, training of nursing personnel is an essential element of effective verbal abuse prevention program. [Hala A. Abdou. **Verbal Abuse and Coping Behaviors Directed to Operating Room Nursing Staff at University Hospitals.** Journal of American Science 2011;7(5):466-476]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** Operating suites, surgeons, incidence of verbal abuse, similarity and effectiveness of coping behaviors	Full Text	63
64	**Socio-demographic Determinants of Rubella Vaccine Uptake by Egyptian University Students Attended a Catch-up Vaccination Campaign** **Ghada F. El-Sharkawy** Public Health & Community Medicine Department, Faculty of Medicine, Zagazig University, Egypt ghada_el_sharkawy@hotmail.com **Abstract:** Rubella immunization of susceptible persons is the best strategy to prevent all cases of congenital rubella syndrome. In November-December 2008, university students were included -for the first time in Egypt - in a mass campaign for measles-rubella vaccination. However, their rate of vaccine uptake and its determinants were not explored enough. So, a cross sectional study was conducted to compare the university students' vaccine uptake by their socio-demographic characteristics and their knowledge and to identify motivating and de-motivating factors. Findings revealed vaccine uptake by 64.8% of the sample;	Full Text	64

significantly higher among younger students, who heard about the campaign and who knew its aim. Among the total sample, a high level of awareness was found in knowledge about rubella name, its hazards, suitable age for vaccination and hearing about the campaign while lower awareness level was found in knowing susceptible groups and campaign's aim. Being from a governorate other than that of the university is the significant factor for low hearing about the campaign while being a female and being an urban resident were the significant factors for low knowledge of the campaign's aim. Reported motivating factors for compliance were; knowing rubella hazards and the national aim and encouragement by family & friends while de-motivating factors were insufficiency of information, lack of trust in government and previous vaccination. In conclusion, rubella vaccine uptake by university students can be increased by more advertisement especially among older, female, urban and from other governorates students in addition to trust building and motivation.

[Ghada F. El-Sharkawy. Socio-demographic Determinants of Rubella Vaccine Uptake by Egyptian University Students Attended a Catch-up Vaccination Campaign. Journal of American Science 2011;7(5):477-484]. (ISSN: 1545-1003). http://www.americanscience.org.

Key wards: Rubella vaccination- Compliance- Campaign – Socio demographic determinants - University students - Egypt

| 65 | Optimization of Bio-Fuel Production by *Saccharomyces cerevisiae* Isolated from Sugar Cane Bagasse | Full Text | 65 |

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Abstract: Twenty yeast isolates were tested for ethanol productivity, *Saccharomyces cerevisiae* isolated from sugar cane bagasse was the potent producer. Fresh *Saccharomyces cerevisiae* was grown overnight on YEPD medium and was tested to determine the optimum conditions for both biomass and ethanol production. The maximum production of ethanol was obtained at 30°C, pH 6, 35% sugar cane molasses as fermentation medium, 1% corn steep liquor, 1ml of 1 O.D. YEPD broth and shaking at 200 rpm. Different microelements also were tested.

[Osman, M.E., Khattab, O.H., Hammad, I.A., El-Hussieny, N.I. Optimization of Bio-Fuel Production by *Saccharomyces cerevisiae* Isolated from Sugar Cane Bagasse. Journal of American Science 2011;7(5):485-492]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Optimization; Bio-Fuel Production; *Saccharomyces cerevisiae;* Sugar Cane Bagasse

| 66 | **Effect of Calcium chloride and Gibberellic acid on storability of "Succary Abiad" mango fruits under cold storage** | Full Text | 66 |

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ABSTRACT: This study was carried out in two successive seasons (2007 and 2008) on Succary Abiad cv. mango trees grown in Abou Swear region, Ismailia Governorate, Egypt. The trees were 30-year-old, planted at 7×7 meters apart. Fruits storability was improved by CaCl2 or GA3 treatments under cold storage. Fruit weight declined starting from the first week of cold storage up to the end of storage period. GA_3 40 ppm dipping treatment showed the lowest fruit weight loss in the two seasons. The fruit pulp percentage gradually decreased as the storage periods elongated. Fruits from $CaCl_2$ 2% dipping showed the highest fruit pulp percentage compared with the control fruits. Fruit firmness was the highest in fruits treated with $CaCl_2$ 2% sprayed at two months after full bloom or dipping after harvesting. Moreover, SSC increased gradually up to the end of storage periods. While, titratable acidity in the fruits showed gradually decreasing up to the end of storage periods as compared with its values at the beginning of storage. The

	fruit SSC/acid ratios showed gradually increasing in its values higher than at zero time storage. Total sugars in the fruits increased as the storage period elongated to reach its maximum values at the end of storage period. [Wahdan, M. T., Habib, S. E., Bassal, M. A. And Qaoud, E. M. **Effect of Calcium chloride and Gibberellic acid on storability of "Succary Abiad" mango fruits under cold storage**. Journal of American Science 2011;493-501]. (ISSN: 1545-1003). http://www.americanscience.org **Key words:** Mango, $CaCl_2$, GA_3, fruit quality, cold storage		
67	**Role of Bacterial Treatments for Upgrading Nutritive Value of Bean Straw and Native Goats Performance** **Abd El-Galil[1], Etab, R. and Ebtehag, I. M. Abou-Elenin[*2]** [1]Department of Animal Production, Faculty of Agric. Ain Shams University, Egypt [2]Department of Animal Nutrition, Animal Production Research Institute (APRI), P .O. Box 443, Nadi El-Said St., Dokki, Giza. [*]eabouelenin@hotmail.com **Abstract:** Twenty baladi kids (16.20 ±0.52 kg; four months age) were divided into four equal groups (five animals each). The animals were randomly assigned using a complete randomize design to receive one of the four rations for 90 days. All animals fed 50% concentrate feed mixture plus one of the roughages as follows: 50% rice straw (R1), 50% untreated bean straw (R2), 50% bean straw treated with *Bacillus sp.* (R3) and 50% bean straw treated with *Ruminococcus albus* (R4). Four digestion trails were carried out using metabolic cages to determine nutrients digestibility and feeding values. In addition, some rumen and blood parameters of experimental rations were determined. Data obtained revealed that treated bean straw with *Ruminococcus albus* (R4) was the highest CP and the lowest value of CF, ADF, ADL and cellulose. No significant differences were observed in total dry matter intake DMI **(kg/ h/d)** among R2, R3 and R4. Total gain, average daily gain (ADG) and feed efficiency (kg gain/kg DMI) were significantly ($P<0.05$) higher for R4 and R3 followed with R2 then R1. Bean straw treated with *Bacillus sp*. Or *Ruminococcus albus* had significantly ($P<0.05$) higher digestibilities of OM, CP, CF, EE, NFE, NDF, ADF and cellulose % than bean straw without treatment (R1) or control ration (R1). Total digestible nutrient (TDN) and digestible crude protein (DCP) had significantly ($P<0.05$) higher values for R4 (67.76% and 10.32%) and R3 (66.88% and 10.05%) than those of R2 (63.55% and 7.28%) then R1 (62.15% and 5.36%), respectively. Total volatile fatty acids (TVFA's) mean value and blood total protein for R4 was significantly higher (12.97 m.equ./100ml and 12.07 mg/100ml, respectively) than that of R3 then R2, and the lowest value was observed with R1. Further more, rumen ammonia NH_3-N (13.95mg/100ml) and blood plasma urea (10.63 mg/100ml) were recorded significant higher values ($P<0.05$) for R4 and R3 than those of R2 and R1, while creatinine had no significant differences among all treatments. It was concluded that treatment of 50% bean straw treated with bacteria (*Ruminococcus or Bacillus)* improved its nutrient digestibility, ADG, and feed efficiency. [Abd El-Galil, Etab, R. and Ebtehag, I. M. Abou-Elenin. Role of Bacterial Treatments for Upgrading Nutritive Value of Bean Straw and Native Goats Performance. Journal of American Science 2011;7(5):502-510]. (ISSN: 1545-1003). http://www.americanscience.org. **Key words:** bean straw, biological treatments, feeding values, performance, goats	Full Text	67
68	**Fungal occurrence in physic nut *((Jatropha curcas)* seeds during storage and possibility aflatoxin production by *Aspergillus flavs* and *Aspergillus paraziticus* isolates.** **Ahmed F. Sahab[1], Soher E. Aly[2], Lobna S. Nawar[3] and Sawsan Y. El-Faham[4]** 1Plant Pathology Dept., N. R. C., Dokki, Cairo, Egypt 2Food Toxicology &Contaminants Dept., N. R. C., Dokki, Cairo, Egypt 3Biology Dep., Fac. of Science, King Abd El-Aziz Univ., Jeddah, Saudi Arabia. 4Food Tech. Dept., N. R. C., Dokki, Cairo, Egypt **Corresponding author: ahmedsahab2002@yahoo.co.uk**	Full Text	68

Abstract: The aims of the current study were to determine the seed quality of *J. curcas* of peeled and non peeled nut during storage and the capability of *Aspergillus flavus* and *Aspergillus paraziticus* isolates to produce aflatoxin. Seeds of peeled or non peeled nuts stored for one year and the recent collected seeds of non peeled nut were contaminated with fungi with an average of 37.8% on PDA medium and with an average of 48.9% on Czapek's agar medium. The percentage of fungal infection was higher in seeds stored for one year than in the seeds of the other two sources of non peeled nuts. The obtained results also showed that the number of fungi as cfu per seed was ranged from 0.8 to 6.7cfu/seed with an average of 2.93 and 3.3 cfu/seed on PDA and salt Czapek's agar media respectively. Twelve species which belong to seven genera were detected and they were classified as, *Alternaria tenuis* (11.03%), *A. flavus* (11.77%), *A. niger* (9.77%), *A. paraziticus* (2.05%), *A. terreus* (3.05%), *Fusarium* spp. (22.13%), *Mucor* spp. (6.20%), *Penicillium* spp. (11.03%), *Rhizopus* spp. (8.73%) and *Rhizoctonia solani* (11.87 %). Among the so called storage fungi, *Aspergillus* spp. was the most dominant fungi occurred in highest frequent (30.16%), beside the field fungi (damping –off, root rot and wilt pathogens), i.e., *Fusarium* spp and *Rhizoctonia solani* were also found in high frequencies. The current data showed that the highest percentage of contamination with *A. flavus* was detected in seeds of non peeled nut stored for one year (12.5%) followed by seeds of recent collected non peeled nut (12.1%), while *A. Paraziticus* were detected only in seeds of recently collected of non peeled nut by 6.1%. 62. Percentae of *A. flavus* isolates had a higher ability to produce aflatoxin B_1 with maximal level reached to 20.6μg /100ml, while 60.0% isolates of *A. paraziticus* were able to produce aflatoxin in lower level than *A. flavus,* where the maximum level reached to 17.2μg /100ml.
[Ahmed F. Sahab, Soher E. Aly Lobna S. Nawar, and Sawsan Y. El-Faham. Fungal occurrence in physic nut ((Jatropha curcas) seeds during storage and possibility aflatoxin production by Aspergillus flavs and Aspergillus paraziticus isolates. Journal of American Science 2011;7(5):511-516]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: physic nut, seedborne fungi, aflatoxin, biodiesel, frequency occurrence

Full Text

Microbiological evaluation of Egyptian white soft cheeses style

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Abstract: A total of 70 samples of the Egyptian white soft cheese style, different varieties, (30 samples of Domiati , 15 samples of Tallaga , 10 samples of Feta and 15 samples of Kariesh) were collected from Cairo & Giza governorate markets and microbiologically examined as well as the presence of mycotoxins .Aerobic colony bacterial counts (ACC) and molds & yeasts counts (M/YC) revealed that there are clear differences between the cheese varieties. Coliform group and *Escherichia coli* as fecal indicator contamination were implicated in 50 and 24 % of the retailed white soft cheese samples, respectively. The pathogenic *E.coli* O157H7 has been isolated from 19% of the total samples. Also, *Salmonella spp*, has been only isolated from Domiati and Tallaga cheese varieties in 3 and 7 % of the samples, respectively. Meanwhile, the other enteric gram negative foodborne bacteria as *Proteus spp*, *Pseudomonas* spp and *Citrobacter spp* have been isolated from all samples in an average of 24 % .Gram positive bacteria as *staphylococcus aureus, Bacillus cereus* and *Listeria monocytogenes* were isolated from different Egyptian varieties of white soft cheese in rates of 25.7, 11.4 and 14.2% respectively. Therefore, the presences of these pathogens in 26% of the total white soft cheese samples were not accepted according to the Egyptian standard (ES) 1008-2000. *Campylobacter jejuni* was not found in any of the Egyptian white soft cheese style.The other part of study was to apply new methods as Food system (FS) kit, a rapid microbiological test which revealed complete compatibility with the conventional methods (CM) for mold and yeast and most likely for *Salmonella spp*. For the gram positive bacteria, FS test results revealed a relatively lower incidence percentages than the CM. According to the microbiological specifications of the ES 1008-2000, most of Domiati and Kariesh samples were not comply with the ES due to one or more of criterion, 80 and 86.6 % of samples, respectively. Totally , 28.6 % of the Egyptian style white soft cheese were accepted and meet the ES 1008-2000 , using the microbiological conventional methods .While using FS kit test as a rapid method , results revealed 73.3 % of the tested samples (35 sample) did not meet the ES due to mold

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and yeast similar to that found by CM. Contrarily. However, FS test for the other ES specifications as *Listeria monocytogenes*, the presence of pathogenic bacteria as *S. aureus ,B. cereus* and *Salmonella spp* , results were near but lower than obtained by CM. Thus, the deficiency the FS test is due to the lack of counts and coliform not set up, and subsequently the test is not highly recommended for compromising cheese samples with the ES. Aflatoxin M_1, presence was studied in the same 70 samples of the Egyptian style white soft cheese retailed in great Cairo and Giza markets. Results revealed that 4 out of 15 Kariesh , 7 out of 30 Domiati , 3 out of 15 Tallaga and 2 out of 10 Feta cheese samples were positive for the presence of aflatoxin M1 . The highest and lowest aflatoxin concentrations were 0.4 to 0.1 microgram / kilogram of the cheese.

[M.A El Sayed., Hosny I.M., El Kholy W.I., R.K. El Dairouty and Sahar H. S Mohamed. **Microbiological evaluation of Egyptian white soft cheeses style.** Journal of American Science 2011;7(5):517-526]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: soft cheeses; Microbiological; mycotoxins; *Escherichia coli*

Microbiological quality of different varieties of Ready to Eat Foods retailed in Cairo area

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Full Text

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Abstract: One hundred and thirty five different predefined / reference strains of mold, yeast and foodborne pathogens were recovered by FS kits to check up the reliability of the kits to be used as a rapid test for ready to eat different foods. A total of one hundred sixty five samples of ready to eat foods (meat, carbohydrate, savory, salad, dairy) were collected from Cairo area restaurants and take away shops and were tested microbiologically by the conventional (CM) and FS (RM) methods. Microbiological analysis encompassed the pathogenic food borne bacteria and other microbiological criteria determining food safety and according to Communicable Disease and Public Health CDPH, 2000. The results of FS test were reliable for different varieties of ready to eat foods as a rapid method with the conventional methods for detecting foodborne microorganisms. The microbiological analysis revealed that the worst the quality was due to salad foods 70%, then cheese samples 40%, meat different categories 30%, and carbohydrate foods 15% fit out the CDPH, 2000. The main etiologies were due to the presence and high levels of Enterobacteriaceae members and the pathogens of *Salmonella spp*, *E. coli O157H7*, *S. aureus*, *B. cereus* and *L. monocytogenes*.

[Hosny I.M ,W.I. El Kholy, R.K. El Dairouty, M.A. El Shenawy and Sahar H. Salah. **Microbiological quality of different varieties of Ready to Eat Foods retailed in Cairo area.** Journal of American Science 2011;7(5):527-536]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: microbiologically; Enterobacteriaceae; *Salmonella spp,*; *E. coli O157H7*, *S. aureus*, *B. cereus*

The Effect of Calcium Nitrite on the Electrochemical Characterization of 3003 Aluminum Alloys in Sea Water

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Full Text

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Abstract: The electrochemical behavior of 3003 aluminum alloys with calcium nitride in sea water was tested using electrochemical techniques. It was found that calcium nitride can be used as an inhibitor to protect the 3003 aluminum alloy from corrosion in sea water, if used with a specific volume. Cyclic polarization testing was conducted to investigate the corrosion behavior of the 3003 aluminum alloys at different calcium nitride volumes. The studies showed that at high volumes (13 ml and up of calcium to 250 ml of sea water) or low volumes (1-7 ml of the calcium nitride 10 250 ml of sea water), the 3003 aluminum alloy has higher susceptibility to corrosion. When 8ml of the inhibitor used a noticeable difference was observed. Passivation was clear from the cyclic polarization curves. In addition to the

	cyclic polarization testing, SEM was used to study the surface of the alloys after being exposed to different volumes of calcium nitride. The results were matched. [H.Mogawer and R.Brown. **The Effect of Calcium Nitrite on the Electrochemical Characterization of 3003 Aluminum Alloys in Sea Water.** Journal of American Science 2011;7(5):537-541]. (ISSN: 1545-1003). http://www.americanscience.org. Keywords: Effect; Calcium Nitrite; Electrochemical Characterization; Aluminum Alloys; Sea Water		
72	**Importance of Micro-Credits for Rural Women** [1] Khatereh siyar, [2] Zahra Geraeli Afra [1, 2] Department of Agricultural Economic, Islamic Azad University, Qaemshahr Branch, Iran *Corresponding author: khaterehsiyar@yahoo.com **Abstract:** Women's agriculture activities in villages of Iran in three sections of recent history of rural improvement have been affected by developmental factors. Before land reforms (1962), according to conventional laws in Iran, women were kept apart from having farm lands. According to customs, if farmer was farming in farm system and also if he had large farms so he must used his family workforce (especially woman workforce), but if it was small, he used to work at other's fields for wage. In many cases, women had to work at other parts. Before land reforms and because of being traditional of instruments and production tools, using women's roles was often in conservation and harvesting. While cultivating, most of picking cotton, was done by women, exclusively. In same period (before 1962), women roles was remarkable in cultivating rice. While plowing and preparing fields, they took part in third time trowel, also they had significant role in preparing natural fertilizer. [Khatereh siyar, Zahra Geraeli Afra. **Importance of Micro-Credits for Rural Women.** Journal of American Science 2011;7(5):542-546]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** women, rural, credit, empowerment	Full Text	72
73	**Role of rural women in rural economy** [1] Ali Badragheh, [2] Mohammad Abedi [1, 2] Department of Agricultural Extension and Education, Varamin Branch, Islamic Azad University, Varamin, Iran *Corresponding author: abedi114@yahoo.com **Abstract:** rural women are great part of workforce, needed for agriculture and rural societies. In 1966, according to F.A.O reports to food security congress, women doing 50% of productions in agriculture part averagely and this issue in developing country has very special importance. in African desert area about 70-80%, Asia 65%, in Latin America 45% and Caribbean and in Tunes 89% of workforces are women (Varzgar 2001:217) and in Iran more than 50% of agriculture workforce are women . Most rural women's service work, pertain to out of house. For example: rural women not only traditionally strive for environmental protection, they also take part in maintaining forest, plant cultivation and weeding in rural regions. [Ali Badragheh, Mohammad Abedi. **Role of rural women in rural economy.** Journal of American Science 2011;7(5):547-551]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** women, rural, credit, empowerment	Full Text	73
74	**Associative Effect of the Rhizobacteria *Streptomyces Chibaensis* and Commercial Biofertilizers on the Growth, Yield and Nutritional Value of *Vicia Faba*** Maha A. Hewedy Botany Department, Women's College for Arts, Sciences and Education Ain Shams University, Heliopolis,	Full Text	74

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Abstract: A pot experiment was done to investigate the effect of the commercial biofertilizers Biogen (B) and Potassiomage (PG) as well as the rhizobacteria *Streptomyces chibaensis* on the growth of faba bean (*Vicia faba* CV Giza 843). The experiment was done through two successive growing seasons (2008-2009, 2009-2010). In the first season, three different doses of each inoculant were used to select the profitable dose while in the second growing season 2009-2010 the co-inoculation of the three profitable doses were used as inoculant for faba bean seeds. Data was illustrated as growth, yield parameters, seed content of minerals (N, P, K), protein, vitamins (ascorbic acid, riboflavin and thiamin) and carbohydrates were estimated by applying the co-inoculant of the three biofertilizers. The highest values of all these items were obtained from the application of the Biogen + *S. chibaensis* followed by Potassiomage+ *S. chibaensis*
[Maha A. Hewedy. **Associative Effect of the Rhizobacteria *Streptomyces Chibaensis* and Commercial Biofertilizers on the Growth, Yield and Nutritional Value of *Vicia Faba***. Journal of American Science 2011;7(5):552-559]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: biofertilizers, *Vicia faba*, PGPR

	Average stem biomass of SANGUISORBA MINOR in Shanjan Rangelands, East Azerbaijan, Iran	Full Text	

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Abstract: Plants can be used for animal grazing, in wind erosion control, to reduce water flow rates, and to increase evaporation and transpiration. In the NW of Iran (East Azerbaijan Province), rangelands previously used to animal grazing were changed to agricultural land use; this vegetation is unsuitable vegetation coverage. We studied SANGUISORBA MINOR to determine its stem biomass characteristics. Data were collected using an accidental sampling methodology (1*1 m). In total, 8 plots were identify and 40 samples were collected for this research. In the minimum, maximum and mean stem biomass for this plant were found to me 4.5, 16.5 and 8.5 g, respectively.
[Ghassem HABIBI BIBALANI. **Average stem biomass of SANGUISORBA MINOR in Shanjan Rangelands, East Azerbaijan, Iran.** Journal of American Science 2011;7(5):560-563]. (ISSN: 1545-1003). http://www.americanscience.org.

Keyword: SANGUISORBA MINOR , Iran, Rangeland, stem Biomass.

75 (row number, left column); 75 (right column)

	Applications of the Policy Analysis Matrix in Iranian Bottled Drinking Water Factory: The Case study, Sistan & Baluchestan Region, Iran	Full Text	

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Abstract: In this study the comparative advantage of bottled drinking water production in Sistan and Baluchestan province was investigated using DRC index and policy analysis matrix (PAM) in 2009. Data was collected from the site of External Trade Statistics Yearbook, FAO and annual foreign trade database. The Nominal protection coefficient showed that there was an indirect tax on producers in all sectors. The NSP index was positive in all regions. Result supports this idea that Sistan and Baluchestan has comparative advantage in bottled drinking water production. When yield increase and production cost decrease, bottled drinking water production is usefulness in Sistan and Baluchestan province.
[Alireza Karbasi, Fatemeh Rastegaripour, Abolfazl Tavassoli, Ebrahim Amiri. Applications of the Policy Analysis Matrix in Iranian Bottled Drinking Water Factory: The Case study, Sistan & Baluchestan Region,

76 (row number, left column); 76 (right column)

	Bone and lipid profile changes in anandamide injected and high fat fed rats **Mai M .Hasan[*1] and Dalia M. Abd- Elmotteleb[2]** [1]Department of physiology, [2] Department of pharmacology, Faculty of Medicine Zagazig University mmjewefel@zu.edu.eg **Abstract:** Background: Endocannabinoid system has recently attracted the attention not only for the physiological functions, but also for the promising therapeutic potentials as drugs. Bone has been identified as major target for endocannabinoids in which anandamide and 2-arachidonoylglycerol are present at high levels. Also, obesity represents a risk factor for many health disorders including cardiovascular disease, diabetes and cancer. Aim: to explore the effect of high fat diet and anandamide on lipid profile and bone in normal and high fat fed rats. Design: A total number of forty healthy, adult, male albino rats were divided into 4 equal groups each (n=10): Group I: lean control group, Group II: lean injected group, injected with anandamide (0.02 mg/kg i.p., daily for 2 weeks), Group III: high fat-fed group(high fat diet control group) fed with (58% fat) for 12 weeks and Group IV: high fat-fed injected group fed with (58% fat) for12 weeks and then injected with anandamide (0.02 mg/kg i.p., daily for 2 weeks) , in all groups initial body weight, final body weight, cholesterol, triglycerides, high density lipoproteins, serum calcium, serum phosphate, serum alkaline phosphatase, dry femur weight, ash weight, bone calcium content, bone phosphorus content were measured and histopathological studies for bone sections were done. Results: high fat diet fed rats showed significant increase in final body weight, total cholesterol (TC), triglycerides (TG), alkaline phosphatase activity, dry and ash femur weight, as well as significant decrease in serum level of high density lipoproteins (HDL), bone calcium and phosphorus content and corrected dry and ash femur in comparison to lean control group. While, anandamide injected groups (lean and high fat fed) showed significant increase in final body weight, total cholesterol (TC), triglycerides (TG), dry and ash femur weight, bone calcium and phosphorus content with significant decrease in serum level of high density lipoproteins (HDL) in comparison to their corresponding control groups. Alkaline phosphatase activity was significantly increased in lean injected, but significantly decreased in high fat injected rats in comparison to their control groups. The histopathological study showed normal bone architecture in lean control group, foci of new bone formation in lean injected group while high fat fed groups showed thinning in bone trabeculea with mild correction and foci of new bone formation in high fat fed injected group. Conclusion: High fat diet and anandamide caused disturbances in body weight and lipid profile. High fat diet was detrimental to bone health while, anandamide was able to produce beneficial effects on bone. 	Full Text	
77		77
78	**Over-under ground Biomass characteristic of perennial Species (*Lappula microcarpa*) in northwest Iran (Till area of Shabestar)** Hamideh Shadkami1 , Ghassem Habibi bibalani2 1. M.Sc. On Plant Systematic-Ecology, Department of Plant biology, Marand Branch, Islamic Azad University, Marand, Iran 2. Department of Agriculture, Shabestar Branch, Islamic Azad University, Shabestar, Iran h_shadkamie@yahoo.com ABSTRACT: *Lappula microcarpa* (Ledeb.) is an important perennial shrub widespread in the range areas of the arid and semi-arid phytogeographical region in northwest Iran. Previous studies have shown great	Full Text	78

variability in forage biomass production per plant among different varieties. Research area is of rangeland of Till village from Shabestar distract with distance is 25 Kilometers from it. This area is semi arid area and this land covered with natural range land grasses. Root and shoot in these species were sampled in one stage from Mar to Aug. roots of plants stable soils on slope and provide resistance against the forces that improve slope instability. We studied: *Lappula microcarpa* to determine its characteristics. Data were collected with random sampling in this aria with $1m^2$ in 64 quadrate plots. Mean, Max and Min over ground biomass of this plant is 0.17, 1.58, 1.25 g^{-2}, respectively.

Full Text

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Parallelism Study between Biochemical, Immunological and Histochemical Parameters of Liver Injury Induced by Carbon Tetrachloride on Rats

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Abstract: This study was carried out to investigate, the parallism between biochemical, histochemical and immunological parameters in liver injury model induced by CCl_4. We evaluated, (a) The activities of serum aminotransferases (ALT, AST), blood platelets count, hepatic antioxidant enzymes [superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH), hepatic hydroxyproline concentration, serum collagenase activity and hepatic DNA content. (b) Serum autoantibodies (ANA, ASMA and AMA or LKM). (c)Liver histology in control and CCl_4-treated rats at different interval times 24, 72 hrs and 1, 4, 8 and 12 weeks. The activities of ALT, AST, collagenase and hydroxyproline concentration, were significantly elevated, while hepatic antioxidant enzymes, blood platelets count and hepatic DNA content were decreased in toxicated rats as compared to non-toxicated rats at 24-72 hrs. On histological examination, steatosis, lymphocyte inflammation and fibrosis were illustrated at 24-72 hrs in CCl_4-treated rats compared to control rats. Absent of autoantibodies from the serum but lymphocytes in tissues were observed began from sample of 72 hrs. Thus we concluded that a parallelism study was demonstrated between biochemical, immunological and histochemical parameters in CCl_4-induced liver injury rats.

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Application of JASMINUM OFFICINALE in poems by Nezami Ganjavi

Full Text

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Abstract: Jasminum officinale (Common Jasminum officinale) or (Poet's Jasminum officinale) is a species of Jasminum officinale, in the family Oleaceae. Nez mi-ye Ganjavi (1141 to 1209), or Nez mi, whose formal name was Ni m ad-D n Ab Mu ammad Ily s ibn-Y suf ibn-Zak ibn-Mu ayyad, is considered the greatest romantic epic poet in Persian language, who brought a colloquial and realistic style to the Persian epic. Jasminum officinale has been used at 58 poetries lines that at 23 lines used this plant in Metaphor and at 15 lines used in Simile. Jasmine has been used for Metaphor for Tear (in 1 line), Face (in

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	7 lines), Women (in 1 line), White color (in 3 lines), His Book (in 1 line), Love (in 3 lines) and White hair (in 1 line). Jasmine has been used for Simile for White face (in 1 line), Eyebrow (in 1 line), White body (in 1 line), Water spring (in 1 line), With silver (in 1 line), Milk (in 1 line), Face (in 1 line), Expensive carpet (in 1 line), Hair (in 1 line) and Nail (in 1 line). [Fatemeh Mosazadeh-Sayadmahaleh, Ghassem Habibi Bibalani. Application of JASMINUM OFFICINALE in poems by Nezami Ganjavi. Journal of American Science 2011;7(5):592-595]. (ISSN: 1545-1003). http://www.americanscience.org. **Key Words:** Simile, Metaphor, Jasmine, Jasminum officinale, poems, Nezami Ganjavi		
81	**Roles of Dog Rose in poems by Manochehri Damghani** Fatemeh Mosazadeh-Sayadmahaleh, Ghassem Habibi Bibalani* Shabestar Branch, Islamic Azad University, Shabestar, Iran * Corresponding Author: ghhabibi@iaushab.ac.ir **Abstract:** Rosa canina (Dog Rose) is a variable scrambling rose species native to Europe, northwest Africa and western Asia. It is a deciduous shrub normally ranging in height from 1-5 m, though sometimes it can scramble higher into the crowns of taller trees. Abu Najm Ahmad ibn Ahmad ibn Qaus Manuchehri, Also known as Manuchehri Damghani, was a royal poet of the 11th century in Persia. Dog Rose has been used at 14 poetry lines that at 3 lines used this plant in Metaphor and at 3 lines used in Simile. Dog Rose has been used for Metaphor for Musk Seller (in 1 line) , Silvery blindfolded (in 1 line) and Silvery ear (in 1 line). Dog Rose has been used for Simile for Canopy nail (in 1 line), Musk Seller (in 1 line) and Fragrant Crystal Cord (in 1 line). [Fatemeh Mosazadeh-Sayadmahaleh, Ghassem Habibi Bibalani. Roles of Dog Rose in poems by Manochehri Damghani. Journal of American Science 2011;7(5):596-598]. (ISSN: 1545-1003). http://www.americanscience.org. **Key Words:** Simile, Metaphor, Dog Rose, poems, Manochehri Damghani	Full Text	81
82	**Security Performance Analysis and Enhancement of Authentication Protocol in Wireless Mobile Networks** Ja'afer AL-Saraireh Applied Science UniversityUniversity, Amman, Jordan, 11931. sarjaafer@yahoo.com **Abstract:** Due to the rapid growth of wireless technology and wireless services, a detailed look at the issue of security is required. Mobile networks are protected by using authentication security mechanisms. The authentication protocol incurs overheads on the transmission process. These overheads affect the mobile network performance such as delay, bandwidth allocation efficiency and throughput. The main aim of this research is to improve authentication mechanism in mobile networks. In the proposed protocol, AKA has been enhanced by generating temporary key to enable visitor location register (VLR/SGSN) to authenticate mobile station (MS) without intervention of HLR/AuC. Therefore, the bottleneck at the authentication centre is avoided by reducing the number of messages between mobile and authentication centre. A fluid mobility model is used to investigate the performance of signaling traffic and load transaction messages between mobile databases, such as Home Location Register (HLR) and Visitor Location Register (VLR), for both the current protocol and the proposed protocol. The simulation results show that the authentication delay and current load transaction messages between entities and bandwidth are minimized as compared with the current protocol. Therefore, the performance and authentication delay time have been improved significantly. To validate the simulation results in this research work, the results have been compared and analyzed with the analytical results. [Ja'afer AL-Saraireh. **Security Performance Analysis and Enhancement of Authentication Protocol in Wireless Mobile Networks.** Journal of American Science 2011;7(5):599-610]. (ISSN: 1545-1003). http://www.americanscience.org.	Full Text	82

83	**Antimicrobial activity of Curcumin upon pathogenic microorganisms during manufacture and storage of a novel style cheese 'Karishcum".** Hosny I.M., W.I El Kholy , H.A. Murad and R.K. El Dairouty. Dairy Science Department, National Research Center, Dokki, Egypt. ibrahim_mhosny@yahoo.com **Abstract:** A survey study was made to evaluate the level of microbial contamination of 35 samples of Karish cheese retailed in Cairo area in compare with the Egyptian standard (ES-1008-2000). Survey results indicated that the brand cheese showed the highest quality, while the street & shop made and vend cheese samples showed the higher the ACC and the worst mycological quality, as reached $>10^3$ cfu/g for each of mold and yeast counts. So, 57% of Karish cheese samples would not be accepted due to the high mycological counts. Coliform group and *Escherichia coli* as fecal indicator contamination were detected in 57 and 25.7 % of the retailed Karish cheese samples, in averages of ~10^3 cfu/g of the Coliform counts, respectively. However, *Staphylococcus aureus, Bacillus cereus and Listeria monocytogenes* were isolated from 17, 8.5 and 2.8 % of the total Kariesh samples, respectively, but any was isolated from the brand cheese. A novel style of Karish cheese was made by adding *Curcuma. Longa* (Curcumin or Turmeric) at a rate of 0.3% (w/v), to obtain a new dairy product "Karishcum". A primary experiment was done to determine the correct percentage of Curcumin addition to cheese milk to get good taste and long shelf-life. A panel test was carried out to determined organoleptic properties of "Karishcum". The behavior of pathogenic bacteria in artificially contaminated during cold storage period at 7°C+1,for 14days, revealed that addition of aqueous Curcumin extract (0.3%) achived a reduction of bacterial counts obout one log of *Salmonella typhimrium*, tow log of *Pseudomonas aurogenosa* and *E.coli0157:H7*, respectively. Meanwhile each *of S.aureus, B.cereus* and *L.monocytogenes* were vanished at the end of the cold storage period (14 days). [Hosny I.M., W.I El Kholy , H.A. Murad and R.K. El Dairouty. **Antimicrobial activity of Curcumin upon pathogenic microorganisms during manufacture and storage of a novel style cheese 'Karishcum".** Journal of American Science 2011;7(5):611-618]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Antimicrobial; Curcumin ; microorganisms; Karishcum	Full Text	83
84	**Impact of basic skills in decision-making among graduate literacy courses Gil Malek village to the literacy education of disadvantaged** Zahra Habibi Bibalani Student of Education planning, Department of Education, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran. Habibibibalani.zahra@gmail.com **Abstract:** It is essential that formal literacy curriculum with their books to see a series of training. Basic life skills training that are known. These skills are very high in this study between the two halves of four classes in two classes and skills training conducted by this group with the control group trained in skills s decision is evaluated. According to a study conducted by trained personnel decisions and analysis are high compared to others. With this training so we can develop the basic skills of life in more and more for our literacy education. [Zahra Habibi Bibalani. Impact of basic skills in decision-making among graduate literacy courses Gil Malek village to the literacy education of disadvantaged. Journal of American Science 2011;7(5):619-621]. (ISSN: 1545-1003). http://www.americanscience.org. Keywords: basic skill; decision-making; literacy; education	Full Text	84

85	**Roles of Boxwood in poems by Manochehri Damghani** Fatemeh Mosazadeh-Sayadmahaleh [1], Ghassem Habibi Bibalani [2] 1. Tonekabon Branch, Islamic Azad University, Tonekabon, Iran 2. Shabestar Branch, Islamic Azad University, Shabestar, Iran Mosazadeh.f@gmail.com **Abstract:** Buxus sempervirens (Common Box or European Box; also as Boxwood) is a flowering plant in the genus Buxus, native to western and southern Europe, northwest Africa, and southwest Asia, from southern England south to northern Morocco, and east through the northern Mediterranean region to Turkey. Abu Najm Ahmad ibn Ahmad ibn Qaus Manuchehri, Also known as Manuchehri Damghani, was a royal poet of the 11th century in Persia. Boxwood has been used at 7 poetry lines that at 1 line used this plant in Metaphor and at 3 lines used in Simile. Boxwood has been used for Metaphor for Long hair (in 1 line). Boxwood has been used for Simile for Good hair (in 1 line), Khatoun Hair (in 1 line), Green Color (in 1 line). **Key Words:** Simile, Metaphor, Boxwood, poems, Manochehri Damghani	Full Text	85
86	**Credits for Rural Women in third world** [1] Zahra Geraeli Afra, [2] Khatereh siyar [1, 2] Department of Agricultural Economic, Islamic Azad University, Qaemshahr Branch, Iran *Corresponding author: khaterehsiyar@yahoo.com **Abstract:** One of the other roles that financial credits and women financial empowering play among women is that creating their sense of equality against men. Women especially at rural societies and undeveloped countries compared with men are kept powerless from many aspects and often are not considered equal against men. For example while they do more duties compared to men, but they don't receive equal wage which men receive. Thus if they are financed in order to participate in development freely and deliberately, so they don't fill weakness and their spirit of equality with men would increased. On the other hand inside one active and successful woman, there are great sources of energy and power to progress. She has capacity to do constant job during the day and also she has capability to do favorite activity alongside working and she can create great evolution in economic and social life at village, if credits provided for her. **Keywords:** women, rural, credit	Full Text	86
87	**Determination of the dominant families in Ilkhji region, Eastern Azerbaijan province (Northwest of Iran)** **Leila Joudi* and Hamide shadkami** Department of Agriculture, Shabestar Branch, Islamic Azad University (**IRI**) Leila.judy@yahoo.com **Abstract:** Systematic Knowledge or plant taxonomy is one of the very old and important branches of botany. By gathering plants, we can recognize rare species of plants or those which are facing extinction, so that we can find some ways to prevent them from destruction. In this research, all plants were gathered from Ilkhji area which is located in East Azerbaijan province. Ilkhji region is located in 25 km south west	Full Text	87

of Tabriz and the geographic coordinates 45.59 to 12 and 46.3 eastern longitudes and 37.55 to 37.57 north latitude. Plant samples from Yal, Khaselar, Kordlar and Chaman areas as well, were obtained during winter of year 2008 to fall year 2009. Standard method was followed with regard to collection of plant materials, drying, mounting, preparation and preservation of plant specimens' .All the plant samples were pressed according to standard guides. If the plant samples were too long, then they were cut from several areas, so the sample contained the complete plant. At the next stage, samples were stick to the herbarium Cardboards and then were identified using floras, keys, illustrations and explanations which are available for different sources of plant Species. Dominant plant families consist of: Asteraceae (30 species), Brassicaceae (23 species), Fabaceae (21 species), Poaceae (21 species) Boraginaceae (16 species) and Lamiaceae (16 species).

[Leila Joudi and Hamide shadkami. Determination of the dominant families in Ilkhji region, Eastern Azerbaijan province (Northwest of Iran). Journal of American Science 2011;7(5):629-632]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Herbarium, systematic, flora

Adult education in developing countries

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Abstract: Adult illiteracy feeds the state's unemployment, its welfare rolls, and the correctional institutions. Adult illiteracy severely hinders the life chances of young children, undermines school reform, and limits the opportunities for postsecondary education. Despite landmark reforms in public schools, too many Kentuckians continue to drop out of school, thereby perpetuating the chronic problem of adult illiteracy. in developed countries, adult education is a form of informal education for people above 24 years is presented. In fact, a means of expanding knowledge, skills and abilities of adults. In these countries, adult education helps adults to variable conditions of political, social, economic and cultural adjustment, and pay to fix their shortcomings. Concept of adult education in revolutionary countries, is a combination of these two concepts. Changes in these countries due to social, political and cultural revolution, resulting from, literacy and continuing education necessary to find because of the revolution, there is cultural poverty on the other hand the implementation of development plans and the need for skilled personnel are expert. General adult education system based on economic conditions - social and cultural community is different and each specific goals will follow. General objectives of adult education and literacy in two categories is divided into professional education.

[Ali Badragheh, Mohammad Abedi. **Adult education in developing countries.** Journal of American Science 2011;7(5):633-636]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: adult education, developing countries

Full Text

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Traditional Degrees and online degrees in distance education

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Abstract: Distances between teachers and students are bridged with an array of familiar technology as well as new information age equipment. What sets today's distance education efforts apart from previous efforts is the possibility of an interactive capacity that provides learner and teacher with needed feedback, including the opportunity to dialogue, clarify, or assess. Advances in digital compression technology may greatly expand the number of channels that can be sent over any transmission medium, doubling or even tripling channel capacity. Technologies for learning at a distance are also enlarging our definition of how students learn, where they learn, and who teaches them. No one technology is best for all situations and applications. The base of available information technology resources is increasing with dramatic speed. Much has been learned about connecting various forms of technology into systems, so that the ability to

Full Text

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link systems is growing. Most distance learning systems are hybrids, combining several technologies, such as satellite, ITFS, microwave, cable, fiber optic, and computer connections. Technology transports information, not people.

[Mohammad Abedi, Ali Badragheh. **Traditional Degrees and online degrees in distance education.** Journal of American Science 2011;7(5):637-541]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Online Degrees, Traditional Degrees, distance education

90	**Prevalence and etiology of subclinical mastitis in Buffalo of the Tabriz region, Iran** *Rahim Beheshti[1], Behrad Eshratkhah[1], Jalal Shayegh[1], Jamshid Giasi Ghalehkandi[2], Vahid Dianat[1], Kambiz Valiei [3]* [1.] Department of Veterinary medicine, Shabestar Branch, Islamic Azad University, Shabestar, East Azarbaijan, Iran. [2.] Department of Animal science, Shabestar Branch, Islamic Azad University, Shabestar, East Azarbaijan, Iran. [3.] Department of Veterinary medicine, science and research Branch, Islamic Azad University, Tehran, Iran. Rahimbeheshti@gmail.com **Abstract:** To investigate the period prevalence, etiology and some epidemiological features of subclinical mastitis in buffaloes from the Tabriz region, milk samples from 51 lactating buffaloes were aseptically collected for bacterial and California mastitis test and somatic cell counte. An association was observed between the occurrence of subclinical mastitis and lactation number of buffaloes. The periodic prevalence rate of SCM was 27.36%. *Staphylococci* were the most prevalent bacteria, representing 48.55% of the isolates. Coagulase-negative staphylococci (CNS) (36.18%), was the most prevalent species followed by *staphylococcus aurous* (14%). *Lactobacillus, Corynebacterium bovis* and *Bacillus subtilis* was the subsequent bacterial groups in importance according with the distribution among flocks representing 14%, 8% and 7% of the isolates. Coagulase-negative Staphylococci were the most prevailing isolates from samples that showed positve CMT results. [Rahim Beheshti, Behrad Eshratkhah, Jalal Shayegh, Jamshid Giasi Ghalehkandi, Vahid Dianat, Kambiz Valiei. Prevalence and etiology of subclinical mastitis in Buffalo of the Tabriz region, Iran. Journal of American Science 2011;7(5):642-645]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords***: Subclinical mastitis; buffalo; etiology; prevalence*	Full Text	90	
91	**Determination of most important part of yield components by Path Analysis in Corn** Maral Moradi[*], Ebrahim Azarpour Department of Agriculture, Lahijan Branch, Islamic Azad University, Lahijan, P.O. Box 1616, Iran M.A4444@yahoo.com **Abstract:** In order to study of direct and indirect effects of yield components on corn yield for find the most important effective part on yield, an experiment in researching filed of Lahijan Islamic Azad University in 2009 was conducted. This experiment in Split plot format based on Randomized complete block design with two factors, main factor consist of different amounts of nitrogen fertilizer (50, 100, 150 and 200 kg/ha) and sub factor consist of rows spacing (30, 40 and 50 cm) in three replications was performed. In this experiment, Single cross 704 cultivar was used and path analysis for determination of most important part of yield under these treatments was conduced. Determination of most important part of yield can use in agronomical and corrective managements. Results were showed that corn yield had significant correlation with ear length, rows in ear, plant height and ear per plant (r 0.58). Among yield components, ear length was most determinative and most effective trait among other traits on yield, ear length increases had a positive effect on yield increasing and also indirectly affect yield from way of rows per ear and 1000 grain weight. [Maral Moradi, Ebrahim Azarpour. Determination of most important part of yield components by Path Analysis in Corn. Journal of American Science 2011;7(5):646-650]. (ISSN: 1545-1003). http://www.americanscience.org.	Full Text	91	

Some pharmacokinetic aspects of tulathromycin in Fresian cattle calves

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ABSTRACT: Pharmacokinetics of tulathromycin was studied after single dose intravenous, intramuscular and subcutaneous administration. Six apparently healthy Fresian cattle calves were used in a crossover design with 15-day washout period. After intravenous injection of tulathromycin, the half-lives of distribution and elimination ($t_{0.5(\ )}$ and $t_{0.5(\ )}$), volume of distribution at steady state (Vd_{ss}), mean residence time (MRT) and total body clearance (Cl_B) were 0.166 h., 48.348 h., 4.252 L kg^{-1}., 69.645 h. and 0.061 L kg^{-1} h^{-1}., respectively. Following intramuscular and subcutaneous administration of tulathromycin, the maximum concentration (C_{max}) 0.330 and 0.309 ug ml^{-1} were achieved at a maximum times (t_{max}) 1.118 and 1.234 h., respectively. The mean values for absorption and elimination half-lives ($t_{0.5(ab)}$ and $t_{0.5(el)}$) and MRT were 0.135 and 0.155 h., 68.929 and 65.874 h., 99.562 and 95.165 h., respectively. The intramuscular and subcutaneous bioavailabilities were 82.8 and 71.85%, respectively. The result of *in-vitro* protein-binding study indicated that 38.86 % of tulathromycin was bound to calve's serum proteins.
[M.A. TOHAMY, A.A.M. EL-GENDY and Taha A. Attia. Journal of American Science 2011;7(5):651-655]. (ISSN: 1545-1003). http://www.americanscience.org.

Dynamic Optimization of LQ Objective Loss Function: Application in Economic Planning

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Abstract

In this paper, the stochastic dynamic optimization is used to calculate optimal values of liquidity and government budgetary expenditures for the Iran's forth five year development plan (2005-2009). For this purpose, we minimized quadratic variations of inflation rate and the rate of economic growth from their plan target subject to a nonlinear dynamic system. The results show that, the optimal values of the above control variables are greater than those proposed in forth development plan whereas the optimal values are less than the occurred quantities. Based on obtained results, using the optimal macroeconomic policies will improve the rate of economic growth and inflation rate in comparison with their occurred values. [Amir Mansour Tehranchian, Rezvaneh Poorhabib, Nayere Karegar and Masoud Behravesh. Dynamic Optimization of LQ Objective Loss Function: Application in Economic Planning. [Amir Mansour Tehranchian, Rezvaneh Poorhabib, Nayere Karegar and Masoud Behravesh. **Dynamic Optimization of LQ Objective Loss Function: Application in Economic Planning.** Journal of American Science 2011;7(5):656-660]. (ISSN: 1545-1003). http://www.americanscience.org.

94	**Average stem biomass of ONOBRYCHIS MELANOTRICHA in Shanjan Rangelands, East Azerbaijan, Iran** Ghassem HABIBI BIBALANI Department of Agriculture, Shabestar Branch, Islamic Azad University, Shabestar, Iran Email: ghhabibi@iaushab.ac.ir **Abstract:** Plants can be used for animal grazing, in wind erosion control, to reduce water flow rates, and to increase evaporation and transpiration. In the NW of Iran (East Azerbaijan Province), rangelands previously used to animal grazing were changed to agricultural land use; this vegetation is unsuitable vegetation coverage. We studied ONOBRYCHIS MELANOTRICHA to determine its stem biomass characteristics. Data were collected using an accidental sampling methodology (1*1 m). In total, 4 plots were identify and 20 samples were collected for this research. In the minimum, maximum and mean stem biomass for this plant were found to me 2.1, 6.5 and 3 g, respectively.	Full Text	94
95	**Management of environmental degradation of Jeddah coastal zone, Saudi Arabia, using remote sensing and geographic information systems** **Amal Bent Yahya Al-Sheikh** King Abdul-Aziz University, Jeddah, Saudi Arabia **Abstract:** This study is focused on the environmental degradation of Jeddah Governorate coast. The importance of study area is related to the effect of human factors and their roles in destruction and production of environmental problems in the coastal zone. The study is focused on the problem of land use planning and sustainable touristic development to maintain the marine ecosystem and its natural resources. Also this work is concerned with developing and suggesting strategy to protect the natural resources of the marine environment in relation to the future expansion of population and developmental projects. The study is elaborated using the recent techniques in remote sensing and geographic information system (GIS). TM and ETM landsat images acquired in 1986 and 2003 of the study area were used. Manuscripts and topographic maps of scale of 1: 4000,000 for Jeddah governorate, in addition to data and information obtain from different institutions were also employed. ERDAS Imagine 8.5 software was used for image processing (i.e. Export function, layers tacking, geometric correction.etc.). Results showed that the negative changes in the coast exhibit 84 km as it record a length of 111 km compared to195 km in 2003. This change leads to the depletion of natural environmental marine resources and erosion of the recreational areas at the coast line. Absence of a proper sustainable planning strategy and management for coastal natural resources, cause improper human pressures and disorders in the natural balance of the marine environment. The study has suggested a strategy for sustainable touristic development, represented in building systems and developing laws with continuous work to revise procedures and update the standard limits.	Full Text	95
96	**Effect of Counseling Sessions on Coping Strategies and Anxiety among Parents of Children with Ambiguous Genitalia** **Fawzia Elsayed Abused[1] and Yosr Mohamed Elmasri[2]***	Full Text	96

[1]Pediatric Nursing Dept. [2] Psychiatric & Mental Health Nursing Dept, .Faculty of Nursing, Mansoura University, Mansoura, Egypt. [*]dr_yosrelmasri@yahoo.com

Abstract: Ambiguous genitalia condition is often an emotionally stressful event for parents. Preparation and ongoing support through counseling sessions could be beneficial to both parents and children and would alleviate some of their shame, isolation and ineffective coping associated with intersexes conditions. The present work aimed to investigate the effect of counseling sessions on coping strategies and anxiety among parents of children with Ambiguous Genitalia. A one-group before-after Quasi-experimental design was used. This study was conducted on parent who coming with their children at pediatric surgery department of Mansoura University Pediatrics' Hospital and Private Center for Pediatric Surgery at Mansoura city. The sample included all parents which their children was diagnosed as ambiguous genitalia (n=30). The revised three interview questionnaires, Socio-demographic data sheet, Taylor's Manifest Anxiety Scale and the Parental Coping Strategy Inventory were administered to compare parent anxiety and coping before and after counseling sessions. The total coping score didn't differ significantly at pre and post intervention session (p>0.05) , a highly statistically significant difference was observed between the pre and post test mean score of anxiety (p<0.001) and the coping strategies domain were not correlated significantly with total anxiety of parents at pre, post Inventory session (p>0.05). It is concluded that administration of counseling sessions for parents of children with ambiguous genitalia is an effective method to alleviate their anxiety. It is recommended that, the counseling should ideally be by those trained in sexual/gender/intersexes matters, as early as possible put the family in touch with a counselors and support group, and counseling should be multi-staged (at birth, and at least again at age two, at school entry, prior to and during pubertal changes, and yearly during adolescence) as well as examining parental coping strategies at different stages of development would be an interesting avenue for future research. [Fawzia Elsayed Abused and Yosr Mohamed Elmasri. Effect of Counseling Sessions on Coping Strategies and Anxiety among Parents of Children with Ambiguous Genitalia. Journal of American Science 2011;7(5):674-682]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Anxiety , coping , ambiguous genitalia.

Serum Protein Carbonyl Content, Total Thiol and Nitric Oxide in Patients with Rheumatoid Arthritis

Full Text

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Abstract: Serum protein carbonyl group, total thiol group and nitric oxide were studied in 30 patients with rheumatoid arthritis. Obtained results revealed that , Serum protein carbonyl content and nitric oxide (nitrite and nitrate) were significantly higher in rheumatoid arthritis patients than in the controls. However, total thiol group decreased significantly in rheumatoid arthritis patients than in the controls. In addition, protein carbonyl was negatively correlated with total thiol, while , nitric oxide (nitrite and nitrate) didn't correlate with protein carbonyl or total thiol .The impaired serum antioxidant defence mechanisms as evidenced by decreased total thiol group resulted in increased protein oxidation as indicated by increased protein carbonyl .
[Aida A .Mahmoud and Mohamed A. Ismail. **Serum Protein Carbonyl Content, Total Thiol and Nitric Oxide in Patients with Rheumatoid Arthritis.** Journal of American Science 2011;7(5):683-686]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: nitric oxide, protein oxidation, total thiol

Protective Effect of Nigella Sativa, Linseed and Celery Oils against Testicular Toxicity Induced by Sodium Valproate in Male Rats

Full Text

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Abstract: The protective effect of nigella sativa, linseed and celery oils against testicular toxicity induced by sodium valproate (SVP) in male rats was studied. The experiment was carried out along 4 weeks on fifty male rats divided into 5 equal groups. Group (1) was kept as normal control (given vehicle), while rats of group (2) were given orally SVP in a dose of 500 mg/kg /day during the last week of experimental period (positive control). The other protected three groups were pretreated by oral administration of nigella sativa, linseed and celery oils each in a dose of 250 mg/kg/day and received SVP in the last week. At the end of experiment, sex organs were obtained for semen analysis, changes in sex organs weight and for lipid peroxidation in testicular tissue and histopathology. Also blood samples were collected for serum testosterone level. Results showed that pretreatment with nigella sativa, linseed and celery oil in SVP-intoxicated rats induced significant increase in the weight of testis, sperm count and motility with a decrease in abnormal sperms. An increase in serum testosterone levels and a decrease in testicular lipid peroxides (MDA) with increase in reduced glutathione were reported in the protected rats. Histopathological examination of the testes of protected rats revealed that these oils caused alleviation of testicular degenerative lesions which seen in valporate-treated rats. In conclusion, nigella sativa, linseed and celery oils produced protective effects against testicular damage induced by SVP. This study recommends that consumption of nigella sativa, linseed or celery oils may be useful as protective agents for patients who suffer from sexual impotency.

	Docetaxel and gemcitabine in patients with advanced urinary bladder cancer: A Phase II study	Full Text	

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Abstract: The work aimed: To evaluate the efficacy and tolerability of a combination of docetaxel and gemcitabine in patients with locally advanced recurrent, and/or metastatic urinary bladder cancer. **Patients and methods**: An outpatient regimen of gemcitabine and docetaxel combination was tried in thirty-three patients with locally advanced,recurrent,and/or metastatic urinary bladder cancer.Study treatment consisted of gemcitabine1000 mg m^{-2} (days 1+8), and docetaxel 75 mg m^{-2} (day 8) every 21 days for a total of six to nine cycles. **Results:** Among the 33 patients, 17 patients (51.5%) had transitional cell carcinoma, 7patients (21.2%) had squamous cell carcinoma and 9 patients (27.3%) had transitional cell carcinoma with squamous metaplasia. Two patients (6.1%) had complete remission (CR), and 14 patients (42.4%) had partial remission (PR), for an overall response rate of 48.5%. Disease stabilization (SD) occurred in 7 patients (21.2%), while 10 patients (30.3%) had disease progression (PD). Analysis of response rate according to prognostic features known to predict response; Patients with PS 0&1 had an overall response rate of 55.6% (15/27), and patients with PS 2 had an overall response rate of 16.7%(1/6), and this difference was statistically insignificant (P =0.1). As regard to the site of disease, the overall response rate of patients with soft tissue and locally advanced disease was 58.3% (7/12) and 42.9% for patients with visceral metastasis (9/21), and this difference was statistically insignificant (p=0.4). The response rates for patients with risk index of 0, 1, or 2 were100% (2/2), 66.7% (10/15), and25% (4/16), respectively (P = 0.006).With a median follow-up of 10 months (range, 2-20 months), the median survival time was 11 months, the median time to progression was 7 months , 1-year survival rate was 40.3% and1-year progression free survival rate was 28.3%.Both haematologic and non haematologic toxicity were treatable and not severe. **Conclusion:** This schedule of docetaxel and gemcitabine is active and well tolerated as a

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first-line treatment for locally advanced, recurrent, and metastatic bladder carcinoma. The favourable toxicity profile of this regimen may offer an interesting alternative, particularly in patients with compromised renal function or cardiovascular disease.

[Hoda H. Essa and Samy M Al-Gezawy **Docetaxel and gemcitabine in patients with advanced urinary bladder cancer: A Phase II study.** Journal of American Science 2011;7(5):694-702]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Docetaxel, Gemcitabine, Advanced bladder cancer.

100	**Characterization and Reuse of Kiln Rollers Waste in the Manufacture of Ceramic Floor Tiles** **M.M. Youssef [1] and H. B.G. Ghazal [*2]** [1] Mataria Engineering, Helwan University, [2] The High Institute of Engineering, Chemical Engineering Department, Shorouk, Cairo, Egypt. [*] hbarakat86@yahoo.com **Abstract:** Roller kilns used in the production of ceramic tiles are routinely ground to remove traces of contamination. The ground powder is usually discarded as useless waste. In a previous paper [1] the possibility of reusing this powder in refractory making was investigated. The present paper deals with the possibility of adding this powder without any treatment to standard wall tiles composition. XRD and XRF were used to identify the mineralogical and chemical composition of the powder. Powder compacts were prepared by uniaxial pressing at pressures ranging from 30 to 50 MPa. Firing was performed at temperatures ranging from 1200 to 1350°C for soaking periods ranging from 2 to 6 hours. It was proved that among the investigated parameters, firing temperature plays the leading role in assessing sintering characteristics, followed by soaking time. Forming pressure hardly affected sinterability. SEM micrographs were performed under different firing conditions to follow up the morphology of phases appearing. It was proved that adding up to 10% powder to ceramic floor tiles standard mix did not alter its final properties. [M.M. Youssef and H. B.G. Ghazal. Characterization and Reuse of Kiln Rollers Waste in the Manufacture of Ceramic Floor Tiles. Journal of American Science 2011;7(5):703-709]. (ISSN: 1545-1003). http://www.americanscience.org. **Keyword:** Kiln Rollers Waste, Ceramic Tiles, Sintering Characteristics, Mechanical Properties, ES Standards	Full Text	100
101	**Iran's Electricity Renewable Resource Planning** Mohammad Sadegh Javadi [1], Faride Ghanavati [2] [1]Department of Electrical and Electronic Engineering, Science and Research Branch, Islamic Azad University, Fars, Iran [1]Young Researchers Club, Science and Research Branch, Islamic Azad University, Fars, Iran [2]Department of Executive Management, Science and Research Branch, Islamic Azad University, Arak, Iran. msjavadi@gmail.com **Abstract**: Iran's domestic consumption and production have steadily grown together since 1984 and it is still heavily reliant on traditional thermal energy sources of electricity, with a small fraction being produced by hydroelectric plants. In this regard, the governments in energy sectors would like to investigate in renewable resources. Infrastructure resource planning in long term has an important role in maintaining future demand and also economical and environmental aspects of energy generation and consumption are recent worries about future for the ministry of energy in Iran. This paper surveys on the future infrastructure resource planning and long term demand forecasting for Iran electrical energy sector. [Mohammad Sadegh Javadi, Faride Ghanavati. Iran's Electricity Infrastructure Resource Planning. Journal of American Science 2011;7(5):710-714]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Renewable Energy, Resource Planning, Generation Expansion Planning	Full Text	101

102	**Specific Geochemical Parameters and Oil: Source Rock Correlations of Some Oilfields in the North Western Desert, Egypt** **M. I. Roushdy, A. I. Hashem, M. M. El Nady, Y. M. Mostafa, N.Sh. El Gendy and *Hager. R. Ali** Egyptian Petroleum Research Institute, Nasr City, Cairo, Egypt *hugochem@yahoo.com\ **Abstract:** Different analytical techniques, including liquid chromatographic separation, gas chromatography and gas chromatography-mass spectrometry were used to characterize the crude oil and extract samples of the source rocks. The samples were collected from different oilfields in North Western Desert Egypt namely: Meleiha, Misaada and Qarun oilfields. In the present work, the mentioned parameters have been used to essentially discuss the relation between the produced oils and their potential source rocks to confirm the indigenous sources for the petroleum generation of the studied oilfields. The results showed that the studied oil samples of Misaada and Qarun oilfields are well correlated with each other, where they are similar in their maturation and source depositional environments and slightly correlated with Meleiha oil. The correlation between source rocks and crude oils show that there is a good correlation between the extract samples of Kharita and Khatatba formations and crude oils from Qarun and Misaada oilfields. While the extract of Bahariya source rocks and Meleiha oil show slight correlation. These evidences indicate that Kharita and Khataba source rocks seem to act as sources and reservoirs for oil generation in the Qarun and Misaada oilfields. **Keywords:** Egypt. Oilfields, Biomarkers, Oil: Source Rocks Correlations, Western Desert	Full Text	102
103	**Characterization of El-Fawakhir Serpentine Fibers and Their Use in the Reinforcement of Unsaturated Polyester** **Ghoneim, I. A. [1], W.A. El–kholy [2], M.S. Hassan [3], M.F. Abadir [4*]** [1] Ministry of the military production, [2] Egypt Fibre Company, [3] Central Metallurgical Research Institute (CMRDI), [4]Chemical Engineering Department, Faculty of Engineering, Cairo University, Cairo, Egypt *magdi.abadir@yahoo.com **Abstract:** Serpentine fibers from the El–Fawakhir area in the Eastern Egyptian desert were obtained from the parent rock and characterized using XRD, XRF, IR and thermal analysis. They were then incorporated into unsaturated polyester (UP) matrix to from slabs. These slabs were tested for thermal conductivity and thermal expansion where their insulation behavior was much better than UP samples containing E type glass fibers. Both composite matrices (UP + Serpentine and glass fibers) exhibited similar values of thermal expansion, decreasing with increased fiber level. Both matrices showed comparable tensile and flexural strengths both increasing with increased fiber fraction; while the elongation was much lower in case of serpentine fibers. AC characteristics (AC resistivity, dielectric constant, dielectric loss and dissipation factor) were also determined for both types of UP matrices at different frequencies ranging from 40 Hz to 1 MHz and temperatures up to 120°C. The results showed similar behavior in both types of matrices although those reinforced with mineral fibers showed lower dissipation losses. **Key words:** unsaturated polyester – serpentine fibers – glass fibers – composite	Full Text	103
104	**Ginger Administration has a Protective Effect on the Liver of Albino Rats Treated with 6-Mercaptopurine Drug**	Full Text	104

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Abstract: The leukemia is considered to be one of the most frequent tumors in childhood. The first line of its treatment is 6-mercaptopurine (6-MP). There are many recorded cytotoxic effect for 6-mercaptopurine on tissues such as liver, pancreas and bone marrow. Nowadays the needs for administration of cytotoxic drugs is increases as the incidence of malignancies increases. So we have to search for a safe method that can minimize the side effects of these cytotoxic drugs. The ginger has many benefits as anti-inflammatory and anti-oxidant substance. Some indicated as a protective effect for ginger on the radiotherapy treated rats and also it protected from the hepatotoxic and gonado-toxic drugs. This work amid to investigate the protective effects of ginger on liver of rats treated by cytotoxic drug (6-mercaptopurine), a drug of choice in maintenance therapy for leukemia in adult and children. Our hope is to minimize the side effects of the cytotoxic drug with simple and available procedure. Material The current study had been carried on 40 white albino rats that divided into four equal groups. Group I: was served as control group. Group II: was given ginger extract only. Group III: was given 6- MP. Group IV: was given 6-MP + ginger extract. The following parameters were examined in all groups: 1- The serum Alanine aminotransferase (ALT), and aspirate aminotransferase (AST). 2- The cell morphology and histo-pathological changes in the liver The results of the present study showed that treatment with 6-MP alone caused marked signs of cellular degeneration and necrosis of the hepatic tissues, significant increase in the serum levels of ALT (P<0.001) and AST (P<0.001) enzymes when compared with control group. However, the treatment by ginger along with 6-MP showed marked regeneration and improvement in the hepatic tissues and significant decrease in the serum levels of liver enzymes; ALT (P<0.001) and AST (P<0.001) when compared with 6-MP treated group. Conclusion: These findings indicated that ginger has protective effect against 6-MP induced hepatic toxicity.

[Olfat A. Abd-El Aty and Enas N. Morgan. Ginger Administration Has a Protective Effect on The Liver Of Albino Rats Treated with 6-Mercaptopurine Drug. Journal of American Science 2011;7(5):737-745]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Ginger, 6-MP, hepatic toxicity.

	The Effect of Job Demands on Work-Family Conflict (W-FC) and Family-Work Conflict (F-WC) among Female Nurses	Full Text
105	Hajar Namayandeh[1], Samira Golestan[1], Seyedeh Nosrat Shojaei[1], Saber Ghasemi[1] [1] Islamic Azad University, Bandar Abbas Branch, Iran h_nemayandeh@yahoo.com **ABSTRACT:** The present study highlights the significance of job demands as one of the most important work factor on W-FC and F-WC. Nurses working in public hospitals in Shiraz-Iran are the respondents for this study; sample are including of 198 married female nurses. The findings revealed that married female nurses who experience an increase in job demands would result in an increase in W-FC and F-WC. Implications are discussed and recommendations are made regarding future researches in this area. [Hajar Namayandeh, Samira Golestan, Seyedeh Nosrat Shojaei, Saber Ghasemi. **The Effect of Job Demands on Work- Family Conflict (W-FC) and Family-Work Conflict (F-WC) among Female Nurses.** Journal of American Science 2011;7(5):746-750]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Work-family conflict (W-FC); Family-work conflict (F-WC); Job demands	105
106	**A Survey on Day Lighting Design Strategies in Schools**	Full Text 106

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Abstract: Throughout history, daylight has been a primary source of lighting in buildings, supplemented originally with burned fuels and more recently with electrical energy. Before daylight was supplemented or replaced with electric light in the late 19th-century, consideration of good daylight strategies was essential. As we entered the mid-20th-century, electric light supplanted daylight in buildings in many cases. Fortunately, during the last quarter of the 20th-century and early years of this century, architects and designers have recognized the importance and value of introducing natural light into buildings. Daylight can provide a welcome and dynamic contribution to the human experience in buildings and, as demonstrated in recent studies on schools and retail sales environments, can impact human performance. Most people appreciate daylight and also enjoy the outside view that windows provide. Good daylighting design can result in energy savings and can shift peak electrical demand during afternoon hours when daylight availability levels and utility rates are high. Le Corbusier so clearly identified the importance of light in architecture when he expressed the point that, "Architecture is the masterly, correct and magnificent play of volumes brought together in light ..." emphasizing that "...the history of architecture is the history of the struggle for light. This article summarizes the use of daylight in primary schools with focus on goals, climate and weather, sky, conditions, design criteria, and strategies for day lighting design. [Seied Majid Mofidi Shemirani.Gholam Hossein Memarian. Shahnaz Pour Naseri. Vahid Vaziri.. A Survey on Day Lighting Design Strategies in Schools. Journal of American Science 2011;7(5):751-758]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Day Lighting; Design; Strategies; Schools

Serum Fetuin-A Levels in Type 2 Diabetes Patients with Early Diabetic Nephropathy: It's Relation to Diabetes Control

Full Text

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Abstract: Background and objective: Fetuin-A is a circulating calcium-regulatory glycoprotein that inhibits vascular calcification. In the present study, serum fetuin-A was studied as a novel risk factor for the development of diabetic nephropathy and the relation between its levels with the state of diabetes control. Patients and Methods: 50 patients with type 2 diabetes mellitus (T2DM) and early diabetic nephropathy, 25 patients of them have well controlled diabetes on treatment (the first group), the other 25 patients have uncontrolled diabetes (the second group), and another 25 healthy volunteers (control group)) were enrolled in this cross sectional study. Serum fetuin-A, Fasting plasma glucose (FP glucose), glycoselated hemoglobin A1c, lipid profile (total cholesterol,HDL and triglycerides), Serum creatinine, Glomerular filtration rate (GFR), Albumin excretion in urine were measured. Results: There was a significant reduction in Serum fetuin-A levels in controlled diabetic patients (314 ± 66.8) and uncontrolled diabetic patients (252.4 ± 55.6) compared to control group (478.6 ± 74.4). A significant decrease was also detected in uncontrolled diabetic patients when compared to controlled diabetic patients ($P<0.001$). A strong inverse correlation was found between serum fetuin-A and each of F P glucose, glycoselated hemoglobin (HbA1c), serum creatinine, and urinary albumin excretion ($r = -0.52, -0.55, -0.61$, and -0.56 respectively; $P < 0.001$ for each). Whereas; GFR was significantly positively associated with serum fetuin-A levels ($r = 0.53, P<0.001$). Conclusion: The results of this study demonstrate that diabetic nephropathy, especially with uncontrolled diabetes, is linked to low serum fetuin-A levels which represents a novel risk factor for the development of vascular complications. This factor could be responsible for the development

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	and progression of accelerated nephropathy especially with uncontrolled diabetes. [**Ayman Ramadan, Amira Shoukry, Mabrouk I. Ismail and Maher Borai. Serum Fetuin-A Levels in Type 2 Diabetes Patients with Early Diabetic Nephropathy: It's Relation to Diabetes Control.** Journal of American Science 2011;7(5):759-765]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Diabetic nephropathy; fetuin-A; Glycoselated hemoglobin A1c; diabetes mellitus; and control.		
108	**IL 18 in diabetic patients with and without coronary atherosclerosis** Hanan Abdel mawgod , Abeer Ibrahim, *Ahmed A. Battah, and **Mustafa I. mokarrab Biochemistry department, Faculty of pharmacy (girls), *Critical Care department, Kasr El Ainy Hospital, **cardiology department, Faculty of medicine, Al-Azhar and Cairo University, Cairo, Egypt. s_eldayem@yahoo.com **Abstract: Objective:** To assess interlukein 18 in diabetic patients with and without coronary atherosclerosis and to detect its relation to lipid profile and blood glucose. Also to investigate the hypothesis that the serum level of IL-18 is a predictor of coronary atherosclerosis in patients with type 2 diabetes. **Patients and Methods:** The study included 45 diabetic patients (15 with no complication and 30 with coronary atherosclerosis) and 15 age and sex matched as a control group. **Results:** Total cholesterol, HbA1c and IL 18 is significantly different in the 3 groups and the highest level is in the diabetic patients with atherosclerosis. On the contrary HDL-c is significantly lower in diabetic patients with atherosclerosis than the other 2 groups. IL8 shows a strong significant positive correlation with blood glucose in diabetic patients with no complication and in diabetics with atherosclerosis. **Conclusion:** that, IL8 is a useful inflammatory marker in diabetic patients and it is higher in those with atherosclerosis. IL-18 might serve as a marker of future cardiovascular risk in diabetic patients. [Hanan Abdel mawgod, Abeer Ibrahim, Ahmed A. Battah, and Mustafa I. mokarrab. **IL 18 in diabetic patients with and without coronary atherosclerosis.** Journal of American Science 2011;7(5):766-770]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** IL 18; coronary; atherosclerosis; inflammatory.	Full Text	108
109	**Efficient radial basis functions collocation methods for numerical solution of the parabolic PDE's** Majid Amirfakhrian Department of Mathematics, Islamic Azad University, Central Tehran Branch, Payambar Complex, Shahrak Gharb,Tehran,Iran. majiamir@yahoo.com, m_amirfakhrian@iauctb.ac.ir **Abstract:** In this paper, we apply the collocation methods of meshfree RBF over differential equation containing partial derivation of one dimension time dependent with a compound boundary nonlocal condition. in this work, we compare efficient collocation methods in order to obtain approximate solution of nonlocal parabolic differential equations. [Majid Amirfakhrian. **Efficient radial basis functions collocation methods for numerical solution of the parabolic PDE's.** Journal of American Science 2011;7(5):771-775]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** partial differential equations, parabolic equations, Radial basis function, collocation method	Full Text	109
110	**Menopausal Symptoms and Quality of Life among Saudi Women in Riyadh and Taif** [1&3]Sahar M.Yakout, [1&2*]Samar M. kamal and [3]SalmaMoawed [1]Maternity and Gynecologic Nursing Department, Alexandria University. Alexandria, Egypt. [2]Nursing Department.Taif University, Saudi Arabia	Full Text	110

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Abstract: This work aimed to study the effect of menopause symptoms on Saudi women's quality of life. A descriptive study was carried out on a convenient sample of 120 women during their menopausal period who attended two gynaecologic clinics, in Riyadh, KSMC and Taif, KSA. The subjects were interviewed individually throughout a period of 10 months from February 2010 to November 2010.An interview questionnaire and Greene Climacteric Scale,and menopausal symptoms and the Manchester health questionnaire were used for data collection. The results showed 80% of none educated menopausal women had poor quality of life, 75% of the worker also, had poor quality of life and 63.7% of them who were multipara had poor quality of life. The Pearson correlation test proved a negative significant correlation between the total mean score of quality of life and total mean score of menopausal symptoms. The study concluded that Saudi menopausal women in the study subjects experience high prevalence of menopausal symptoms that adversely affected their quality of life. Women's general characteristics such as: educational level, cohabitation, family size and their gravidity were among factors contributed to their poor quality of life.
[Sahar M.Yakout, Samar M. kamal, SalmaMoawed. Menopausal Symptoms and Quality of Life among Saudi Women in Riyadh and Taif. Journal of American Science 2011;7(5):776-783]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: menopause; quality of life; Saudi; women.

Amendment Effect of Antioxidants of Barley and Oat against Teratogenicity Induced by Amitraz

Full Text

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Abstract: The present study investigated the protective effect of phytonutrients and antioxidants in barley and oat added to diet on teratognic effects induced by amitraz® after maternal exposure during pregnancy. 40 pregnant albino rats were divided into 4 groups each of 10. one group was kept as control fed the balanced ration& administered distilled water. Three groups were administered amitraz® (50 mg/ kg b.w.) by gavage during organogenesis from days 6 through day15 of gestation, a group of them fed the balanced ratio and the other 2 groups fed the same diet supplemented with barley or oat (20%), 4 days prior of gestation and continued till the end of the experiment. All dams underwent a caesarean section on day 20 of gestation and their fetuses were examined for external, visceral and skeletal abnormalities. Amitraz induced maternal toxicity manifested as lower body weight gain, developmental toxicity included fetal death, a decrease in fetal body weight and length, as well as increased incidence of fetal external, visceral & skeletal anomalies. These findings were prevented or in lower incidence in groups provided with barley or oat. The obtained data were reviewed and discussed. Conclusively, barley and oat supplement have protective and positive modulation response due to their phytonutrients and antioxidants against congenital anomalies induced by amitraz®. In recommendation, the incorporation of cereal grains such as barley and oat in the food products are chemopreventive agents for adverse effects of xenobiotics.
[Omina, I. Ali ,Hanaa, M.R. Hegazy and Fatma,M.Fakhry. Amendment Effect of Antioxidants of Barley and Oat against Teratogenicity Induced by Amitraz. Journal of American Science 2011;7(5):784-790]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Amendment Effect; Antioxidant; Barley; Oat; Teratogenicity; Induced; Amitraz

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Quality and fertility of the frozen-thawed bull semen as affected by the different cryoprotectants and glutathione levels

Full Text

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Abstract: Five sexually mature Friesian bulls (3-4 years old and 600-650 kg as an average body weight) were used in the present study. Two experiments were carried out. The first experiment aimed to define the effect of different types of cryoprotective agents (7% glycerol: GL and 7% dimethyl sulfoxide: DMSO) and their combinations (3.5% GL plus 3.5% DMSO) on post-thawing sperm motility, freezability and acrosomal damage of spermatozoa. Enzymatic activity (aspartate-aminotransferase: AST, alanine-aminotransferase: ALT, acid phosphatase: ACP, alkaline phosphatase: ALP and lactic dehydrogenase: LDH) in the frozen-thawed semen was also determined. The second experiment was carried out to establish the effects of 3.5% GL plus 3.5% DMSO (the best cryoprotectant in the first experiment) supplemented with different levels of glutathione (0.0, 0.2, 0.4 and 0.8 mM/ 100 ml) on the frozen-thawed semen quality and enzymatic activity during thawing-incubation at 37°C for 2 hours. The conception rates of the cows artificially inseminated with the frozen-thawed semen containing 7% GL, 7% DMSO, 3.5% GL plus 3.5% DMSO with or without 0.4mM glutathione (GSH) were also assessed. The results revealed that the highest ($P<0.05$) percentage of sperm motility, freezability of spermatozoa and the lowest ($P<0.05$) percentage of acrosomal damage of spermatozoa were obtained in the post-thawed semen extended with 3.5% GL plus 3.5% DMSO as compared to 7% GL or 7% DMSO alone. Moreover, the frozen-thawed bull semen extended with 3.5% GL plus 3.5% DMSO showed significantly ($P<0.05$) lower amounts of AST, ALT, ACP, ALP and LDH enzymes released into the extracellular medium than 7% GL or 7% DMSO alone the (first experiment). The obtained results in the second experiment showed that the frozen-thawed semen extended with 3.5% GL plus 3.5% DMSO added with GSH at levels of 0.2, 0.4 and 0.8mM showed significantly ($P<0.05$) increased the percentage of frozen-thawed sperm motility and freezability of spermatozoa and decreased ($P<0.05$) percentage of acrosomal damage of spermatozoa and amount of AST, ALT, ACP, ALP and LDH enzymes released into the extracellular medium compared to free GSH medium (control). It is of interest to note that, the best level ($P<0.05$) of GSH which maintained frozen-thawed semen quality and enzymatic activities was 0.4mM/100ml GSH. The advancement of thawing- incubation time at 37°C for up to 2 hours of the frozen-thawed bull semen decreased significantly ($P<0.05$) the percentage of post- thawing sperm motility and freezability of spermatozoa, while increased significantly ($P<0.05$) the percentage of the acrosomal damage of spermatozoa and leakage of AST, ALT, ACP, ALP and LDH enzymes into the extracellular medium with the different glutathione levels or free glutathione medium. The highest conception rate ($P<0.05$) was recorded in the cows artificially inseminated with the frozen-thawed bull semen extended with 3.5% glycerol plus 3.5% DMSO added with 0.4mM GSH, and the lowest ($P<0.05$) conception rate was observed with the frozen-thawed bull semen extended with 7% GL or 7% DMSO alone.
[M. A. El-Harairy, Laila N. Eid, A. E. B. Zeidan, A.M.Abd El-Salaam and M. A. M. El-Kishk. **Quality and fertility of the frozen-thawed bull semen as affected by the different cryoprotectants and glutathione levels.** Journal of American Science 2011;7(5):791-801]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Bull semen, glycerol, dimethyl sulfoxide, freezing, enzyme, glutathione.

Full Text

Burden and coping strategies in caregivers of schizophrenic patients

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Abstract: Care of schizophrenic patients is an enduring stress and leads to considerable amount of burden among caregivers. Little is known about the ways in which families cope while caring for a relative with schizophrenia in developing countries. The aim of the present study was to explore burden and coping strategies in caregivers of schizophrenic patients and identify the relationship between burden

and coping strategies among them. Caregivers were assessed by utilizing caregiver burden self report and ways of coping questionnaires. A descriptive correlational design was used for the study. The sample comprised of 100 caregivers of schizophrenic patients from psychiatric in patient and the outpatient clinic of Neuropsychiatry Department at Assiut University Hospital. The result revealed that level of burden reported by caregivers of schizophrenic patients was high. The most coping strategies used by caregivers of schizophrenic patients were self controlling, positive reappraisal and escape-avoidance. Burden was negatively and non significantly correlated with confrontive coping, distancing, seeking social support and positive reappraisal coping strategies. However, it was positively and non significantly correlated with self controlling, accepting responsibility, escape- avoidance and planful problem solving. Sociodemographic variables were not associated significantly with burden and coping strategies. It is concluded that: Caregivers experienced high level of burden. Burden was none significantly correlated with coping strategies. Recommendation: Psycho educational program is needed to assist caregivers cope successfully with burden resulting from the care of schizophrenic patients.

[Wageeh Abdel - Nasser Hassan, Ikram Ibraheem Mohamed, Amira Ezzat Abd Elnaser , Nadia Ebraheim Sayed. Burden and coping strategies in caregivers of schizophrenic patients. Journal of American Science 2011;7(5):802-811]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: schizophrenia; caregivers; Sociodemographic.

The Influence of Oral Administration of Simvastatin on Delayed Non-Union Facial Fractures- Clinical Study

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Abstract: In this study ten patients with delayed facial fractures presented to our clinic, three of them were in the Research institute of ophthalmology clinic, dental and maxillofacial unit and the other seven were in AL Haram hospital clinic, maxillofacial unit. The patients were in a range of age 25-45 years old, two females and eight males (table.1). All of the patients had non-union fibrous healing and most of them had facial scars at different sites of the face. Others had a chief complaint of pain or numbness of different areas of the face. All of them underwent physical, clinical and radiographic investigations using computed tomograph. Reduction of bone fragments using bone holder was done. The infraorbital nerve was evaluated and decompressed when necessary. Following alignment of the fractures, fixation was maintained by a titanium miniplate and in some cases microplates and screws, after adaptation of the plates to the area. Postoperative care included antibiotics (Clindamycin 300mg.) for a total of 7 days, ice compresses intermittently for 24h., Voltaren 75mg. I.M. every12 h.. Simvastatin (zocor 20 mg. tab.) daily dose was prescribed only to five patients for 3 months (group1) while the other five patients received only the ordinary postoperative prescription (group 2). The aim of this study is to evaluate the effect of oral administration of simvastatin drug on accelerating delayed non –union fractured bone healing. Results: Follow up of the cases revealed slight edema, swelling and hematoma in the first2 weeks; however, it was less in simvastatin group patients, while no infection was noticed in all the patients. Clinical examination of the patients revealed good stability of the bones immediately postoperative. Three months postoperative CT. and/ or three dimensional (3D) facial bone CT scans for all patients revealed that the displaced bone was reduced to its normal anatomy. . It was noticed that patients on the regimen of simvastatin (zocor tablets) (group1) had ameliorated recovery without any complications than in (group2), as the inflammatory reaction was more severe in this group. Bone healing seemed to be accelerated as seen in the CT. radiograph in (group1). At 6-month follow- up, all patients complained of no particular discomfort in everyday life activities and were satisfied with their external appearance. Conclusion:-From this study it could concluded that oral administration of simvastatin 20mg.tablets (zocor) could be prescribed as a regimen postoperatively for all patients with fractures specially in delayed cases for acceleration of bone and soft tissue healing and enhancement of postoperative inflammatory reactions.

[Maha M.Sallam. The Influence of Oral Administration of Simvastatin on Delayed Non-Union Facial Fractures-Clinical Study. Journal of American Science 2011;7(5):812-818]. (ISSN: 1545-1003).

Full Text

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Evaluation of the Effects of *Colatropis gigantea* Leaf Extracts on Blood pH, Blood Glucose and Total Protein concentrations in Diabetic Rabbits.

[Full Text]

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UHUO, Emmanuel Nnaemeka; OGUGUA, Victor N.; JOSHUA, Parker Elijah; OKONKWO, Chinedu Joseph and OKORO, Onyinyechi Ruth

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ABSTRACT: Screening for the most effective organic extract revealed that acetone fraction significantly decreased the blood glucose level ($p<0.05$) when compared to other fractions and therefore was used for further study in phase 11. The result showed reduction of blood pH with significant value ($p<0.05$) of diabetic untreated when compared to group treated with acetone fraction of *C. gigantea* leaf extract. There was no significant difference ($p>0.05$) in blood pH among the extract-treated groups and glibenclamide-treated group. Protein concentration was observed to increase significantly ($p<0.05$) in diabetic rabbits treated with *C. gigantea leaf* extract when compared to diabetic untreated group. A significant decrease ($p<0.05$) in value of protein concentration of the group treated with acetone fraction of *C. gigantea* leaf extract was observed when compared with group treated to reference drug (glibenclamide).
[UHUO, Emmanuel Nnaemeka; OGUGUA, Victor N.; JOSHUA, Parker Elijah; OKONKWO, Chinedu Joseph and OKORO, Onyinyechi Ruth. **Evaluation of the Effects of *Colatropis gigantea* Leaf Extracts on Blood pH, Blood Glucose and Total Protein concentrations in Diabetic Rabbits.** Journal of American Science 2011;7(5):819-826]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: *Colatropis gigantea*; Blood pH; Blood Glucose; Total Protein; Diabetic Rabbits.

Physicochemical Evaluation of the Effects of Total Suspended Solids, Total Dissolved Solids and Total Hardness Concentrations on the Water Samples in Nsukka Town, Enugu State of Nigeria.

[Full Text]

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NDEFO, Chinedum Joseph; ALUMANAH, Eddy O., JOSHUA, Parker Elijah and ONWURAH, Ikechukwu, N. E.

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ABSTRACT: The problem of environmental pollution due to toxic metals has begun to cause concern now in most major metropolitan cities. Nsukka environs have been plagued with perennial problem of water supplies round the year and a better understanding of its water physicochemically status will help to address this daunting problem and issues of human health. The analysis carried out was on the utility water supplies in Nsukka area. Thirteen sampling areas consisting of four boreholes, six dugwells and three springs were chosen for this research work. A total of 26 water samples were taken from the sampling areas during the dry season and another 26 samples during the wet season. Water samples were collected from these sampling areas and refrigerated at 4^0C for processing. Harch Model C50 digital multirange meter was used to measure total dissolved solid. Complexiometric titration was employed in the determination of total hardness of water samples. Bacteriological analysis of the water samples were carried out to ascertain whether there was faecal contamination by the use of multiple tube/most probable number techniques. It was observed that total suspended solid concentration of water samples from dugwell sources was found to have significant increase ($p<0.05$) when compared with the water samples from the samples obtained from borehole and spring sources during both dry and rainy seasons. Total dissolved solid concentration was found to be significantly higher ($p<0.05$) in the water sample from dugwell sources when compared with the total dissolved solid concentration in the water samples from

	both borehole and spring sources during both dry and rainy seasons. Water sample from dugwell sources had showed significant increase ($p<0.05$) in the level of total hardness as compared with water samples from borehole and spring sources during dry and rainy seasons. Also, there was significant increase ($p<0.05$) in the level of total hardness of water sample from borehole sources when compared with the spring sources during dry and rainy seasons. Therefore, from the foregoing, it could be concluded that these boreholes, springs and dugwells water tested in Nsukka town are physicochemically good for human consumption as all the physicochemical parameters tested conformed to WHO, SON and NAFDAC water quality standards except Iyi-adoro spring water which might not be very good for consumption during rainy season because of possible bacteria contamination. [NDEFO, Chinedum Joseph; ALUMANAH, Eddy O., JOSHUA, Parker Elijah and ONWURAH, Ikechukwu, N. E. **Physicochemical Evaluation of the Effects of Total Suspended Solids, Total Dissolved Solids and Total Hardness Concentrations on the Water Samples in Nsukka Town, Enugu State of Nigeria.** Journal of American Science 2011;7(5):827-836]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Physicochemical; Total Dissolved Solids; Total Suspended Solids, Total Hardness.		
117	**Hadji Mirza Aghasi and Political, Social and religious events in his era** Ali Ahmadalizadeh [1,2] [1.] Research Institute for Education, Ministry of Education, Tehran, Iran [2.] Department of Social History, University of Applied Science,Tehran, Iran dr.alizadeh@yahoo.com **Abstract:** Mirza Abbas Irvaani nicknamed as Hajj Mirza Aghasi, the Sadr-e Aazam (Prime Minister) of Mohammad Shah Qajar must be regarded as one of the star-crossed Iranian Sadr-e Aazams, because he undertook the office when Iran economy and agriculture was devastated due to the Russo-Persian Wars and in the other hands, both Britain and Russia were seeking more influence in Iran and in the court. So, in this harsh condition, Mohammad Shah appointed Hajj Mirza Aghasi as Sadr-e Aazam despite of domestic and foreign efforts to bring the power one that capable to meet their purposes. Although, historians described him as incompetent, semi-insane but history also depicts another picture of him as judicious, gentle, indisposed of punishment and kingcraft and science loving patriot. Following to development of the relations between Iran and the European countries, the economic backwardness and sociological and cultural evolution necessity of Iran was completely revealed and impelled some of the Iranian conscious and provident individuals, under the leadership of Abbas Mirza and then Hajj Mirza Aghasi to ponder and undertake effective measures to obviate this backwardness. In economic and sociologic perspective, as well as student dispatching, order book from abroad, abolishment of torture and execution and take advantage of western civilization are of the beneficial measure of Hajj Mirza Aghasi. In the economic field, he succeeded to launch great leaps towards economical development and advancement and calmed disturbed economical situation after two wars of the Fath Ali Shah period. By relying on agriculture as the pivotal economic factor of that age, Hajj Mirza Aghasi succeeded to relief economical difficulties via aqueduct building and stream construction to irrigate agricultural fields, in a manner that the plenty of cheap agricultural products of that period were available in the markets. Weaponry activity in the field of making artillery and other munitions is another important measure of Hajj Mirza Aghasi which played decisive role in the Iran-Harat war. In foreign affairs, Hajj Mirza Aghasi in struggling to reduce the Britain and Russia influences in Iran was forced to drag third country influence (France) in to the country. [Ali Ahmadalizadeh. **Hadji Mirza Aghasi and Political, Social and religious events in his era.** Journal of American Science 2011;7(5):837-849]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Qajar, Hajj Mirza Aghasi, Sadr-e Aazam, Iran	Full Text	117
118	**Solving an Inverse Diffusion Problem Using Tikhonov Regularization Method** R. Pourgholi and F. Torabi School of Mathematics and Computer Sciences, Damghan University, Damghan, P.O.Box 36715-	Full Text	118

364, Iran. pourgholi@du.ac.ir

Abstract: This paper is concerned with the evaluation of the diffusion coefficient based on the measurement obtained at the boundary by using a numerical approach. We consider the problem of recovering the diffusion coefficient of a rod that is a function of space. The approach is based on finite-difference method and the least-squares scheme. At the beginning of the algorithm, the finite-difference method is used to discretize the problem domain. The present approach is to rearrange the matrix forms of the differential governing equations and estimate unknown diffusion coefficient. The least-squares method is adopted to find the solution. This solution is unstable, hence the problem is ill-posed. This instability is overcome using the Tikhonov regularization method with the gcv criterion for the choice of the regularization parameter. The stability and accuracy of the scheme presented is evaluated by comparison with the Singular Value Decomposition method (SVD). Results show that a good estimation on the diffusion coefficient can be obtained within a couple of minutes CPU time at pentium IV-2.4 GHz PC. [R. Pourgholi. Solving an Inverse Diffusion Problem Using Tikhonov Regularization Method. Journal of American Science 2011;7(5):850-855]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Diffusion coefficient, Inverse diffusion problem, Finite difference method, Least-squares method, Stability, The Tikhonov regularization Method, SVD Method.

	Iran and Saudi Arabia Relationship under Iran's Pragmatic Approach (1989-1993)	Full Text

Reza Ekhtiari Amiri[1], Ku Hasnita Binti Ku Samsu[1], Majid Khorshidi[1], Daryoush Piri[1]

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Abstract: Iran's revolution and its consequences distorted the previous close relationship between Iran and Saudi Arabia. This paper, first as introduction, will discuss the historical competition between ideological and pragmatic approaches in Iran's foreign policy. Then it will study the domination of ideology in the foreign policy of Iran after the Islamic revolution and its role in Iran's foreign relations with littoral states in the Persian Gulf region, in particular, Saudi Arabia. The study further examines the superiority of the pragmatic approach after the end of the Iran- Iraq war (1988) and gradual changes in Iran's foreign policy from 1989. The research also analyzes the role of the new approach in re-establishing and improving the Iran-Saudi Arabia diplomatic relationship, which was severed in 1988, and limited cooperation of the two sides afterwards. The study concludes that despite Iranian-Saudi primary cooperation and agreement after the restoration of mutual ties, they were unable to maintain peaceful relations due to the bilateral and regional problems of the two countries.
[Reza Ekhtiari Amiri, Ku Hasnita Binti Ku Samsu, Majid Khorshidi. Daryoush Piri. Iran and Saudi Arabia Relationship under Iran's Pragmatic Approach (1989-1993). Journal of American Science 2011;7(5):856-863]. (ISSN: 1545-1003). http://www.americanscience.org.

Key Words: Iran, Saudi Arabia, pragmatic approach, foreign policy

119 (row number, left column) | 119 (right column)

	Critical Viewpoint toward Shaykhiyya **Concerning the Coincidence of Hurqalya and the Imaginal World**	Full Text

Yaser Salari[1]

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Abstract: The Shaykhis believed, that between the physical world and the spiritual world, there exists an intermediary world called Hurqalya (from the Greek word Huvarkalya) or the world of archetypal images (Alame' Mithal). From the Shaikhi's point of view, the first corporal form will annihilate completely after

120 (left column) | 120 (right column)

	death and there will have no there return in the Intermediately World and the Resurrection Day, while the corps astral body will remain rotundas, away from any annihilation and destruction. The first body of man will accompany the soul only to the end of the Intermediately World, and while the first Israfil's Blowing of trumpet is heard it will be annihilated too. But the second body as the soul carrier will always accompany the soul and it will never be separated from it, except the time of the Blowing after the second Blowing of the Trumpet in the Resurrection Day, the soul will join the second corps along with the second body, and therefore the spiritual and the corporal resurrection of Sheikhiet will occur. In this paper, the critical viewpoint toward Shaykhiyya is discussed concerning the coincidence of Hurqalya and the Imaginal World. The imaginal world in the spiritual topography of a domain that can only be seen by those who have turned away from the sensus communis and rely on spiritual hermeneutics (ta'wil), a profound issue which he discusses both in the al -Talwihat and Alwah- i imadi. Seeing the archetypes requires transcending all obstacles in order to go beyond what Suhrawardi symbolically refers to as the Qaf Mountain. Finally, the Sheikhis' view of resurrection has been reviewed and analyzed from the point of view of exalted theosophy. [Yaser Salari. Critical Viewpoint toward Shaykhiyya Concerning the Coincidence of Hurqalya and the Imaginal World. Journal of American Science 2011;7(5):864-870]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Shaikhiyya, imaginal world, Intermediately World, Critical Viewpoint, Coincidence.		
121	**Models for Controlling and Replenishing of Inventories in a Supply Chain (With Particular Reference to Robustness versus Forecasting Errors of Demand)** Ayub Rahimzadeh[1] Alireza Haji[2] Ahmad Makui[3] [1] PhD student, Department of Islamic Philosophy and Theology, Science and Research branch, Islamic Azad University, Tehran, Iran. arahimzadeh@gmail.com [2]Ph.D. student, Department of Industrial Engineering, Science and Research, Islamic Azad University, Tehran, Iran. Associate Professor, Department of Industrial Engineering, Sharif University, Tehran, Iran ahaji@sharif.edu [3]Assistant Professor, Department of Industrial Engineering, Iran University of Science and Technology, Tehran, Iran. amakui@iust.ac.ir **Abstract:** This article investigates robustness in Model Predictive Control (MPC) for supply chain. After reviewing the supply chain, and the basic concepts of MPC, we survey the uncertainty descriptions considered in the MPC literature, and the methods proposed for robust constraint handling, stability, and performance. The key idea of closed loop prediction" is discussed at length. The article concludes with some comments on future research directions as input to the Model Predictive Control module. [Ayub Rahimzadeh, Alireza Haji.Ahmad Makui. Models for Controlling and Replenishing of Inventories in a Supply Chain (With Particular Reference to Robustness versus Forecasting Errors of Demand). Journal of American Science 2011;7(5):871-877]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** supply chain, Controlling, Inventories, Robustness and Forecasting.	Full Text	121
122	**Terrorism political development and national security** Ahmad saii[1], Majid Masomi[2] [1.] Associate Professor, Department of Law and Political Science, Science and Research Branch, Islamic Azad University, Tehran, Iran [2.] PhD student, Department of Law and Political Science, Science and Research Branch, Islamic Azad University, Tehran, Iran majid.masumi@gmail.com **Abstract:** As, the terrorism, nowadays, is an important and effective matter that affects different problems especially national security, it is tried to study an important aspect of interaction fields between national	Full Text	122

security and political development in developing countries and Iran. An important point in this study is to consider terrorism as an strategic phenomenon that follows the procedures including three operational phases (creating mental agitation by frightening people-encouraging governor system to responding and transferring legitimacy) to obtain their owns aims and affect on countries national security. They administer a space interaction and oppositional in related to the people and political governor system so that they can get to their own political aims, too.

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The human factors of sustainable design in urban constructions
(With emphasize on Residents' psychological Behaviors)

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syasinian@gmail.com

Abstract: The intention of sustainable design is to "eliminate negative environmental impact completely through skillful, sensitive design". Manifestations of sustainable design require no non-renewable resources, impact the environment minimally, and relate people with the natural environment. This manuscript highlights the human factors of sustainable design in urban constructions. While numerous technical progressions have allowed for the reduction of resource consumption, not much study have addressed the reaction of occupants to these appliances, or the degree to which prosperity in achieving sustainability objectives is dependent upon user behavior. This manuscript reviews investigation in related fields and recommends ways in which psychological, behavioral and social issues might be significant to sustainable design, as same as how ways attending to psychological requirements could enhance the success of meeting these and other objectives. Applied behavior and social psychological analytical approaches are surveyed as methods to answer to conservation and recycling objectives. The physiological and psychological profits that green constructions confer on their inhabitants are also notified, as are fields for future investigation, and steps that the building industry could take to develop more sustainable and holistic building practices which incorporate inhabitant behavioral requirements.

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Investigating the Aspects of Urban Tourism in Developing countries
(With particular reference to Kohgoliyeh and Boyer Ahmad Province in Iran)

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Abstract: Tourism industry puts a lot of influence on the development of cities. The experts of European society emphasizes that because of an increase in the speed of information, an increase in culture level of citizens, and an increase in their level of living, the tourism in next years will belong to urban tourism. Based on a principle and a general definition, urban tourism is a kind of tourism which takes place in geographical limit of the city. Urban tourism is one of the most important sections in tourism industry which attracted the attention of tourisms and travelers. In this article, the position of tourism in developing countries is investigated with particular reference to the tourism aspects in Kohgoliyeh and Boyer Ahmad Province in south-west Iran.

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Full Text

	[Abdolkarim Azizi. Investigating the Aspects of Urban Tourism in Developing countries (With particular reference to Kohgoliyeh and Boyer Ahmad Province in Iran). Journal of American Science 2011;7(5):892-895]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords: Iran**, Developing Countries, Urban Tourism, Kohgoliyeh and Boyer Ahmad Province.		
125	**Effect of condensed tannin on controlling faecal protein excretion in nematode-infected sheep:** *in vivo* **study** Shahin Hassanpour[1], Mohammad Sadaghian[2], Naser MaheriSis[1], Behrad Eshratkhah[2], Majid ChaichiSemsari[1] [1.] Department of Animal science, Shabestar Branch, Islamic Azad University, Shabestar, Iran. [2.] Department of Veterinary medicine, Shabestar Branch, Islamic Azad University, Shabestar, Iran. hassanpour.shahin@gmail.com **Abstract:** The main propose of this study was to investigating the short term effects of different levels of wattle tannin to protein excretion control during a naturally acquired nematode infection in Moghani sheep. Twenty Moghani ewes (aged 7-12 months and body weight 32 ± 3 kg) were selected randomly and divided into 4 treatment groups. The animals of the experiment had not received any anthelmintic drugs for 4 month. During the study all animals fed *ad libitum* on Moghan plateau and free access to water. Group 1 received placebo. Animals in groups 2, 3 and 4, were drenched 1, 1.5 and 2 gr per kg body weight (BW) wattle tannin (WT) as water solution for one day, respectively. At 0, 24 and 48 hours after drenching WT from each animal faecal sample was taken and stored in individual containers less than $4°C$ carried out to laboratory as soon as possible. Faeces nitrogen (N), dry matter (DM), organic matter (OM), Ash and Wet levels determined following the standard procedures. Data were analyzed as a complete randomized design for repeated measurements using SAS (9.1) software and the least square means compared with Tukey multiple range tests. According to our result there was a significant difference between the groups. Twenty-four hours after drenching highest amount of faecal crude protein execration observed in group 4 ($P< 0.0001$). Additionally, Forty-eight hours after drenched WT there was a significant difference in Group 4 compare to the other groups which has lower FCP execration ($P< 0.0001$). There was no significant difference in faecal OM, DM, Ash and Wet content between groups ($P > 0.05$). In conclusion it is observed that administration of 2 gr WT per kg BW leads to decreasing faecal protein excretion and so resulted in nitrogen retention in animals. [Shahin Hassanpour, Mohammad Sadaghian, Naser MaheriSis, Behrad Eshratkhah, Majid ChaichiSemsari. **Effect of condensed tannin on controlling faecal protein excretion in nematode-infected sheep:** *in vivo* **study.** Journal of American Science 2011;7(5):896-900]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords** Condensed tannin, Nematode, Faecal content, Moghani sheep	Full Text	125
126	**Absorbing Foreign Investment in a Developing Country: an Application of Balanced Scorecard Model Case Study: Iran** [1] Mohammad Doudangi, [2] Amir Mansour Tehranchian and [3] Masoud Behravesh [1] PhD Student of Economics, University of science Academy of Armenia. E-mail: mododangi@yahoo.com. [2] Assistant Professor of Economics, Faculty of Economics, University of Mazandaran, Babolsar, Mazandaran, Iran. E-mail: a.tehranchian@umz.ac.ir. [3] (Corresponding Author), Economics Researcher, Department of Management, Bonab Branch, Islamic Azad University, Bonab, Iran. ★ ） : E-mail: behravesh@bonabiau.ac.ir, behrawesh@yahoo.com. Cell Phone: +989192227434. Abstract: Capital accumulation is one of the principle prerequisite in economical growth process. Theoretically capital injection is done through this idea, and the economists believe that capital is the	Full Text	126

engine of economy growth. Financial provision for capital is possible through two ways of internal resources and external resources. In twenty year vision and the absorption law and supporting foreign investment, the fifth laws of economy development and also cultural and social development in Iran for absorbing the foreign investment, suitable regulations have been devised for improving the business environment, and this case leads to suitable growth in absorbing foreign investment in recent years. But due to high potential and rich natural resources such as petrol and gas, expected economy growth in fifth program, there is an urgent necessity for absorbing foreign investment. Different econometric models have been processed in different studies for identifying the effective factors on investment and developing the investment, but the balanced Scorecard pattern has not been used. In this article, we try to suggest necessary measures and programs for development and absorbing foreign investment by using this method and designing suitable strategy and action plan, using SWOT method and also preparing action plan, that it has big effect on absorbing foreign investment and suitable development in country investment. [Mohammad Doudangi, Amir Mansour Tehranchian, and Masoud Behravesh. Absorbing Foreign Investment in a Developing Country: an Application of Balanced Scorecard Model Case Study: Iran. Journal of American Science 2011;7(5):901-906]. (ISSN: 1545-1003). http://www.americanscience.org. JEL Code: O2, O16, O24.

Key words: Absorbing Foreign Investment, Balanced Scorecard Model (BSc).

| 127 | **Development Model Based on Value Chain in Bam's Date Industrial Cluster**

[1] Setareh Rezaee, [2] Armin Rajabzadeh and [3]Nayere Karegar

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Abstract: In this study, we review the development of value chain of industry clusters. At first we benchmark Bam Date Industrial Cluster with sample firm of cluster. Then we benchmark Bam Date Industrial Cluster with Tunes as a successful country. As a result we observe pressure points of Bam Date Industrial Cluster; lack of pricing, lack of grading and undesirable packing. And finally we suggest obeying two strategies about market expansion and quality promotion.
[Setareh Rezaee, Armin Rajabzadeh and Nayere Karegar. Development Model Based on Value Chain in Bam's Date Industrial Cluster. Journal of American Science 2011;7(5):907-914]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Value chain, Value chain analyze, Industrial cluster, Bam Dat. | Full Text | 127 |
| 128 | **The Valid Derogation from a Fair Trial in States of Emergencies**

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[1] PhD Student, Department of Criminal Law and Criminology, Science and Research branch, Islamic Azad University, Tehran, Iran
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Abstract: Fair trial in the states of emergency especially after September 11, 2001 attacks is of a high importance. The goal of this article is to recognize the concept of the states of emergency and the determination of their applicability, the study of the mechanism of deviation from the principles and guarantees of fair trial under the said conditions and the recognition of the principles of deviation of the fair trial. For this purpose, the regional and international documents and the policy of control and legal | Full Text | 128 |

institutions have been studied. Among, several international documents, the International Covenant on Civil and Political Rights and the protocols attached to the Geneva conventions and among the regional documents of the European convention of human rights has had the highest protection of the fair trial guarantees. The deliberative views of the International Court of Justice and the legal policy of the European court of human rights have allocated a special place for the reinforcement of fair trial in the states of emergency. The Human Rights Commission of The United Nations and the International Committee of the Red Cross have also played a strong supervisory role in this matter.

The most important result of this article is that the minimum rules of fair trial should not be deviated from any states of emergency. On the contrary, it should be reinforced. Valid derogation of other rules of fair trial requires certain procedural and substantial standards.

Keywords: Fair trial, Valid derogation, the International Covenant on Civil and Political Rights , the European Court of Human Rights, The Red Cross Committee, The Human Rights Commission, The International Criminal Court.

129	**The Contribution of Rural Cooperatives Development in Building Sense of Community in Iran** **Fatemeh Allahdadi** Dept of Organizational and Industrial Psychology, Marvdasht Bramch, Islamic Azad University, Marvdasht, Iran faref2011@yahoo.com **Abstract:** The purpose of this paper is to determine the role of rural cooperatives in building sense of community in Marvdasht, Iran. Capacity building for rural development requires a range of sense of community. Hence, it is expected that the rural cooperatives contribute to building sense of community. The paper is based on the survey questionnaire carried out among 250 rural cooperatives members in rural areas of Marvdasht, Iran. The findings revealed that rural cooperatives have a little contribution in building sense of community for rural development. [Fatemeh Allahdadi. **The Contribution of Rural Cooperatives Development for Building Sense of Community in Iran**. Journal of American Science 2011;7(5):926-929]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** sense of community, participation, rural cooperatives, rural development	Full Text	129	

The importance of lesson plan in adult education

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Abstract: Every good course design begins with a needs assessment. For our purposes here, we're going to assume you've completed this assessment and you understand what your students need and what your objectives are for the course you're designing. If you don't know your objectives, you're not ready to design your course. With your objectives in hand, course design can be easy. Like any gathering of people for any reason, it's good to begin at the beginning and address who is there, why they've gathered, what they hope to accomplish, and how they'll accomplish it. Design an activity that gives your students an opportunity to practice what they just learned. Activities that involve breaking into small groups to complete a task or to discuss an issue are good ways to keep adults engaged and moving. It is also a perfect opportunity for them to share the life experience and wisdom they bring to the classroom. Be sure to build in opportunities to take advantage of this wealth of relevant information. Activities can be personal assessments or reflections that are worked on quietly and independently; they can be games or role playing; or they can be small group discussions. Choose your activity based on the best way to provide the adults in

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	your class with an opportunity to experience what you just taught. [Zeynab Behzadi, Hamid Mohammadi. **The importance of lesson plan in adult education.** Journal of American Science 2011;7(5):930-934]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** lesson plan**,** adult learning		
131	**Adult learning: Features and functions** [1] Azam Ghaffari, [2] Abbas Emami [1, 2] Marvdasht Branch, Islamic Azad University, Marvdasht, Iran *Corresponding author: khodamoradi121@yahoo.com **Abstract:** A distinguishing characteristic of adult education programs is that program content and language must be suitable and respectful of adult clients. For example, instead of using the word "student" which may imply a traditional teacher/student relationship where a student is subservient to the teacher, all state program materials use the word "learner" or "customer." Using this type of language acknowledges the adults' existing knowledge and real-world experience and makes them the focus of the program. The Pennsylvania Adult Basic and Literacy Education Indicators of Program Quality emphasize the importance of customer satisfaction and learner progress on individualized goals. One quality area explicitly states that "program staff and learners jointly develop, regularly evaluate, and update an instructional plan that incorporates the individual's learning styles and preferences". This is just one example of how learners and staff are equals and collaborate on the learners' participation in the program. Successful adult education programs recognize that adult learner needs and learning styles may require non-traditional methods of teaching and accommodate them whenever possible. This means holding classes and sessions outside of typical working hours for adults that work, providing one-on-one tutoring, group classes, and other methods of delivering services that are flexible. It is also important to hold the classes where it is convenient for adult learners to attend, such as local houses of worship, residential facilities, libraries, or other community centers. Understanding this key principle is difficult sometimes for organizations that have worked in child education, but not in adult education. [Azam Ghaffari, Abbas Emami. **Adult learning: Features and functions.** Journal of American Science 2011;7(5):935-939]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** indigenous knowledge, rural	Full Text	131
132	**Importance of women's participation in rural programs especially micro-credit** [1] Mohammad Reza Rezaei, [2] Hamid Mohammadi [1, 2] Marvdasht Branch, Islamic Azad University, Marvdasht, Iran *Corresponding author: hossein11070@yahoo.com **Abstract:** One of the raised strategy , in order to accelerate investment process and reinforcing financial foundations , and saving , at deprived and rural areas , has been empowering and eradicating poverty of rural societies through efficiency with emphasize on applying micro-credits. Micro-loans as useful tool to fight against poverty and starvation, has proven its capabilities and values to develop these areas. These tools have ability to change and improve human's life, especially poor peoples. Micro loans , saving accounts , and giving various bank services , cause this belief in low income and poor family that , by accessing to these services , their income will increase ,so they can protect themselves against barriers of unexpected problems and their current level of life and also invest on nutrition , housing and their children's education. Accessing to these conditions is among main goals of third millennium program. [Mohammad Reza Rezaei, Hamid Mohammadi. **Importance of women's participation in rural programs especially micro-credit.** Journal of American Science 2011;7(5):940-944]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** participation, micro-credit, rural women	Full Text	132

133	**Utilization Information and communication technologies (ICT) in rural people education** [1] Hamid Mohammadi, [2] Azam Ghaffari [1, 2] Marvdasht Branch, Islamic Azad University, Marvdasht, Iran *Corresponding author: mehran11070@yahoo.com **Abstract:** An important factor influencing the adoption of any new technology is an individual's perception of that technology. It is hypothesized by this research that one of the key perception aspects influencing the adoption of IT is the level of trust that the potential adopter has in the IT system and in those who use IT. Trust can be defined as "an individual's optimistic expectation about the outcome of an event" (Hosmer 1995). There are different aspects of trust related to IT. An individual must first trust that information technologies will work and that IT will be beneficial in accomplishing his/her goals and in completing his/her tasks. An individual must also trust that the information they obtain via IT is accurate and the information they send via IT will not be tampered with and privacy levels will be maintained. [Hamid Mohammadi, Azam Ghaffari. **Utilization Information and communication technologies (ICT) in rural people education.** Journal of American Science 2011;7(5):945-948]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords** information and communication technologies (ICT), education	Full Text	133
134	**Adult education implications and differences with children education** [1] Hamid Mohammadi, [2] Azam Ghaffari [1, 2] Marvdasht Branch, Islamic Azad University, Marvdasht, Iran *Corresponding author: saba11085@yahoo.com **Abstract:** adults, social experiences, many have already learned different values and beliefs in their pronouns have stabilized, so changes in the new act very cautiously. The idea of such a manner that skill and applying them older and longer life is, Similar resistance to accept new ideas will be more and more severe. Thus, the adult criteria for the built and paid for their ideas and beliefs that are forming. Because of these criteria and the beliefs that they are afraid of failure, Therefore, to prevent it, sometimes against the resistance of new phenomena are only the material taught and its face that make reinforced concrete and tangible interference situation is. Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture. [Hamid Mohammadi, Azam Ghaffari. **Adult education implications and differences with children education.** Journal of American Science 2011;7(5):949-953]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords**: Andragogy , education, adult education	Full Text	134
135	**Employment of rural women and its effect on empowerment** [1] Abbas Emami, [2] Mohammad Reza Rezaei [1, 2] Marvdasht Branch, Islamic Azad University, Marvdasht, Iran *Corresponding author: sharif11070@yahoo.com **Abstract:** Rural women constitute about half of the world's population and in the world production supply they have energetic communion and constitute a great part of agriculture workforce. They constitute% 50 of the workforce and they participate in the production of half of the foods in the agriculture section. As an example the rural women constitute about 70 to% 80 of agriculture workforce in sub-Saharan Africa, %65 in Asia, %45 in Latin American & Caribbean, %80 in Nigeria & Tunisia and %80 in India, but their role in	Full Text	135

production system is the men's supplements roles and this causes a big responsibility inside their mother & wife duties and it takes a great time and energy of them. Studies in this field show that women spend about two thirds of their time for production, management & organize of their house as the men spend only one third of their time for such things. Although we are familiar with the rural women's role in the village and family's economic, but they direct & indirectly start a new economic relation, with finding modern jobs & financial independency. Catching loan from financial organizations has forced them to have economic schematization for loan reimbursement and to have intellectual economic behaviors. So after that rural women become active in economic activities. In rural traditional economic, women only have productive role and they don't have any role in economic planning, providence and they don't pay any attention to profits and losses. But in this new condition, for managing affairs in best way, the women have to be active in all of the affairs from production to dispense and also in others economic aspects. In other words, women will not be a productive only; they will contribute in managing of economic activities and will find various economic behaviors.

Micro-credit for rural women

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Abstract: Rural women are among those major groups at society who previously were considered less by planners, due to specific reasons in the past. And this problem is more observable at developing countries. While, by looking at women's history of economic and social life, we can find that this great group, continuously have played basic role in forming economic condition of country. This great group consistent with men have had active role at areas of social-economic activities and always have had major part on economic production of society. Nowadays, supporting family supervisor women is adopted by universal society, as politic, economic a social concern and nearly all countries applied related approaches, and however these efforts have resulted in failure, in so many cases . paying part of cost of life by government or charities , establishing forums to analyze family supervisor women's problems , supplying necessary facilities to grow and improve child's life quality and paying facilities to provide sustainable employment , are among most important approaches to support family supervisor women . Paying credit facilities to access sustainable employment with easy terms at limited time, is one of the most important approaches to support family supervisor women. Because alongside supplying their continues needs, their esteem wouldn't be marred. Currently, this approach is used at many countries and positive results have emerged.

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Importance and role of rural women in rural activities

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Abstract: a positive relationship between women's participation in agricultural and non-agricultural employment of men can be seen, so that in some countries men migration to cities or bringing them on a day wage jobs has led them responsibilities in the absence of their husbands take charge of 30 to 40 percent of work related to home and agriculture. In some areas this figure reaches to 70 percent. Number of factors also led to a kind of common gender division of labor, especially in rural societies and one the most

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veteran of these factors is a particular power and ability of women to provide sustenance. Means participation of women in all stages of development, evaluate needs, identify problems, planning, management, implementation and evaluation is. Equity participation in a patriarchal society was not easily achieved, such matter requires the participation of women, especially rural women in projects is the way that they are concerned. Rural population of Iran always different roles in the production and distribution have been responsible. Agricultural sector, supplier of about one third of employment, food needs of more than Chharpnjm country, half of exports, do not need the agricultural products industry and one-fifth of GDP countries.

[Mehdi Nazarpour, Mohammad Reza Rezaei. **Importance and role of rural women in rural activities.** Journal of American Science 2011;7(5):964-968]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Rural women, Agriculture

Evaluation of energy consumption and special energy required for drying of *Hypericum perforatum L.*

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Abstract: Drying is one of the most important post harvest processes which convert decaying products to resistant preparations so that it increases the storage duration and keeping product quality (food stuff shelflife). *Hypericum perforatum* L. is an important kind of herbs which its Iranian species characterized by high percentage of Hyperisin as the most important substance of its leaves and flowers. It has an important role in curing some of diseases. In this research, the energy consumption and special required energy for drying of *Hypericum perforatum L.* were investigated by using hot air drying method. The experiments were done at four levels of the temperature (40, 50, 60 and 70°C), air velocity at three levels (0.3, 0.7 and 1 m/s) and bed depth at three levels (1, 2 and 3 cm) on factorial experiment design based on completely randomized design with three replications. Based on results with increasing of temperature, air velocity and bed depth, energy consumption was increased. On the other hand, in constant temperature, with increasing of air velocity special required energy was increased but in constant air velocity, with increasing of temperature, increased.

[Hossein AhmadiChenarbon, Saeid Minaei, Akbar Arabhosseini, Ali Motevali. Evaluation of energy consumption and special energy required for drying of *Hypericum perforatum L.*. Journal of American Science 2011;7(5):969-]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: *Hypericum perforatum* L., energy consumption, special required energy

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A survey in antecedents of cynicism about change in a judicial organization

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Abstract: Cynicism about change is defined as pessimistic viewpoint about change efforts being successful because those responsible for making change are blamed for being unmotivated, incompetent, or both. It may be caused by, According to researchers, either personality traits or situational factors. Based

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on this assumption, we selected 132 employees from a judicial organization and gathered necessary data by five questionnaires. Structural equation modeling (SEM) results showed that participation in decision making, organizational justice (all positively), hostile personality and psychological contract violation (all negatively), have significant impact on cynicism about change and they aggregately can explain 41 percent of its variance.

[Mohammad Javad Hozoori, *, Mojtaba Rafiei, Pouri Safari. A survey in antecedents of cynicism about change in a judicial organization. Journal of American Science 2011;7(5):974-982]. (ISSN: 1545-1003). http://www.americanscience.org

Keywords: cynicism about change, antecedents, SEM, judicial organization.

| 140 | **Correlation of MRP8/MRP14 and S100A12 with disease activity in rheumatoid and psoriatic arthritis** | Full Text | 140 |

Manal Othman, Soma Sherif Abd El Gawad*, Hala Garieb**, Essam Faried***, and Mohammad Abdul-Naiem****

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Abstract: *Objective:* To evaluate myeloid-related protein MRP8/MRP14 (S100 protein) and S100A12 in the serum and synovial fluid of rheumatoid arthritis (RA) and psoriatic arthritis (PsA) patients and its relation to local and systemic parameters of disease activity. *Methodology:* Thirty RA patients (Group I), twenty five PsA patients (Group II) and ten controls (Group III) were included in the study. The patients were subjected to through history taking and clinical examination. Synovial fluid (SF) aspiration was done from twenty RA patients and ten PsA patients. ESR, CRP and synovial fluid analysis for white blood cell count, lymphocytes%, and acute phase serum amyloid (A-SAA) were performed. MRP8/MRP14 and S100A12 were assessed with ELISA technique in serum and synovial fluid samples. *Results:* Serum level of MRP8/MRP14 and S100A12 were elevated in Groups I and II in comparison to group III. The serum and synovial levels of MRP8/MRP14 and S100A12 in Group I and II showed no significant difference. The MRP8/MRP14 and S100A12 in group I showed significant positive correlation with disease activity score (DAS), ESR, CRP, SF MRP8/MRP14, SF S100A12, SF WBCs, lymphocytes% and A-SAA. The SF MRP8/MRP14 and SF S100A12 in group I showed positive significant correlation with ESR, DAS, SF-WBCs, lymphocytes and A-SAA. Group II showed a positive significant correlation of MRP8/MRP14 and S100A12 with ESR, CRP, DAS and PAS index. The SF- MRP8/MRP14 and SF S100A12 in group II showed a positive significant correlation with local inflammatory markers. *Conclusions:* The elevated MRP8/MRP14 and S100A12 in the serum and synovial fluids of patients with RA and PsA showed a significant correlation with local and systemic disease activity parameters. So, it can be used to monitor disease activity and patient's response to treatment.

[Manal Othman, Soma Sherif Abd El Gawad, Hala Garieb, Essam Faried and Mohammad Abdul-Naiem: Correlation of MRP8/MRP14 and S100A12 with disease activity in rheumatoid and psoriatic arthritis. Journal of American Science 2011;7(5):983-994]. (ISSN: 1545-1003). http://www.americanscience.org.

Key Words: Rheumatoid arthritis (RA), Psoriatic arthritis (PsA), Myeloid- related protein (MRP8/MRP14), S100A12.

| 141 | **Characteristics of rural women in third world** | Full Text | 141 |

[1] Azam Ghaffari, [2] Abbas Emami

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*Corresponding author: khodamoradi121@yahoo.com

Abstract: Women, especially in villages of fewer possibilities in terms of investment, credit and enjoy the power. Miran role of rural women more than men, influenced by various factors, conditions and economic,

social, cultural and ecological is. Rural women, either directly (production of crops, livestock, handicrafts and rural) or in terms of helping the agricultural sector (as labor) considerable potential in the community are considered. About 5/6 million women in the production Iran's agricultural sector involved. Activities related to planting, and harvesting, processing and preparation of animal feed, preservation and care of livestock and poultry and some related activities including marketing and sales field role and participation of rural women to sue. One of the problems that governments and governments today should know the world should talk TVs? Especially in rural undeveloped countries. In these countries for lack of proper planning policies and improving quality of life of people in these areas, rural migration to cities has increased significantly is Urbanization and the incidence and growth problems and mental disorders, social, cultural and economic sectors especially in agriculture and animal husbandry provides guidelines and rural development requires a deep study and research in this field is that the governments can Planning and economic policy, social and cultural to help.

142	**Using of Distance learning in agricultural education** [1] Zeynab Behzadi, [2] Mehdi Nazarpour [1, 2] Marvdasht Branch, Islamic Azad University, Marvdasht, Iran *Corresponding author: leila11070@yahoo.com **Abstract:** Distance education courses also vary greatly in scope, level, and length. Some have a few assignments and require only a few months to complete, while others have a hundred or more lesson assignments requiring three or four years of conscientious study. Since 1890, more than 130 million Americans have studied at DETC member institutions, including Franklin D. Roosevelt, Walter P. Chrysler, Walter Cronkite, Barry Goldwater, Charles Schulz, and many other distinguished alumni of DETC members. Unlike most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority. [Zeynab Behzadi, [2] Mehdi Nazarpour. **Using of Distance learning in agricultural education.** Journal of American Science 2011;7(5):999-1002]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** Distance Learning, Distance education, agricultural activities	Full Text	142
143	**Rural women empowerment: definitions and Criteria** [1] Abbas Emami, [2] Mohammad Reza Rezaei [1, 2] Marvdasht Branch, Islamic Azad University, Marvdasht, Iran *Corresponding author: allahyari121@yahoo.com **Abstract:** Rural women are among those major groups at society who previously were considered less by planners, due to specific reasons in the past. And this problem is more observable at developing countries. While, by looking at women's history of economic and social life, we can find that this great group, continuously have played basic role in forming economic condition of country. This great group consistent with men have had active role at areas of social-economic activities and always have had major part on economic production of society. Nowadays, supporting family supervisor women is adopted by universal society, as politic, economic a social concern and nearly all countries applied related approaches, and however these efforts have resulted in failure, in so many cases. paying part of cost of life by government or charities , establishing forums to analyze family supervisor women's problems , supplying necessary	Full Text	143

facilities to grow and improve child's life quality and paying facilities to provide sustainable employment , are among most important approaches to support family supervisor women . Paying credit facilities to access sustainable employment with easy terms at limited time, is one of the most important approaches to support family supervisor women. Because alongside supplying their continues needs, their esteem wouldn't be marred. Currently, this approach is used at many countries and have emerged positive results. [Abbas Emami, Mohammad Reza Rezaei. **Rural women empowerment: definitions and Criteria.** Journal of American Science 2011;7(5):1003-1007]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: empowerment, rural women

New Look to the indigenous knowledge in rural

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Full Text

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Abstract: Indigenous knowledge is set of all knowledge and skills that people enjoy in one geographical area (in one environmental conditions) that most of their skills and knowledge be transmitted to next generation , and new generation would be adapted with them and add to it . The lack of indigenous knowledge about indigenous practices in many technologies in the developing countries will lead to failure. So attention to indigenous knowledge as a knowledge that is result of many thousand years experience is important in development of villages. Rural benefactors, the people who had communion in development of villages, can take efficient steps in rural development if they pay attention in the process of rural schematization for its development. Indigenous knowledge has different aspects, such as hygiene and treatment, medical plants, linguistics, livestock and agriculture, art and mystery and unprofessional things. Indigenous knowledge is local knowledge that is restricted to one specific culture and/or certain society. Indigenous knowledge is different with scientific knowledge that was established by universities and scientific communities. This knowledge is basis for decision making at field of agriculture, health, education, food and natural sources.
[Mehdi Nazarpour, Mohammad Reza Rezaei. **New Look to the indigenous knowledge in rural.** Journal of American Science 2011;7(5):1008-1013]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: indigenous knowledge, rural

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Effect of Mineral and Organic Nitrogen Fertilization and K-Humate Addition on Soil Properties (Orchard Field Experiment)

Full Text

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Abstract: This study was carried out through two successive seasons (2008 and 2009) in a private orange orchard in Qalubia governorate, Egypt in a three years old Navel orange trees budded on sour orange rootstock on clay loam soil (Typic Torriorthents). Planting distance was 2.5×5.0 meters apart and flood irrigation was used by river Nile water. Two nitrogen rates were used 150 and 300 g N/tree/year in three form, 100% mineral nitrogen (M.N.) as ammonium nitrate, 100% organic nitrogen (O.N.) as compost and mixed 50% M.N.+ 50% O.N. each of these treatments with or without K-humate addition (6 kg/feddan). All fertilization treatments were divided into equal five doses added every two months from February to October during the two seasons. The obtained results showed that soil pH values increased significantly with treatments of O.N. and mixed N form. Soil saturation percent increased significantly with organic nitrogen treatments. The highest value of soil organic matter content was obtained with treatment of 300g N/tree/year in organic form and with addition of K-humate (4.7%). There is not clear role of humic acid at 6 kg/feddan on the soil organic matter content. Total soil N content recorded higher significant values with the nitrogen addition as organic form compared with mineral form. Regarding to the N rate treatments of

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300 g N/tree/year gave higher significant total soil N content than of 150 g N/tree/year. The treatment of organic nitrogen form at 300 g N/tree/year with K-humate addition had highest significant soil available P and K compared with all other treatments in both seasons. In spite of the content of K-humate of K was 7%, there is no stable trend for the K-humate application for the two seasons. There were inconstant trends in soil available Ca, Mg, Fe, Mn and Zn.

The Response of Nonbearing Navel Orange Trees for Mineral and Organic Nitrogen Fertilization Treatments and K-Humate Addition

Full Text

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Abstract: T This study was carried out through two successive seasons (2008 and 2009) in a private orange orchard in Qalubia governorate Egypt in a three years old Navel orange trees budded on sour orange rootstock on clay loam soil (Typic Torriorthents). Planting distance was 2.5×5 meters apart and flood irrigation was used by river Nile water. Two nitrogen rates were used 150 and 300 g N/tree/y in three forms 100% mineral nitrogen (M.N.) as ammonium nitrate, 100% organic nitrogen (O.N.) as compost and mixed (50% M.N. + 50% O.N.) each of these treatments with or without K humate addition (6 kg/feddan). All fertilization treatments were divided into equal five doses added every two months from February to October during the two seasons. The obtained results showed that the highest stem thickness increment percentage was recorded by mixed nitrogen form (50% M.N. + 50% O.N.). Mixed nitrogen form with K-humate recorded the highest significant value of plant height increment percentage in the first season, but in the second season, using nitrogen form at 150g N/tree/y without K-humate recorded the highest significant value. Leaf N content had higher significant values with M.N. treatments. Leaf P content showed insignificant differences among treatments. Mixed N source at 300g N/tree/y without K-humate recorded a higher significant value of leaf K content, in the second season compared with other treatments. Leaf Ca content showed a higher significant value by organic and mixed N form treatments in the first season. Leaf Mg, Fe, Mn and Zn contents increased significantly with M.N. treatments in the first season. While in the second season leaf Fe content had a higher significant value with O.N. treatments. Leaf Mn content illustrated the lowest significant mean level by using N form at 150g N/tree/y treatment. While, leaf Zn content recorded a higher significant value with mixed nitrogen source at 150g N/tree/y with K-humate addition compared with all other treatments. From this results we recommended that the mixed sources of N fertilizer (50% M.N. + 50% O.N.) at 150g N/tree/y is the best N fertilizer, and the application of K-humate or humic acid at commercial rate is not recognized for the young Navel orange trees in clay loam (Typic Torriorthents) soil.

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Effective factors on rural women's employment

Full Text

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Abstract: Rural women are among those major groups at society who previously were considered less by planners, due to specific reasons in the past. And this problem is more observable at developing countries. While, by looking at women's history of economic and social life, we can find that this great group, continuously have played basic role in forming economic condition of country. This great group consistent with men have had active role at areas of social-economic activities and always have had major part on economic production of society. Nowadays, supporting family supervisor women is adopted by universal society, as politic, economic a social concern and nearly all countries applied related approaches, and however these efforts have resulted in failure, in so many cases . Supplying credits and analyzing credits approaches cause opportunity to activate poor men's working power , establishing field for sustainable production and income , prevent usurers and pre shoppers of agriculture productions to plunder poor rural men and finally empowering poor people especially women who can work but were deprived to have capital and work tools , and extension accordance to their activities such as needs assessment, identifying target group , organizing poor people , giving needed specialized and public training and … have important role on effectiveness and make effective activities of these credits.

Proper use of learning styles in adult education

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Full Text

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Abstract: There are many tests available to help you and your students discover your best learning style. Generally speaking, however, if you are someone who is more likely to think in pictures, prefer to meet with someone in person, and are more likely to want visual diagrams when completing a project you have tendencies towards visual learning. Similarly, if you are more likely to think in terms of sounds, prefer to speak on the phone with someone, and want verbal instructions then you tend towards auditory learning. Finally, if you are more likely to think in terms of moving images like mini-movies in your mind, prefer to participate in an activity when you meet to speak with someone, and tend to jump right into a project without reading directions you tend towards tactile/kinesthetic learning. In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.

Application of Learning Styles in education

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Full Text

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Abstract: One of the aspects of flexible space is that individuals can, regardless of their residence to the study and advancing their knowledge and skills pay. For example, adults in remote villages should like people who live in the city use of educational programs. After flexibility in other places is that the issue of specificity of location is not considered primarily educational. Educational opportunities for certain age should not use it for all regardless of their age, is possible. In fact, educational programs must use people of

	different ages to prepare. No adult should not only be deprived of education because of the necessary conditions for admission in the class does. Of course this is not such a person without academic records to participate in university classes is accepted, Adoption order is that the adults in educational programs at different levels, according to the possibility of using the opportunity that is provided must be based on the experience and knowledge and their knowledge is. Generally speaking, however, if you are someone who is more likely to think in pictures, prefer to meet with someone in person, and are more likely to want visual diagrams when completing a project you have tendencies towards visual learning. Similarly, if you are more likely to think in terms of sounds, prefer to speak on the phone with someone, and want verbal instructions then you tend towards auditory learning. [Mehdi Nazarpour, Abbas Emami. **Application of Learning Styles in education.** Journal of American Science 2011;7(5):1043-1047]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** learning styles, adult learning		
150	**Indigenous Knowledge toward agricultural development** Azita Zamani [1] and Nahideh Erfanirad[2] [1, 2] Mahabad Branch, Islamic Azad University, Mahabad, Iran *Corresponding author: mehran11070@yahoo.com **Abstract:** Imbalance population growth, non-sustainable efficiency of natural sources and unequal distribution of resources, goods and services made involved societies in confusing issues and impasses. In these countries , inappropriate sampling of abroad countries and inordinate imports (e.g. heterogeneous and non-indigenous technology) devastated independent collection of micro local systems , and instead has established heterogeneous and dependent system to global economy system , that obviously couldn't supply people's needs. Since , this development process is formed without considering social , cultural and environmental consequents so isn't continuing and human have to find strategies which can make development sustainable and humane Indigenous knowledge owners of world in current age (which known as information age) have valuable experiences from industry age and from inappropriate exploitation of their natural sources. These countries have learned that exporting produced goods is better than selling petroleum. [Sharareh Khodamoradi and Mohammad Abedi. **Attention to Indigenous Knowledge toward agricultural development.** Journal of American Science 2011;7(5):1048-1052]. (ISSN: 1545-1003). http://www.americanscience.org. **Keywords:** indigenous knowledge	Full Text	150

Robust Control of an Active Suspension System Using H₂ & H∞ Control Methods

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Abstract: In this paper, H2 & H∞ control for an active suspension system are presented. These Controllers are designed for the order reduced model of the plant that makes the design problem so easy, But preserves the performances and stability of the nominal closed loop system. Some constraints on the Input and output sensitivity functions are considered. The results show control specifications are met to large extent with both methods.
[Fatemeh Jamshidi, Afshin Shaabany. Robust Control of an Active Suspension System Using H₂ & H∞ Control Methods. Journal of American Science 2011;7(5):1-5]. (ISSN: 1545-1003). http://www.americanscience.org.

1. Introduction

An active suspension system is used for disturbance attenuation in a large frequency band and in the presence of the load variation. Active suspension systems are currently of great interest in both academia and industry. A literature survey on suspension system shows that several models and controllers have been developed in attempts to enhance and improve the ride and handling qualities in today's vehicle Amirifar (2003), Ray (1991). Linear controllers are the main group of these controllers. In the linear control philosophy, it is assumed that the system's state exhibit only small variations around the equilibrium point, so that a linear approximation model can be used. Existing linear controllers range from PID to robust multivariable controllers Thompson (1989), Landau (1995), Landau (1995), Amirifar (2006), Thompson (1976), Kuo (1999), Aghaie (2007)1]. In Landau (1995) robustness analysis and synthesis methods based on stochastic stability robustness for a quarter-car model was presented that can be applied to higher order active suspension systems. However, such approach requires large feedback gain and reasonable phase must be selected. In Landau (1995) the centralized/ local optimal output feedback controller (CLOFC) was developed for active suspension systems. In Amirifar (2006) and Thompson (1976) optimal control theory was applied to the design of an active suspension system. The used performance index is based on ride quality, suspension deflection, and tire deflection. In Thompson (1989) a combination of the H∞ and LQR methods was used to improve the system performance when it is subject to external disturbances, e.g., road irregularities, and parameter uncertainties, e.g., vehicle weight as payload varies. Even though this method provided better performance, its application to a vehicle suspension

System is difficult, since the H∞ method

often results in complex high- order controllers even the design model is of reasonable size Karnopp (1983). In order to reduce the order of high-order controllers, controller order reduction techniques can be used. In Sunwoo (1991) a new controller order reduction technique with stability and performance preservation via LMI optimization was presented and implemented on an active suspension system. The controller order reduction problem was reduced to an LMI problem, so it can be solved efficiently. The fixed parts of the high-order controller which should be preserved in the reduced-order controller, and many other specifications on the reduced-order controller that can be expressed as LMIs constraints, can easily be treated.

The novelty of this paper is the presentation of the classical H₂ & H∞ control schemes for the active suspension system. The control specifications are enforced in the H₂ & H∞ problems as the constraints on the input and output sensitivities. The desired performances are obtained by precise selection of the weighting functions that may affect the stability of the closed loop system in turn. In this paper, the reduced order model of the system is used to design the controllers, but performance indexes and stability are examined for the main system. The simulation results for both of H₂ & H∞ controllers are given and compared.

The reminder of this paper is organized as follows. In section 2, an active suspension system is introduced. Section 3 is devoted to the H₂ & H∞ controller design for robustifying, achieving the wanted performances and the stability margins. Finally, section 4 presents the concluding remarks.

2. Active suspension system

The schematic diagram of the active suspension system is shown in Figure 1.
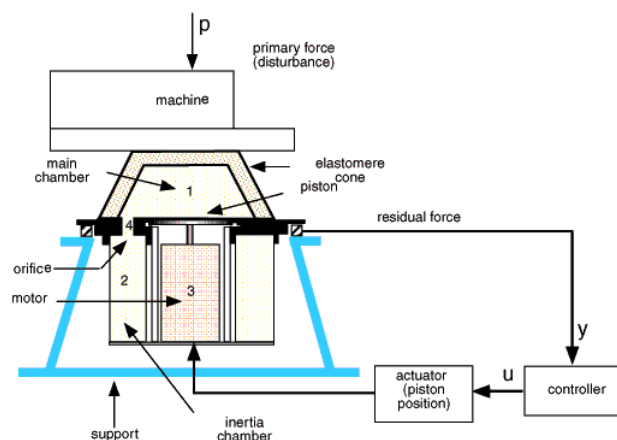
Figure 1. Schematic diagram of the active suspension system

Figure 2. Magnitude of the frequency response of the primary path

Two models for the system will be identified, corresponding to the primary and secondary path. The input of the primary path (excitation of the shaker), u is the input of the secondary path (proportional to the piston position) and y is the system output (residual force).

The active hydro-suspension system reduces the machine vibration at the resonance frequency. The principal parts of the suspension system are given below:

1.   an elastomere cone that encloses the main chamber filled with silicon oil (1);
2.   an inertia chamber enclosed with a flexible membrane (2);
3.   A piston (3) that is fixed on a DC motor. When the position of the piston is fixed, the suspension system is passive;
4.   An orifice (4) that allows oil flow between two chambers.

The principal idea of the active suspension is to change the elasticity of the system in order to absorb the vibrations generated by the machine that we want to isolate. For the experimental purposes the machine is replaced by a shaker which is driven by a computer generated control signal.

The output of the system is the measured voltage corresponding to the residual force. The control input drives the position of the piston via an actuator. The transfer function, F(s) between the excitation of the shaker and the residual force is called the primary path. The secondary path is defined as the transfer function between the control input and the residual force.

The magnitude analysis of the frequency response of the primary path obtained by spectral analysis is shown in Figure 2, this analysis shows that there are several vibrational modes, with the first mode at 31.47 Hz and the second mode around 160Hz are the most important ones.

The structure of the controlled active suspension system is given in the Figure 3.
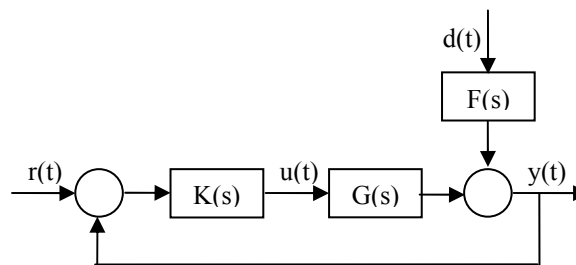
Figure. 3. Block diagram of the controlled active suspension system

In this section, the design of a controller for the active suspension system is considered. A 15-th order continuous-time model of the secondary path G(s) is used for scheme. G(s) consists of several vibration modes, whereas the first mode around 30 Hz, and the second mode around 160 Hz are the most important ones. In order to consider the effects of the most important modes during the controller design procedure, a low-order model, namely, $G_1(s)$ is obtained by truncating the high frequency modes. Figure 4 shows the magnitude Bode plot of G(s) and $G_1(s)$.
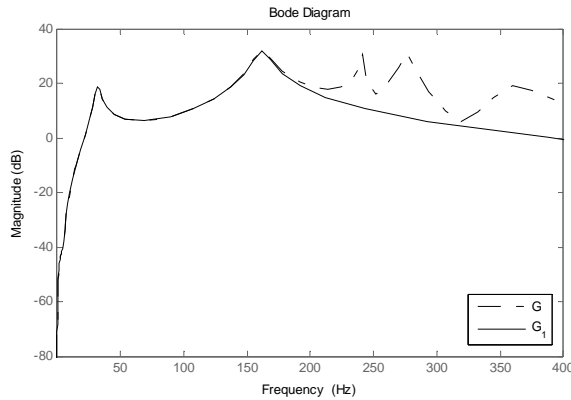
Figure 4. The magnitude Bode plot of G(s) and $G_1(s)$.

3. Controller design and simulation results

The control goal of this system is to compute a linear controller which minimizes the residual force around the main vibration modes of the primary path model and to try to distribute the amplification of the disturbances over the higher frequencies.

The control objective can be presented in terms of the constraints for the closed-loop sensitivity functions. The output sensitivity function of the nominal closed loop system, $S_{yp}(s)$ is defined as

$$S_{yp}(s) = \frac{1}{1 + G(s)K(s)} \qquad (1)$$

The input sensitivity function of the nominal closed loop system, Sup(s) is defined as

$$S_{up}(s) = -\frac{K(s)}{1 + G(s)K(s)} \qquad (2)$$

The modulus of the output and input sensitivity functions must be bounded above in the frequency domain by the special constraints. Figure 5 and Figure 6 show the magnitude Bode plot of the constraints on the input and output sensitivity functions used in the controller designs.

The resulting 12-th order H∞ Controller achieves the control specifications approximately. The nominator and denominator of K(s) are given below. Figure 7 and 8 show the magnitude bode plot of the sensitivity functions obtained by controller implementation.

$$d_{K_\infty}(s) = s^{12} + 1996.8s^{11} + 4.2813 \times 10^6 s^{10} + 4.8207 \times 10^9 s^9$$

$$+ 5.5322 \times 10^{12} s^8 + 3.4406 \times 10^{15} s^7 + 2.4111 \times 10^{18} s^6$$

$$+ 6.4411 \times 10^{20} s^5 + 1.8 \times 10^{23} s^4 + 2.5085 \times 10^{25} s^3$$

$$+ 3.4302 \times 10^{27} s^2 + 1.9448 \times 10^{29} s + 3.2362 \times 10^{30}$$

$$n_{K_\infty}(s) = 2.302 \times s^{11} + 9801 \times s^{10} + 1.8232 \times 10^7 \times s^9$$

$$+ 2.8513 \times 10^{10} s^8 + 2.9356 \times 10^{13} s^7 + 2.7491 \times 10^{16} s^6$$

$$+ 1.4999 \times 10^{19} s^5 + 9.3233 \times 10^{21} s^4 + 1.6425 \times 10^{24} s^3$$

$$+ 3.6921 \times 10^{26} s^2 + 3.5976 \times 10^{28} s + 1.0494 \times 10^{30}$$
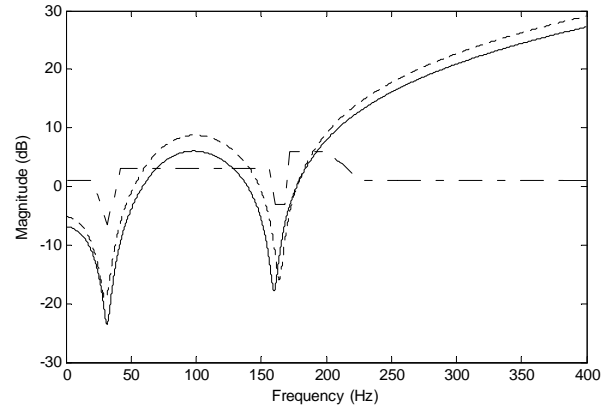
Figure 5: Output sensitivity constraint (dashed-dot) and the inverse of the Output sensitivity weighting function of H∞ Controller (dotted) and the inverse of the Output sensitivity weighting function of H₂ Controller (solid)
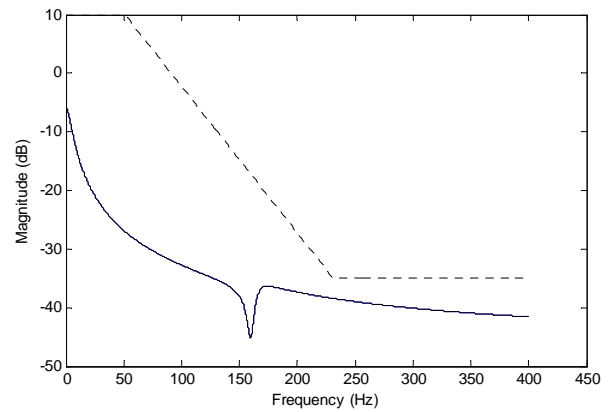
Figure 6. Input sensitivity constraint (dotted) and the inverse of the Output sensitivity weighting function of H∞ Controller and H₂ Controller (solid)
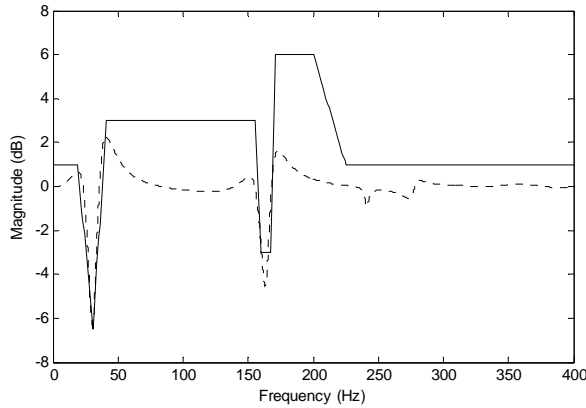
Figure 7. Output sensitivity function constraint (solid) and output sensitivity function (dotted), with H_∞ controller

The resulting 10-th order H2 Controller achieves the control specifications approximately. The nominator and denominator of K(s) are given below. Fig. 9 and 10 show the magnitude bode plot of the sensitivity functions obtained by controller implementation.
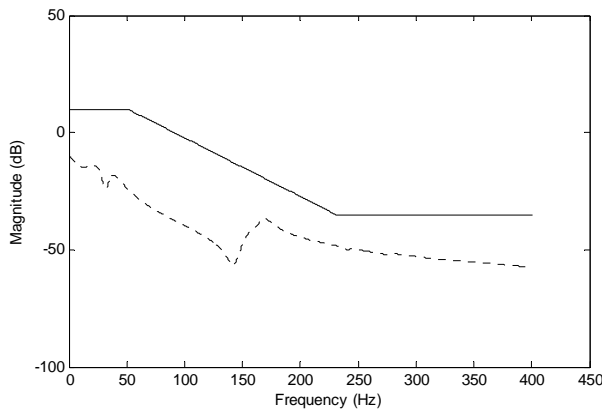
Figure 8. Input sensitivity function constraint (solid) and input sensitivity function (dotted), with H∞ controller

$$n_{K_2}(s) = 2.1505s^9 + 9519.1s^8 + 1.832 \times 10^7 s^7 + 2.7996 \times 10^{10} s^6$$
$$+ 2.8233 \times 10^{13} s^5 + 2.4727 \times 10^{16} s^4 + 1.2337 \times 10^{19} s^3$$
$$+ 6.4232 \times 10^{21} s^2 + 5.0442 \times 10^{23} s + 1.0294 \times 10^{25}$$
$$d_{K_2}(s) = s^{10} + 1942.3s^9 + 4.14 \times 10^6 s^8 + 4.5216 \times 10^9 s^7 + 5.126 \times 10^{12} s^6$$
$$+ 2.9771 \times 10^{15} s^5 + 2.0559 \times 10^{18} s^4 + 4.081 \times 10^{20} s^3 + 8.1062 \times 10^{22} s^2$$
$$+ 5.1225 \times 10^{24} s + 8.7689 \times 10^{25}$$

Figure 9. Output sensitivity function constraint (solid) and output sensitivity function (dotted), with H_2 controller
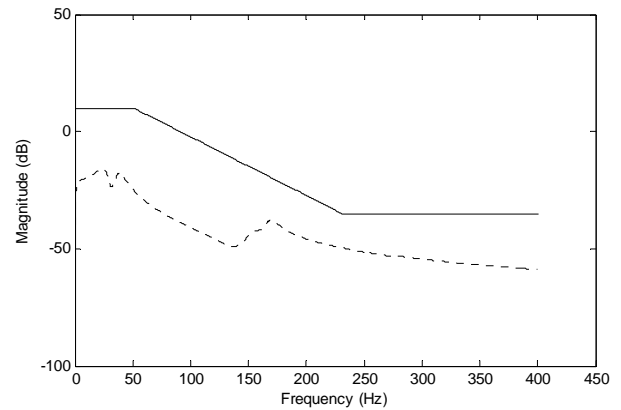
Figure 10. Input sensitivity function constraint (solid) and input sensitivity function (dotted), with H_2 controller

The gain margin and phase margin of the controlled system are presented in table. 1. Results show that the controlled system is stable and is sufficiently far from stability margins.

Table. 1 stability margins

	H_2 Controller	H_∞ Controller
Gain Margin	5.0897	6.5464
Phase Margin	109.9230	130.5152

3.   Conclusion

An application of the H_2 & H_∞ controls to an active suspension system has been presented. By translating the control goals on the input and output sensitivity functions, a mixed sensitivity problem has been obtained. The reduced order model of the system is used to design the controllers, but performance indexes and stability are examined for the main

system. The final solutions are the 10th-order H_2 controller and the 12th-order H_∞ controller that achieve all design specifications and have good stability margins. It is clear that the H_∞ controller has higher order than the H_2 controller but give better performances.

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Biotechnological Approach for Lignin Peroxidase (LiP) Production from Agricultural Wastes (Rice Husk) by *Cunninghamella elegans*

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Abstract: Peroxidases are essential enzymes in biodegradation of lignin which have been investigated intensively in fungi. Six fungal isolates were isolated from rice husk and screened for their activities to produce an extracellular lignin peroxidase enzyme (LiP). One isolate (identified as *Cunninghamella elegans*) was found to be the most potent one. The maximum LiP productivity was under static condition (LiP activity= 15800 U L^{-1}), at pH 6 (LiP activity= 14200 U L^{-1}), 30°C (LiP activity= 15300 U L^{-1}) and after 14 days incubation period (LiP activity= 14300 U L^{-1}). LiP Purification protocols involved several steps including firstly, the precipitation of LiP with 80% ammonium sulphate with a fold of 2.43 and enzyme activity of 89500 U L^{-1}. Secondly, LiP was further purified using Sephadex G-100 fractionation with a purification fold of 2.76 and enzyme activity of 112200 U L^{-1}. Finally, the molecular mass of purified LiP was estimated at 50 kDa. using SDS-PAGE technique.
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1. Introduction

The increasing expansion of agro-industrial activity over the last 40 years has led to the accumulation of a large quantity of lignocellulosic residues all over the world (Villas-Boas *et al*., 2002). Agriculture has played and will continue to play an important economic role in Egypt. Egyptian agriculture is traditionally based on crop productions, particularly cotton, wheat, vegetables, rice and bean. By-products derived from these sub-sectors have and will continue to provide large quantities of valuable nutrients to sustain livestock, particularly ruminant production in Egypt. However, they are known mostly containing lignocellulosic materials which are a complex structure of lignin. Zanirun (2008) reported that removal of lignin is important in order for enzymatic hydrolysis to occur as it acts as a barrier to most of agricultural wastes. Lignin is a complex aromatic amorphous polymer, most commonly derived from wood and is an integral part of plant cell walls and is the second most abundant biopolymer after cellulose, employing 30 % of non-fossil organic carbon and constituting from a quarter to a third of the dry mass of wood (Boerjan *et al.*, 2003). It is relatively hydrophobic and aromatic in nature and is known for its heterogeneity in lacking a defined primary structure (D'Souza Ticlo, 2008). It is an essential part of the plant cell wall, imparting rigidity and protecting the easily degradable cellulose from attack by pathogens (Lankinen, 2004). Eriksson *et al*. (1990) also stated that lignin is a three-dimensional heterogeneous polymer stored in the plant cell wall of all vascular plants. It is the most abundant renewable aromatic biopolymer in the biosphere. Owing to its recalcitrant nature, lignin is remarkably resistant to degradation by most microorganisms, an important factor limiting the rate of degradation of lignocellulosic materials. Studies on lignin biodegradation are important for possible biotechnology application, since lignin polymers are major obstacles to the efficient of utilization of lignocellulosic materials in a wide range of industrial processes. The lignocellulosic biomass from plants is a renewable source of food, energy and chemicals. It accounts for more than 60% of the total biomass production (Kuhad *et al.*, 1997). Lignocellulosic waste material is produced in huge amounts in agriculture, forestry and in the pulp and paper industry. The use of this waste is an important way to recycle carbon to energy and food. The lignocellulosic material of plants consists of three main components, namely cellulose, hemicelluloses and lignin.

Ligninase or lignin peroxidase (LiP) is gaining importance for its biotechnological application due to its integral role in the biodegradation of lignin, lignin related aromatic compounds and the potential use in industrial processes such as biopulping, biobleaching and bioremediation. (LiP) has been extensively studied and has been reported that its production was by several fungal isolates (Zanirun, 2008).

Due to its complicated structure and non-hydrolysable bonds, lignin is more difficult to break

down than cellulose or hemicelluloses. The molecular mass of lignin is about 100 kDa which prevents its uptake inside the microbial cell. Thus, the biological degradation of macromolecular lignin must occur through the activity of extracellular enzymes (Argyropoulos and Menachem, 1997). In 2004, Kareem and Akpan reported that the use of agricultural by-products as substrate for enzyme production was cheap and could facilitate large scale production of industrial enzymes in the tropics. Obligate and facultative fungi from lignocelluloses substrates are an important source of lignin-degrading enzymes (Bucher *et al.*, 2004; Pointing and Hyde, 2000). Fungi play a mostly saprophytic role to release nutrients which can again be used by plants and animals as organic sources for metabolism (Raghukumar, 2004). This role involves the degradation and mineralization of lignocellulosic substrates and fungi that do so are termed as lignicolous or lignin-degrading fungi (D'Souza Ticlo, 2008). The lignin degrading fungi initiate the process of lignin degradation using a specialized set of enzymes, i.e., the lignin-degrading enzymes, which include the heme-containing peroxidases.

A lignocellulosic substrate (wheat straw and hemp woody core) promotes the production of LiP of *P. chrysosporium* under culture conditions, in which, N and C are non-limiting (Kapich *et al.*, 2004). Peroxidases catalyze the oxidation of substrates using H_2O_2 as a final electron acceptor. All peroxidases share the same catalytic mechanism consisting of three steps. First, the ground state ferric peroxidase reacts with H_2O_2 to yield two electron oxidized intermediate known as the compound I. Then, compound I is reduced by an exogenous substrate in one electron reaction to another enzyme intermediate called compound II, which is subsequently reduced back to the ground state by another substrate molecule, also, in one electron reaction (Verdin *et al.*, 2006).

Under natural conditions fungi are able to grow on many substrates difficult to exploit by more rapidly growing organisms such as bacteria. Growth on complex substrates is based on the secretion of extracellular enzymes (Lankinen, 2004).

Guo (2001) and Shen *et al.* (2005) isolated the LiP enzyme by precipitation with ammonium sulphate and the enzyme was further purified by fractionation on three steps of chromatography, cation exchange, hydrophobic interaction and anion exchange to obtain an electrophoretically homogenous pectinase. The molecular weight of the purified enzyme was estimated by SDS-PAGE.

2. Material and Methods
2.1. Rice husk preparation and cultivation

The rice husk was obtained from Mansoura governorate of Egypt. It was homogenized using sterile mortar and pestle and passed through sterile stainless steel sieves of 200 μm and 100 μm in succession, followed by washing with sterile distilled water. The particles were then plated on potato dextrose agar (PDA) supplemented with 10% antibiotic solution (contained 1 gm of penicillin in a combination with 1 gm of streptomycin sulphate in 100 ml of sterile distilled water) to prevent bacterial growth (D'Souza Ticlo, 2008). The plates were then incubated at 25°C for 4-7 days. After the end of incubation period, six fungal isolates were isolated and purified.

2.2. Media preparation for enzyme production

The culivation medium (production medium) of the fungal isolates contained 4.5% (w/v) rice husk, 1.5% yeast extract, 1% glucose, 0.25% NH_4Cl, 0.05% thiamine chloride, 0.2% KH_2PO_4, 0.2% $MgSO_4.7H_2O$, 0.01% $CaCl_2$, and 0.05% KCl. Tap water was used for preparation of the medium and the pH was adjusted to 6. Erlenmeyer flasks (250 ml) containing 100 ml of medium were inoculated with 1 cm square agar piece ($8x10^6$ spores/ml) from an actively growing fungal isolates on PDA and incubated at 25°C for 7 days (Dayaram and Desgupta, 2008).

2.3. Enzyme extraction

The enzyme extraction was carried out according to the method described by Dayaram and Desgupta (2008). Briefly, cultures were harvested after 7 days, filtered and clarified by cooling centrifugation at ~12000 x*g* for 20 min at 4°C to remove the mycelia and enzyme activity was assayed.

2.4. Lignin peroxidase activity assay

Lignin peroxidase (LiP) was determined by monitoring the increase in absorbance (A_{310}) due to the oxidation of Veratryl alcohol to veratraldehyde at 37°C (Tien and Kirk 1988). The reaction mixture (2.5 ml) contained 500 μl enzyme extract (previously prepared as mentioned above), 500 μl H_2O_2, 500 μl Veratryl alcohol solution and 1.0 ml sodium tartarate buffer, pH 3.0 and LiP activity was calculated from the molar extinction coefficient ( ) of 9300 mM cm^{-1} (D'Souza Ticlo, 2008). LiP was expressed as enzyme units per liter (U L^{-1}), where one unit of enzyme activity is defined as the amount of enzyme oxidizing 1 μmol of substrate per minute. One fungal isolate was selected as the most potent isolate and sub-cultured to be identified.

2.5. Identification of the fungal isolate

The most potent fungal isolate was characterized and identified at Regional Center of Mycology and Biotechnology (Al-Azhar university, Cairo, Egypt) for further identification. The identification method was based on the fungal identification as described by Domsch *et al.* (1993) and Samson *et al.* (2000).

2.6. Factors affecting LiP productivity

The effects of pH, agitation, incubation time and temperature on the production of the crude enzyme were studied. In each experiment the optimum conditions deduced from the previous experiments were considered.

2.7. Protein estimation

Protein concentration was determined according to Bradford (1976) method. To 30 µl of sample, 900 µl of Bradford's reagent (Bio-Rad, CA, USA) were added and incubated at room temperature for 30 min. The absorbance was recorded spectrophotometrically at 595 nm. Bovine serum albumin (Sigma) was used for standard curve plotting.

2.8. Ammonium sulphate fractionation

Ammonium sulphate was added slowly to the culture filtrate with stirring at 4°C to 80% saturation. The mixture was stored overnight at 4°C, to allow the protein to precipitate. The solution was then centrifuged at 17000 x*g* at 4°C for 30 min. The precipitate was dissolved in distilled water to a final volume 10 ml (D'Souza Ticlo, 2008).

2.9. Dialysis and concentration of the crude LiP enzyme

The culture filtrate was placed in dialysis bags, cut off 12 kDa (Sigma), and dialyzed against 0.2M citrate-phosphate buffer, pH 6 for three successive times until no longer of ammonium sulphate in the buffer, then concentrated by osmosis using sucrose (D'Souza Ticlo, 2008).

2.10. LiP enzyme purification

The dialyzed protein preparation was applied onto a column (Pharmacia column, 2.5 x 50 cm) packed with Sephadex G-100. This was equilibrated in 0.2M citrate-phosphate buffer pH 6, then eluted with the same buffer. The fractions O.D. was monitored at A_{310} and LiP activity was measured. LiP purity was confirmed by SDS-PAGE. Preparation of the column and the fractionation procedure was carried out as mentioned by Scopes (1994).

2.11. Determination of LiP molecular mass

LiP molecular mass was estimated using sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE) as described by Weber and Osborn (1969).

3. Results
3.1. Microorganisms

Six fungal isolates were used in teh preliminary experiment to screen their efficiency for the production of the lignin-degrading enzymes. Only one isolate was selected for further identification due to its highest enzyme productivity. The isolate was identified as *Cunninghamella elegans* as shown in Fig (1).

3.2. Production and activity of LiP enzyme

The production of ligninolytic enzyme by *Cunninghamella elegans* was investigated in rice husk containing medium i.e. Production medium. Optimization of medium was regularly studied for further characterization purposes.

3.2.1. Optimization of cultivation medium for LiP production

Results shown in Fig.2 revealed that LiP activity reached the maximum productivity on day 14 of growth (10.800 U L^{-1}) at 25°C. Below and above this particular incubation period, a remarkable drop in the enzyme yield was noticed. LiP productivity at different pH values was determined. LiP showed the highest activity peak at pH 6 (14.200 U L^{-1}). However, the activity decreased gradually in the alkaline side. The maximum LiP activity found at 30°C (15.300 U L^{-1}). The noticeable difference between static and shaking conditions (12.3 x*g*) on production of LiP was found (Fig.2). Since, static state was more effective (15.800 U L^{-1}) than shaking one (8.400 U L^{-1}).

3.2.2. Concentration of LiP by ammonium sulphate fractionation

The highest activity of LiP protein preparation was obtained by precipitation at 80% ammonium sulphate (Table, 1).

3.2.3. Purification of LiP enzyme by column chromatography

Results revealed that only one peak was found. This step resulted in increasing purification folds of LiP enzyme up to 2.76. A summary of purification steps is represented in Table 2.

3.2.4. Molecular mass determination of LiP

As shown in Fig. (3), the purified LiP was analyzed by SDS-PAGE. A single protein band was

observed and the molecular mass of LiP was estimated at 50 kDa.
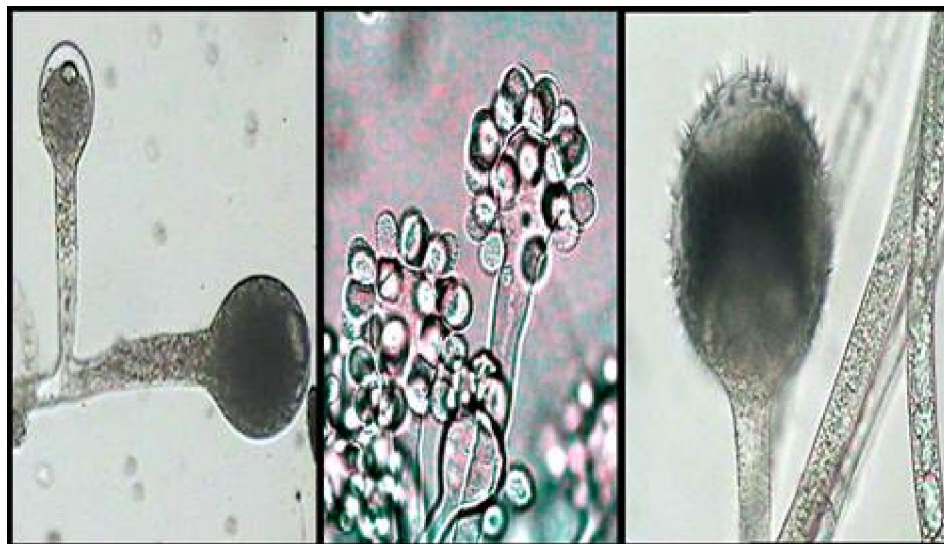
Figure 1. Lignin peroxidase producing *Cunninghamella elegans*.
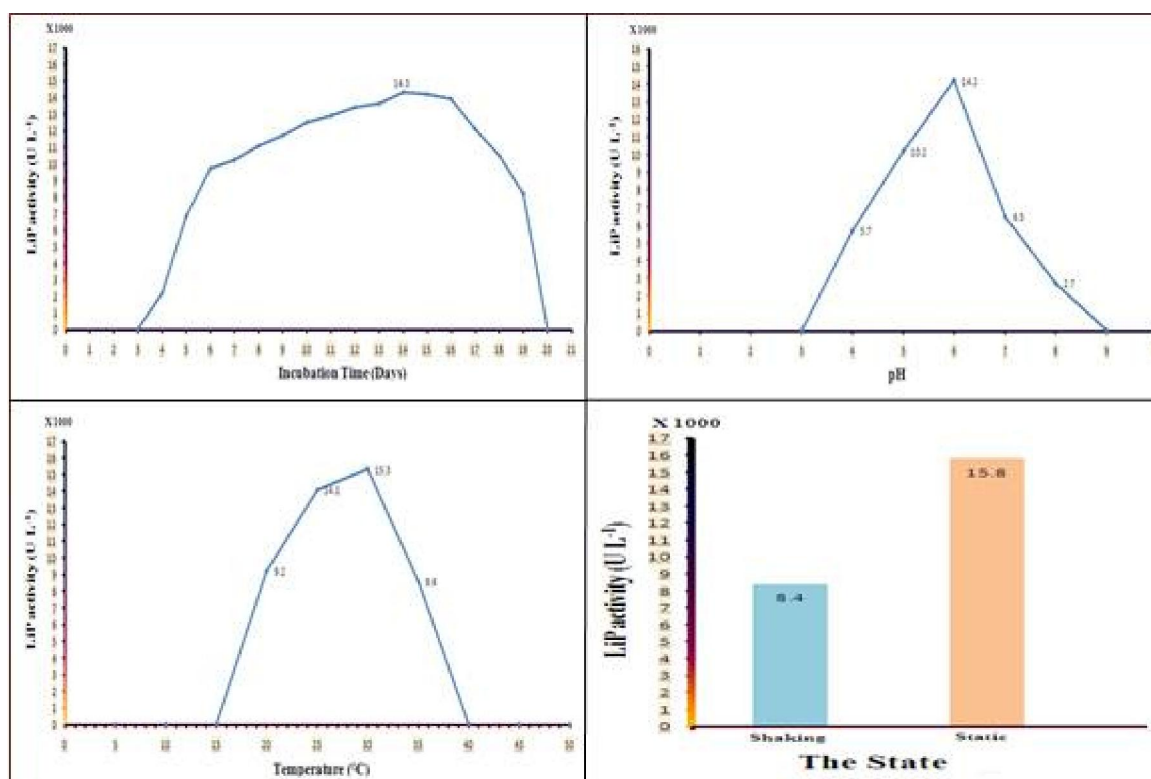
Figure 2. LiP production by *Cunninghamella elegans* at different incubation times, pH values, temperatures as well as at static and shaking states.

Table 1. Ammonium sulphate fractionation

(NH$_4$)$_2$SO$_4$ Conc. (%)	Protein Content (mg/L)	LiP activity (Unit/L)	Sp. Activity Units/mg protein
0.0	350	15900	45.43
20	610	32400	53.11
40	680	58100	85.44
60	720	70600	98.06
80	840	89300	106.31
100	800	76700	95.88

Table 2. A summary of purification steps of LiP produced by *Cunninghamella elegans*

Step No.	Purification Step	Volume (L)	Enzyme activity	Protein Content	Specific activity	Purification Folds	Yield (%)
1	Cell free filtrate	0.5	16000	370	43.24	1.0	100
2	Amm. Sulph. 80%	0.1	89500	853	104.92	2.43	55.9
3	Concentration by	0.01	112200	955	117.49	2.72	70.1
4	Sephadex G-100	0.15	115400	967	119.34	2.76	72.1
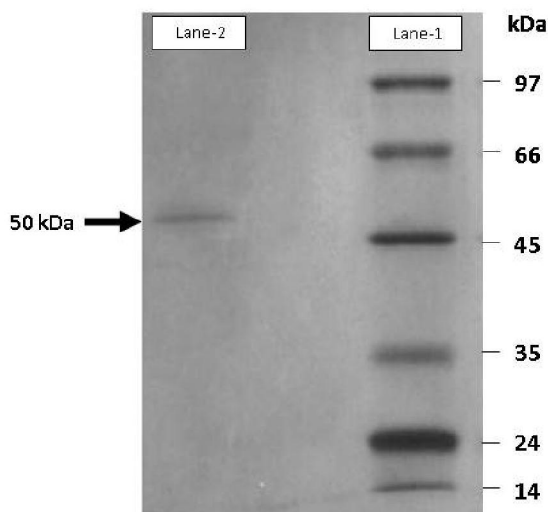
Figure 3. SDS-PAGE pattern of purified LiP produced by *Cunninghamella elegans* showing molecular mass standards (Lane-1) and molecular mass of LiP from Sephadex G-100 (Lane-2)

4. Discussions

To reduce environmental damage from weathering and coal burning, biotechnological processes are needed to convert hard coal or lignin to clean, cost-effective energy sources or other useful materials. A microbial, enzymatic or enzyme-mimetic technology that can take place at moderate temperatures and pressures (Fakoussa, 1992) would have great advantages compared to the current physical and chemical coal conversion technologies. Biocatalytic particles are also smaller than conventional catalytic particles and thus more efficient. In this study, the potential of producing LiP has been investigated. *Cunninghamella elegans* was found to be the most potent isolate between six fungal isolates for producing LiP. The maximum LiP productivity was under static condition at pH 6, 30°C and after 14 days of incubation period. LiP

Purification was isolated firstly by the precipitation with ammonium sulphate. Its enzyme activity was 89500 U L^{-1}. Then, LiP was purified by gel permission chromatography and its activity increased to 112200 U L^{-1}. The molecular mass of LiP was estimated, by SDS-PAGE, at 50 kDa. During the past decade, fungi were studied in relation to their ability to degrade recalcitrant organo-wastes (Field *et al*., 1993; Vyas *et al*., 1994; Demir, 2004). These studies were done in parallel with those on a complex enzymic system that allows fungi to degrade lignin (Barr and Aust, 1994; Costa *et al*., 1994). Peroxidases are essential enzymes in biodegradation of lignin and lignite which have been investigated intensively in fungi (Yang *et al*., 2005). In our study, it was observed that LiP activity appeared to reach the maximum in the culture fluid, when *Cunninghamella elegans* was grown in specially designed rice husk broth. Growth and enzyme production in static flasks were superior when compared to that found in shaked cultures, therefore, static conditions were chosen for routine cultivation. LiP activity in the culture fluid was detectable after 14 days. Kareem and Akpan (2004) reported that the use of agricultural by-products as a substrate for the enzyme production was cheap and could facilitate large scale production of industrial enzymes. LiP activity was determined by monitoring the oxidation of veratryl alcohol to veratraldehyde at 37°C as indicated by an increase in A$_{310}$. Chia (2008) stated that the discovery of LiP, veratryl alcohol has played a pivotal role in the study of the lignin biodegradation process. Veratryl alcohol is used as an assay for enzyme activity due to the easily detectable absorbance of the produced veratraldehyde. LiP is capable of oxidizing non-phenolic compounds with a relatively high redox potential of the oxidized enzyme intermediates (Schoemaker and Piontek, 1996). The mechanism of action of LiP was discovered from studies of methoxylated benzenes, which were oxidized by LiP to unstable molecules called cation radicals. The cation radical 1,4-dimethoxibenzene, decomposes in the reaction with H$_2$O, producing methanol and benzenequinone (Chia 2008). Fakoussa and Hofrichter (1999) reported that the pH range for LiP was between 2.0 and 5.0 with an optimum somewhere between 2.5 and 3.0. In our study, the *Cunninghamella elegans* LiP is different from other fungal LiP, since the optimum pH of *Cunninghamella elegans* LiP was 6.0. However, the *Cunninghamella elegans* LiP had a wider range of pH. At pH 8.0, the LiP activity was still retained. The optimum temperature was between 25 and 30°C. It was highest at 30°C, and rapid inactivation occurred above 35°C. These results on extracellular LiP agree fairly well with those reported by other researchers (Zanirun *et al*., 2009 and Yadav *et al*., 2010). The subunit molecular mass range of white-rot fungal LiP was 38– 47 kDa and that of peroxidases was 38–50 kDa (Fakoussa & Hofrichter 1999). *Cunninghamella elegans* LiP had a subunit molecular mass of 50 kDa, that was within this range. Peroxidase activity was detected in PAGE by selective staining. The optical absorption spectra of enzyme showed that *Cunninghamella elegans* peroxidase had a distinct band. Yadav *et al*., (2010) isolated LiP from a fungal culture filtrate with a molecular mass of 48 kDa estimated by SDS-PAGE. Further studies are in progress for the practical application of *Cunninghamella elegans* LiP. Meanwhile, future study using this isolate would concentrate upon finding the breadth of pollutants that can be further exploited to develop a cost effective bioremediation process.

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Changes in physico-mechanical properties of banana fruit during ripening treatment

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Abstract. In this paper, some physical and mechanical properties of banana fruits at different level of ripeness were investigated. Relation between various stages of ripeness and these properties were determined and correlation coefficients were calculated. The color of the fruit skin was measured as L^*, a^* and b^* in *CIELAB* system. The mechanical properties were extracted from plotted force-deformation curve. A significant difference at 5% level was found between the level of ripeness and these properties. Duncan's multiple range test was conducted and results were reported. Results showed that changes in L^*, b^* and C was similar, also variation of color index (*CI*) was similar to a^*. The firmness, rupture energy and hardness decreased as banana fruit ripened. All measured physico-mechanical properties of banana fruit except deformation had High correlation with stage of ripeness. Result of deformation analysis showed no significant difference at various stages of ripeness. The correlation between deformation and stage of ripeness was obtained as 0.2.

Key words: Banana fruit, Physical, Mechanical, Ripening

1. Introduction

Banana is one of the popular fruits in the world. Banana fruit is grown in many countries in sub-tropical areas and the big exporters are located in South East Asia, South America and the Caribbean. The Cavendish variety is widely produced by these countries. Banana is subsumed third place in the world fruits volume production after citrus fruit and grapes. Green-mature banana fruits are transported to consumer countries and ripened in controlled conditions. Imported banana fruits are transported to airtight warehouses with ethylene gas control system and are ripened. During ripening process, many changes are occurred in physical and mechanical properties of banana fruits. Knowing the physical and mechanical properties of banana fruit and changes in these parameters in ripening treatment is the most important attributes to design handling, sorting, processing and packaging system. Knowing these properties of agricultural products would help designer engineers to apply forces and dimensions of machine's units properly to protect fruits from bruises, injuries, decay lesions and numerous other defects that emanate as results of post-harvest processing treatments. In many fruits such as banana and mango, the level of ripeness associates with physical and mechanical properties such as firmness, color and dimensions of fruits. These parameters can be applied to predict the quality of fruits. Also in design of processing systems for these fruits, changes occurred in phisyco-mechanical properties must be remarked. Many studies have been reported on the physical and mechanical properties of fruits, such as bergamot (Rafiee et al., 2007), coconut (Terdwongworakul et al., 2009), date fruit (Keramat Jahromi et al., 2008), kiwi fruit (Lorestani and Tabatabaeefar, 2006), melon (Emadi et al., 2009), orange (Khojastehnazhand et al., 2009; Sharifi et al., 2007) and citrus fruits (Omid et al., 2010).

For banana fruit, some researches were accomplished about its physico-mechanical properties. For example, Kachru et al., (1995) investigated physical and mechanical characteristics of two varieties of green-mature banana fruit. Saeed Ahmad et al., (2002) conciliated the temperature effect of ripening treatment on properties of banana fruit. Also investigation on reciprocal effect of storage humidity, temperature and fruit length on characteristics of banana fruit were done (Saeed Ahmad et al., 2006). Salvador et al., (2007) studied the changes in color and texture of banana during storage at 10 ºC and 20 ºC. They found that during storage, the change in peel color from green to yellow was gradual in the *M. Cavendish* samples, whereas the *M. Paradisiacal* variety presented a different pattern, remaining green for the first 8 days and then changing rapidly to a yellow tone from day 12 onwards. While the flesh texture of the *M. Cavendish* type bananas softened quite rapidly during storage, it evolved more slowly in the *M. Paradisiacal* variety and there was little variation in the flesh hardness values over the storage time. As it is found from previous studies, it is necessary to

investigate changes in physico-mechanical properties of banana fruit during ripening treatment.

The objectives of this research were to study some physical and mechanical properties of banana fruit and changes in these parameters during ripening treatment. The parameters investigated include L*, a*, b*, CI, C, H, firmness (*F*), rupture energy (R_E), hardness (*Ha*), deformation (*D*).

2. Materials and Methods

Specimens were provided from an airtight warehouse having ripening operation on banana fruit. During ripening, peel color varied from green to yellow. Ripeness is currently assessed visually by comparing the color of the peel with standardized color charts that describe various stages of ripeness. In trade market, seven ripening stages of bananas are usually discerned: stage1: all green; stage 2: green with a trace of yellow; stage 3: more green than yellow; stage 4: more yellow than green; stage 5: yellow with a trace of green; stage 6: all yellow; stage 7: all yellow with brown speckles. Color stage was judged visually using a chart scale to categorize bananas based on their level of ripeness. Banana fruits (*Cavendish* variety) were selected from imported bananas that were ripened in an airtight warehouse with ethylene gas control system. Undamaged bananas of each stage were selected and cut into fingers. The specimens were transferred to the material property laboratory, department of Agricultural Machinery Engineering, Faculty of Engineering and Technology, University of Tehran.

Color of fruit can be described by several color coordinate systems. Some of the most popular systems are CIELAB and RGB. The CIELAB color space is based on the concept that colors can be considered as combinations of red and yellow, red and blue, green and yellow, and green and blue (Figure 1). To determine the exact combination of colors of a product, coordinates of a three dimensional color space are assigned.

The L* coordinate of an object is the lightness intensity as measured on a scale from 0 to 100, where 0 represents black and 100 represents white. The a* coordinate of an object represents the position of the object's color on a pure green and pure red scale, where -127 represents pure green and +127 represents pure red. The *b** coordinate represents the position of the object's color on a pure blue and pure yellow scale, where -127 represents pure blue and +127 represents pure yellow.
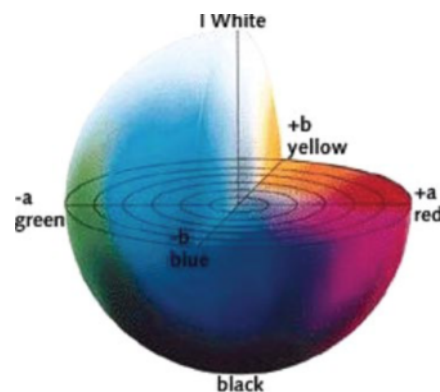
Figure 1. *CILAB* color space.

The color of the fruit skin was measured as L*, a* and b* by a spectrocolorimeter (Model Konica Minolta CR-400, Japan), in *CIELAB* system. The color index (*CI*) was calculated using the following formula (Jimenez-Cuesta et al., 1981):

$$CI = 1000 \frac{a*}{L*.b*} \tag{1}$$

The saturation or chroma (*C*) indicates intensity or strength of hue. This parameter was computed by following formula (Ozturk et al., 2009):

$$C = \sqrt{a*^2 + b*^2} \tag{2}$$

The hue angle (*H*) between the color vector and the negative a* axis was used to characterize the color changes during developmental changes. This hue angle was calculated from the a* and b* values as follows:

$$H = \begin{cases} 180° - \tan^{-1}\left(\dfrac{b*}{a*}\right) & if \quad a* > 0 \\ \tan^{-1}\left(\dfrac{b*}{a*}\right) & otherwise \end{cases} \tag{3}$$

Mechanical properties of specimens were measured by an Instron Universal Testing Machine (Model SANTAM ST 5) controlled by a *PC*- based data acquisition card in a personal computer. A cylindrical probe with 8 mm diameter was used to penetrate in banana fruit (Saeed Ahmad et al., 2006).The penetration speed was set at 50 mm/min. The samples were placed on a fixed plate on its lateral surface and the puncture test was carried out at 2 cm away from the middle of the fruit. The compression test was initiated until rupture occurred as is denoted by a rupture point in the force–deformation curve. As the penetration initiated and progressed, a force-deformation curve was plotted (Figure 2). The rupture point was detected by the

break point in the force-deformation curve as shown in Figure 2. When the rupture occurred, the test was stopped. The compression test results and graphs were generated automatically (by software installed on the computer, *ver* 5, *SMT* Machine Linker, SANTAM Co).The mechanical properties of banana fruit were extracted in terms of firmness, rupture energy, rupture deformation and hardness.
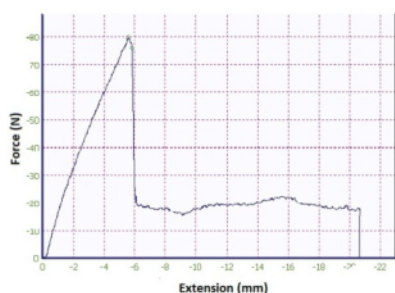
Figure 2. Compressive force versus deformation of banana fruit.

A randomized complete block experiment design was carried out on experiments. For each treatment, three samples were randomly selected and the average values of three experiments were reported. Experimental data were analyzed using analysis of variance (*ANOVA*). Duncan's multiple range test was employed for mean separation. The level of significance was at 5%. The analysis was performed using the Excel Analysis Toolpack Option (*MS* Corporation, Redmond, *WA*, *USA*).

3. Results and Discussion

Mean values and standard deviations of chromatic properties of banana fruit were calculated. There was a significant difference (P ≤ 0.05) between the levels of banana ripeness for L^*, a^*, b^*, *CI*, *H* and *C*. Results of Duncan's multiple range test for these characteristics are presented in Table 1.

The value of L^* increased between stages one and three and reached to 70.35 and stopped until stage six then decreased rapidly to 48.82 at stage seven. Similarly, b^* varied in this fashion (Figure 3). The saturation or chroma is a function of a^* and b^*. The values of a^* were smaller than b^* values, so the effect of a^* on chroma was poor. Therefore, the values of chroma were approximately equal to b^* (Figure 3). Decrease in these parameters at stage seven was as a result of developing brown spots on banana fruit skins.

Table 1. Mean values of L^*, a^* and b^* at different stages of ripeness.

level	L^*	a^*	b^*	CI	C	H(°)
1	57.4[c]	-14[c]	32.6[c]	-7.6[a]	35.6[c]	-66.7[b]
2	62[bc]	-9.1[b]	38.4[b]	-4.6[d]	39.9[bc]	-74.4[c]
3	70.4[a]	-4.6[b]	45.7[a]	-1.5[bc]	46[a]	-84.2[d]
4	66[ab]	-7.7[b]	40.9[ab]	-3[cd]	41.7[ab]	-79.2[cd]
5	65.4[ab]	1.2[a]	40.4[ab]	0.5[a]	40.4[bc]	91.7[a]
6	67.1[ab]	0.9[a]	40.3[ab]	0.4[ab]	40.3[bc]	91.6[a]
7	48[d]	2.6[a]	27.4[d]	2[a]	27.5[bc]	95.6[a]

In each column, means followed by the same letter are not significantly different (P ≤ 0.05) according to Duncan's multiple range test.
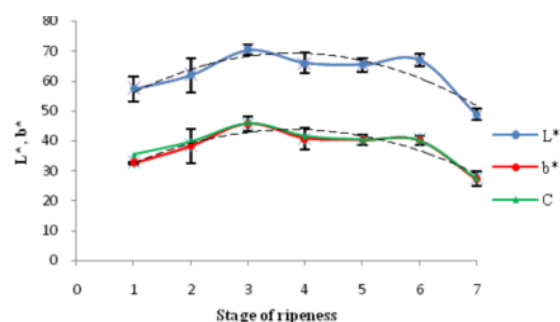
Figure 3. Variation of L^*, b^* and C *vs* stage of ripeness. Vertical lines represent the standard deviation.

The a^* increased when banana fruits reached to a full-ripe stage. A positive correlation was observed between a^* and various stages of ripeness. As it was noted, an increase in a^* means a decrease in the degree of greenness. The maximum value of a^* was 2.6. This point is near of the b^* axis, so the redness of skin color can be neglected. These changes during ripening period (loss of greenness) occurred as a result of the breakdown of the chlorophyll pigments in the peel tissue. The color index (*CI*) is a function of a^*, b^* and L^*, but as perceived from Figure 4, the procedure variation of *CI* and a^* were similar.
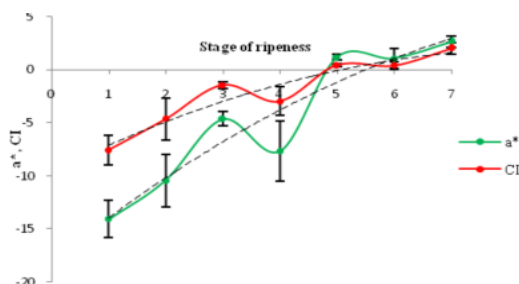
Figure 4. Variation of a^* and CI *vs* stage of ripeness. Vertical lines represent the standard deviation.

The correlation (R) between CI and a^* was obtained as 0.985. Change in hue angle is presented in Figure 5. After the banana fruit reached to stage four, the color vector transferred from green to yellow region. The time near the inflexion point was the most illustrative of the dynamics of the developmental changes.
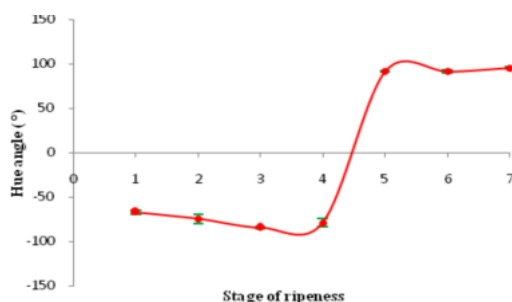
Figure 5. Variation of hue angle *vs* stage of ripeness. Vertical lines represent the standard deviation.

The time when the inflexion point occurs might be suitable for characterising the development process, comparing cultivars, influences of ripening treatment at various conditions and determining the time of appearance of the ripe fruit (Muskovics et al., 2006). The slope of that part of the graph showed the rate of the color changing provides useful information about the number of days during which the color turns from green to yellow (Muskovics et al., 2006). The equations representing the relationship among chromatic properties and ripeness stage of banana fruit and their coefficient of determination (R^2) are given in Table 2. Results of polynomial regression show a quadratic relation between these parameters and stage of ripeness.

Table 2. Equations representing relationship between chromatic properties and stage of banana fruit.

Parameter	Equation	R^2
L^*	$L^* = -1.6651 S_r^2 + 12.588 S_r^{\wedge} + 45.397$	0.78
a^*	$a^* = -0.1539 S_r^2 + 2.6837\ S_r - 9.6171$	0.91
b^*	$b^* = -1.4531 S_r^2 + 11\ S_r + 23.027$	0.85
CI	$CI = -0.1912 S_r^2 + 4.3479\ S_r - 18.123$	0.90
C	$C = -1.3189 S_r^2 + 9.5146\ S_r + 27.092$	0.86

$^{\wedge}$ S_r is the ripeness level of banana fruit.

There were significant difference ($P < 0.05$) in firmness, rupture energy and hardness of banana fruit at different stages of ripeness. Results of Duncan's multiple range test for these parameters are presented in Table 3. There was no significant difference ($P > 0.05$) in the deformation.

Table 3. Mean values of firmness, Rupture energy, and hardness.

Ripeness level	Firmness (N)	Rupture energy (J)	Hardness (N/mm)	Deformation (mm)
1	75 [a]	225 [a]	12.6 [a]	6
2	60.1[b]	252 [a]	7.2 [b]	8.3
3	46.2 [c]	192[ab]	5.6 [c]	8.3
4	40.9 [c]	214[a]	3.9 [d]	10.5
5	26.7 [d]	99.4 [b]	3.6 [d]	7.4
6	28.9[d]	158 [ab]	2.9 [d]	10
7	27 [d]	91.3[b]	3.9 [d]	6.8

In each column, means followed by the same letter are not significantly different ($P \leq 0.05$) according to Duncan's multiple range test.

A decrease was observed in firmness, rupture energy and hardness as fruit ripened. The firmness degraded from 75.1 N at stage one to 27 N at stage seven. A second degree polynomial relationship was found between firmness and stage of ripeness (Table 4). The similar trends were also reported by Singh *et al.*, (2006) for orange. After stage four, the slope of firmness degradation was slower than before stage four (Figure 6). As noted in previous expression, this stage is inflexion point. In this point the banana converted to ripe status from unripe mood. The variation of rupture energy was irregular, but the green mature banana (stage one) have greater rupture energy than full-ripe (stage seven) one. The rupture energy decreased from 225.8

J to 91.3 J (Figure 7).   The hardness of fruit, decreased in quadratic form as banana fruit ripened from 12.6 J.mm^{-1} to 3.9 J.mm^{-1} (Table 4). No relationship was found among deformation of fruit and ripeness level (Figure 9). The correlation between deformation and stage of ripeness was 0.2.
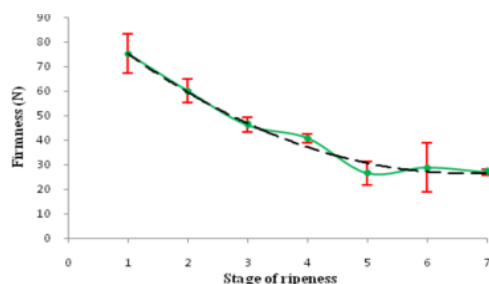
Figure 6. Variation of firmness *vs* stage of ripeness. Vertical lines represent the standard deviation.
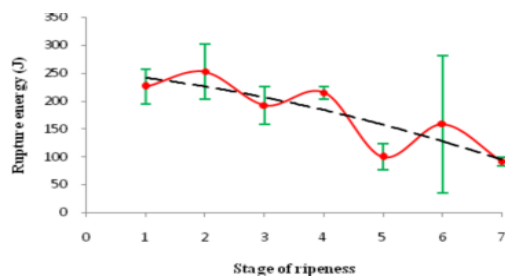
Figure 7. Variation of rupture energy *vs* stage of ripeness. Vertical lines represent the standard deviation.
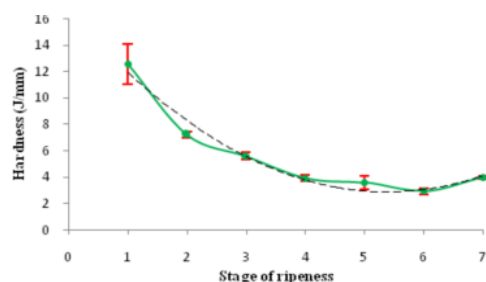
Figure 8. Variation of hardness *vs* stage of ripeness. Vertical lines represent the standard deviation.
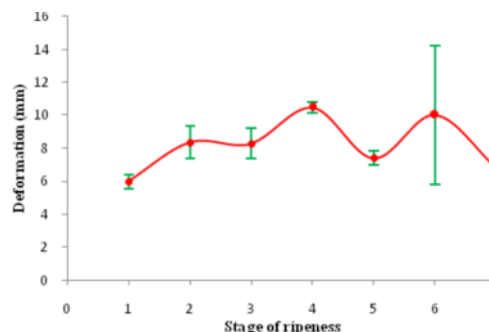
Figure 9. Variation of deformation versus stage of ripeness. Vertical lines represent the standard deviation.

Decreases in mechanical properties were as a result of alteration in the composition of cell wall solubilisation of pectins and hydration of cell walls during ripening. Banana fruit softening is due to alteration in cell wall structure by degrading enzymes (e.g. polyglacteronase) and also to degradation of starch (Seymour, 1993).

The equations representing relationship among mechanical properties and ripeness stage of banana fruit and their coefficient of determination (R^2) are given in Table 4. Results of polynomial regression showed a quadratic relation between these parameters and stage of ripeness.

Table 4. Equations representing relationship between chromatic properties and stage of banana fruit.

Parameter	Equation	R^2
Firmness (F)	$F = 1.5274\ S_r^2 - 20.296\ S_r^\wedge +94.204$	0.98
Rupture energy(R_E)	$R_E = -1.7614\ S_r^2 - 10.29\ S_r +252.69$	0.73
Hardness (Ha)	$Ha = 0.470\ S_r^2 - 5.0591\ S_r +16.509$	0.97

$^\wedge$ S_r is the ripeness level of banana fruit.

4. Conclusion

The changes in physical and mechanical properties of banana fruit as a function of ripeness stage were investigated in this study. A significant difference was found in studied properties except deformation. At different levels of ripeness, the relationship of these properties with stages of ripeness and coefficient of determination were found. The *a** and *CI* had a good correlation with the ripeness level of banana, also firmness and hardness had good correlation with ripeness level, so these properties can predict the ripeness level of banana fruit during ripening treatment, but extraction of

mechanical properties would result in the destruction of samples. It could only be a good practice in laboratory and not for quality inspection in warehouses. The best method for predicting the level of ripeness is to measure chromatic properties ($a*$ and CI) since this method dose not destroy the fruits. It is also a rapid method of ripeness prediction of banana fruit.

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Neural Network and Wavelet Transform For Classification and Object Detection

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Abstract: The practical utilization of object detection and classification, in high-performance structural mine detection or proximity fuses is somewhat impeded due to some complicated phenomena such as: existence of multiple wave modes, jamming, high susceptibility to diverse interferences, bulky sampled data, clutters and difficulty in signal interpretation. An intelligent signal processing approach using the wavelet transform and artificial neural network algorithms was developed; this was actualized in a signal processing package. The intelligent signal processing technique comprehensively functions as signal filtration, data compression and pattern recognition, capable of extracting essential features from acquired raw wave signals and further assisting in structural mine detection or proximity fuses evaluation. For validation, the algorithm was applied to the detection and classification of 10 different objects.
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Keywords: Wavelet; Classification; Mine detection; intelligent signal processing.

1. Introduction

Signal processing and interpretation plays a pivotal role in a mine detection or proximity fuse system, dominating in deciding the precision that the system can offer and its feasibility. An effective signal processing and interpretation approach is expected to extract essential yet concise characteristics from acquired raw signals, and assist the decision-making unit in conducting a diagnosis or prognosis. In the past few decades, more challenging requirements from various industrial practices, such as real-time failure surveillance on aircraft, have increasingly motivated the research into developing viable Signal processing and interpretation techniques.

With the aid of the state-of-the-art advances in information processing and high-capacity computing devices, a diversity of novel and pragmatic signal processing and interpretation techniques have become available. Amongst these, methods using time-series analysis (Keilers, 1995), the fast Fourier spectrum (FFS) (Kim, 2001), the time–frequency distribution (the short-time Fourier transform (STFT) (Legendre, 2000), the wavelet transform (WT) (Legendre, 2000, Zheng, 2001) and blind de-convolution have been adopted. It's noticeable that Time-series analysis, FFS and STFT aren't suitable for time limited signals i.e. proposed magnetic sensor in this paper.

On the other hand, signal processing and interpretation have gained substantial acceptance from major engineering communities due to their good balance between desirable precision and versatile accessibility. However, several troublesome issues associated with the utilization of signal processing, are commonly noticed:

(1) In practice, the sensors may be operated in noisy or fluctuating environments, where the captured wave signals usually suffer from diverse disturbances or jamming signals.

(2) In experimental, the interferences from clutters, such as type of the soil in mine detection or clods in radar systems, may obscure the object-induced wave components in the signals.

(3) The use of high-resolution sampling can guarantee a precise identification, but it unavoidably leads to bulky data flow for serializing the scanning, burdening the signal processing to a certain extent.

All of these factors undoubtedly weaken the sensitivity of sensors to detecting and classifying objects and considerably lower the identification precision of a mine detection or proximity fuses system. With this motivation, an intelligent signal processing and pattern recognition technique for mine detection systems was developed, taking advantage of the wavelet transform and artificial neural algorithms, implemented by a signal processing package. The signal processing package is comprehensively includes units of signal filtration, data compression and pattern recognition. Validation of the algorithm was conducted by classifying the waves that acquired by the magnetic sensor proposed in (Birgé, 1997) for 10 different objects.

2. The Philosophy of Using Wavelet

In studies of vibrational signals in the early 1990s, found a clear advantage in singularity detection in signals. Nowadays, wavelet transform-based signal processing, covering signal purification,

spectrographic analysis, clutters removing and signal/image compression. The output of magnetic sensor is time limited, thus the remarkable potential of the wavelet transform leads to powerful signal processing Technique for Clutter Reduction in detection problem.

During practical implementation, two forms of wavelet transform are available, the continuous wavelet transforms (CWT) and the discrete wavelet transforms (DWT).

Fundamentally, applied with a basic orthogonal wavelet transform function, $\Psi(t)$ a time-dependent wave signal, $f(t)$ acquired from a sensor is converted into a quadratic expression using the dual parameters scale, a, and time, b:

$$W(a,b) = \frac{1}{\sqrt{a}} \int_{-\infty}^{+\infty} f(t)\overline{\Psi}(\frac{t-b}{a})dt \qquad (1)$$

The operation performed by equation (1) is defined as the CWT and W (a, b) is the CWT coefficient. $\overline{\Psi}(t)$ denotes the complex conjugate of $\Psi(t)$.

For simplicity, equation (1) is executed by calculating the wavelet coefficients only at discretized scale and time using dyadic variables m and n, contrastingly defined as the (DWT):

$$DWT(m,n) = a_0^{-m/2} \int f(t)\Psi(-a_0^{-m}t - nb_0)dt \quad (2)$$

$$a = a_0^m \qquad b = na_0^m b_0 \qquad m,n \in Z$$

where a_0 and b_0 are constants deciding the sampling intervals along the time and scale axes, respectively. Equation (2) decomposes signals into associated ranges of relatively higher and lower frequencies. The signal is represented hierarchically by a series of approximations (low-frequency components, denoted by A) (Figure 1) and details (high-frequency components, denoted by D). Inversely, reconstruction of the wave signal is discretely implemented via:

$$f(t) = c\sum_m \sum_m C_{m,n}(t)DWT(m,n) \qquad (3)$$

$$C_{m,n}(t) = a_0^{-m/2}\Psi(a_0^{-m}t - nb_0)$$

This is the multi-resolution concept that is the base of signal de-noising or compression. The multi-resolution formulation is obviously designed to decompose signals into finer and finer details.

For the first step in object detection and classification, two approaches were used for signal purification: de-noising and scale selecting.

2.1. De-Noising

In this algorithm, at the first step, noise was removed from acquired signal; then the samples that are close to zero were removed (delay removing) and

pure signal was remained. In the last step, correlations of pure signal with reference signals that are in database were computed in order to classify the proposed objects. In this way, input signal assigned to the class that lead to maximum correlation (Figure 2).
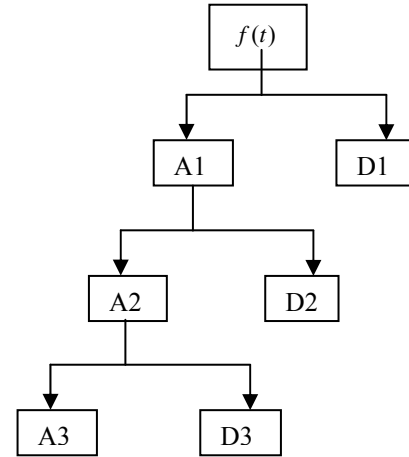
Figure 1. The hierarchical architecture for a three-level DWT decomposition.
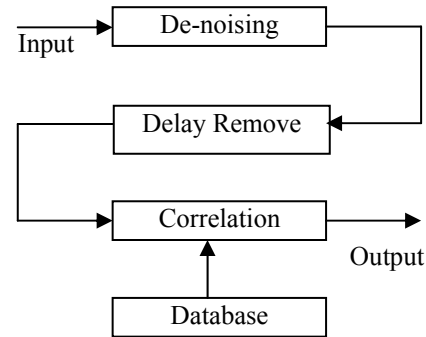
Figure 2. Classification by wavelet; De-noising method.

The underlying model for the noisy signal is basically of the following form:

$$s(n) = f(n) + \sigma e(n) \qquad (4)$$

where time n is equally spaced. In the simplest model we suppose that $e(n)$ is a Gaussian white noise $N(0, 1)$ and the noise level is supposed to be equal to 1. The main objective of de-noising is to suppress the noise part of the signal $s(t)$ and to recover $f(t)$. Use of wavelet for de-noising is efficient for families of functions $f(t)$ that have only a few nonzero wavelet coefficients or have a sparse wavelet representation (SU,2004). For example, a time limited function, has such a property

and since the output of magnetic sensor is a time limited signal thus de-noising with wavelet was selected. From a statistical viewpoint, the model is a regression model over time and the method can be viewed as a nonparametric estimation of the function $f(t)$ using orthogonal basis.

The general de-noising procedure involves three steps:

(1) Decompose: Choose a wavelet and level N then compute the wavelet decomposition of the signal $s(t)$ at level N.

(2) Threshold detail coefficients: For each level from 1 to N, select a threshold and apply thresholding to the detail coefficients.

(3) Reconstruct: Compute wavelet re-construction using the original approximation coefficients of level N and the modified detail coefficients of levels from 1 to N.

According to the basic noise model, two threshold selection rules are implemented in the signal processing packet: *scarce* and *penalized*. These strategies are based on an approximation and de-noising result from Barge and Massart (Fausett, 1994).

2.1.1. Scarce Method

The scarce strategy is such that at level J the approximation is kept and for level j from 1 to J, the n_j largest coefficients are kept with:

$$n_j = \frac{M}{(J + 2 - j)^a} \qquad (5)$$

where J is the level of the decomposition, M a positive constant and a a sparsely parameter ($a > 1$).

So, the strategy leads to select the highest coefficients in absolute value at each level. The numbers of kept coefficients grow scarcely with J-j. Typically, $a = 1.5$ for compression and $a = 3$ for de-noising. A natural default value for M is $L \le M \le 2L$ where L denotes the length of the coarsest approximation coefficients.

The rate of false alarm depends on a. Minimum of error (28%) obtain in $a = 2.2$. See Figure 3.

2.1.2. Penalized Method

This strategy can be viewed as a variant of the fixed form strategy of the wavelet shrinkage. The threshold T applied to the detail coefficients for the wavelet case or the wavelet packet coefficients for a given fixed *WP* tree is defined by:

$$T = \left| c(t^*) \right| \qquad (6)$$

With:

$$t^* = \arg\min\left[-\sum_{k=1}^{t} c^2(k) + 2\upsilon t \left(a + \log(\frac{n}{t}) \right); t = 1, \ldots, n \right]$$

where $a > 1$, $c(k)$ are sorted in decreasing order of their absolute value υ is the noise variance.

Also, in this method, the rate of false alarm, depend on a (Figure 4).
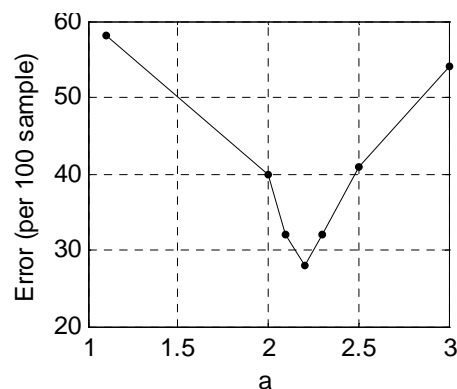
Figure 3. Scarce method
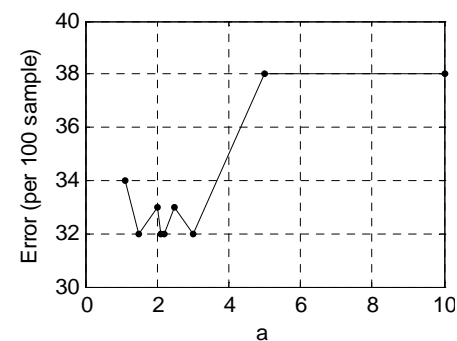
Figure 4. Penalized method

2.2. Scale Selecting

In this algorithm, at the first step, wavelet transform coefficients of acquired signal were computed; then the signal was reconstructed but some of coefficients for fine scales were removed. For example see Figure 5. This result would be clarified in the last section.

In the next step, samples that are close to zero were removed (delay removing) and pure signal was remained. In the last step, correlations of pure signal with reference signals that are in database were computed. Input signal assign to the class that lead to maximum correlation (Figure 6). In this method the amount of 7% error can be achieved.

3. The Philosophy of Using Neural Networks

Artificial neural networks are major tools for classification, especially in nonlinear systems (Kohonen, 1990). Because of nonlinearity nature of system such as magnetic field, communication channel and goal object, neural networks have been

used to classify different objects. LVQ and MLP are supervised neural networks that have been used for object detection and classification.
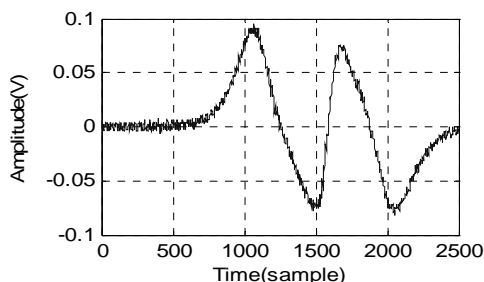
Figure 5. Amplitude vs. time of samples
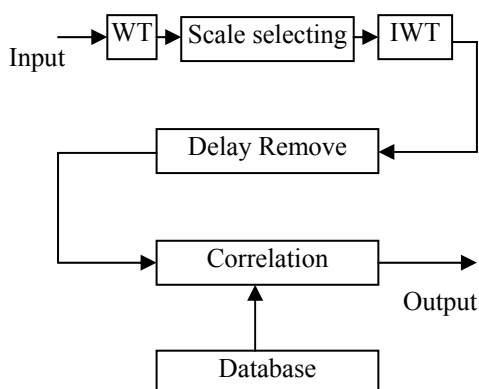
Figure 6. Classification by wavelet; Scale selecting method.

3.1. LVQ

Linear vector quantization (LVQ) (Mandelbrot, 1982) is a pattern classification method in which each output unit represents a particular class or category. The weight vector for an output unit is often referred to as a reference vector for the class that the unit represents. During training, the output units are positioned to approximate the decision surfaces of the theoretical base classifier. After training, an LVQ net classifies an input vector assigning it to the same class as the output unit that has its weights vector closed to the input vector. An LVQ network has a first competitive layer and a second linear layer. The competitive layer learns to classify input vectors in much the same way as the competitive layers of Self-Organizing. The linear layer transforms the competitive layer's classes into target classifications defined by the user. LVQ network training diagram have been shown in Figure 7. The network was trained in 7 epochs and 5.828 second by Intel 2.4MHz processor. Some of input vectors of each class have been used for initial values of weight vectors.

3.2. MLP

General purpose Multilayer Perceptron neural net, have been used for recognizing objects. A multi-layer feed-forward neural network, consisting of one input layer with α input elements, hidden layer with λ computing neurons and one output layer containing β output variables, was used. Where the variables α, β and λ are dependent on the actual application. Training diagram for MLP network with α, β and λ equal to 200, 16 and 8 respectively and 80 training vector have been showed in Figure 8. The network was trained in 603 epochs and 13.5 second by Intel 2.4MHz processor.
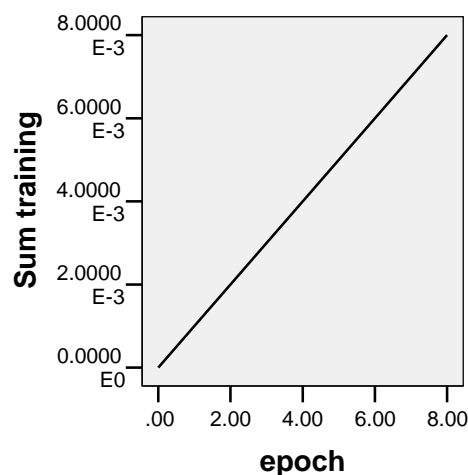
Figure 7. LVQ training diagram
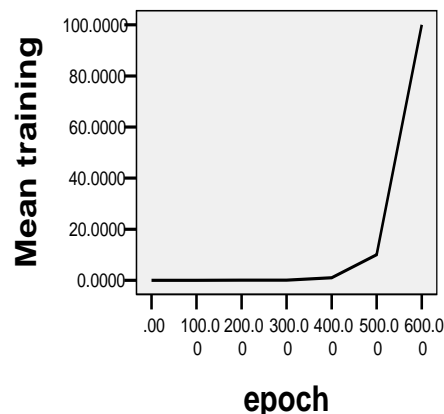
Figure 8. MLP training diagram.

4. The Philosophy of Combination of Neural Network and Wavelet

If the captured signals suffer with noise and clutter, the neural network can be unsuccessful to classify them correctly. Also, wavelet transform can be unsuccessful to classify captured signals from nonlinear systems (minimum 9% error in simulation results). Thus combination of wavelet transform and neural network has been used. Wavelet analysis and

neural networks have been combined in numerous manners. We distinguish two categories of methods. In the first one, the wavelet part is essentially decoupled from learning. A signal is decomposed on some wavelet and the wavelet coefficients are furnished to a neural network. In the second category, wavelet theory and neural networks are combined into a single method. We limit the scope of this article to the first category.

The combination of neural network and wavelet algorithm procedure involves four steps (Figure 9):

(1) In the first step, wavelet transform coefficient of input signal was computed.

(2) In the second step some of scales were selected and coefficient of this scales furnished to a MLP neural network.

(3) Next, delay for stability emulated to signal.

(4) Finally, neural network classify inputs.
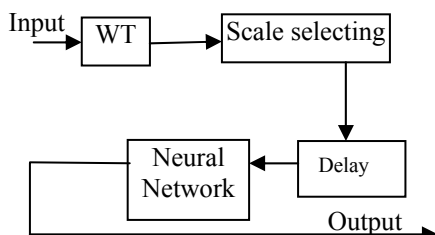
Figure 9. Classification by combination of Neural network and wavelet.

4.1. Selecting Scales

Details coefficients are independent random Gaussian realizations and coarse scales are object information. The multi-resolution analysis can be viewed as a bank of digital filters (low pass and high pass filters). Frequency bands correspond to wavelet analysis tree in Figure 1 was shown in Figure 10.

The maximum relative velocity of sensor and object is approximately 2 meters per second that should travel 10 centimeters. This travel consuming 0.05 seconds and lead to maximum 5 period of signal. The FFT of one of input signals was shown in
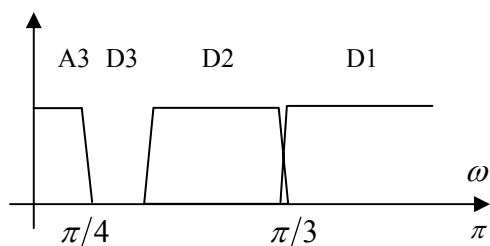
Figure 10. Classification by combination of neural network and wavelet.

Figure 11. The fastest component of acquired signals also confirms this bandwidth. Thus the bandwidth of input signals is approximately 100Hz. The sampling frequency of input signals is 5 KHz. Thus the filter bank idea leads to the selection of scales 6, 7 and 8.

This view also can be reasonable with Fractional Brownian motion (fBm). An fBm is a continuous-time Gaussian process depending on the Hurst parameter $0 < H < 1$. Versus fBm theory the fluctuation of signals depend on derivation of magnitude of wavelet transform coefficient (SU, 2004). Whatever fluctuation increases, the derivation of magnitude of wavelet transform coefficient would be close to zero and for completely random noise is equal to zero. For separating noise and object information from acquired signal, the 1-norm of wavelet transform coefficient of signal in each scale was computed. The logarithm of 1-norm versus scale was shown in Figure 12. It shows that derivation of 1-norm is close to zero for scales 1, 2, 3, 4 and 5, thus the detail of signal in these scales corresponds to noises and scales 6, 7 and 8 denote information. Coefficient of wavelet transform in scales 6, 7 and 8 furnished to neural network and would be classified. Wavelet transform remove noise and clutter and neural network classify objects. Also in this algorithm because some scale was selected, number of inputs to neural network would be decrease and training would be faster. Each acquired signal has 2500 samples. With this technique the input to neural network decreases to 87 samples.

5. Conclusion

With the motivation of some troublesome issues in the development mine detection, an intelligent signal processing and pattern recognition approach has been developed using the wavelet transform and artificial neural algorithms; this was actualized in a signal processing package. Its functionally consists of units of signal filtration, data compression and pattern recognition.

For validation, the signal processing package was applied to acquired wave signals from a magnetic sensor for 10 different objects. The results show that, taking advantage of the intelligent signal processing and pattern recognition technique, the procedure for mine detection effectiveness can be dramatically enhanced. The methodology presented in the current work can also be extended to other structural pattern recognition techniques with appropriate modifications.
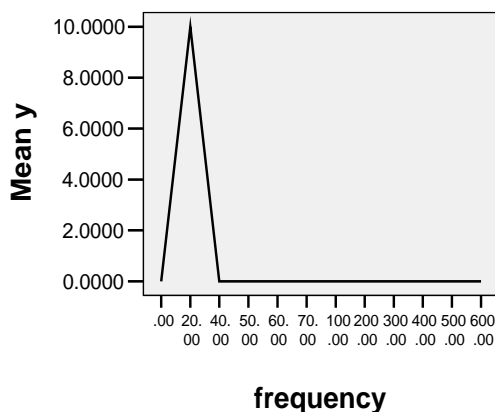
Figure 11. FFT of one of the input signal
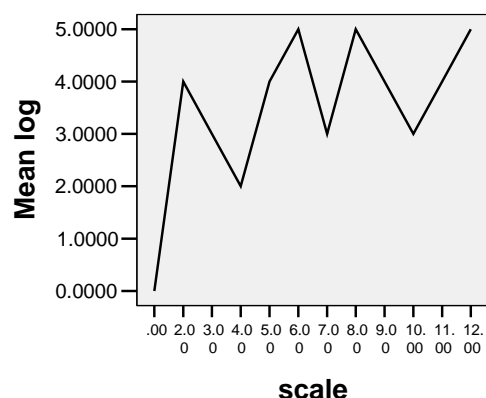
Figure 12. 1-norm of wavelet transform coefficient in each scales.

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Pharmacokinetic of florfenicol (Water soluble formulation) in healthy and Pasteurella infected broiler chickens

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Abstract: Florfenicol has been approved in the European Union for use in cattle and pigs as an injectable solution for treatment of respiratory diseases in cattle through injection .But now, it was introduced in some countries as an oral solution for the treatment of several poultry diseases. **The aim** of the present study is to describe the Pharmacokinetics of florfenicol (water soluble formulation)in broiler chickens after either a single intravenous and oral administration (by a dose of 30 mg/kg^{-1} body weight). Meanwhile, comparing its disposition in control healthy and *Pasteurella*-infected broilers. Following the IV administration of the drug in healthy and diseased birds, the drug plasma concentration declined in a biphasic pattern. The maximum plasma concentration of florfenicol in control healthy and diseased was reached one hour after its oral administration. But the peak level detected in control broilers was higher than that detected in infected birds. **Conclusion:** Data of the present study showed that volume of distribution, total body clearance in infected birds were higher than that determined in healthy ones. On the other hands, systemic bioavailability were significantly lower (F %,55.6 %) in diseased broiler compared to values determined in healthy ones (F % ,71.5).

1. Introduction:

Florfenicol, (FF) is a structural analogue of thiamphenicol, possessing a wide spectrum of activity against both Gram-negative and Gram-positive bacteria (Syriopoulou *et al.,* 1981). Florfenicol was reported to have a greater activity than chloramphenicol and especially against *Pasteurella*, *Salmonella, E. coli* and *Staphylococcus aureus.* Florfenicol inhibits peptidyltransferase activity and affect microbial protein synthesis (Cannon et al., 1990).

The p-nitro group of chloramphenicol is responsible for serious bone marrow toxicity and dose-independent irreversible aplastic anemia, partially described in human, but not in animals. For this reasons, the use of chloramphenicol in food-producing animals has been banned in the USA, the European Union and several other countries.

Florfenicol has been approved in the European Union for use in cattle and pigs as injectable solution for treatment of respiratory diseases in cattle but now it introduced in some countries as oral solution for the treatment of several poultry diseases. The efficacy and residual pattern of water soluble formulation of florfenicol in broilers were described by El-Banna et al., (2007). The disposition kinetic of florfenicol injectable

formulation has been described in healthy and experimentally infected broiler chickens (Afifi and Abo El-Sooud, 1997; Shen et al., 2003) and ducks (El-Banna, 1998). No references to data concerning the disposition kinetics of water soluble formulation in poultry could be obtained.The aim of the present study is to describe the Pharmacokinetic of florfenicol (water soluble formulation) in broiler chickens after a single intravenous and/or oral administration at a dose of 30 mg/kg body weight. Meanwhile, comparing its disposition in *healthy* and *Pasteurella*-infected broilers.

2.Materials and Methods:
2.1. Materials:
2.1.1.Birds

Sixteen symptom-free control healthy broiler chickens and 34 naturally *Pasteurella*-infected (diseased) were used.

-Their body weight ranged from 1.5 to 1.8 kg and their was age 35 days.

-Birds were housed in cages, fed on antibacterial-free balanced rations *ad-libitum* with free access for water.

-Diseased broilers, suffering from slightdiarrhoea, mucoid discharge from the mouth, ruffled feathers, conjuctivits and lack of appetite, were selected from a naturally infected flock.

-Microbiological examination of heart blood samples collected from all used birds revealed that birds were infected with *Pasteurella. .*

-On the other hand, symptom-free broilers were found *Pasteurella*-free.

-Biochemical identification of the isolated strain indicated that the pathogen was *Pasteurella multocida*.

-Analysis of bird plasma revealed no peaks of flofrenicol were seen using the HPLC method of analysis.

2.1.2. Drugs
Florfenicol (Florecol ,100 mg/ml) water soluble formulation for oral use was supplied by Avico (JORDAN). The sterile solutions were prepared by I.V. and oral administration.

2.2.Methods:

2.2.1.Single dose study
A single dose (30 mg /kg^{-1} body weight) of florfenicol was injected intravenously (wing vein) in control healthy and infected broilers (8 birds / group).

Another two groups of 8 control healthy and infected broilers were received florfenicol orally at the same dose (30 mg/ kg^{-1}, b.wt.).

Blood samples (1 ml each) were collected in heparinized tube via wing vein puncture before , after 10, 20, 30 min and 1, 2, 4, 8, 12 and 24 hours post administration.

Blood samples were centrifuged and the clear plasma samples were separated and stored at -20 C until assayed.

*2.2.2.*Multiple doses studies:
This was performed on the diseased group (18 birds/ group), and given florfenicol (30 mg kg^{-1}, b. wt) daily for 5 consecutive days in drinking water.

Blood samples (1ml each) were collected at 24, 48, 72, 96 and 120 hours from the starting time of giving the dose to estimate florfenicol blood concentrations.

Three birds were slaughtered at 1 hour then at 1, 2, 4, 6 and 7days after the last dose. Blood and tissue samples (lung, liver, kidney, and muscles) were collected for estimation of the drug concentration.

*2.2.3.*Analytical method
The plasma concentrations of the examined florfenicol were measured by means of a modified reverse-phase high-performance liquid chromatography (HPLC) method reported previously by Varma et al. (1986).

A Shimadzu HPLC system (JAPAN) equipped with auto sampler and detector uv. SPD – 10 AVP detector (Shimadzu) and a Chromolith

Performance RP-180 4.6–100 mm column (Merck KGoA Darmstadt, Germany) were used for the separation and quantification of the drugs. The mobile phase was established on mixture of acetonitrile and water (18:82) at a flow rate of 1 mL/min. The drugs were detected by UV absorption at 224.1 nm.

Plasma or tissue samples were extracted in ethylene acetate (0.5 ml: 1.5 mL or 1g :5ml). The tubes were rotated for 10 min and then centrifuged at 2000 g for 10 min as well. Then, 1 mL of the organic layer was aspirated and evaporated under nitrogen. Each of the residues was dissolved in 0.375 mL of the solvent mixture of acetonitrile–water (1:2, v/v), vortexed, and then centrifuged at 19 000 g for 20 min at 4 ºC. The supernatant was collected, filtered through a 0.45-mm nylon filter, and finally transferred to auto-sampler vials.

Assay validation for Florfenicol indicated a limit of detection (LOD) of 0.01 ug/mL, limit of quantification (LOQ) of 0.05 ug/mL whereas the recovery rates were higher than 92.3% for all florfenicol.

The serum protein-binding of the drug was determined in vitro using the method of Craig and Suh (1980) with florfenicol concentration of 0.625, and 10μg/ml^{-1}

*2.2.4.*Pharmacokinetic analyses of the data
A computerized curve-stripping program (R Strip; Micromath Scientific Software, Salt Lake City, UT, USA) was used to analyze the concentration-vs-time curves for each individual bird after the administration of florfenicol by both routed. The following intravenous injection, the disposition curve of florfenicol that expresses the decline in drug concentration as a function of time was best described by a bi-exponential expression. The following equation was used to describe the bi-exponential concentration-time curve for florfenicol in serum after intravenous administration:

$$Cp° = Ae^{-t} + Be^{-t}$$

Cp° is the concentration of drug in the serum at time t.

A is the intercept of the distribution phase with the concentration axis expressed as μg ml^{-1}.

B is the intercept of the elimination phase with the concentration axis expressed as μg ml^{-1}.

is the distribution rate constant expressed in units of reciprocal time (h^{-1}).

is the elimination rate constant expressed in units of reciprocal time (h^{-1}), and **e** is the natural logarithm base. Following administration, each individual curve of florfenicol-vs- time was analyzed to determine the peak of drug concentration (C_{max}) and time to peak concentration (T_{max}). This program also calculated non-compartmental parameters by statistical moment theory. Elimination of half-life ($t_{½el}$) was calculated as Ln 2/ .

The area under the concentration-time curves (AUC) were calculated by the trapezoidal rule, (Gibaldi and Perrier, 1982) and further extrapolated to infinity. AUC is the area under the curve. Systemic bioavailability (F%) is the fraction of the oral dose absorbed and calculated from AUC oral / AUC X100. body clearance area calculated according to Baggot (1978).

2.2.5.Statistical analysis:

The obtained results were presented as mean ± standard error (SE). These results were statistically analyzed using student "t" test, according to (Snedecor and Cochran, 1980)

3.Results:
3.1.**The plasma concentration of florfenicolin tested groups**:

Table 1 : Pharmacokinetic parameters of florfenicol in healthy and Pasteurella infected chickens (diseased) after a single intravenous injection of 30 mg /kg b.wt.

Parameter	Unite	Healthy	Diseased
CP^o	µg/ml	76.5 ± 4.3	53 ± 2.35 ***
α	h^{-1}	4.1 ± 0.06	4.4 ± 0.07 **
t $_{½}$ α	H	0.17 ± 0.01	0.16 ± 0.01
β	h^{-1}	0.19 ± 0.001	0.25 ± 0.002 ***
t $_{½}$ (β)	H	3.65 ± 0.11	2.77 ± 0.15 ***
K12	h^{-1}	2.5 ± 0.01	2.7 ± 0.01
K21	h^{-1}	0.85 ± 0.001	1.09 ± 0.02 ***
K el	h^{-1}	0.97 ± 0.02	0.95 ± 0.002
MRT	H	5.3 ± 0.47	4.1 ± 0.11 ***
Vc	L/kg	0.39 ± 0.001	0.57 ± 0.001 ***
Vdss	L/kg	1.3 ± 0.02	1.98 ± 0.001 ***
CLB (tot)	L/kg/h.	0.38 ± 0.01	0.55 ± 0.02 ***
AUC		77.5 ± 2.6	59.3 ± 3.7 ***

(Mean ± S.E., n = 8)

*significant at p ≥ 0.05   ** significant at p ≥ 0.01   *** significant at p ≥ 0.001

The mean plasma concentration of florfenicol in control healthy and infected (diseased) broiler chickens following the I.V.and oral administration of 30 mg kg-1 body weight are recorded in Fig (1 and 2) . Data showed that plasma concentrations of the drug were significantly (p<0.01) lower in diseased than in healthy birds at the same time intervals.
Following the I.V. administration of the drug in healthy and diseased birds, the drug plasma concentration declined in a biphasic pattern (Fig1) .
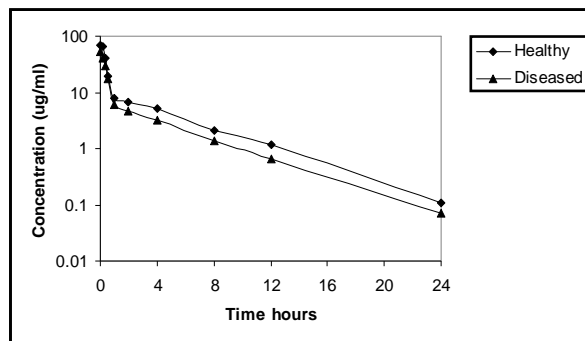
Figure (1): Semilogarithmic graph depicting the time-course of florfenicol in plasma control healthy and diseased broilers after a single intravenous administration of 30 mg kg^{-1}

Following the oral administration   of florfenicol with a single dose of (30 mg kg^{-1} b.wt), the maximum plasma level   in healthy and   in diseased was observed 1 hour post administration (Fig. 2).
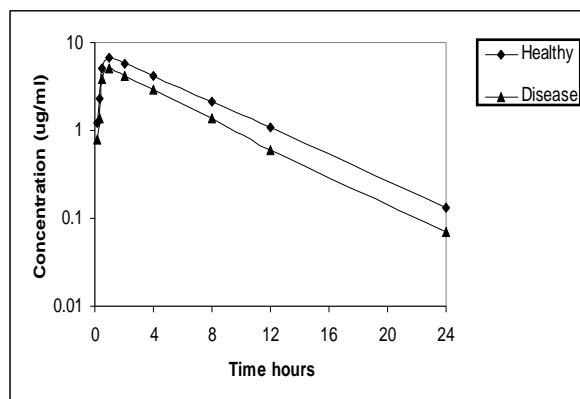
Figure (2) : Semilogarithmic graph depicting the time-course of florfenicol in plasma of control healthy and diseased broilers after a single oral administration of 30 mg kg^{-1}

The drug was detected in   concentration of 0.14 and 0.07 ug/ml at   24 hours post oral administration in the healthy   and diseased boilers respectively. Pharmacokinetic variables describing the disposition of florfenicol in normal and diseased broilers following intravenous and oral administration were depicted in tables (1 and 2).

Table (2) : Pharmacokinetic parameters of florfenicol in healthy and Pasteurella infected chickens (diseased) after a single after a single oral administration of 30 mg /kg b.wt.

Parameter	Unite	Healthy			Diseased			
Kab	h^{-1}	1.9	±	0.03	2.3	±	0.02	***
t $_{1/2}$ (ab)	h	0.37	±	0.02	0.30	±	0.01	***
MAT	h	3.99	±	0.21	1.13	±	0.011	***
Kel	h^{-1}	0.18	±	0.001	0.22	± 0.001		***
t $_{1/2}$ (el)	h	3.8	±	0.01	3.1	±	0.01	***
C$_{max}$	µg/ml	6.8	±	0.13	5.3	±	0.2	***
t$_{max}$	h	1.4	±	0.11	1.3	±	0.1	
MRT	h	5.7	±	0.21	4.3	±	0.11	***
AUC	µg.ml.h^{-1}	55.4	±	2.17	33.2	±	1.97	***
F	%	71.5	± 3.45		55.6	± 4.27		

(Mean ± S.E., n = 8)

3.2.Multiple dose studies
Following the oral administration of florfenicol (30 mg kg^{-1} b.wt) in infected birds daily for 5 successive days, the collected blood samples at 24, 48, 72, 96 and 120 hours showed that Florfenicol was still detected in plasma,   and all tested tissues on the 4th day after stopping of drug medication in   diseased birds. All tissues of   infected birds could be considered drug free except liver and kindeys of infected birds   at 6th day after stopping of drug administration (Table 3).

3.3.Protein binding
 The capacity of florfenicol binding to plasma proteins was 18.5 and 23.7 % (at 10 µg ml^{-1}) ;   and 16.5 and 18.4 % (at 0.625 µg ml^{-1}) with mean values of 17.5 ± 0.82 and 21.05 ± 1.57 % in healthy and diseased plasma; respectively.

Table. (3) : Mean plasma,   and tissues concentrations of florfenicol (ug/ml or ug/gm)   in pasteurella infected broiler chickens following oral administration of 30 mg/kg b.wt   daily for 5 consecutive days.(n = 3).
*** significant at p $\geq$ 0.001

Tissue	Time of slaughter after the last dose					
	1 h	1st day	2nd day	4th day	6th day	7th day
Plasma	5.2.07 ± 0.09	1.2 ± 0.1	0.6 ± 0.10	0.3 ± 0.02	-	-
Liver	10.4 ± 0.31	4.5 ± 0.11	1.7 ± 0.1	0.5 ± 0.04	0.15 ± 0.01	-
Kidney	9.8 ± 0.45	4.31 ± 0.12	1.6 ± 0.05	0.45 ± 0.03	0.2 ± 0.011	-
Lung	7.1 ± 0.87	3.1 ± 0.23	1.2 ± 0.11	0.32 ± 0.04	-	-
muscle	3.2 ± 0.31	1. 4 ± 0.11	0.9 ± 0.05	0.2 ± 0.03	-	-

-   Undetectable.

4. Disscussion

The concentrations of the florfenicol in the plasma were analyzed by means of the same HPLC method.

The results obtained   showed lower plasma concentrations of florfenicol in diseased broilers as compared with healthy ones following the drug administration at different time intervals. This observation could be attributed to a more rapid extravascular distribution of florfenicol in diseased than in healthy broilers . The phenomenon of rapid and wide distribution of antimicrobial drugs in diseased tissues have been previously reported in chickens (Soliman, 1989; Atef et al., 1991), and in mammals (Ladefoged, 1979; Baggot 1980).

Our findings showed that plasma concentration of florfenicol injected IV to healthy and diseased broilers follows a two compartment open model. This finding is in agreement with the result previously recorded in broiler chickens (Afifi and Abo El-Sooud, 1997); ducks (Elbanna,1998) and turkeys (Switala,et al.,2007). The reported short distribution and elimination half-lives (t $_{0.5}$ α and β); higher body clearance and the increase in volume of distribution in diseased birds is consistent with the observed lower plasma concentrations of florfenicol in Pasteurella infected broilers. Similar findings have been previously recorded for chloramphenicol in chickens suffering from E. coli infection (Atef et al., 1991). Following IV injection in broilers , florfenicol was rapidly distributed and eliminated. The elimination half-life in healthy broilers (t $_{0.5}$ β) of 3.65   is higher than values recorded in broiler chickens using injectable formulation (2.88 h), Afifi and Abo El-Sooud 1997), turkeys (2.37),

Switala,et al.,2007) but shorter than values recorded in ducks (El-Banna, 1998).

In addition, the volume of distribution at steady state (Vdss) and total body clearance (ClB) were also different in different formulation ; being 5.11 L/kg and 26.86 ml/kg/min in broilers (Afifi and Abo El-Sooud 1997) and 1.06 L/kg and 0.32 L/kg/h in turkeys (Switala, et al.,2007) for injectable formulation   as compared with 1.3 L/kg and 0.38 L/kg/h respectively for healthy broilers in the present investigation for water soluble formulation.

Following the oral administration, the mean plasma concentration of florfenicol was significantly lower in diseased broilers . This is consistent with the rapid elimination of the drug indicated by the shorter elimination half-life in diseased birds (3.1 h) as compared with the value for healthy ones (t$_{0.5el}$, 3.8 h). Maximum plasma concentrations of florfenicol in healthy and diseased broilers (7.3 and 5.8 µg ml-1) were observed 1 hour post oral administration   of the drug. The calculated C$_{max}$ and t$_{max}$ for healthy broilers (6.8 µg ml-1 and 1.4 h respectively) recorded in this study were higher   than values recorded previously in broiler chickens (C$_{max}$, 3.2   µg ml-1 and t$_{max}$ 63.11 + 3.9 min) by Afifi and Abo El-Sooud (1997) but lower than values recorded in turkey (C$_{max}$, 12.25   µg ml-1 and t$_{max}$ 2 h) by Switala, et al., (2007) . Following the oral administration of florfenicol in a dose of 30 mg kg-1 b.wt. Florfenicol could be detected in plasma of healthy broilers for 19.25 hours following a single IV injection or oral adminsteration in a concentration above   the minimum inhibitory concentration (MIC) for pasteurella determined in the present study (0.312 ug/ml) (Syriopoulou *et al.,* 1981).

On the other hand, these levels were obtained for shorter period (15 h) in Pasteurella infected broilers following oral administration.

Until now, studies on the efficacy of florfenicol using pharmacokinetic/pharmacodynamic (PK/PD) approaches have not been carried out. This means that surrogate markers for predicting the clinical effects for florfenicol used in veterinary therapy have not yet been established. On the basis of results obtained in the present studies, we could show graphically that the duration of time that florfenicol concentrations exceed MIC values (T > MIC) characteristic for the susceptible organism were similar. For example, the plasma concentration of florfenicol were maintained above 0.312 ug/mL for 19 and 15 h, respectivelcty in healthy and pateurella infected birds. If one assumes that T > MIC correlates with the efficacy of florfenicol, the differences in the rational dosage regimen based on the PK/PD approach for these drugs would be relative mainly to their pharmacodynamic properties.

For the treatment of infected chickens, a florfenicol oral dose of 30 mg/kg at 12-h interval has been recommended (Afifi & Abo El-Sooud, 1997; Shen et al., 2003). In this study, we have shown that after a single oral dose of 30 mg/kg, the time of florfenicol plasma concentration above 0.31 ug/mL was approximately 15 h in diseased broilers which is in good agreement with Shen et al., (2003). Examination of the pharmacokinetics of florfenicol and its possible adverse effects during continuous administration are necessary for confirming similar dosage in briolers.

Bioavailability value is associated mainly with the degree of bioactivecompound absorption from the gastrointestinal tract and the first-pass effect when the drug particles undergo biodegradation before reaching the central compartment area. Relatively improved florfenicol absorption can be confirmed by its kinetic profile; in particular, florfenicol concentration reaches its maximum value (C_{max},) in the shortest time. This is consistent with shorter absorption live time recorded in the present study. The data obtained showed a relatively lower value of systemic bioavailability F % in diseased broilers (55.6%) as compared with that recorded in healthy ones (F %, 71.5). Similar values was recorded previously in ducks (El-Banna, 1998) but higher values of systemic bioavailability were ,however, previously recorded in broiler chickens (F %, 96.58 %, Afifi and Abo El-Sooud, 1997) following the IM injection and in turkeys following the oral administration (F%, 83 % , Switala, et al., 2007). The capacity of florfenicol binding to plasma proteins was 17.5±0.82 and 21.05±1.57 % respectively in the plasma of healthy and diseased birds. The values in healthy plasma were similar to those reported in broiler chickens (Afifi and Abo El-Soud, 1997) and in ducks (El-Banna, 1998). The relatively low extent of protein binding of florfenicol was consistent with its high steady-state volume of distribution and extensive distribution in tissues

Our finding revealed that florfenicol concentration in the kidney, and liver was higher than the concurrent plasma concentration. This finding agreed with that reported for florfenicol in poultry (Afifi and Abo El-Soud, 1997 ;El-Banna, et. al. 2007) and in ducks (El-Banna, et. al., 1998). High drug concentrations in the lung and kidney indicated that florfenicol may be an excellent drug for treating respiratory and urinary tract infections caused by susceptible organisms. The drug was detected in the kidney, and liver of diseased birds until the 6th day after treatment ceased (30 mg kg-1 daily for 5 days).

CONCLUSION

It must be emphasized that it would be unwise to over generalize the findings of this study in relation to all broiler diseases; because clearance rates in birds infected with other different organisms might follow different time courses.

Plasma florfenicol concentrations for 30 mg kg^{-1} daily dosage were suitable to maintain its therapeutic concentration for controlling fowl cholera (Pasteurellosis). In addition, florfenicol should be withdrawn at least 7 days before marketing to ensure that the drug is completely eliminated from tissues.

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Rural women participation in extension activities

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Abstract: In all communities, rural women are considered as an important factor in achieving rural development goals and in fact are half of the manpower needed for rural development. However, in the rural community of Iran, there are gaps between the ruling class (capital owners) and villagers, between literate and illiterate, and between men and women. Especially in villages women have fewer possibilities in terms of investment and less power and credit. Role of rural women, over of men, is more influenced with different economic, social, cultural and ecologic factors. Rural women are considered as a noticeable potential in the community either directly (crops production, livestock, handicrafts, cottage industries) or indirectly by helping the agricultural sector (as labor)

Introduction:

About 5.6 million women are involved in agricultural production, and activities related to planting... harvesting, preparation of animal food, and taking care of livestock and poultry and some certain activities related to trading and marketing are all different fields of rural women's role and participation. Based on current statistics, women in rural area participate about 50% in conversion industries, 22% in producing crops and livestock, 75% in handicrafts and in areas related to planting…harvesting , respectively, 25, 24 and 4.26. And also in activities related to livestock, they handle 23% of livestock grazing, 42% of animal care and 100 percent of total poultry in the village. Therefore their role in achieving food security is undeniable. But, like most developing countries, this crucial role in society and in process of rural development, is not obvious. In Iranian rural community, about 80% of women work, but they are mostly considered as housewives, unpaid employment, domestic workers, family workers, or independent employers. The statistics often do not take into account seasonal, part-time, unpaid employment, and housekeeping activities. In economics and social sciences, those of women's activities that have emerged out of house and affected national economy, are the ones to be noticed. In most research and statistics men are known as the heads of household and they are also the owners of lands and fields. That only 1% of the rural lands are belonging to women does confirm such matter (Samadi Afshar, 2004).

Development is a multidimensional process and has various economic, social, political and cultural dimensions. Rural women's participation has not been active and effective; because this participation's most important aspect, namely economics, is for rural women. However the value of their work in

agricultural products is rarely considered as income and they are not independent either (Amiri, 2000).

For an active participation of women in development, first we need to give a definition for their role in development and then barriers related to their role will be discussed. Although apparently there is no difference of gender in development programs but reality is that women are less considered in participatory programs and most of these plans are planned for men. Finally, planner's optimistic look toward women's participation will be greatly helpful improve rural family budget and will increase the difference between urban and rural families. If, by credit, loans and other financial facilities, rural families are able to build up their own business and make a living through the income and become financially self-reliance or independent, no doubt we will witness some social, economic and cultural changes in villages (Varzgar and Azizi, 2001).

Rural women's participation:

Women, being half the population, play an effective role in the economic welfare of family and society. In Iran's economy, women are one of productive factors, but, so far, researchers and writers have ignored the issue of women's participation in economic activities. While in present situation considering the role of women's participation seems to be obligatory (Balali, 2005).

Participation in its broader sense means to motivate people and thus increase the sensitivity to understand and become responsive of development programs and it also carries the concept of local initiatives.

In fact, participation is to guide people caught by disability, to help them realize their potentials and to empower them to make the best use of life.

According to preceding definition of participation, and the ability of participation to turn potential into imminence power, women should participate more actively in economic affairs. Statistics regarding women and girls' activities,

especially in rural areas, are always presented much lower than the real numbers (Ghaffari, 2000).

Village with the word "woman" removed will lose its literally in production and economic activities, their everyday activities in different fields all are evidence of woman being required in rural production. Rural girls and women are responsible for a variety of roles and duties including wife, mother, producing crops, livestock and agricultural activities, making and marketing handicrafts which are common in each area, and food preparation.

Daily activities of girls and women in different fields all are evidence of woman being required in rural production sector. Women are the major potential for developing the rural economy which leads to further growth of rural production. Increasing awareness towards the role of this class in production and towards necessity of their broader participation in economical and social development, have forced the countries to consider and support their activities while making new rural, Local and national policies (Rahmani Andalibi, 2001).

Being aware of women and girls' important role in rural activities, many countries have established institutes and organizations to advance women's progress. These organizations try to remove legal barriers that prevent women to participate in development activities as much as men. And finally improve their social, political and economic status in society. With continues evaluation and analysis of current development plans, we can provide especial conditions to ease women's access to production recourses and social services, and considering women's social situation in every society, we can provide the opportunity for them to increase their participation, share income like men, and take part in decision-making(FAO, 1998).

Importance of women's participation:

It's not possible to reach rural development goals without understanding the present situation of society and its groups. Meanwhile identifying the groups with critical roles in the rural area development program will be of importance. Women, as a rural group, due to numerous reasons have always received the least attention while their activities in non-monetary sector play a certain role in rural household economy. As most men leave the village to work in town, women provide much of the agriculture force in the area. In recent years the situation has been more considerable as rural migration to town is getting more. In most Iranian villages women's population is more than men. According to FAO's reports, in some African regions, for 60% of families, women are responsible for supervising family. Even for cases that men are the direct responsible of production affairs, women's role

in family economy can't be denied just because they don't get paid. Although these efforts appear to register in none of official statistics, they easily replace some other activities with significant financial value.

Studies by FAO show that more than half of the world's crops are collected by women. According to estimates, 1.3 billion of world's poor are women, thus the slogan "poverty has a feminine face" is spread worldwide.

Given that in many parts of the world, the production potential of women is not used properly, a cost-benefit study by the World Bank shows that investing on women in developing countries will be more profitable than any other investment. In addition to financial benefits of this huge force, its ancillary results will also be useful. The ancillary benefits of women's employment include: lower population growth and children mortality rates (Navab Akbar, 1997).

Rural women are a big part of productive force and in developing countries third to half of them are supervising households; as a result they face numerous problems, such as:

-Lack of access to social and health facilities

-Various daily chores inside and outside the home

-Men's skill and increase of women's responsibility

-Lack of professional to educate women

Around the world and in Iran, the issue related to female employment, especially in rural areas (which is a manifestation of participation), is not unemployment but unpaid employment; because all the unpaid work done by women at home, such as cleaning, washing, nursing, social affairs, agriculture and livestock,… are encountered as non-economical activities; While visible economic sector cannot continue to exist without this invisible sector's goods and services. On the other hand, rise of industrial system and expansion of factory job all over the world, attracted men to these economic systems and this has given men an objective vision; Whereas, the majority of women, due to working alone at home have got a subjective vision. Now, as women enter labor market and start to participate, they'll become objectified; because the work system will encourage them to think like men. Being more around the house and their local area will help both men and women in terms of subjectivity and objectivity (Arab-Mazar and Jamshidi, 2005).

Thus the issue of women's participation has important effects, including:

-Acceleration of plans implementation

-Realization of people's every day needs with cooperation and consultation

-Increasing efficiency and reducing functional expanses of projects

-Creating opportunities for talent realization and scientific activities

-Creating sense of solidarity and cooperation

-Increase social and personal awareness

-Women, sharing ideas in decision-making and determining their own destiny

-Participation of women as an important factor and a major power to achieve development

Therefore, according to preceding discussions and importance of women's participation in future plans, it's of great importance to study and recognize the factors affecting their participation in social activities of rural area (Fakhraee, 2002).

Discussion and results:

In the new system of advanced agricultural economy, the value of women's work that previously was unpaid labor now must be paid in cash. Expect for agriculture which is rural women's main work field they have rarely participated in tow other fields of economy. The most important issue of women's social and political participation is to take part in planning, decision making, implementation of decisions, and evaluation of results. Generally they have had a little share in such processes. Although in recent years rural women have participated more in villages' management, social and cultural organizations, and cooperative institutions' management; but having a lower level of literacy, education, income and social status than urban women they still have the smaller share of administrative and official jobs. Some barriers to women's participation which can be categorized in 3 groups of personal, familial, and social include: law literacy level, large volume of work both inside and outside of home for many reasons including seasonal migration of men and the great diversity of rural women's activities(nursing, housekeeping, agriculture, handicrafts, livestock,…), malnutrition, law health indicator, Patriarchal structure of society, father or husbands disagreement with a woman's participation in social and economic activities for various reasons like cultural reasons or unwilling to lose the labor force at home, negative attitudes towards women's abilities, gender discrimination, family's poverty, superstitious beliefs, misleading customs like fatalism, law access of women to credit and facilities, inaccessibility of extension services, men-orientated social activities and participation plans, deficiency of professionals needed to educate rural women, problems of access to health services and social facilities, low income of rural women compared with men, lack of non-governmental organizations dealing with rural women's problems, few women managers in rural area. (Rahimi, 2001)

Nowadays, micro-credit and micro-financing have changed people's lives; it has brought back life to poorest and richest communities of the world. So we can easily observe a great increase in people's access to general financial services. Facilitating the access of families to financial services, they begin to invest on educational expenses, healthcare, healthy nourishment, trading, and housing based on their priorities. Overall in many countries financial plans mostly focus on women. Women, provided with financial facilities, will receive a loan, guarantee to pay it back, keep their saving account and also they'll have insurance coverage. Micro-financial plans have an important message for families and communities. Many studies have proven that women's access to mentioned facilities may improve their conditions in family and society; it also helps them feel more self-confident and makes them aware of their own abilities. Thus providing micro-credit services for the poor in society is a powerful tool to reduce poverty and so that they are able to create assets, earn more money and become less vulnerable against the economic pressure. Of about 1.3 billion poor in the world there are 900 million poor women, this obviously shows that poverty has a feminine face. According to UN's development fund, 10% of world's income and less than 10% of world's assets belongs to women. While a majority of them never posses the capital needed for their activities, women still play an important role in the economic development of country. Therefore women draw the micro-credit policy maker's attention more than others. Choosing women as the main target of micro-credit plans is an effective strategy to eradicate poverty; because their income will upgrade the family welfare; furthermore earning money improves their social status. In some countries this choice is influenced by society's attitude and culture (Araghzadeh, 2002).

For instance founder of Grumman Bank of Bangladesh, Mohammad Yunes, has stated that: "women have plans for themselves, their children, and their family life; they always have an overlook while men just look for fun" to explain why 94% of their clients are women.

Women's access to micro-credits have shown that their income benefit to improve their family and provide livelihood. In addition to all these another reason of women being the target of micro-credit plans is that women have higher loan recovery rates. Totally, expanding women's access to micro-credits may lead to many useful results which in economy is mentioned as "virtuous spiral"; because their access to micro-credits results in family welfare and in a broader point it'll improve community's welfare and shall be increased welfare this process is repeated.

In researches that conducted by Nanda (2004) became clear that women participation in credits programs had positive effects on their demand about health care. Fiona Steele and et al (2008) in researches that conducted as called " influences of credits programs on empowering women at Bangladesh , found that women who joined to credits programs , have participated in more educational programs

and have married with more educated men and also they have saved more and they had more cash .

Shahnaj and Chaudhury(2009) in research as "credits and its role on empowering women " concluded that there is meaningful relation between attending in credits programs and empowering women , at economical dimensions .

Maybe the main challenges that threaten credits associations , is lack of necessary emphasizes on social dimensions and on reinforcing their basics , that practically cause that this social foundations lose its efficiency soon and practically changed to unsuccessful institution .

Fiona Steele and et al (2008) in researches that conducted as called " influences of credits programs on empowering women at Bangladesh , found that women who joined to credits programs , have participated in more educational programs and have married with more educated men and also they have saved more and they had more cash .

Ellen and her Colleagues (2009) used approach called it "credits and education at Bolivia, Ghana, Honduras, Mali and Thailand". This approach looks for empowering women through financial services with education. In this approach, women get familiar with importance of credits through education and extension and also familiar with ways to access it through establishing different groups.

Ruhal Amin and others (2010) found that those who joined credit funds had more ability rather than those who didn't.

Jameela (2010) presented that credit programs has shown lot of affects on empowering women so that has increased their social, politic and economic ability. Thus it is obvious that credits programs and its educational and empowering programs can be affective on social, humane and economic development or rural society, if it be associated with proper and gradual practices and base on reciprocal communications principles and apply opinion of local society.

A study conducted by Chabokru et al (1384) shows the crucial importance of micro-credits for farmers who do not possess physical financial assets (land, building, livestock, well…) and work in agricultural sector because of environmental conditions (such as living in a village) or because it's their ancestral occupation.

So today, women's participation in sustainable economic, social, and cultural development in rural areas is not optional but an essential matter. Those communities that have not seriously considered the necessity of participation faced failures and delayed community's development, welfare and security process. In any community, village, or social group, broad participation of every women in decision-making and any other matter related to national or local development programs, is a key variable in social sciences and in the last few decades, it has

interested many scholars of socio-economic and especially cultural issues, and is considered as one of the most fundamental democratic rights of women in a society. As we know in a popular participation, all people are given the opportunity to participate in planning and decision making for their society and for their own future. When in practice women feel that they can be involved in planning, policy making and deciding or solving problems in the society certainly they'll feel more solidary and become more interested in social, economic, and cultural development programs.

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Effect of Oleozon on Healing of Exposed Pulp Tissues

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Abstract: Objective: To compare the healing effect of Oleozon and calcium hydroxide on experimentally exposed pulp tissue. **Method:** Direct pulp exposures were conducted in nine dogs, i.e., three dogs were prepared for each experimental period of 7, 30 and 90 days. In each dog the upper and lower canines of the right side were capped with calcium hydroxide (Dycal), while those of the left side were capped with ozonated olive oil (Oleozon). After the observation periods, the teeth were prepared for histomorphological examination. **Results:** The tissues capped with Oleozon revealed inflammation with dilated blood vessels and hemorrhages at 7 days, a slight inflammatory response at 30 days, and the increase of collagen fibers and fibroblast with dilated blood vessels at 90 days. While, the tissues capped with calcium hydroxide exhibited medium degree of inflammation and necrosis adjacent to the exposure site at 7 days, remarkable absorption of necrotic tissues with few collagen fibers and fibroblast at 30 days, and a localized connective tissue capsule with depositions of reparative dentin at 90 days. **Conclusion:** Based upon the results and the limitations of the study, it was concluded that direct pulp capping with Oleozon induced less degrees of irritation to the dental pulp compared to that with Dycal. **Clinical significant:** The application of Oleozon paste for direct capping to exposed pulp could have a possibility to serve as a therapeutic method to enhance pulp tissue healing.
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Key words: Experimental pulp exposure, pulp capping, Calcium Hydroxide, Oleozon,histopathological examinations

1. Introduction

Preservation and maintenance of pulpal vitality has been a prime concern in operative dentistry. Historically, the placement of medicaments or materials against pulp exposures during caries excavation has been considered controversial, and instead conventional endodontic therapy has been recommended, (Langeland (1981); Tronstad and Mjör (1972)). The reluctance for direct pulp capping to pulp exposures in a carious field is based on unpredictable outcomes using traditional materials and treatment protocols. Moreover, compromised immune responses and impede cellular differentiation and recruitment, normal pulpal repair mechanisms may not function properly when bacterial by-products induce pulp inflammation. To date, researchers have never been identified a reliable non-absorbing bioactive pulp capping material that consistently stimulates cellular repair mechanisms, seals the dentin and promotes formation of a biologically stable reparative dentin bridge, Ward (2002).

Enhanced understandings in pulp physiology, caries progression, inflammatory mediators, and pulpal defence mechanisms have changed the clinical approach to caries removal and protocols for direct pulp capping, Hahn and Liewehr (2007). Several studies have demonstrated that the exposed pulp has the ability to heal when micro-leakage and bacterial contamination are prevented, Cox et al., (1987). A wide verity of materials and techniques for direct pulp capping have been used, including calcium hydroxide, hydrophilic resins, resin-modified glass ionomer cements, tri-calcium phosphates and, more recently, mineral trioxide aggregate(MTA), Heys et al.,(1981); Hørsted et al.,(1985); Matsuo et al.,(1996)and Auschill et al.,(2003) Success rates with direct pulp capping in a carious field have varied depending on the techniques and materials. In humans, success rates range from 30 to 85 percent in two- to 10-year retrospective studies, Barthel et al.,(2000); Baume and Holz (1981).

In fact, Calcium hydroxide, once considered the gold standard for pulp capping materials in which new materials should be tested, Farhad, A. and Mohammadi, (2005); Heys et al., (1980), but long-term studies have shown that the results were variable and somewhat unpredictable, Baume and Holz (1981); Hørsted et al., (1985); Barthel et al., (2000) and Auschill et al., (2003) .The material does not provide close adaptation to dentin, does not promote consistent odontoblast differentiation and has been shown to be cytotoxic in cell cultures; the resultant reparative dentin formation can be

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characterized by tunnel defects, Schröder (1985); Andelin et al., (2003). Tunnel defects within dentin bridges may provide a pathway for the penetration of microorganisms to activate circulating immune cells, induce pulp irritation and produce subsequent dystrophic calcification Cox et al.,(1996).

Other innovative technical advances to halt the carious process and initiate the repair of potentially damaged tissue include the use of lasers, ozone technology and bioactive agents that induce and stimulate pulpal defenses, Moritz et al., (1998); Goldberg et al., (2003); Dähnhardt et al., (2006) . Ozone therapy is a modern noninvasive method of treatment. The word ozone was discovered by Schonbein in 1840 and comprises an allotropic variation of oxygen, Rilling (1983); Stopka (2003) . Ozone is an activated, trivalent form of oxygen. Ozone possesses strong antimicrobial activity, debriding effect, powerful oxidizing properties and can simulate angiogenesis, Sunnen (1988); Stopka (1999). Ozone is not only very powerful oxidizing agent that can kill a wide variety of viruses and bacteria, but also a very powerful non-chemical disinfectant, Seidler et al., (2008). Nowadays, ozone is employed as ozonated olive oil (Oleozon), which is widely used as a clinical therapeutic agent for wound healing Martinez-Sanchez et al., (2005). Ozonated materials, in which the ozone molecule stabilized as an ozonide between the double bonds of mono-saturated fatty acid, have the capacity to deliver nascent oxygen deep into the treated area without causing irritation. Under the influence of ozone, improved rheological properties, Verrazo et al., (1995), raised intracellular ATP, Oosting, et al., (1991) activated cellular metabolism , Shiratori et al., (1993) and expression of cytokines relevant to healing, especially Transforming Growth Factor (TGF- 1) were observed, Bocci et al., (1994).Ozone is currently used in dentistry as a possible antiseptic agent, and the effectiveness of ozone in the treatment of oral diseases is currently a subject of intensive investigations. Ozone has been used either in gaseous or in aqueous form for treatment of caries, in the root canal disinfection, and for enhancing epithelial wound healing, Filippi (2001); Nagayoshi et al., (2004); Baysan A, Lynch (2004). Flippi (2001)observed the accelerating effect of ozonized water on epithelial wound healing in the oral cavity. However, there is a lack of sound data on histological effect of ozone on oral tissues to minimize any possible side effects by controlling its applications , Bocci (2005).

Therefore, the purpose of this in vivo study was to compare the histomorphological characteristics of ozonated olive oil and calcium hydroxide cement when used as pulp capping agents in experimentally exposed dental pulp at different time intervals.

2. Materials and method:
2.1. Materials:
Calcium hydroxide containing product (Dycal, Dentsply/Caulk, U.S.A) and ozonated olive oil (Oleozon) were used as capping materials in this study. Ozonated olive oil paste was prepared through incorporation of ozone gas (O_3), generated by the Ozo-1m VTT unit (Ozomax, Qubba/Canada) with concentration of 70ug/ml (5%), into olive oil and was kept in a sterile sealed jar at $-20C^o$. Glass ionomer restorative material, Ketac Fil plus Aplicap (3M/ESPE, St Paul, MN, USA) was used as a restorative material.

2.2. Method:
Mixed breeds healthy dogs (n=9) between one and two years old were selected for the present study i.e., three dogs were used for each experimental period of 7, 30 and 90 days. After the quarantine period dogs were housed in individual cages with an area of $1.5m^2$ and 1.5m high, provided with dry balanced diet, drinking bowels and cleansed daily. In each dog the right canines were capped with Dycal, while the left canines were capped with ozonated olive oil. Each dog was tranquilized by an IM injection of 10 mg/Kg of neurazine. General anesthesia will be performed by IV injection of Thiopental sodium in dose of 30mg/Kg body weight. The anesthetic effect occurred after 10-15 minutes and lasted for 30-60minutes. The selected teeth were cleaned and disinfected with Betadine. A dry field of operation was maintained by cheek retraction and placement of cotton rolls in the muco-buccal fold during operative procedure. Oval shaped class V cavities were prepared at 2 mm away from the gingival margin. The average dimensions of the cavities were 4mm in the longitudinal direction and 2mm mesiodistally. The cavities were prepared with a sterile #3 rounded bur using a low-speed engine with 25,000 – 30,000 r.p.m. under sterile physiological saline spray. The cavities were rinsed with sterile saline and dried with small cotton pellets. Pulp exposure was performed in the center of the pulp floor by means of #1 round bur under water coolant. Homeostasis was performed by irrigation with sterile saline and cotton pellet before placing the capping materials.

The application of Dycal was carried out according to the manufacturer's instruction. Equal amounts of the base and catalyst were mixed homogenously and placed gently over the exposure site using a #1 insertion spatula. They were served as a positive control group. For the corresponding pulp exposures on the left jaws, a thin layer of Oleozon was applied to the cavity using a small plastic instrument. It was spread evenly throughout the length of the exposed pulp in an incisogingival direction. Then, the cavities were restored with glass

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ionomer restorative material. The animals were observed until recovery, and then every dog was transmitted to the cage after it regained its complete consciousness.

After observation period of 7, 30 and 90 days, the dogs were sacrificed by bilateral perfusion of formalin through cannula in common carotid arteries. The jaws were immediately dissected free, and the teeth were separated from the jaws by the use of handsaw. The apical root third of each tooth was amputated and immediately placed in individual bottles of 10 percent neutral-buffered formalin for 48 to 72 hours to allow proper fixation of pulp tissue. After fixation, they were placed in gauze bag tied with a string, which had been dipped in melted Paraffin .The bag was suspended in large quantity of decalcifying solution consisting of 5 percent aqueous solution of nitric acid for 1 to 4 days. The decalcifying agent was changed daily to maintain its effectiveness. The teeth were stored in decalcifying solution until obtaining certain degree of softening, which was checked by needle penetration. When they reached to required softening stage, every trace of decalcifying solution was removed by rinsing in running water for 24 hours, and then neutralized in 10 percent formalin. The additional irrigation was completed in running water for 24 to 48 hours. Dehydration was carried out in ascending grades of ethyl alcohol, and the specimens were then cleared in Xylene and embedded in Paraffin wax. Bucco-lingual cross sections of 7 microns were serially prepared in each cavity and stained using hematoxylin and eosin staining. The samples were evaluated under light microscopy to detect morphological alterations for each material and time period. The changes in pulp tissues were assessed using the Negm scale as weak, medium and considerable degree of inflammation.

The status of the odontoblastic layer was determined according to Qvist & Qvist (1977) with the following indexes: 0 as no reduction, 1 as insignificant reduction, and, 2 as medium to significant reduction.

The quantity of reparative dentin was evaluated by the method of Stanley on a 3–degree scale: 0 as no reparative dentin, ½ as initial formation of reparative dentin, and 1 as presence of a significant amount of reparative dentin.

3.Results:
3.1.Histomorphological analysis of the samples capped with Oleozon

The microscopic examination of the serial sections of the teeth showed vital pulp in all teeth. After 7 days, direct pulp capping with Oleozon revealed a considerable degree of inflammation with dilated blood vessels and hemorrhages. Significant reduction of the odontoblasts was detected Figure 1.

However after 30 days, the histomorphological image changed drastically. A weak inflammatory reaction according to Negm, a well-organized layer of odontoblastoid cells, absence of hemorrhage, and persistence cellular infiltration were observed in Figure 2. After 90 days, increased collagen fibers and fibroblast with dilated blood vessels were detected in Figure 3.
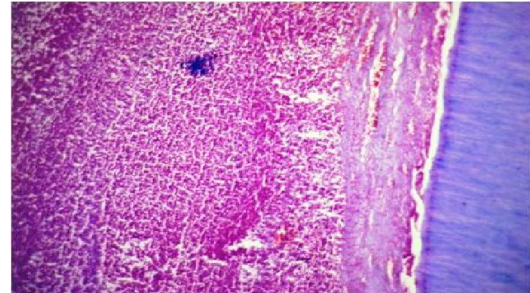
Figure 1 Morphological changes in canine dental pulp 7 days following direct capping with Oleozon
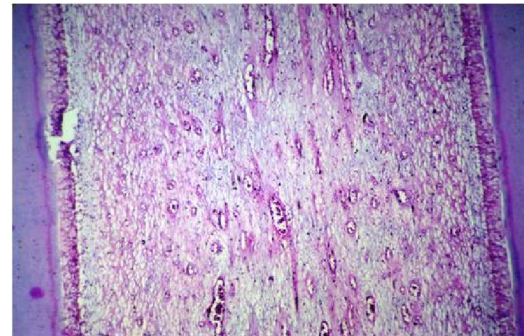
Figure 2 Morphological changes in canine dental pulp 30 days following direct capping with Oleozon
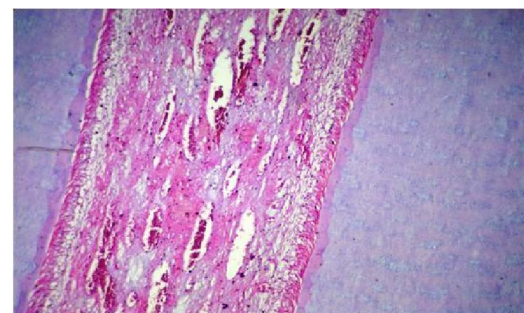
Figure 3 Morphological changes in canine dental pulp 90 days following direct capping with Oleozon

3.2.Histomorphological analysis of the samples capped with Dycal

The histomorphological changes of exposed pulp contact with Dycal revealed medium degree of inflammation, mononuclear cellular infiltration and necrosis at site of exposure at 7 days. The odontoblastic layer shows index 2 by Qvist adjacent to the damaged area. No reparative dentin was detected. The predentin was very thin and almost

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absent near the exposed cavity. The rest of the pulp appeared full of congested and dilated blood vessels with extravasations particularly at the central portion of pulp cavity shown in Figure 4. 30 days specimens demonstrated Qvist index 1 and Stanley index 0. A weak inflammatory reaction, remarkable absorption of necrotic tissues at the exposure site with few collagen fibers and fibroblast were detected. The rest of the pulp appears nearly normal. There was an evidence of thin layer of dentin bridge formation shown in Figure 5, which was not always complete. After 90 days, a localized connective tissue capsule was detected between area with inflammatory reaction and healthy pulp tissues. Fibroblasts, small blood vessels and peripherally cited collagen fibers were detected inside this restrictive capsule. There was a prolific deposition of reparative dentin, as thin collar of osteodentin, with irregular and immature morphology as shown in Figure 6.
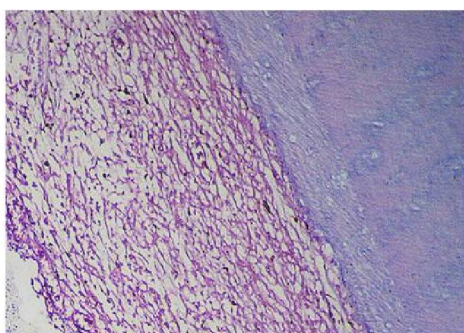
Figure 5 Morphological changes in canine dental pulp 30 days following direct capping with Calcium Hydroxide.
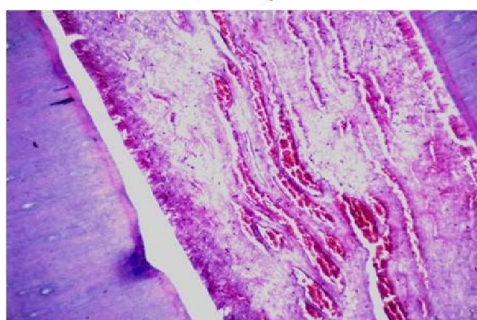
Figure 4 Morphological changes in canine dental pulp 7 days following direct capping with Calcium Hydroxide.

Discussion

Pulp capping comprises adequate protection of exposed dental pulp by the applications of medicaments and restorative material. This technique aims to preserve the vitality of pulp tissue, thus avoiding more invasive endodontic treatment. Although pulp exposure frequently occurs by caries process in which there is inflammatory reaction, the selection of healthy vital teeth for this study has the benefit of standardization and can be regarded as

acceptable method in determining the effects of tested materials. In judging the efficacy of pulp capping materials, it is important to evaluate the presence of inflammatory reaction, necrosis and calcified bridge formation.
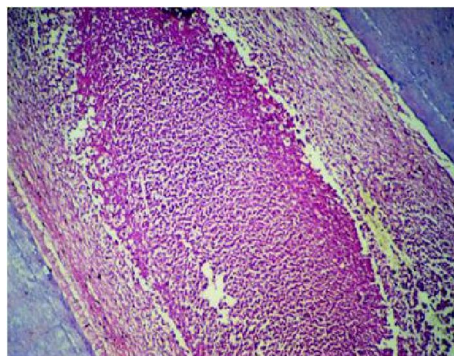
Figure 6 Morphological changes in canine dental pulp 90 days following direct capping with Calcium Hydroxide.

Based on the properties of ozone, the present study was designed to test ozonated olive oil paste as a direct pulp capping material in dogs' teeth. Ozone is very unstable gas. In air, ozone has longevity of only a few minutes; while in water, ozone lasts for a few days. However when ozone dissolved in an oil base such as 100% pure olive oil, ozone has a life span measured in months to years. The amount of oxygen and ozone saturation level is exponentially greater in solid paste than in liquid oil product. Also, the liquid does not have the long time release which ozonated olive oil paste does, Sechi et al., (2001). Different ozonized solutions such as vegetable oils have been used successfully against different infections. Vegetable oils are natural products derived from plant origin consisting of ester mixtures of glycerol with chains of fatty acid contain 14 to 20 carbon atoms with different degree of unsaturation, Ferrari et al.,(2004). The unsaturated triglycerides in vegetable oils were responsible for its favorable properties. There are different vegetable oils derived from various sources. Knowledge of their composition provides insight into their physical and chemical properties. Ozonized olive oil (Oleozon) was widely used for its therapeutic and antimicrobial effect against bacteria, fungi and virus, Hammer et al., (1999). The olive oil is obtained from olive tree and presents a high proportion of oleic acid (65-85%). It is characterized by high ratio of polyunsaturated fatty acids, such as the monounsaturated oleic acid and the polyunsaturated linoleic acid, Gertz et al.,(2000). Ozone chemically reacts with carbon-carbon double bonds present in unsaturated fatty acids producing long complex molecules called 'ozonoids'. These ozonoids are effective antimicrobial agents, and

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stimulate the reparative and regenerative pathways at cellular level. Hydrolysis of ozonized oil will generate different products such as hydroperoxides, acetones, peroxides, and aldehydes and these compounds could be also responsible for the wide biological activity of ozonized olive oil, Siqueira et al.,(2000); Valacchi et al.,(2005). Furthermore, ozonated olive oil remains stable for 2years when stored at 4°C Valacchi et al.,(2005). The safety of Oleozon was discussed by Gundarova et al. (1996) and Alvarez et al. (1997) The present study is the first study that uses ozonated olive oil as direct pulp capping material. The histomorphological results of Oleozon application to the pulp showed a diffused involvement of the inflammation. It was reported that ozone exposure is associated with activation of growth factors, which are important to regulate inflammatory reactions and consequently the process of wound healing, Hørsted et al.,(1985);Pierce et al.,(1988); Werner and Grose (2003);Lim et al.,(2006). The increase of collagen fibers and fibroblasts indicated that ozone might act on healing directly or indirectly through collagen synthesis and fibroblast proliferation. Fibroblasts have been known to play an important role in reepithelization, synthesis of collagen fiber, extracellular matrix regeneration, and for the release of growth factors, Bocci(1994). The deposition of collagen by fibroblasts during the inflammatory process is a key event for human pulp repair, Barkhordar et al.,(2002); Chan et al.,(2005). Kim et al (2009) stated that the increased expression of platelet derived growth factor (PDGF) and transforming growth factor- (TGF-) were correlated with increased collagen fibers and fibroblast proliferation. TGF- 1 has a direct influence on cell proliferation, angiogenesis, chemotaxis (fibroblasts and monocytes), synthesis of extracellular matrix and collagen synthesis, Pierce et al.,(1988);Jazwa et al.,(2006).Also there was increase in vascularity in the ozone group. This was explained by Kim et al (2009) in which the increased vascularity might be due to the increased expression of vascular endothelial growth factors (VEGF) by ozonation, which is the main cytokine of vascularization in the late phase of healing. Bocci et al (1994) stated that the improved delivery of O$_2$ and release of growth factors appear beneficial in accelerating healing of wounds. Therefore, the treatment of the pulp with ozonated olive oil probably works by promoting collagen synthesis, fibroblast proliferation, and improvement of circulation. Taken together, we can infer that ozone application may be regarded as a therapeutic method to enhance pulp tissue healing.

On the other hand, the results obtained with calcium hydroxide are similar to the findings of others in direct pulp capping, Stanly and Lundy (1972);Eskandarizadeh et al.,(2006); Modena et

al.,(2009). The superficial necrotic layer (cauterization zone) could be due to the chemical injury caused by hydroxyl ions, which present highly alkaline pH, yielding to an initial destructive effect , Glass and Zander (1949); Holland(1971). It has been reported that the high alkaline pH can solubilize and release some proteins and growth factors from dentin , Modena et al.,(2009). It was evident that, calcium hydroxide was able to enhance the pulp to perform its normal functions including deposition of secondary dentin. This was evident especially after 90 days test period. Dentin bridge formation occurred mainly from the periphery of exposure site, as its thickness at the periphery was greater than the thickness toward the prepared cavity. This may indicate its formation from the residual dentin chip at the wound surface, Kitasako et al., (2000); Parirokh et al.,(2005). These events may be responsible for pulp healing and hard tissue barrier formation.

So far, ozonated olive oil has the capacity to serve as a therapeutic agent. This highlights the importance of conducting further researches on ozone, which has encouraging expectation for further clinical applications.

Conclusions

Based upon the results and the limitations of the study, it was concluded that direct pulp capping with Oleozon induced less degrees of irritation to the dental pulp compared to that with Dycal. The application of Oleozon paste for direct capping of exposed pulp could have a possibility to serve as a therapeutic method to enhance pulp tissue healing.

Conflict of Interest:

The authors declare that they have no conflict of interest.

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Assessing Advantages and Disadvantages of Distance Learning

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Abstract: most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority. You receive individual attention, and you work at your own pace. In recent years, technology has played a significant role in transforming the traditional distance education school into a dynamic, interactive distance learning method using toll-free telephone lines, as well as a diverse array of personal computers, video devices, CD and DVD ROMs, online courses over the Internet, interactive devices, and other modern technological innovations. The future for distance study promises to be exciting.
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Keywords: Distance Learning, education

Introduction:

When the standardization and the requirements for training by the third millennium will be talking, unconscious form, design and construction to provide context and use tools and indicators to teaching the principles of community-based knowledge to the mind is centered. . No doubt these requirements and identify the correct tools and proper utilization of their functions according to accelerate the development expected in the knowledge-based information society will be effective. Such concerns and problems that any country in its development plans in motion to the information becoming a knowledge based society means a society would be faced with the centrality of knowledge, Dealing with existing tools and how these tools are used.

Led the way when dealing with those massive training programs available to speak to the technological tools that we expect to occur that planners and decision makers that planners and decision makers of large structures, especially university education according to the image Access to the development of community information are available on these tools are selected and used.

Massive wave of data produced in today's world it nicknamed the "information age" has all day and through various means of communication in the world will move on its size are added. Other hand, as we're not the world witnessed the development of the role of information communication devices transporting feedback fast and absorb the information around the world, we forget

Therefore, information and communication as the main lever or two important move in developing

wings, we learn. Meanwhile, proper utilization of the capacities of these two valuable and effective indexes in the general development concept for any society and the principles of a critical need is considered. With a view to clarifying this issue can be paid in the best way to create a platform for developing data standards and access to a knowledge based society, what really can be. To achieve a clear and practical answer in this area before all the existing definitions and indicators mentioned placed.

Definition of distance learning:

in distance education teachers often are separate and comprehensive. Preparation of educational materials, supporting learners under the supervision of a training center takes place almost never do as a group are not**.** For services to education and electronic learning aids such as printed materials, computers and the Internet rely on.

Another look at the educational system of a new e-business and artistic and is a comprehensive solution to the institutions that want to move in the direction that technology and change their teaching methods and environments are possible to achieve the new educational approach provides**.**

Distance education is any type of schooling that takes place away from a physical campus. Distance education is also known as:

- distance learning
- virtual learning
- online learning
- e-learning
- online education
- web-based training

Types of Distance Education Programs:

There are two types of programs offered by distance education schools: synchronous learning programs and asynchronous learning programs. With synchronous learning, distance education students must log on to the school's website at a set time. Often, they interact with their peers and professors via group chats, web seminars, video conferencing, and phone call-ins. With asynchronous learning, distance education students complete all coursework on their own time. They often learn via assignment sheets, message boards, email, pre-recorded video lectures, mp3s, and traditional mail correspondence.

Distance education began for the delivery of courses to students who live in remote areas. Over the years, though, this form of education has become the preferred method for learning outside of the classroom.

Distance Education is now undertaken by people with busy schedules, hectic lifestyles, special needs, and also those living in isolated areas. What's more, with such flexible learning options you can choose to study at any time and from any location you like.

There are a number of different **forms of distance education** and it's important to know which method you prefer:

- **Correspondence learning:** your course materials are printed and sent out to you by mail/courier. The advantages are that you have a printed set of reference materials, you can study anywhere and you are not reliant on a computer, you can learn for long periods of time.
- **eLearning:** your course materials are provided to you in multimedia format; that is, on CD/DVD. In this way you can choose to take your study materials within you and learn anywhere in the world with just a laptop.
- **Online learning:** no materials are sent to you and you do all your learning online. The limitation is that you need to be logged onto a computer (though you may be able to download and print some of your materials yourself, though this can cost you more in ink), there is a limit to how much you can absorb and do online, and most people's attention span on-screen is limited to 20 minutes (your eyes get tired after that).

- **Broadcast learning:** where you tune into a series of television, radio or Internet broadcasts (e.g. podcast, YouTube, etc.).
- **Teleconferencing:** where your lessons are conducted in real time through an Internet connection. Limitations are that streaming can be slow, connections can cause problems (students and teachers generally need to be computer literate) and there can be delays in talk-time, depending on software, hardware and connection capabilities.

Benefits of Distance Learning:
Benefits and opportunities that distance education provides, include:
 - training a wide range of audiences.
 - meet the needs of students and students who can not attend in place.
 - Possible connection between students and students with cultures, beliefs and experiences are different.
- Benefiting from coaches and speakers who do not live in the country.

Educational methods in distance learning:
Today, under the new system replaced the traditional systems of learning and learning week (ie tutoring methods, lectures) are:
-    **Multimedia courses:**
These courses and widely used elements of image, communication, graphics and simulated components, animation and communication elements for guidance and tips, and talk back on course and curriculum issues are held.
-    **Enhanced communication mechanisms:**
The mechanism of any texts simultaneously, and asynchronous audio-visual communications to protect you. This case allows students to practice on topics learned will give.
-    **Written test:**
 thus, question and test via a distributed communication network, are corrected and returned. These exams through video conferencing support and runs.
-Virtual Seminar:
thereby different groups of students in different geographical environments linked together makes.
-    **Collaborative virtual laboratories:**
 the laboratory of the Group's activities are supported. Workshops such as software engineering.
-Smart academic factors:
academic factors that inform intelligent, support and guidance students pay.

Remote educational tool:
distance learning tools and supplies various uses. These tools in four main courses are:

A - Audio Tools:
Audio tools include training such as two-way interactive telephone, video conference, shortwave radio and a strain of tools such as audio tape and radio.

B - Image tools:
including slides, films, video tapes and video conferences.

C - Data:
computers as electronic data are sent and received. Because the data word description for a wide range of educational tools is used.
Computer applications for distance education are varied and include the following:
1- Training to Computer Management.
2 - Computer Assisted Instruction.
3 - through PCs.
4 - e-mail, telegraph, computer conference and the World Wide Web simultaneously.

D - Print:
The main element of distance education programs, particularly in the exchange and delivery system information tools are considered.

Key factors in the process of distance education:
the process of remote training, the following factors contribute:
-       Students:
Regardless of educational content, role and main element in the learning process students are responsible.
-       Coaches and Teachers:
Success depends on a lot of educational activities the ability, skills and knowledge are the coaches and professors.
-       Facilitators of communication:
Facilitator bases, as the bridge between students and mentors are. Must base expectations of teachers and educational needs of students and service coordination and communication to create.
-       Support staff:
One of the important pillars of any development of distance education programs, by development group finds. Operational support staff such as student registration, copy and distribute their resources, order textbooks, security and copyright, and are responsible for the report.
-       Management:
The group decision makers, builders and judges are considered to be educational and should be

considered among the factors above, establish the correct relationship formation.

Advantages of Distance Learning: Benefits of Distance Learning

Since distance learning has emerged as a new learning option, many students consider it. However, because it is new, they hesitate before opting for this education path.

This article lists and discusses about the Distance Learning key advantages.

Like everything in life, what works for on doesn't work for other people.New technology sounds confusing for many as it one of these new "techy things". After reading these 5 benefits of distance learning, you may get the idea of its advantages. Read further..

Benefits of Distance Learning: Advantages to Consider

Here are the good things with it -

1– The Flexibility: You utilize it in a convenient manner – Distance learning gives you the autonomous decision on the learning program and its schedule.
You are the one who decide on the time of taking the online   courses.
You also set your own pace and control how fast you want   to   go   over   material.
Because these are online courses, you set your learning times. You take the decision on where to complete your learning duties and when to have more readings. In some degree programs, you can plan the syllabus and design the set of courses – You can even set the pace of your learning.

2 – The Availability: Almost every degree today is available online. Distance learning becomes an option for many students who cannot take the on-campus rout for any reason. Even a well known universities and college combine distance learning for some of their traditional campus education programs. Many of these online degrees are accredited   regionally.
Distance education is a great option for those who aren't able to leave their jobs/careers and/or family for a traditional education.

3 – The Accessibility: Another benefit of distance learning is that wherever you have a computer access you may learn. Since you're not required to follow certain classroom/class work schedule, you are able to plan a flexible timetable of any given online class you   take.
Choosing distance learning gives you the ability (and flexibility) to study anywhere, anytime. You can also make quick decision down the learning process – How long you would want to learn in any given time.

4 – The Cost effectiveness: A key distance learning advantage for many people is the cost. In most cases the prices of online degree programs are lower than traditional campus college or university.
In addition, other education's costs factors are – travel time, housing, meals and time spent in classroom for every course. When selecting distance learning, you save money on each of these factors.

5 – The Efficiency: You effectively use your time. Distance learning actually saves your precious time. You don't waste your time on travel to class, walking, talking etc. No time is spent on traveling to classrooms and there is no dead time before/after courses.

As it is in any decision taken, distance learning may fit the needs and work best for one while not work for the other.

Disadvantages of Distance Learning: Drawbacks of Distance Learning

Though distance learning sounds appealing for many people, it doesn't necessarily work for all of us – It has its disadvantages. This article provides the key disadvantages of distance learning.

If you consider this method of learning, you may want to know more about certain issues/aspects of this new technology.

Distance Learning Disadvantages & Drawbacks

While distance learning has many good advantages, it also has some drawbacks that require your attention as follows :

1 – Educational Support: Since it is an on-line method, distance learning doesn't provide face to face interaction with teachers or other students. It might be that no teacher is available for answering questions.
In distance learning you have little to no support – you have to work hard for finding own resources for completing learning assignments. If your learning style is to use assistant from instructors (and other students) for discussing/understanding things in the material studied, then distance learning might not work for you.

2 – Accreditation: Many online degree programs still do not have the higher accreditation (regional accreditation) as the mainstream colleges and universities would give you.

3 – New technologies: Distance learning is a new technology and like with new techy things, it doesn't fit many people who have technology fears and cannot adopt new technical skills easily. It requires having technical skills such as – Computer knowledge, working with new software and experience Internet tools.

4 – Responsibilities: Believe it or not, many of us need to follow discipline for things we do and it is also true with taking education, otherwise we would not   learn.
Many people need an extra push to complete tasks and studies. When you opt for distance learning, you are the master of your domain for the bad and good things of it – You responsible for your plan and time.

5 – No Socializing: A downside of distance education is that it takes away an important aspect of the learning experience – Socializing and Interacting with others. If you enjoy meeting new people while learning don't go for distance learning.
Be it teachers, students or the campus itself, some people essentially need the campus atmosphere and the interaction with others to get the right spirit of studding.
With distance learning, you would need to get along by   yourself.
Education is a lot more of just learning experience. It is also a great opportunity to meet other students. Having distance learning, you lack opportunities to interact face-to-face with others

Pros and Cons of Distance Learning:

It is important to weigh the pros and cons of online learning, though the pros already seem to outweigh the cons.

In the future, there is little doubt that online education will become a standard part of our lives, whether traditional institutions disappear completely or not. Here is a list of both advantages and disadvantages for you to consider and compare:

The Pros of Distance Learning

Some of the advantages it provides include:

1. Saves time and money: Distance learning saves time and money by eliminating the need to commute to and from the campus. This is tons of free hours, allowing you to sleep more, study more, or accommodate your studies better to your full-time professional life.

2. Convenience: Asynchronous classes and extremely flexible schedules are perfect for many people. They allow time to absorb and respond. And they make it possible to study when it is most convenient to you, like during work, or on the train home, or even while on a cruise in Hawaii.

3. Geographic availability: Online education abolishes geographic limitations. Anyone can study anywhere. There is not need to travel abroad anymore. You can simply log on to your chosen institution from the comfort of your room.

Education Quality: For now, traditional institutions of great quality are more numerous than equivalent online ones. But there are already a number of online programs which combine revolutionary online methods with uncompromising quality. Soon there will be many more.

The Cons of Distance Learning

Some of the most often cited disadvantages include:

1. New Technology – Confusion

High-tech environments are not for everyone.

Some people are disoriented by absence of face to face contact. Online multi-media may confuse, unless you are a hardcore cyber-space resident.

2. Being self-disciplined

The degree of freedom allowed by online courses may as easily turn to your disadvantage if you have no self-discipline.

3. Lack of Feedback

Most of distance learning classes are asynchronous. This may allow time to think before responding, but it also means that you probably get less feedback than you would have in a traditional classroom.

4. Accreditation concern:

Not all online-course credits are transferable. Not all the employers are willing to hire candidates that have online degrees. Some online institutions accreditation still subjected to questions.

Conclusion:

In general, new methods of educational systems to countries around the world as a necessity and need for learning and training opportunities to study in areas with different climatic features and conditions of learning and education according to their gender and cultures, has been. Each method is mentioned with regard to changes in features and creates an education system, and evaluation is used. Judgement of distance education in an educational way, first as a necessity to eliminate barriers to educational climate and geographical areas, age and gender restrictions learners began their work And more in a death education system, especially in the philosophy and goals based on theories of learning theories have evolved to find and promote professional growth. Approach to distance education with regard to the necessity of education in countries formed.

Emergence and development of information societies is the consequences of industrialization. Despite the diversity of information in various forms of media in local, national and international, access, exchange and use of various information easier than last time is. Information society, a member of your buddies know that open information system in terms of geographical location and the last 25 years, organizational development, are limited. Distance learning faster than other forms of training has been. Growth factor in the economic interests of this type of educational approach, flexibility and remove the

distance can be named. The methods of distance education, required for building physical education is not providing services. Teachers and trainers in this method - compared with traditional methods - and have more opportunities to more people than are being trained. In this type of teaching style of each person in each academic field, and each job can be arbitrary in time and space, trained without having to leave the house for work or business is education. This method requires that students are dispersed over long distances provides. Distance learning advantages of distance education in comparison with traditional education, the need for physical locations and training programs limited to no specific time period. In this type of teaching style, learning for life without possibility of spatial and temporal constraints for each individual there. In distance education, problems related to lack of qualified teachers and appropriate educational environment - as it posed in the traditional method of M is - is resolved. In this way the use of advanced features in digital libraries and search the various sites during the study, time and cost savings are.

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Relationship between civic engagement and level of people's participation in local government

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Abstract: This paper attempts to identify the relationship between civic engagements of local people and level of their participation in local government of Torbat-Heydarieh, Iran. The paper is based on the study carried out among 400 citizens of Torbat-Heydarieh. The analysis of data uses Pearson correlation to determine the relationship between variables involved. The findings reveal that two levels of participation (tokenism and citizen-power) have positive and significant relationship with civic engagement, while there is no significant relationship between non-participation level and civic engagement. The findings of the study imply that those respondents who engage more in civic activities would participate in high level of participation in local government.
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Keywords: civic engagement; people's participation; local government

1.Introduction
A number of studies in recent years have examined the relationship between civic engagement and participation in local government. Many researchers concluded if local people more engage in social activities or community matters, it is more likely that they participate in local government affairs more actively (Putnam. 2000, Zlatareva. 2008). Parnell et.al (2002) argues that civic engagement contributes to enable the people to participate in local government activities and that presents a potential development resource for local government. A lot of studies on relationship between civic engagement and participation in local government have been conducted. All these studies are performed by western researchers. Thus, the relevance of the findings in the Iranian context may not be fitting. To date, very little research has examined about the relationship between civic engagement and participation in local engagement in Iran. In point of case, local communities in Torbat, Iran have been never been studied of such. Thus there is limited understanding of the relationship between engagement in civic activities and participation in local government and also has never done any study here about level of people's participation in local government affairs.

2. Literature Review
Participation of citizens in decision-making can produce more efficient and effective. Citizen participation is an important factor for successful and prosperity of local government, as well as their participation promote the quality of good governance. Without community participation, there are obviously no accountability, no development, and no program (Aref et al, 2009). Ashley & Roe, (1998) describe community participation as a spectrum from passive to active involvement to full local participation, where there is active community participation and venture ownership. Meanwhile, some scholar such as; Pretty (1995), Oakley (1991), Johnson (1982), and Wandersman (1987), provided a typology of participation, but the most suitable typology that is adopted to urban issues is Anstein's ladder (Mohammadi et, al. 2010) Arnstein's ladder of citizen participation (1969), is the most well-know continuum of citizen participation which frames participation in terms of citizen power. According to her; participation is "the redistribution of power that enables the have-not citizens, presently excluded from the politics and economic processes, to be deliberately included in the future. It is the strategy by which the have-nots join in determining how information is shared, goals and policies are set, tax resources are allocated, programs are operated,…" according to her study, citizens are considered as an integral part of governnace process and their participation is essential for community.This ladder has eight rung and each rung corresponding to the extent of citizens' power in determining the plan and/or program. The eight rungs are categorized into three categorize. The bottom rungs of the ladder are manipulation and therapy. These two rungs describe

level of non-participation, which the real objective is not to enable people to participate in planning, but to enable powerholders to educate the participants. The next grouping encompasses three degrees of tokenism; informing, consultation, and placation. In this level citizens may indeed hear or be heard, but under these conditions they lack power to influence

decisions (Arstein 1969). It is the illusion of a voice without the voice itself. The highest level of ladder is citizen-power, which include; partnership, delegated power and citizen control. In this level citizen control all issue and they obtain the majority of decision-making seats.
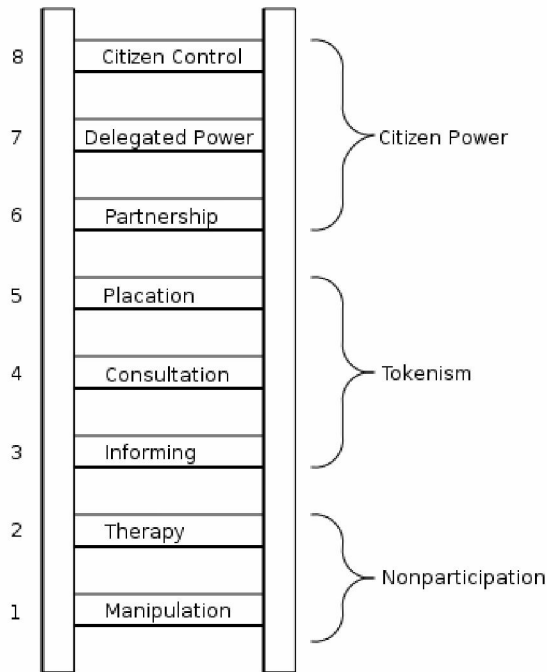
Figure 1: Arnsteins' Ladder of Citizen Participation

manipulation stage (stage 1). It is bottom range of participation, that people are placed on rubber stamp advisory committees or advisory boards for the express purpose of 'educating' them or engineering their support (Arstein 1969).

Second stage is *Therapy* (stage 2). Therapy, as Amstein (1969) noted, a type of participation that is presented in the form of a small group, masked as citizen participation. It is on the lowest rung of participation because it is both dishonest and arrogant (Arstein 1969).

In stage 3 (*informing*), authorities inform citizens of their rights, responsibilities, and options can be the most important first step toward legitimate citizen participation. However, too frequently the emphasis is placed on a one-way flow of information (Arstein 1969).

In 4 stage (*consultation*) people be invited to give their suggestions, this rung of the ladder is still a sham since it offers no assurance that citizen concerns and ideas will be taken into account. The

most frequent methods used for consulting people are attitude surveys, neighbourhood meetings, and public hearings (Arstein 1969).

Placation is stage 5 that citizens begin to have some degree of influence though tokenism is still apparent (Arstein 1969).

At the rung of *partnership* (range 6), power is in fact redistributed through negotiation between citizens and power-holders. They agree to share planning and decision-making responsibilities through such structures as joint policy boards, planning committees and mechanisms for resolving impasses (Arstein 1969).

In range 7 (*delegated power*), Citizen participation under this rung consists of negotiations between citizens and authorities that result in citizens having partial decision making authority over a particular plan, program or project. The citizens gain various delegated power arrangements sometimes as a result of demands (Arstein 1969).

The highest level of ladder citizen participation is *citizen power* (range 8). in this range people have the degree of power (or control) which guarantees that participants or residents can govern a programme (Arstein 1969).

Lowndes et al. (2001) point out, local government networks, public demands, and corporation strategy are as factors that affect public participation in local government (Lowndes et al.,2001). As well as Putnam (2000) have indicated to social capital – especial civic engagement - as a main factor that affect on citizens participation in local government. This study focus on the relationship between civic engagement as a key component of social capital and participation in local government.

Civic engagement refers to the ways in which citizens participate in the life of a community in order to improve conditions for others or to help shape the community's future. Civic engagement is seen as means of building social capital. The concept of social capital has been popularized by so many authors, but very often of them has focused on individual or some groups as the unit of analysis. Although, these views about social capital is useful for social capital theorists, but Putnam offered more useful and practical views of social capital. Putnam thought of social capital as a resource, which is resulted from peoples' social connections. Putnam (1993a), made an important role to the social capital discuss by exploring the nature of social capital at the community level. Community level social capital can not be measured merely as an aggregation of individual networks. Community level social capital resides in groups and the networks among them (Woolcock, 1998). Strong community level social capital creates the civic infrastructure, which supports formal and informal processes of decision making and public involvement (Potapchuck et al., 1997).

Putnam (1993) defines social capital as those features of social life that enable participants to act together more effectively to pursue shared objectives. Unlike physical or human capital, it is not the property of individuals or institutions. Rather it is produced 'in the spaces between people' and affects their ability to associate with one another, particularly outside immediate and intimate relationships. Like other forms of capital, it is productive but differs 'in that it is self reinforcing and cumulative' (Putnam 1993:38). Its depletion is more likely to occur through under-rather than over-use.

The concept of social capital has three main components which have achnowledged by social capital theorists. These key components are; networks of civic engagement', 'norms of generalized reciprocity' and 'relations of social trust'. (Knack and Keefer, 1997, Fukuyama, 1995, and Putnam, 1993). According to Putnam (1993) the establishment of these components is as a precondition for effective government. Social capital in this study is used as manifestication of participation between citizens with each other and also with local government. And, although social capital is elaborated by three component, but, Putnam (2000, p.19) states, the core notion of social capital is networks of civic engagement, which influence productivity of individuals and groups. He argues, without network of civic engagement, individuals become more isolated and lose the expectation that working for their communities.

The mention of civic engagement is very board and there is no consensus about its definition (Gibson, 2000). Different authors define civic engagement in different ways, based on their views and interests. Some authors like; Diller (2001) and Hollister (2002) defined civic engagement in limited way, which only include engagement in formal activities, ig; participation in political activities, or participation to make change in civil society. Whereas, a number of authors defind it in a board way, which encompass both formal and informal activities, these authors are such as; Putnam (2000), and Micheal Della (2004).

Putnam's definition includes informal social activities (visits with friends, card games) as well as formal activities (committee service), community and political participation. Michael Della (2004) also defined civic engagement in broad way. He asserts the term of civic engagement encompass a with range of activities of different types. According to him "Civic engagement is individual and collective actions designed to identify and address issues of public concern. Civic engagement can take many forms, from individual voluntarism to organizational involvement to electoral participation. It can include efforts to directly address an issue, work with others in a community to solve a problem, or interact with the institutions of representative democracy. Civic engagement encompasses a range of specific activities such as working in a soup kitchen, serving on a neighborhood association, writing a letter to an elected official or voting".

According to Zlatareva (2008), civic engagement is about participation, empowerment and partnership. It is about how citizens organize for collective action and interact with national and local level state institutions but also non-state actors such as NGOs and the private sector, and how they articulate their interests and exercise control over decisions that affect their lives. UNDP (2002) defines civic engagement as "a process, not an event that closely involves people in the economic social, cultural and political processes that affect their

lives."It entails ensuring people's involvement in decision-making, and enhancing their enjoyment of the shared benefits from the development process.

Zlatareva (2008), argue Civic engagement requires active citizenship - meaning citizens who are willing to participate in decision-making and to share the responsibility with government and other actors. When citizens perceive themselves as actors and active participants, rather than passive beneficiaries of services, they are more able to assert their citizenship through participation in shaping the policies that have an impact on their lives and by demanding accountability.

Main contribution to civic engagement has been to create: safe space for participation by playing the role of mediator between citizens and local authorities, by motivating and creating suitable environment for people to participat at the local level, and by identifying the necessary changes required for the local governments (Zlatareva, 2008). As well as the major outcome of civic engagement has been to help people overcome some of the key barriers to participation - mistrust, apathy and skepticism - and to demonstrate the value of participation. By developing people's abilities to engage, by opening up space for their involvement, by providing access to information, by mobilizing them for collective action (Zlatareva, 2008). Putnam (2000) states, whatever people more engage in social activities, it is more likely that they more participate in local government activities. This is because, civic engagement as a main component of social capital, enable participants to act together more effectively to pursue shared objectivities at the local level. According to him the stock of social capital in a region for example as measured by the density of citizens' participation in community organizations (choral societies, soccer leagues, pottery clubs, and the like) turned out to the best predictor of local performance.

People are the real capital of societies. Civic engagement implies that living together is not a passive exercise; in societies people must actively contribute to the common welfare of each other. Citizens, especially poorest social sectors must be empowered to participate effectively in decision-making processes. UNICEF (2008) point out civic engagement programs often empower people to make positive contributions to their societies and to change their own lives in the process.

Although the above statements assert, people participation is affected by civic engagement, but it must be mentioned people participation also plays a crucial role in promoting civic engagement as main element of social capital as well as in development of local government. Zlatareva (2008)

believes civic engagement is being foster by enhancing citizen's involvement in public dialogues and decision-making and by strengthening the participation of the poorest groups in policy processes. UNDP (2006) identify the effective role of participation of poorest social sectors, women, youth, and indigenous people. Mobilizing civic engagement among these groups is a basic foundation for strengthening their voice in the policymaking process. participation of people in local community activities, put them in the position that being connected to other sectors and engage in new social networks.

3. Methodology

This study is based on quantitative method. Quantitative methods use standardized measures that fit divers' opinion and experiences into predetermined response categories (Hopkins, 2000). The advantage of the quantitative technique is that it measures the reaction of a great many people against a limited set of questions, thus facilitating comparison and statistical aggregation of the data. This allows the researcher to give a broad, generalized set of findings (Patton, 1987). Quantitative measures are brief, and easily aggregated for analysis. They are systematic, standardized, and easily presented in short space and period of time. The study used survey design in which questionnaire was used to collect the data. Questionnaires are well-established methods of collecting data within social science research (Dillman, 2000). Questionnaire survey is a useful tool of research that are related to community participation (Shin, 2004). A questionnaire is a data instrument that each respondent fills out as part of participating in research study (Johnson & Christensen, 2004).

The findings of this paper are drawn from 400 questionnaires carried out with citizens of Torbat-Heydarieh. Torbat Heydarieh is located in the east north of Iran in Khorasan Razavi province; it is 1005km far from Tehran (capital of Iran). In this study Cluster Sampling was used. This is type of random sample that use multi stages and is often used to cover wide geographic areas. Cluster sampling was chosen because it can select a proxy for community that they represent the voice of people. The population of this research will be all of the residents include men and women and 17 above years who live in Torbat Hedarieh. Ten questions were developed based on the literature review of the measurement of civic engagement. The respondents were asked to insure these questions which were constructed to gauge their engagement in civic activities. The questionnaire was piloted tested to have its content validated by several reviewers of Persian background.

Statements of civic engagement were tested for their validity using Cronbach's alpha. The respondents in pilot study had diverse demographic characteristics, especially with regards to community.

To test the proposed objective, this research was used statistical statics such as Pearson correlation and descriptive statistic. Pearson correlation was employed to measure the degree of relationship between variables involved (the civic engagement and levels of participation). Pearson correlation statistic is a statistical technique to measure the strength of the association that exist between two quantitative variables (Ary et al.,1996). In statistics, correlation (often measured as a correlation coefficient) points to the strength and direction of a linear relationship between two variables that has been determined randomly (Aref and Redzuan, 2009). And, Descriptive analysis was employed to determine level of people participation. In this study participation is a composite variable, consisting of three level, namely, nonparticipation (5 items), tokenism (7 items), and citizen power (9 items). The study used Likert-scale to measure every item. In the analysis, the civic engagement was correlated with the three levels of participation in order to determine the strength of their relationships. Meanwhile, means and standard deviations are the descriptive statistics that were used to describe the basic features of these variables. To assess the normality of the distribution of the data, the skewness and kurtosis of each variable were also examined. According to George & Mallery (2002) if the coefficient of the skewness and kurtosis falls between -0.5 and +0.5 inclusive, then the distribution appears to be relatively symmetric which in this study skewness of non-participation was -.312 and Kurtosis -.447, skewness of tokenism was .303 and Kurtosis -.118, and skewness of citizen-power was -.577 and Kurtosis -.325.
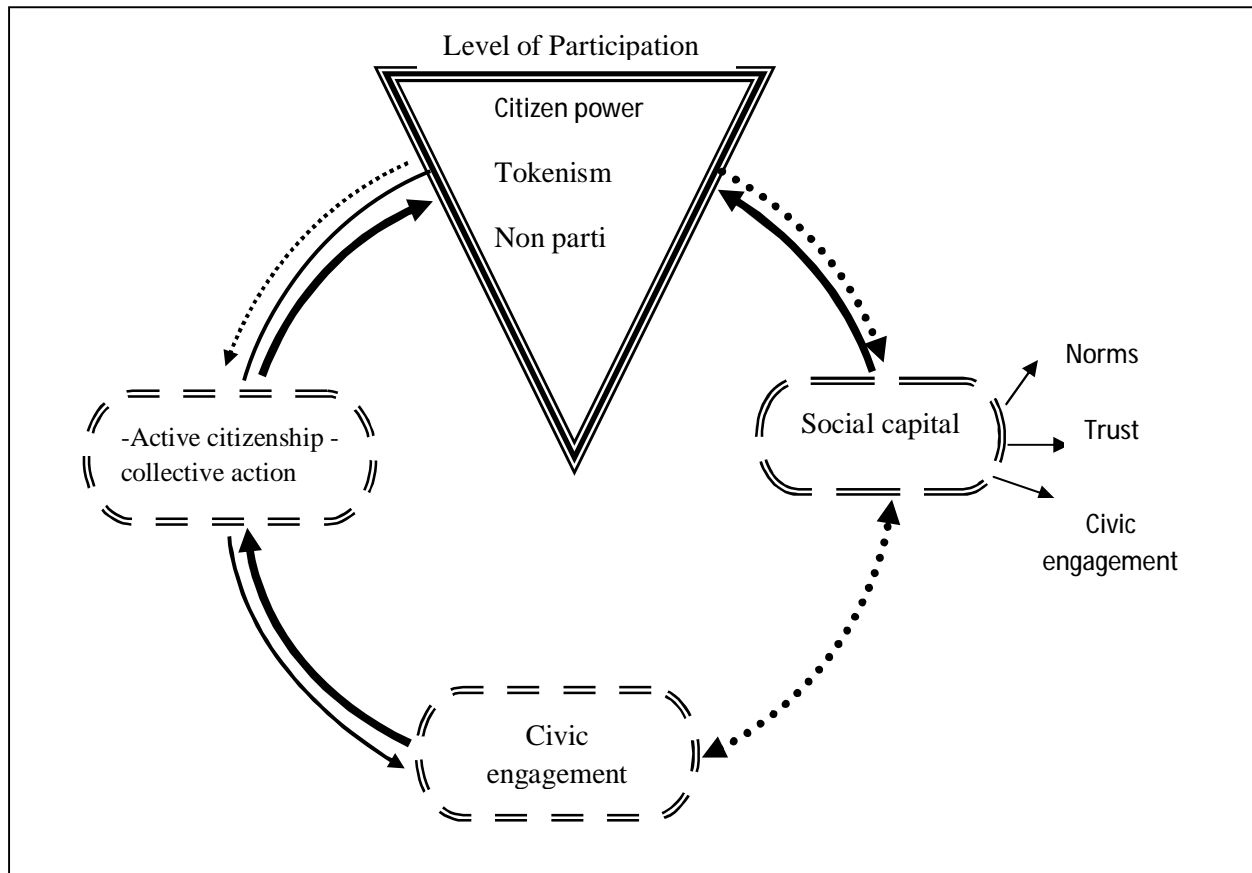
Figure 2; Cycle of engagement in civic activities, social capital and level of participation

4. Result and Discussion

As mentioned above, the main objective of the study is to determine the relationship between civic engagement and level of participation. Pearson correlation was used to identify these relationships. Table 1 shows the findings of the study in relations to means and standard deviations of studied variables. For the three variables related to level of participation (nonparticipation, tokenism and citizen power), the data reveal that generally, the mean scores of nonparticipation level is higher than tokenism and citizen-power. This is reflected by the means of every level – nonparticipation level (M = 20.26, SD = 3.12), tokenism level (M = 17.27, SD = 3.93), citizen-power level (M = 15.91, SD = 4.8). These findings imply that participation in nonparticipation level is more frequent than tokenism and citizen-power. Moreover, the standard deviations show that there are relatively small deviations (differences) between respondents (citizens) in terms of their participation in each level. Meanwhile, the mean of civic engagement is relatively moderate (M = 24.35, SD = 4.91). It implies the majority of citizen engage in civic activities relatively moderate.

The second analysis for this paper focuses on the relationships between civic engagement and the level of participation based on Arnstein ladder. The results of the analysis are shown in table 2. The relationship between them were investigated using the Pearson product moment correlation coefficient. Based on the person product moment correlation results (table 4.17) and the magnitude of association guidelines (0.70 to 0.99 = very strong association, 0.50 to 0.69 = substantial association, 0.30 to 0.49 = moderate association, 0.10 to 0.29 = low association and 0.01 to 0.10 = negligible association) suggested by Davis (1971), there was not significant relationship between civic engagement and non-participation level of participation (r = .026, N = 400, P = .601). While, the relationship between civic engagement and tokenism level of participation shows a positive and low linear relationship (r = 203, N = 400, P = 0.000). Also the correlation between civic engagement with citizen-power level of

participation was found to be statistically significant (r = 120, N = 400, P = .016).

When comparing the nonparticipation, tokenism and citizen-power levels of participation with civic engagement, table 2 shows no significant relationship between civic engagements with non-participation level of participation. However civic engagement has weak positive and significant relationship with tokenism and citizen-power levels of participation. According to Parnell et.al (2002) engagement to civic activities enables people to participate in local government activities and that presents a potential development resource for local government. The findings of this study are supported with Knack (2002), which believe civic engagement can lead to better local government performance, through enabling local people to participate in election and especially other modes of citizen voice, that cause local government be accountable to local people (Kneck, 2002).

Based on results of this study, table 2 revealed, although there was a relationship between civic engagement and levels of participation, their relationship is at the "low association". It depends on the socio-cultura context of Iran, because people in Iran are more interested in participating in uncivil activities rather than civil activities. In other words, people are more interested participating in religious, charity, and sports activities than participating in local government, NGOs, and politica parties. As well as they have not had enough experience interact collectively with local government. Sharma (2009) argue civic engagement is not related to the interaction of an individual citizen with governing but rather the interaction of a collection of individuals.

This results is supported by study that has been conducted by Wilson (1999), he conclude people would prefer to take part in social activities such as sporting events, religion ceremonies, or trade union gathering than attend public meeting about community-based issues. He argued/elaborated people will mobilize over issues that they can visualize, that affect them in an immediate way.

Table 1: Means and Standard Deviation of the studied variables

Variables	Means	Standard Deviation
Level of nonparticipation	20.26	3.12
Level of tokenism	17.22	3.93
Level of citizen-power	15.91	4.8
Engagement in civic activities	24.35	4.91

Table 2 : Correlation Matrix Analysis of Engagement in civic activities and Levels of people Participation (n = 400)

Variable	X	Y_1	Y_2	Y_3
X- Engagement in civic activities	1.00			
Y_1- Non-Participation level	.026	1.00		
Y_2- Tokenism level	.203**	.418**	1.00	
Y_3- Citizen-Power level	.120*	-.491**	.493**	1.00

** Correlation is significant at 0.01 level

5. Conclusion

This study endeavored to investigate the relationship between civic engagement and level of people participation in local government, based on the findings of the questionnaire carried out in Torbat-Hehdarieh city. Participation of citizens is a focal point for promoting the efficiency of local government programs. The efficiency of of local government programs is ensured when citizens are involved in policy formulations. From the findings of this study, it is found that, - based on Arnstein's ladder of participation - there is no correlation between civic engagement and non-participation level. Whereas, there is positive correlation between civic engagement and levels of tokenism and citizen-power. Thus it could be concluded that, more engagement in civic activities, may make possible that citizens more participate in local government matters. In other words, if citizens engage in formal or in-formal activities, such as; sports and religious programmes and attending public meeting, it is more likely that they be able to involve in decision-making process, exercise their priorities, and discuss with local government about their problems. Therefore the result of this study indicates main recommendation, that is; focus on measures which involve citizens more in civic activities. The findings of this study have an implication on understanding the role of engagement in civic activities in participation in local government.

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Use of Medicinal Plants in the Treatment of Premenstrual Syndrome: A Review

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Abstract: Premenstrual syndrome is a common condition in women and includes a range of emotional, psychological, and physical symptoms triggered by the menstrual cycle. Complementary and alternative medicine use is more prevalent in the treatment of diseases, and many women use medicinal plants without a physician's prescription. Modified diet and use of herbal medicine may be one effective method in the treatment of premenstrual syndrome. The purpose of this study was to collect information about medicinal plants used in the treatment of premenstrual syndrome. This review studied articles obtained from data bases, *Pubmed, Science Direct, MD Consult, Inter Science,* and *Iran Medex* from 2000-2010. Several studies and trials have shown a reduction of premenstrual syndrome symptoms after consumption of *Hypericum perforatum*, *Vitex agnus castus*, saffron, ginkgo, and soy rather than the placebo group. Medicinal plants can be used in the treatment of premenstrual syndrome if certain precautions are followed. More studies are needed about these and other plants.
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Keywords: Medicinal Plant, Premenstrual Syndrome, Treatment

1. Introduction

Premenstrual syndrome (PMS) is a common condition (Jurgens, 2009; Canning, 2010) and a collection of symptoms, ranging from physical to behavioral, which begin one to two weeks prior to menstruation and diminish with the onset of menstruation (Jurgens, 2009). Symptoms can be severe enough to overshadow family activities, and interfere with social or professional obligations of the affected individual (Kimural, 2007; Adriane, 2000). PMS has been reported to occur in at least 75 percent of women at some point during their reproductive years (Jurgens, 2009). About 30-80 percent of women have mild to moderate symptoms of PMS in each cycle, but only 2.5 percent of women exhibit symptoms so severe that they interfere in everyday activities (Bryant, 2005; Clare, 2001). Although there is a wide range of symptoms, the primary cause is unknown probably the result of several factors (Jurgens, 2009). There are several potential hormonal scenarios involved in the etiology of PMS: estrogen dominance, progesterone dominance, too much prolactin, vitamin/mineral deficiencies, reduce indorophin, disorder prostaglandin metabolism, low levels of serotonin, and psychological factors (Canning, 2010; Ryan, 2008, Marsden, 2003; Berek, 2003). Also, there are factors like hormonal imbalance, reduced progesterone-to-estrogen ratio, sodium retention, lack of nutrients such as Vit. B6, Mg, Ca, inappropriate response to neurotransmitters, abnormal function axis hypothalamus - pituitary - adrenal defect that leads to adrenal hormone secretion

and environmental factors such as stress (Braverman, 2007; Clare, 2001).

The most common age is for symptoms to appear is between 25 to 45 years. PMS symptoms are quite variable. The most common symptoms are: abdominal pain, mood instability, irritability, nervous tension, headache, increased appetite, palpitations, weakness, dizziness and fainting, weight gain, swollen hands and feet, swelling and sensitivity of breast, penchant to sweets, feel of swelling and abdominal bloating, depression, poor memory, and insomnia (Clare and Subhash, 2001). Many treatment approaches have used a range of western drugs and non-drug therapies with varying outcomes (Morse, 2007). Drug treatments include antidepressants, diuretics, progesterone, estrogen replacement, pyridoxine and GNRH agonists and supplement treatment. Chemical drugs used to treat PMS have many side effects, including gastrointestinal disorders, kidney failure, etc. (Kimural, 2007; Schellenberg 2001). Most women do not require long-term drug treatment and medication is not needed for moderate symptoms. Nutritional therapies are popular, but lack a clear evidence base. Although there is little research to determine the effects of alternative medicines, many women are using them (Canning, 2006). As many as 80 percent of women suffering from symptoms of PMS report self-medicating with over-the-counter (OTC) products, including natural health products (NHPs) such as herbs, vitamins, and minerals (Jurgens and Whelan, 2009). As women search for ways to treat the troublesome symptoms of premenstrual syndrome

(PMS), many hope to find a natural option (Marsden, 2003). Since PMS is a chronic condition, we must note side effects of medications. Herbal medicine has recently been recognized as acceptable treatment because it has fewer side effects (Ozgoli, 2009). One study found that the most common treatment in Asian women was hormones (32 percent) while in European group, phytotherapy/vitamins prevailed (48 percent) (Facchinetti, 2007). The purpose of this study to collect information about medicinal plants used in the treatment of premenstrual syndrome.

This review studied data obtained from *Pubmed, Science Direct, MD Consult, Inter Science,* and *Iran Medex* databases between 2000-2010. Key search terms were: complementary medicine, alternative therapy, premenstrual syndrome, PMS. The results of studies have been resulted such as clinical trial, case-control studies.

2. Discussions
2.1 Chasteberry (*Vitex agnus castus*)

Chasteberry (*Vitex agnus-castus*), or monk's pepper, is found in western Asia, southwestern Europe, and much of the southeastern United States (Roemheld-Hamm, 2005). Chasteberry has been used for several centuries in the treatment of hormone-dependent gynecologic diseases. Recent studies support its use for periodic breast discomfort related to premenstrual syndrome (Roemheld-Hamm, 2005; Gorkow, 2002). The main mechanism is not known but it impacts dopamine receptors and reduces the secretion of prolactin. It is assumed that vitex stimulates the release of luteinizing hormone (LH) that leads to release of progesterone. Increased progesterone reduces the secretion of estrogen. Its indirect and direct effect on progesterone and prolactin result in an improved balance in the luteal phase of the menstrual cycle (Stevinson, 2000). Chasteberry is well-tolerated. Its few reported side effects may include gastrointestinal discomfort, dizziness, and dry mouth. Drug interactions have not been reported, but caution is recommended for its use with dopamine agonists or antagonists (Roemheld-Hamm, 2005). Randomized controlled trials showed that chasteberry is helpful in reducing symptoms of PMS/PMDD such as irritability, mood, anger, breast fullness and tenderness, headache, cramps, water retention, swelling, and food cravings (Jurgens, 2009).

A 2001 BMJ study evaluated 170 women with PMS symptoms. Women were randomized and blinded for receiving either vitex or placebo. Participants were evaluated for irritability, mood alteration, anger, headache, and breast tenderness and bloating. After three consecutive menstrual cycles, 52 percent of the vitex group had a 50 percent or greater decrease in symptoms versus only 24 percent of

placebo patients. Vitex relieved irritability, mood swings, anger, and headache and breast tenderness but not bloating (Marsden, 2003).

A study by Aqajani and colleagues was performed in Babol University of Medical Sciences to evaluate *vitex agnus castus* in PMS treatment. This study was performed on 20 patients with PMS. Diagnosis of PMS was conducted through interviews according to COPE (Calendar of Premenstrual Experiences). The severity of symptoms was given a score zero (absence of symptoms) to three (severe symptoms prohibiting activity). Patients in both groups (10 people per group) received *vitex agnus castus* and placebo drops. Both groups used 30 drops of the drug twice a day for at least five days before menstruation for three consecutive cycles. After three months of treatment, researchers recorded physical and psychological symptoms through questionnaires and interviews. At the end of research, they showed 70 percent improvement in the treated group with *vitex agnus castus* and 30 percent improvement in the placebo group. Therefore they recommended that women with PMS receive medical *vitex agnus castus* (Aqajani, 2002).

A double-blind clinical trial was conducted to assess *agnus castus* in the treatment of premenstrual syndrome in Germany. In this study, 170 women in the control group (84 cases) and intervention group (86 cases) were sampled. The mean age was 36 years and the average menstrual cycles was 28 days. Both of groups received a drug (*agnus castus* or placebo) - one tablet daily for three months. At the end of the study, there was a 52 percent improvement in the *agnus castus* group and 24 percent in the placebo group, a significant difference between two groups (Schellenberg, 2001). A prospective randomized double-blind placebo-controlled study was conducted to assess the efficacy of the extract of *vitex agnus castus* (VAC) in the treatment of 67 Chinese women with moderate to severe premenstrual syndrome (PMS). Women received one tablet of VAC or placebo. Researchers documented symptoms with a daily rating scale with negative effect, water retention, food cravings, and pain. The result was that all four symptom factor scores were significantly reduced by the third treatment cycle. They concluded that *vitex agnus castus* extract was effective in treating moderate to severe PMS in Chinese women, especially in symptoms of negative affect and water retention (Ma, 2010). Atmaca et al. compared the efficacy of fluoxetine with *vitex agnus castus* extract and concluded that fluoxetine was more effective for psychological symptoms although the extract decreased the physical symptoms (Atmaca, 2003).

Adverse effects of *vitex agnus castus* include GI upset, nausea, vomiting, headache, rash, acne, and irregular menstrual cycle. Researchers used a different preparation of chasteberry, ranging from a crude extract of *vitex agnus castus* (20–40 mg/day) to 20 mg/day of an extract (fruit extract ZE 440:60 percent ethanol 6-12:1) standardized to casticin. Drug interactions were theoretical, but documentation was lacking (Jurgens, 2009).

Several different studies have shown that products containing *vitex agnus castus* fruit extract are useful for decreasing prolactin serum levels and increasing pathophysiologicaly and can be a good treatment for women who suffer from premenstrual syndrome (Doll, 2009). A study showed that *vitex agnus castus* is a safe, well-tolerated, and useful drug for the treatment of moderate to severe PMS (He, 2009).

2.2 Hypericum perforatum (St. John's wort)

Hypericum perforatum (St. John's wort) is a medicinal plant that prompts amino-oxidase activity and prevents serotonin reuptake. It reduces premenstrual syndrome symptoms with treatment properties similar to fluoxetine Several studies have shown that it is effective in the treatment of mild types of depression. For the treatment of premenstrual symptoms its use is for at least two months in the luteal phase (Pakghohar, 2005). If this plant is used in high doses, it can cause sensitivity to light (Van, 2009). Adverse effects include GI upset, nausea, diarrhea, insomnia, irritability, agitation, forgetfulness, dizziness, headache, dry mouth, worsening of PMS symptoms, bloating, breast tenderness, and rashes (Jurgens, 2009). Its drug interactions are anesthetics, anticoagulants/antiplatelets, antidepressants, antidiabetic agents, barbiturates, benzodiazepines, beta-adrenergic blockers, calcium channel blockers, cyclosporine, HIV protease inhibitors, etc. (Jurgens, 2009; Van, 2009).

Canning et al. (2010) investigated the effectiveness of *hypericum perforatum* on symptoms of PMS in UK. They conducted a randomized, double-blind, placebo-controlled, crossover study between November 2005 and June 2007. In this study, 36 women, who remained eligible after three screening cycles, underwent a two-cycle placebo run-in phase. They randomly received *hypericum perforatum* tablets 900 mg/day (standardized to 0.18 percent hypericin; 3.38 percent hyperforin) or placebo tablets for two menstrual cycles. After a placebo-treated period, the women crossed over to receiving placebo or *hypericum perforatum* for two additional periods. Symptoms were recorded daily using the Daily Symptom Report. The results

indicated that the effect of *hypericum perforatum* was statistically better than the placebo in improving physical and behavioral symptoms of PMS. A significant difference in the treatment of pain-related PMS symptoms was not found. They concluded that treatment with *hypericum perforatum* was more effective than placebo for the most common physical and behavioral symptoms associated with PMS (Canning, 2010).

Pakgohar and colleagues did a double-blind clinical trial on 70 students with PMS at Tehran University in 2005. After confirmation of PMS symptoms by the completion of daily symptoms for two consecutive cycles, participants were randomly divided into two groups. Samples were treated with 30 drops of *hypericum perforatum* (haypyran) and placebo twice a day at least seven days before menstruation for a duration two consecutive cycles. PMS symptoms decreased after consumption of *hypericum perforatum* 46.45 percent and in the placebo group 18.1 percent. They concluded that treatment of PMS with haypyran is effective (Pakghohar, 2005).

A pilot study was performed at Exeter University. In their study, 19 women with PMS were treated with 300 mg standard hapyrysyn 3 percent. The results showed a 51 percent reduction in PMS score and at least a 50 percent reduction in symptoms for more than two thirds of women (Stevinson, 2000). A study showed the herbal combination of *hypericum perforatum* and *vitex agnus castus* to be superior to the placebo for total PMS-like scores, PMS-D, and PMS-C clusters. Also it was shown to reduce anxiety and hydration clusters in the treated group (Van, 2009).

2.3 Saffron (crocus sativus)

Saffron was effective in relieving overall symptoms of PMS in one good-quality randomized control trials. Adverse effects of saffron were increased or decreased in appetite, headache, hypomania, sedation, and nausea. Saffron poisoning was reported at high doses (5 g). Drug interactions were not reported (Jurgens, 2009). Agha-Hosseini et al. (2008) conducted a double-blind and placebo-controlled trial to investigate whether saffron (stigma of *crocus sativus L.*) could relieve symptoms of premenstrual syndrome (PMS) in Tehran and Zanjan. Women who were 20 to 45 years old and had regular menstrual cycles and PMS symptoms for at least six months were selected for the study. Women were randomly divided into two groups and received capsule saffron 30 mg/day (15 mg twice a day - morning and evening) (group A) or capsule placebo (twice a day) for two menstrual cycles (cycles three and four).

Researchers found that saffron was effective in relieving symptoms of PMS. It was shown that saffron was significantly effective in cycles three and four in the total Premenstrual Daily Symptoms and Hamilton Depression Rating Scale. They concluded that *crocus sativus L.* can used in the treatment of PMS. However, further investigation is needed (Agha-Hosseini, 2008).

2.4 Ginkgo biloba L.

Ginkgo biloba is used in traditional Chinese medicine. Clinical studies have shown that ginkgo extracts have a therapeutic effect in Alzheimer's disease, failing memory, age-related dementias, poor cerebral and ocular blood flow, congestive symptoms of premenstrual syndrome, and the prevention of altitude sickness (McKenna, 2001). It was used 160–320 mg/day (EGb 761) from day 16 of menstrual cycle to day five of the next menstrual cycle. Its adverse effects were mild: GI, confusion, dizziness, headache, constipation, and palpitations (Jurgens, 2009).

A study was conducted to determine the effect of ginkgo biloba L on the symptoms of PMS. Their single-blind, randomized, placebo-controlled trial was conducted from November 2007 to April 2008. Students who lived in dormitories of a medical university (Tehran) and suffered from PMS symptoms were selected. They recorded daily symptoms for two consecutive menstrual cycles. After 90 students with PMS were identified, they were randomized in two treatment and placebo groups and took gingko biloba L. tablets (containing 40 mg leaf extracts) or placebo three times a day from the 16th day of the menstrual cycle to the fifth day of the next cycle. The results showed that there were reduced physical and psychological symptoms and their severity in both groups. They concluded that gingko biloba L. can reduce the severity of PMS symptoms (Ozgoli, 2009).

2.5 Soy

A cross-sectional study was conducted to evaluate the effect of dietary soy isoflavones on PMS. In that study, 84 women between the ages of 28 and 40 years participated. They found that soy isoflavone intake was significantly related to MDQ scores in the menstrual phase. They suggested that soy isoflavones could be one of the dietary factors related to the complexity of premenstrual syndrome (PMS) and further study conducted on the effect of soy isoflavones on PMS is required (Kim, 2006).
A study was conducted to determine the effect of soy isoflavones on premenstrual symptom severity. Results indicated that premenstrual symptoms like headache and breast tenderness were reduced in the soy IF group. After active treatment, the soy IF group showed significantly greater reduction of cramps and swelling over the placebo group (Bryant, 2005).
A cross-sectional study was conducted to evaluate the effects of intake of soy, fat, and other dietary components on premenstrual symptoms in 189 Japanese women aged 19-34. Food consumption information, including soy products and isoflavones, was obtained by a semiquantitative food frequency questionnaire. The Moos Menstrual Distress Questionnaire (MDQ) was used to evaluate the changes in the menstrual cycle. They found that soy products or isoflavone intake do not change the MDQ score in the premenstrual phase (Negata, 2004).

2. Discussions

Medicinal plants can be used in the treatment of premenstrual syndrome with respect of specific principles and precaution. Chasteberry is possibly effective and effectiveness of saffron, ginkgo, St. John's wort, and soy are limited according to the evidence. Therefore more studies are needed about them and other plants.

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Effect of Green Tea Extract on the Rat Liver; Histoarchitectural, Histochemical and Ultrastructural Studies

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Abstract: Green tea consumed worldwide since earliest time considered beneficial to human health due to its specific metabolic activity along with antioxidant effect. This study was headed for investigate the effect of green tea on histoarchitecture and histochemistry as well as the fine structure of rat liver. For this purpose, male albino rats (*Rattus norvegicus*); 3 months age weighing between 100 –120 g were used. The animals group-housed six for each in wire mesh cages fed ad libitum divided into two groups: control and experimental group. The latter was divided into three subgroups; 1%, 1.5% and 3% green tea extract feeding animals. Green tea was received instead of drinking water for 25 days using feeding bottles. After the experimental period, the animals were sacrificed and liver pieces were prepared for both light and electron microscopic examination. The results depicted hypertrophied hepatocytes associated with cloudy swelling. There were some pyknotic and karyorrhectic hepatic nuclei in comparison to the control. Blood vessels appear congested and Blood sinusoids contracted. There was an indication of few collagen fibrils in the hepatic stroma. Hepatocytes had PAS positive deposits in their cytoplasm. Furthermore, hyalinization of the hepatocytes was distinct in the animal's liver feeding on higher doses. The ultrastructural results revealed destructed hepatocytic organelles as well as hypertrophied and irregular contoured hepatocytic nuclei. Moreover, many lipid droplets, few profiles of granular endoplasmic reticulum and destructed mitochondria in the hepatocytes cytoplasm were apparent especially after higher doses of treatment. Though, it was fulfilled that green tea consumption induced an alteration in the liver tissues and its fine structure as well as carbohydrate metabolism. Consequently, another aspect was providing into the cellular response of rat liver toward green tea extract property. It must be carefully using for it's harmfully outcome on long term.

1. Introduction

Tea is one of the most widely consumed beverages in the world made from the leaves of *Camellia sinensis* L. species. Green tea is the non-oxidized/non fermented product contains high quantities of several polyphenolic flavonoid compounds such as epicatechin, epicatechin gallate, epigallocatechin, and epigallocatechin gallate (EGCG) which reported to have antioxidant properties (Graham, 1992; Rice-Evens et al., 1996) well thought-out to maintain and improve health. It contains high quantities of an active compounds (catechin and caffeine) so as to might act to exert thermogenic and so an antiobesity action (Chantre and Lairon, 2002). It has anticarcinogenic activity (Stoner and Mukhtar, 1995; Zhen, 2002). Moreover, polyphenols because an active ingredients exhibit antioxidant and free radical scavenging properties showed cardioprotective, neuroprotective, antidiabetic, and antimicrobial properties (Liao et al., 2001; Alschuler et al., 1998; Augustyniak et al., 2005). Besides, EGCG prevents the ethanol induced

hepatotoxicity and inhibits the development of the fatty liver and renal failure (Yokozawa et al., 1996 & 2005; Yun et al., 2007). At the level of green tea extract, many researches reported that it have a benefit for human and protective against the diseases resembling treatment of arthritis, infection, and impaired immune function (Van et al., 1999). Moreover, it reduce cholesterol synthesis in liver (Bursill et al., 2007) and traditional decrease the severity of liver injury in association with lower concentrations of lipid peroxidation (Chen et al., 2004; Duh et al., 2004). In addition, Kan et al. (2009) demonstrated that green tea extract have a protective against nephrotoxicity and oxidative damage in rat kidney induced by gentamicin.

In the period in-between, few researchers (McCormick et al., 1999; Stratton et al., 2000; Chang et al., 2003) have investigate the potential toxicity of green tea and polyphenols when administered at high doses, as a concentrated product. Although the potential biological effects and powerful antioxidant properties of green tea extracts (Vial et al., 2003 and

Bonkovsky, 2006) data regarding the hepatotoxicity effect are limited in the literature. There are no longer doubt that ingestion of concentrated extracts of Chinese green tea (*C. sinensis*) poses a real and growing risk to liver health (Jimenez-Saenz and Martinez-Sanchez, 2006) of which we require to be attentive. Additionally, the mechanisms of hepatotoxicity of that *C. sinensis* ought to have further investigation and its wide-spread consumption requires an increase attention by doctors and pharmacovigilance authorities (Javaid and Bonkovsky, 2006).

However, the data available are still not definitive for cellular and *in vivo* hepatotoxicity caused by green tea phenolic acids and catechins (Galati et al., 2006). It was reported that green tea, like any active principle, needs to be used at the exact composition and the accurate posology to exert a pharmacologically significant effect (Chantre and Lairon, 2002).

Therefore, the aim of the current study was to investigate the effect of green tea on the liver of rats, is it has a side effects at any hazard doses, especially it used in a further attenuated studies as a protective antioxidant with no harmful material.

2. Materials and Methods
Green tea extract:

Green tea (Kangra, Himanchal Pradesh, India and Lipton-Unilever, Englewood Cliffs, NJ, USA) was purchased locally packaged by the Egypt National Native Product sources. Green tea extract (GTE) was prepared according to Khan et al, (2009) by adding green tea (30 g) to 500ml of boiling water, steeped for 15–20 min. Infusion was cooled to room temperature and then filtered. The tea leaves were extracted a second time with 500ml of boiling water and filtered, and the two filtrates were combined to obtain 3% green tea extract (3 g tea leaves/100 ml water).This dietary treatment reflected a daily consumption of 3 cups of green tea by an adult weighing 70 kg. The resulting clear solution is similar to tea brews consumed by humans.

The used extract poured into the animals feeding bottles. The rats supplied with freshly prepared tea every morning.

Animals and experimental design:

Male albino rats (*Rattus norvegicus*) obtained from the National Research Center in Dukki, Cairo (N.R.C.), 3-4 months age weighing between 100 –120 g were used. The animals were housed in wire mesh cages fed ad libitum and allowed to adjust to the new environment for one week before starting the experiment. The rats were housed at $25 \pm 2^{o}C$ dark/light cycle. Animals were

randomly divided into two experimental groups each of six animals as follows:
1) Group I (control): Animals given standard diet and tap water.
2) Group II (green tea extract): Animals given standard diet and green tea extract (GTE). This group divided into three subgroups so as to received GTE in three concentrations 1% , 1.5% and 3%) instead of drinking water within a repeated dose for 25 days to determine the dose dependent effect.

After the experimental period, 24 hrs after the previous administration the animals were anesthesized under light ether, livers were removed and subjected to different studies.

Preparation of Specimens:

Small pieces of liver were fixed separately in 10% buffered neutral formalin for 24hrs. Tissues were processed and embedded in paraffin blocks. Paraffin sections were cut with at 5μ thickness, stained by routine hematoxylin and eosin stain and Crossman's Trichrome stain for evaluation of collagen fibers. Other sections prepared for periodic acid Schiff reaction intended for carbohydrates (Bancroft and Stevens, 1990). The ready sections examined under a Zeiss light microscope.

For electron microscopy small pieces of liver were fixed in 2% glutaraldehyde fixative in 0.1M Na- cacodylate buffer, pH 7.2, followed by three washes in the buffer, then post fixed during 1 h in 1% $OsO4$ in the same buffer, dehydrated, cleared and infiltrated within Resin. Ultra thin sections were stained with 2% uranyl acetate, followed by Reynold's lead citrate and examined with a Siemens ELMISKOP I or Zeizz M-109 Turbo electron microscope.

3. Results:

In control liver of rats, the hepatic tissue is formed of hepatic cords of normal healthy polyhedral hepatocytes having one or two vesicular nuclei, every with distinct one or more nucleoli. The blood sinusoids in between the hepatic cords are lined with flat endothelial cells and von Kupffer cells (Fig. 1). The distribution of collagenic fibers and fibrils could be distinguished with Crossmon's trichrome stain, while the hepatocytes took a reddish colour and the blood erythrocytes were orangiophilic (Fig. 2). The distribution of glycogen in the hepatocytes took the magenta colour after Periodic acid Schiff technique (PAS) (Fig. 3).

The hepatic tissue by the electron microscope (EM) revealed the ideal hepatocytes with normal mostly euchromatic nuclei and fewer nuclear heterochromatic contents with apparent more

electron dense nucleoli with their associated heterochromatin, filamentous and elongated mitochondria with their intact cristae (shelves), bile canaliculi between the adjacent hepatocytes, few lipid droplets, intact Golgi apparatus, free ribosomes, primary lysosomes mostly related to the bile canaliculi, secondary lysosomes, also few peroxisomes as also fine electron dense glycogen deposits(Fig. 4).

In the rat liver, given 1% GTE for continuous 25 days instead of drinking water, the hepatic tissue revealed hepatocytes with, their cytoplasm exhibited cloudy swelling degeneration, and narrow blood sinusoids between the hepatic cords, congested blood vessels other than the sinusoids, there were some pyknotic and karyorrhectic hepatic nuclei (Fig.5). In comparison to the control, there were here depositions of few collagenic fibrils in the stroma (Fig.6). Most of hepatocytes revealed depleted glycogen from their cytoplasm, so few number of hepatocytes had PAS positive deposits in their cytoplasm, the hepatocytes exhibited hypertrophied pictures (Fig.7).

The ultrastructural picture of the hepatic tissue demonstrated many lipid droplets in the cytoplasm of the hepatocytes replacing the destructed hepatocytic organelles, hypertrophied hepatocytic nuclei (Fig. 8). Irregular contoured hepatocytic nuclei, few profiles of granular endoplasmic reticulum (gER); (Fig. 9), many lipid droplets and destructed mitochondria (Fig. 10). As well, were present large intact von Kupffer cells in the blood sinusoids (Fig. 11).

In the rat liver, given 1.5% GTE for continuous 25 days instead of drinking water, the hepatic tissue revealed very distinct hepatocytic vacuolar degeneration, some completely destructed

hepatocytes and congested branches of portal vein were seen (Fig.12). Regarding the Crossmon's trichrome stain, it was clear that there were no collagen fibrils more than in control (Fig. 13). The hepatocytes had PAS +ve, some of the hepatocytes revealed vacuolar degeneration; those latter cells were deprived of glycogen deposition in their vacuolar cytoplasm (Fig. 14).

By EM, Some shrunken hepatocytes were in their way of degeneration and necrosis, had electron dense cytoplasm as a whole, numerous lipid droplets in their cytoplasm, decreased number of profiles of granular endoplasmic reticulum, few glycogen electron dense granules, many secondary lysosomes, destructed mitochondria, and widely spaced hepatocytes (Fig. 15).

In the rat liver, given 3% GTE for continuous 25 days replacing by drinking water, the hepatic tissue showed frequent number of destructed and dead hepatocytes, numerous number of leucocytic infiltration in the portal areas, congested blood sinusoids (Fig. 16), less glycogen deposition but more hyalinization of PAS+ve in the hepatocytes, atrophied hepatocytes with smaller hypotrophied or smaller nuclei (Fig. 17).

By EM, the hepatic tissue showed severe destruction of the hepatocyte cytoplasmic organelles in many of the cells, many lipid droplets, the hepatocytes lost their microvilli in relation to the space of Disse, active large very distinct von Kupffer cells in the hepatic sinusoids (Fig. 18). In addition, there were exaggerated loss of the plasma membranes of some hepatocytes, extravasated neutrophils from sinusoids to the area of hepatocyte degeneration and destruction (Fig. 19).
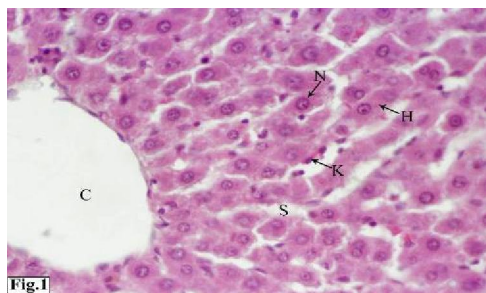
Fig. l: Photomicrograph for a section in the control liver of rat, showing central vein (C), Hepatic cords (H), normal hepatocytes with vesicular nucleus (h), blood sinusoids (s) lined with endothelium and von Kupffer cells (k). (H & E stain, X 400)
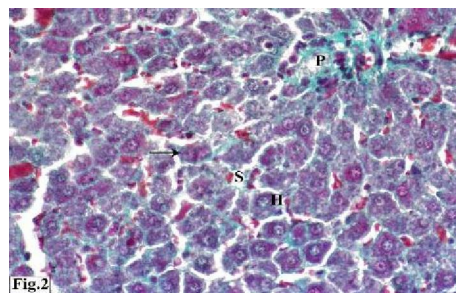
Fig.2: Photomicrograph for a section in the control liver of rat, showing distribution of collagen fibres and fibrils (in green), normal hepatocytes (h) and blood sinusoids (s), portal area (p). (Crossmon's trichrome stain, X 400)
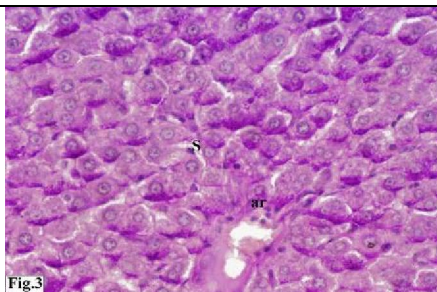
Fig.3: Photomicrograph for a section in the control liver of rat, showing normal distribution of glycogen in the hepatocytes (in magenta colour), blood arteriole (ar), blood sinusoids (s). (PAS-technique, X 400)
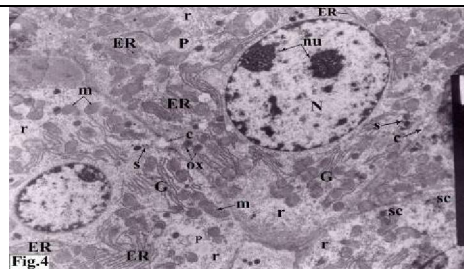
Fig.4: Electron micrograph for a section in the liver of control rat showing normal hepatocyte nucleus (N) and 2 nucleoli (nu), mitochondria (m), bile canaliculi (c) and related lysosomes (s), granular endoplasmic reticulum (ER) in many profiles (ER), Golgi apparatus (G), few lipid droplets (P), free ribosomes (r), secoundary lysosomes (sc) and peroxisomes (ox).(X 6000)
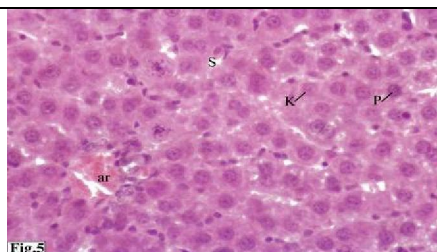
Fig.5: Photomicrograph for a section in the liver of rat given 1% GTE for continuous 25 days instead of drinking water,   showing cloudy swelling of hepatocytes and their nuclei, the cells   are suffered from slight hydropic degeneration, narrow blood sinusoids (s) congested arteriole (ar), note pyknotic nucleus (p) and karyorrhectic nuclei (k) .(H & E stain, X 400).
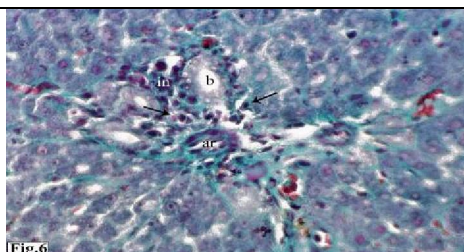
Fig.6 : Photomicrograph for a section in the liver of rat given 1% GTE for continuous 25 days instead of drinking water showing, more deposition of collagen fibrils than control (in green), leucocytic infiltration in the portal area (in), bile ducts (b), branches of hepatic arterioles (ar). (Crossmon's trichrome stain, X 400).
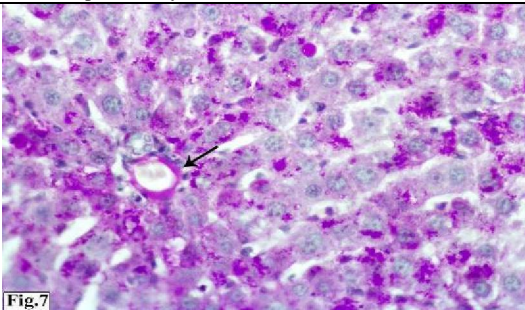
Fig.7:   Histochemical detection of liver section of rat given 1% GTE for continuous 25 days instead in drinking water, showing distribution of glycogen in the hypertrophied hepatocytes in few amounts (in magenta colour), and the PAS positive reacted basal lamina of the branch of the hepatic arteriole (arrow). (PAS technique, X 400).
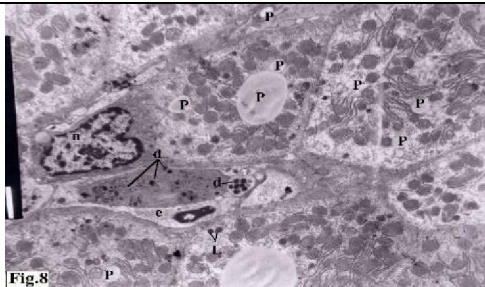
Fig.8: Electron micrograph for a section in the liver of rat given 1% GTE for continuous 25 days instead of drinking water, showing many lipid droplets of variable sizes (P) in the hepatocytes, replacing the destructed some organelles, hypertrophied hepatocytic nucleus (n) that is deviated to one side, few number of lysosomes (l) some in groups (d) were poured to the adjacent blood sinusoid, endothelial cell of blood sinusoid (e), (X 6000).
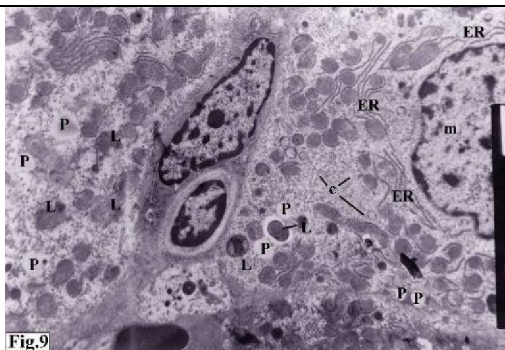
Fig.9 : Electron micrograph for a section in the liver of rat given 1% GTE for continuous 25 days instead of drinking water, showing secondary lysosomes (l) many lipid droplets,   irregular contour of hepatocytic nucleus (n), few granular ER profiles (ER),   cross sectioned   profiles of the endoplasmic reticulum cisternae (c), (X 8000).
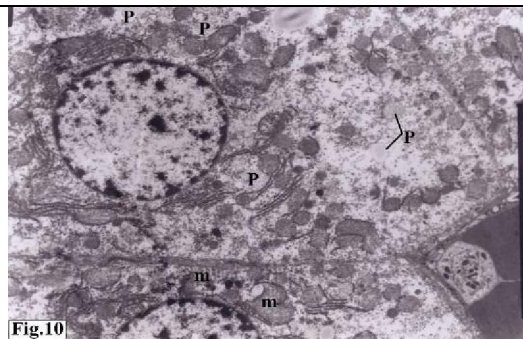
Fig.10: Electron micrograph for a section in the liver of rat given 1% GTE for continuous 25 days instead of drinking water, showing destructed mitochondria with many lipid droplets (p) at the region of the destructed mitochondria, distorted other mitochondria (m), (X 8000).
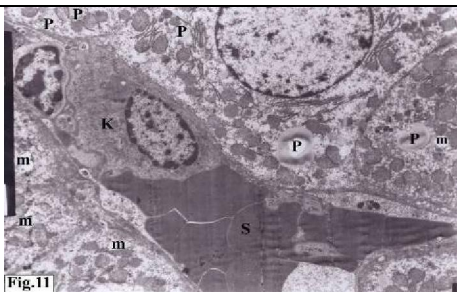
Fig.11: Electron micrograph for a section in the liver of rat given 1% GTE for continuous 25 days instead of drinking water, showing active intact von kupffer cell (k)in the hepatic sinusoid (s), distorted mitochondria (m) and many lipid droplets (p), (X 6000).
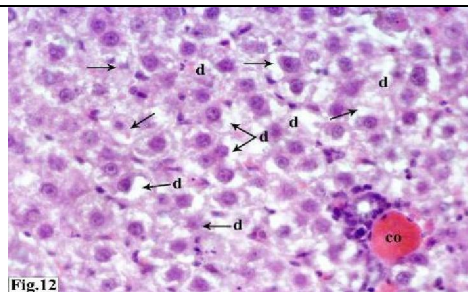
Fig.12: Photomicrograph of hepatic histopathology in rat liver given 1.5% Green tea extract for continuous 25 days instead of drinking water, displaying very distinct vacuolar degeneration of many hepatocytes (arrows), congested branches of portal vein (co) in the portal area, some degenerated hepatocytes and completely destructed or obscured (d), (H & E stain, X400).
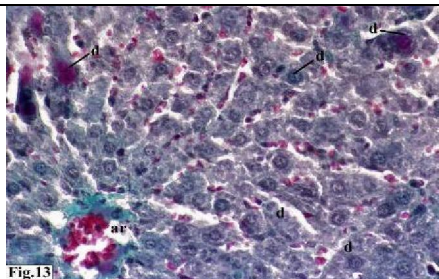
Fig.13: Photomicrograph of hepatic histopathology in rat liver given 1.5% Green tea extract for continuous 25 days instead of drinking water ,screening congested blood sinusoids and branch of hepatic arteriole (ar), degenerated hepatocytes (d), (Crossmon's trichrome stain, X 400).
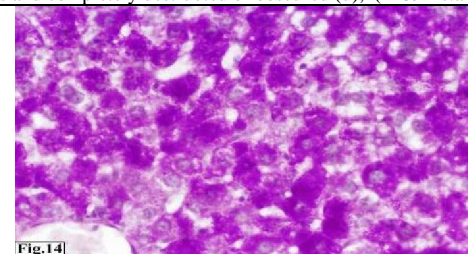
Fig.14: Histochemical examination of rat liver section given 1.5% Green tea extract for continuous 25 days instead of drinking water, viewing accumulation of hypertrophied hepatocytic glycogen in their cytoplasm(in magenta colour), some hepatocytes were suffering from vacuolar degeneration and had no glycogen deposits, (PAS-technique, X 400)
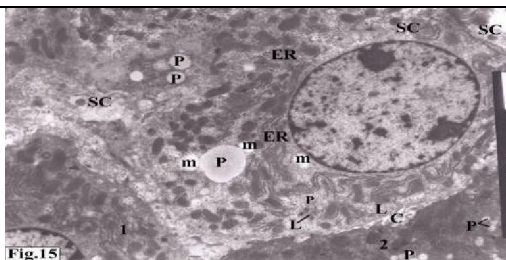
Fig.15: Electron micrograph for a section in the liver of rat given 1.5% GTE for continuous 25 days instead of drinking water ,performance some affected shrunken hepatocytes (1 & 2) having electron dense cytoplasm with many lipid droplets (P), the latter were also present in the still active hepatocytes, mitochondria with destructed cristae (m), primary lysosomes (l), bile canaliculi (c), decreased profiles of granular endoplasmic reticulum (ER), secondary lysosomes (sc), widely spaced hepatocytes, many delicate electron dense glycogen deposits (g), (X 8000).
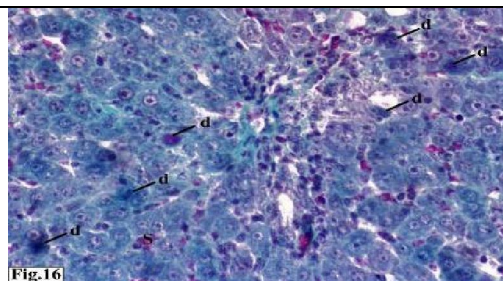
Fig.16: Photomicrograph for a section in the liver of rat given 3% GTE for continuous 25 days instead of drinking water, showing numerous number of leucocytic infiltration in the portal area of the hepatic tissue, hypotrophied nuclei, dead hepatocytes (d), congested blood sinusoids(s), (Crossmon's trichrome stain, X 400).
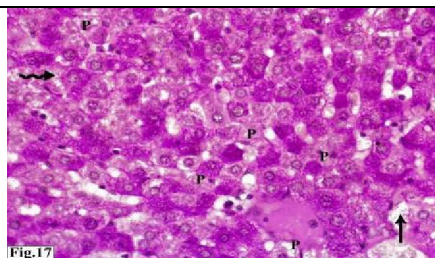
Fig.17: Histochemical analysis of hepatocellular distribution of carbohydrates using periodic acid Schiff reaction in liver of rat given 3% GTE for continuous 25 days instead of drinking water; showing less storage of glycogen(in magenta colour) in the hepatocytes than in those of 1.5% GTE given, atrophied hepatocytes with smaller hypotrophied nuclei, many dead hepatocytes(d), (PAS-technique, X 400).
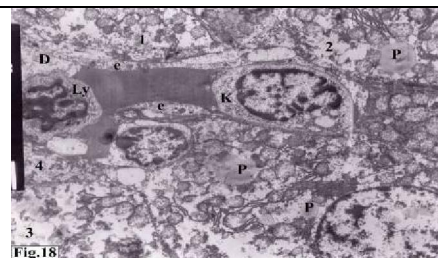
Fig.18: Electron micrograph for a section in the liver of rat given 3% GTE for continuous 25 days instead of drinking water, showing severe destruction for the cytoplasmic organelles of many hepatocytes 1,2,3 & 4 that evinced also many lipid dropletrs (p), the hepatocytes lost ther microvilli in the space of Disse (d), the blood sinusoids evinced intact active von kupffer cells(k),endothelium of the sinusoids (e), a lymphocyte (ly) in the sinusoid , (X 6000)
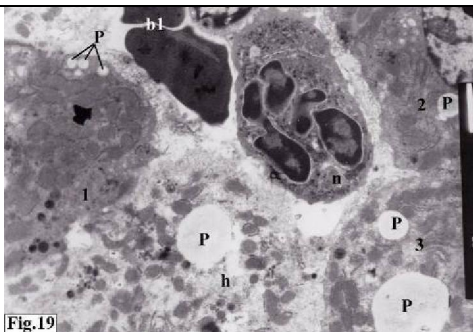
Fig.19: Electron photomicrograph corresponds to hepatocytes of rat given 3% GTE for continuous 25 days in drinking water ,showing exaggerated destructed hepatocytes (h) that lost its cell membrane, the neighboring 3 hepatocytes 1,2 & 3 had electron dense cytoplasm , many lipid droplets(p), extravasated neutrophil (n) to the area of hepatocyte degeneration,   blood vessel (bl), (X 8000)

4. Discussion

Green tea is a natural antioxidant that have been used in the most enduring of food cultures-Chinese and Japanese tea and to the safety concerns about nutrient supplements such as vitamin C., Vit. E and B-carotenes. Although these concerns still exist, consumption of naturally derived antioxidants such as green tea beverages and extract may a safer alternative and effective means of increasing the intake of antioxidants, since each cup of green tea (100 ml) is reported to contain 50- 100 mg of polyphenols (Luo et al.,1997). However, an ancient knowledge in traditional remedies does not always guarantee safety. There have been a number of available adverse events, including hepatic failure associated with human use of green tea extracts intended for its antioxidant (Gloro et al., 2005; Javaid and Bonkovsky, 2006; Jimenez-Saenz and Martinez-Sanchez, 2006; Bjornsson and Olsson, 2007). Moreover, consumption of natural remedies which considered as food supplements need increase attention to prevent liver hepatotoxicity (Javaid and Bonkovsky, 2006). It was reported that *in vitro* treatment of rat hepatocytes with high concentration of epigallocatechin gallate (EGCG) reduced cell viability (Schmidt et al., 2005; Galati et al., 2006) and hence caused liver, kidney and gastrointestinal toxicity (Isbrucker et al. ,2006).

So, concerning the findings of the latter authors, the current work is coincident with their results, where the hepatocytes of rats showed hydropic degeneration and the cells appear larger than the hepatocytes of control due to cloudy swelling after 1% GTE, also congested hepatic arterioles, and deprived hepatocytes from deposition of glycogen in their cytoplasm, leucocytic infiltration in the portal areas of the hepatic tissue. Moreover, the ultrastructural study revealed numerous secondary lysossomes, numerous lipid droplets; fewer profiles of granular endoplasmic reticulum, large intact and active von Kupffer cells and some distorted mitochondria, some of the hepatocytes nuclei were deviated to one side, few numbers of primary lysosomes. In vivo studies, Isbrucker et al., (2006) and Galati (2006) suggested that administration of high doses of the tea catechin, EGCG resulted in hepatotoxicity, so disagreeing with the finding of Bonkovsky (2006), Federico et al., (2007) and Sarma et al., (2008) who considered green tea is safe in a wide range of doses, but hepatotxicity was related to consumption of high does of tea-based dietary supplements. Consequently, the results of this work, after giving GTE by a concentration of 1.5%, the hepatic tissue evinced hepatocyte vacuolar degeneration followed by destructed some hepatocytes, congestion of hepatic arterioles and blood sinusoids apparent intact well-developed active Kupffer cells and few fibrin deposits in the hepatic stroma, more glycogen deposition in the hepatocytes cytoplasm in comparison to control. Other effects of similarly doses that tested in this study have been found by Elasrag (2010). The research focused his demonstration on mutation, chromosomal damage and necrosis in the liver and kidney. Furthermore, Lambert et al. (2007) added that gastrointestinal irritation associated with consumption of high doses of tea preparations.

From the view of the portal areas of the hepatic tissue which was also considered in this study, more leucocytic infiltrations and congested blood sinusoids were present. It might be due to inflammatory reaction and thrombosed capillaries a accompanied the necrosis of the hepatocytes (Cotran et al., 1999). In the other hand, the atrophied hepatocytes with smaller hypertrophied nuclei apparent in this study probably due to vascular damaged after ingestion of higher doses as reported by the same author. Moreover, at the level of tea ingredients, liver necrosis was associated with treatment of high concentrations of high doses of epigallocatechin

gallate (Schmidt et al., 2005; Goodin and Rosengren,2003) and catechin preparation up to 2000 mg/kg induced chromosomal aberration (Ogura et al., 2008). In converse, Manna et al. (2009) reported that tea polyphenol diminish the inflammatory response, proliferation and apoptosis in lung lesions on the 9th week of benzo[a] pyrene exposure.

According to this work, ingestion of the higher dose (3% GTE) revealed depletion of glycogen in hepatocytes cytoplasm but lesser than lower dose i.e. dose dependant. It may possibly induced instability of metabolic enzymes related to glycogen storage. Hence, it previously reported that the polyphenols of GTE such as flavonoids and pyrogallol are potent inhebetors of the detoxifation enzyme COMT (Kdowakiet al., 2005) and catechin gallate, the major constituent in GTE were found to inhebits human COMT-mediate O-methyl translation of catechol estrogen with high potency (Nagai,2004). The mechanism by which green tea extract induces trouble in carbohydrate metabolism may by attributed to mitochondrial toxicity and reactive oxygen species (ROS) formation by tea catechins which induced cytotoxic effects (Galati et al., 2006). The present data agreed with other work by Broadhurst et al. (2000) and Kao et al. (2000) who found that glucose production inhibited by green tea leading to lower blood glucose level that is related to glycogen (PAS-positive) of the hepatocytes. Some authors reported that GTE polyphenols, epigalleatechi-3-gallate was mimetic in that lowered blood glucose, while others approved that glucose-carrier transport through cell membrane (Waltner-Law et al., 2002).

Electron microscopic examination of rats liver cells after supplemented green tea in this study, revealed destruction of the mitochondrial cristae and somewhat decreased profiles of the granular ER besides wider blood sinusoids that carried neutrophils to the areas of destructed hepatocytes and their organelles. These changes were recognized especially after higher dose treatment. Hence, might be due to the bioavailability and oxidative stress induced by administration of high doses of the tea catechin EGCG (Maeta et al. (2007; Schmidt et al., 2005). Moreover, Arakawa et al. (2004) and Nakagawa et al. (2004) added that EGCG promotes apoptosis and has bactericidal activity which is qualified to its ability to reduce O_2 to yield H_2O_2

The present data revealed trouble in several hepatocytes which denoted within electron dense cytoplasm and rich lipid droplets in accordance with Kan et al (2009) who reported significant increase of phospholipids after GT consumption. Furthermore, abundant of secondary lysosomes were apparent because of the attack of primary lysosomes to the degenerated cytoplasmic organelles of the hepatocytes. Kumar et al. (2005) reported that the increases in the number of autophagic vacuoles within the cell that contain fragments of cell components like mitochondria and endoplasmic reticulum at which the lysosomes discharge their hydrolytic contents This thought to connected to potential toxicity when green tea administered at high dose that previously confirmed by Change et al. (2003) and Stratton et al. (2000).

Since each model has its reverse, this work can be finish with the intention of GTE must supplement by one or two cups daily to be beneficially for human. In the main time, it was determined that polyphenols of GTE are exhibit antioxidant and free radical scavenging properties (Scott et al., 1993) but other searchers found to have potent inhibitors of the detoxification enzyme (Kadowaki et al., 2005). Others sure those catechins are known to be unstable at neutral and basic pH and undergo oxidation leading to production of reactive oxygen species. Besides, EGCG has been reported to have both antioxidant and pro-oxidative activities (Sang et al., 2005a) under certain conditions and may induce oxidative stress *in vivo* (Lambert et al., 2007 and Sang et al., 2005b). Conversely, Bonkovsky (2006), Federico et al. (2007) and Sarma et al. (2008) found that green tea is safe in a wide range of doses. In this regard, Isbrucker et al. (2006) found that oral administration of green tea extract (Teavigo) to Bangle dogs for 13 weeks resulted in dose dependent toxicity and death, conditions that are supported by the findings of this work.

5. Conclusion:

The repeated ingestion of highly concentrated up to 3% green tea extracts has its harmful effect on the liver tissues that are subjected to variable hazards due to hepatotoxicity from tea extract polyphenols, so it can be allowed to ingest GTE beverage in a low concentration and for one or two times a day, every one a cup of 100ml containing 50-100mg of poly phenols, so to keep well the hepatic tissue.

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Disadvantages of Online Education: Drawbacks to Consider

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Abstract: Distance education delivers classes (live or pre-taped) to students in their home, office, or classroom. It is used by K-12, higher education, continuing education and business. As the cost of delivering quality education increases, institutions find that limited resources prevent them from building facilities, hiring faculty, or expanding curricula. They are using distance education to maximize resources and are combining their assets with others to produce programming. Distance education is offered internationally, nationally, regionally, and locally over all forms of conferencing technology. Distance learning is expanding and examples of it are increasing dramatically. Fewer than 10 states were using distance learning in 1987; today, virtually all states have an interest or effort in distance education. Distance learning systems connect the teacher with the students when physical face-to-face interaction is not possible. Telecommunications systems carry instruction, moving information instead of people. The technology at distant locations are important and affect how interaction takes place, what information resources are used, and how effective the system is likely to be.

Introduction:

Distance education delivers classes (live or pre-taped) to students in their home, office, or classroom. It is used by K-12, higher education, continuing education and business. As the cost of delivering quality education increases, institutions find that limited resources prevent them from building facilities, hiring faculty, or expanding curricula. They are using distance education to maximize resources and are combining their assets with others to produce programming. Distance education is offered internationally, nationally, regionally, and locally over all forms of conferencing technology.

Distance learning is expanding and examples of it are increasing dramatically. Fewer than 10 states were using distance learning in 1987; today, virtually all states have an interest or effort in distance education. Distance learning systems connect the teacher with the students when physical face-to-face interaction is not possible. Telecommunications systems carry instruction, moving information instead of people. The technology at distant locations are important and affect how interaction takes place, what information resources are used, and how effective the system is likely to be.Technology transports information, not people. Distances between teachers and students are bridged with an array of familiar technology as well as new information age equipment. What sets today's distance education efforts apart from previous efforts is the possibility of an interactive capacity that provides learner and teacher with needed feedback, including the opportunity to dialogue, clarify, or assess. Advances in digital compression technology may greatly expand the number of channels that can be sent over any transmission medium, doubling or even tripling channel capacity. Technologies for learning at a distance are also enlarging our definition of how students learn, where they learn, and who teaches them. No one technology is best for all situations and applications. Different technologies have different capabilities and limitations, and effective implementation will depend on matching technological capabilities to education needs.

Distance education places students and their instructors in separate locations using some form of technology to communicate and interact. The student may be located in the classroom, home, office or learning center. The instructor may be located in a media classroom, studio, office or home.

The student may receive information via satellite, microwave, or fiber optic cable, television (broadcast, cable or Instructional Television Fixed Services (ITFS), video cassette or disk, telephone - audio conferencing bridge or direct phone line, audio cassette, printed materials - text, study guide, or handout, computer - modem or floppy disk, and compressed video. Recent rapid development of technology has resulted in systems that are powerful, flexible, and increasingly affordable. The base of available information technology resources is increasing with dramatic speed. Much has been

learned about connecting various forms of technology into systems, so that the ability to link systems is growing. Most distance learning systems are hybrids, combining several technologies, such as satellite, ITFS, microwave, cable, fiber optic, and computer connections.

Interactivity is accomplished via telephone (one-way video and two-way audio), two-way video or graphics interactivity, two-way computer hookups, two-way audio. Interactivity may be delayed but interaction provided by teacher telephone office hours when students can call or through time with on-site facilitators. Classes with large numbers of students have a limited amount of interactivity. Much of the activity on computer networks is on a delayed basis as well. Possibilities for audio and visual interaction are increasingly wide.

In the earlier days of distance learning, it was most common to see distance learning used for rural students who were at a distance from an educational institution. The student might watch a telecourse on a television stations, read texts, mail in assignments and then travel to the local college to take an exam. This model is still in use, but as the technology has become more sophisticated and the cost of distance learning dropped as equipment prices dropped, the use of distance education has increased.

High front-end costs prevented an early widespread adoption of electronically mediated learning. Distance learning has been aggressively adopted in many areas because it can meet specific educational needs. As the concept of accountability became accepted and laws required certain courses in high school in order for students to be admitted to state colleges, telecommunications was examined as a way to provide student access to the required courses. Many rural school districts could not afford the special teachers to conduct required courses. Distance education met this need by providing courses in schools where teachers were not available or were too costly to provide for a few students. It also fulfilled a need for teacher training and staff development in locations where experts and resources were difficult to obtain. These systems link learner communities with each other and bring a wide array of experts and information to the classroom.

Challenges which faced the early users of distance education are still with us today. If distance education is to play a greater role in improving the quality of education, it will require expanded technology; more linkages between schools, higher education, and the private sector; and more teachers who use technology well. Teachers must be involved in planning the systems, trained to use the tools they provide, and given the flexibility to revise their teaching. Federal and state regulations will need

revision to ensure a more flexible and effective use of technology. Connections have been established across geographic, instructional, and institutional boundaries which provide opportunities for collaboration and resource sharing among many groups In the pooling of students and teachers, distance learning reconfigures the classroom which no longer is bounded by the physical space of the school, district, state or nation.

The key to success in distance learning is the teacher. If the teacher is good, the technology can become almost transparent. No technology can overcome poor teaching which is actually exacerbated in distance education applications. When skilled teachers are involved, enthusiasm, expertise, and creative use of the media can enrich students beyond the four walls of their classroom.

Teachers need training in the system's technical aspects and in the educational applications of the technology. Areas for assistance include the amount of time needed to prepare and teach courses, how to establish and maintain effective communication with students, strategies for adding visual components to audio courses, ways to increase interaction between students and faculty, planning and management of organizational details, and strategies for group cohesion and student motivation.

The interchange of ideas requires different communication methods than in conventional classrooms: information technologies are predominantly visual media, rather than the textual and auditory environment of the conventional classroom, the affective content of mediated messages is muted compared to face-to-face interaction, and complex cognitive content can be conveyed more readily in electronic form because multiple representations of material (e.g., animations, text, verbal descriptions, and visual images) can be presented to give learners many ways of understanding the fundamental concept.

WHAT IS DISTANCE EDUCATION?

Distance education is a method of education in which the learner is physically separated from the teacher and the institution sponsoring the instruction. It may be used on its own, or in conjunction with other forms of education, including face-to-face instruction. In any distance education process there must be a teacher, one or more students, and a course or curriculum that the teacher is capable of teaching and the student is trying to learn. The contract between teacher and learner, whether in a traditional classroom or distance education, requires that the student be taught, assessed, given guidance and, where appropriate, prepared for examinations that may or may not be conducted by the institution. This

must be accomplished by two-way communication. Learning may be undertaken either individually or in groups; in either case, it is accomplished in the physical absence of the teacher in distance education. Where distance teaching materials are provided to learners, they are structured in ways that facilitate learning at a distance.

EFFECTIVE TEACHING AND LEARNING WITH DISTANCE EDUCATION

Distance education dictates changes in behavior for both the teacher and the learner. The successful student develops persistence and skills in self-directing work. The successful distance education teacher becomes conversant with new technology and develops new instructional styles, moving from creating instruction to managing resources and students and disseminating views (Strain, 1987). Administrative and faculty support for distance education are critical to the success of this instructional method. Administrators should take note that the implementation of a distance education program may allow access to a greater number of students. However, the time and work associated with teaching at a distance exceeds the normal requirements of campus-based instruction.

Students in distance education settings perform as well or better on assignments, class activities, and exams when compared to campus-based students (St. Pierre, 1998). Nevertheless, students must maintain persistence and a clear focus to succeed in a distance learning situation. Self-direction, a passion for learning, and strong individual responsibility are important influences on achievement. There are indications that distance education works best for more mature, motivated, well-organized, and already accomplished learners (Rintala, 1998).

Garrels (1997) describes five critical elements for successful teaching at a distance:

1. Instructor enthusiasm. This requires animation and comfort in front of the camera, or with the technology utilized. Faculty support and interest are critical to the success of distance learning endeavors.

2. Organization. Teaching materials must be prepared in advance; timing, variation, and smooth transitions must be planned. Instructors should allocate from 3 to 5 hours of preparation for each hour of distance instruction. Great attention to detail is required long before the actual classroom activity occurs (Summers, 1997).

3. Strong commitment to student interaction. Whatever the modality used to teach at a distance, the instructor must encourage and facilitate ongoing communication between the students and the instructor.

4. Familiarity with the technology used in the class format. Faculty development is important before beginning any distance activities, and instructors should be trained in video use, computer use, or other forms of instructional technology used.

5. Critical support personnel. Production staff, graphic designers, and technical staff members will help the instructional setting produce successful teaching at a distance.

Distance education is any type of schooling that takes place away from a physical campus. Distance education is also known as:

- distance learning
- virtual learning
- online learning
- e-learning
- online education
- web-based training

Types of Distance Education Programs:

There are two types of programs offered by distance education schools: synchronous learning programs and asynchronous learning programs. With synchronous learning, distance education students must log on to the school's website at a set time. Often, they interact with their peers and professors via group chats, web seminars, video conferencing, and phone call-ins. With asynchronous learning, distance education students complete all coursework on their own time. They often learn via assignment sheets, message boards, email, pre-recorded video lectures, mp3s, and traditional mail correspondence.

Distance education began for the delivery of courses to students who live in remote areas. Over the years, though, this form of education has become the preferred method for learning outside of the classroom.

Distance Education is now undertaken by people with busy schedules, hectic lifestyles, special needs, and also those living in isolated areas. What's more, with such flexible learning options you can choose to study at any time and from any location you like.

There are a number of different **forms of distance education** and it's important to know which method you prefer:

- **Correspondence learning:** your course materials are printed and sent out to you by mail/courier. The advantages are that you have a printed set of reference materials, you can study anywhere and you are not reliant on a computer, you can learn for long periods of time.
- **eLearning:** your course materials are provided to you in multimedia format; that

is, on CD/DVD. In this way you can choose to take your study materials within you and learn anywhere in the world with just a laptop.

- **Online learning:** no materials are sent to you and you do all your learning online. The limitation is that you need to be logged onto a computer (though you may be able to download and print some of your materials yourself, though this can cost you more in ink), there is a limit to how much you can absorb and do online, and most people's attention span on-screen is limited to 20 minutes (your eyes get tired after that).
- **Broadcast learning:** where you tune into a series of television, radio or Internet broadcasts (e.g. podcast, YouTube, etc.).
- **Teleconferencing:** where your lessons are conducted in real time through an Internet connection. Limitations are that streaming can be slow, connections can cause problems (students and teachers generally need to be computer literate) and there can be delays in talk-time, depending on software, hardware and connection capabilities.

Online Education Pros

Of the many advantages and new possibilities of online education, here are some of the Strengths:

1. Greater flexibility

Online students have more freedom in choosing their programs and schedules. This allows many busy adults to adapt online courses to their already established everyday life of work and family. For many, this is simply the only way they can study for that degree which will take them farther in their career and life.

2. Saves Time and Money

Online education saves an enormous amount of time and money which in traditional education is wasted on commuting. Commuting is also very tiring, while online education means you can study from home, in a comfortable environment with everything you need close   at   hand. Tuition also costs less for most online institutions.

3. Logistics

Traditional education is restricted due to logistical issues; there is only this amount of students who can be in a place at a given time, whereas in online classes, there is no question of paucity of space. As long as the online classes have the necessary bandwidth, an unlimited number of students can study, all over the globe. Then again, traditional classes would turn up expensive to maintain, because the educational institution needs to maintain a place

and its facilities. When it comes to online education, all they need to do is to set up E-learning tools, an Internet connection and a website where people can learn. While this is not cheap too, but it is definitely cost less as compared to the costs of a place to carry on.

Online Education Cons

To balance our view of online education, let's consider some of the disadvantages/Weaknesses:

1. Requires Self Discipline

The greater freedom of online classes requires greater self disciplines, but not everybody has it. The comfort of studying from home may also reflect negatively on your motivation to do your best.

Depending on your personality, home can provide as many distractions as traditional campus facilities (designed especially for studying).

2. How well have you learned

With online education, the students have a greater hold on the education process, and that is not always a good sign. For example, in online education, though the teachers set up the audio and video clips with the same dedication, it remains to be seen whether the students study it with the same dedication that they would in a classroom.

3. No Campus Life

Many people remember the college/university as the best time of their lives. Part of it is the campus life – During and after classes. One of the disadvantages of taking online education rather than traditional one, is that in online education you will not have the atmosphere of campus lawns, corridors and classrooms, huge libraries with real books you can hold. There will be no campus buddies and no campus culture.

4. Internet Connection

Another negative point of online education is that it entirely depends on the internet connection. Though many countries have a robust Internet connection and others are getting it soon, there are still countries, and areas in countries that do not have access to Internet and other enhanced technologies. It would be difficult to get online education in countries that have a limited online presence.

Online Education VS Traditional Education

This article reviews the differences and the pros and cons of online VS traditional education. Gone is the world where only traditional, campus-based education existed and you only had to choose the university or college you wanted to study in.

Someday, probably in the near future, Online Education will replace traditional institutions. At least, many degree programs will combine the on

campus courses as well as online classes as a standard educational approach.

But for now, the future student has to decide first whether he/she wants to study online or on a campus degree.

Here are some points to consider the pros and cons of online and traditional institutions:

Differences between Online and Traditional Education; Comparison

1. Convenience

One of the most striking, innovative, and unprecedented features of online education is their convenience for almost anyone. Persons busy with careers or families will be able to compose their schedules so that they fit their individual time constraints. This is possible because courses are delivered in the form of electronic-based modules online.

It is also convenient because it requires no commuting, saving a great deal of time and money. It allows to study from home, with the only requirement being the possession of an adequate computer and internet connection. Basic computer skills only are required to acquire higher education online.

2. Expenses

Tuition costs less for most online institutions. Online education also eliminates the additional expenses usually entailed by traditional "campus life", commuting, and the purchase of study materials.

3. Feedback

Feedback is somewhat better in traditional education. Students can interact directly face to face with both classmates and teachers, which makes feedback easier to understand and faster to get. Some online institutions do offer chat rooms and video/audio meetings.

4. Accreditation

The credit of online education depends on its purpose and context. If you only have online degree(s) and are just trying to find work, employers may prefer traditionally educated candidates. If you are already an employed and valuable professional, online learning will be seen favorable as a way to improve your skills, expand your professional knowledge, and thus contribute more at work.

5. Ecology

Online education has obvious positive effect on the environment.

It may not be measurable now, but if online education largely replaces traditional institutions in the near future it will mean that less paper will be used for books and writing material and fewer campuses will be built while the number of students and employed teachers will only increase radically.

Conclusion:

In general, new methods of educational systems to countries around the world as a necessity and need for learning and training opportunities to study in areas with different climatic features and conditions of learning and education according to their gender and cultures, has been. Each method is mentioned with regard to changes in features and creates an education system, and evaluation is used. Judgement of distance education in an educational way, first as a necessity to eliminate barriers to educational climate and geographical areas, age and gender restrictions learners began their work And more in a death education system, especially in the philosophy and goals based on theories of learning theories have evolved to find and promote professional growth. Approach to distance education with regard to the necessity of education in countries formed.

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Pros and Cons of Online Classes: Advantages and Disadvantages of Online Courses

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Abstract: Distance education can be used for some aspects of most disciplines. For example, several institutions of higher education already have developed certificate programs, undergraduate programs, and graduate programs in health and physical education that are delivered using distance education methods. Eastern Oregon University, Emporia State University, Kutztown University, LaSalle University, the Medical College of Wisconsin, University of Wisconsin at Stevens Point, and Virginia Tech are among institutions integrating distance technology into their physical education programs. Traditional programs that are heavily based in skill development and demonstration or require laboratory work can be offered in a distance education framework using interactive video interfaced with computers to facilitate a hands-on learning approach at a distance. Classes that use lecture and laboratory experiences are easily adapted to a distance education situation. Course materials, including animals for dissection, are sent to class participants with video and written instructions and assignments.
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Introduction:

Distance education delivers classes (live or pre-taped) to students in their home, office, or classroom. It is used by K-12, higher education, continuing education and business. As the cost of delivering quality education increases, institutions find that limited resources prevent them from building facilities, hiring faculty, or expanding curricula. They are using distance education to maximize resources and are combining their assets with others to produce programming. Distance education is offered internationally, nationally, regionally, and locally over all forms of conferencing technology.

Distance learning is expanding and examples of it are increasing dramatically. Fewer than 10 states were using distance learning in 1987; today, virtually all states have an interest or effort in distance education. Distance learning systems connect the teacher with the students when physical face-to-face interaction is not possible. Telecommunications systems carry instruction, moving information instead of people. The technology at distant locations are important and affect how interaction takes place, what information resources are used, and how effective the system is likely to be.

Technology transports information, not people. Distances between teachers and students are bridged with an array of familiar technology as well as new information age equipment. What sets today's distance education efforts apart from previous efforts is the possibility of an interactive capacity that provides learner and teacher with needed feedback, including the opportunity to dialogue, clarify, or assess. Advances in digital compression technology may greatly expand the number of channels that can be sent over any transmission medium, doubling or even tripling channel capacity. Technologies for learning at a distance are also enlarging our definition of how students learn, where they learn, and who teaches them. No one technology is best for all situations and applications. Different technologies have different capabilities and limitations, and effective implementation will depend on matching technological capabilities to education needs.

Distance education places students and their instructors in separate locations using some form of technology to communicate and interact. The student may be located in the classroom, home, office or learning center. The instructor may be located in a media classroom, studio, office or home.

The student may receive information via satellite, microwave, or fiber optic cable, television (broadcast, cable or Instructional Television Fixed Services (ITFS), video cassette or disk, telephone - audio conferencing bridge or direct phone line, audio cassette, printed materials - text, study guide, or handout, computer - modem or floppy disk, and compressed video. Recent rapid development of technology has resulted in systems that are powerful, flexible, and increasingly affordable. The base of available information technology resources is increasing with dramatic speed. Much has been

learned about connecting various forms of technology into systems, so that the ability to link systems is growing. Most distance learning systems are hybrids, combining several technologies, such as satellite, ITFS, microwave, cable, fiber optic, and computer connections.

Interactivity is accomplished via telephone (one-way video and two-way audio), two-way video or graphics interactivity, two-way computer hookups, two-way audio. Interactivity may be delayed but interaction provided by teacher telephone office hours when students can call or through time with on-site facilitators. Classes with large numbers of students have a limited amount of interactivity. Much of the activity on computer networks is on a delayed basis as well. Possibilities for audio and visual interaction are increasingly wide.

In the earlier days of distance learning, it was most common to see distance learning used for rural students who were at a distance from an educational institution. The student might watch a telecourse on a television stations, read texts, mail in assignments and then travel to the local college to take an exam. This model is still in use, but as the technology has become more sophisticated and the cost of distance learning dropped as equipment prices dropped, the use of distance education has increased.

High front-end costs prevented an early widespread adoption of electronically mediated learning. Distance learning has been aggressively adopted in many areas because it can meet specific educational needs. As the concept of accountability became accepted and laws required certain courses in high school in order for students to be admitted to state colleges, telecommunications was examined as a way to provide student access to the required courses. Many rural school districts could not afford the special teachers to conduct required courses. Distance education met this need by providing courses in schools where teachers were not available or were too costly to provide for a few students. It also fulfilled a need for teacher training and staff development in locations where experts and resources were difficult to obtain. These systems link learner communities with each other and bring a wide array of experts and information to the classroom.

Challenges which faced the early users of distance education are still with us today. If distance education is to play a greater role in improving the quality of education, it will require expanded technology; more linkages between schools, higher education, and the private sector; and more teachers who use technology well. Teachers must be involved in planning the systems, trained to use the tools they provide, and given the flexibility to revise their teaching. Federal and state regulations will need

revision to ensure a more flexible and effective use of technology. Connections have been established across geographic, instructional, and institutional boundaries which provide opportunities for collaboration and resource sharing among many groups In the pooling of students and teachers, distance learning reconfigures the classroom which no longer is bounded by the physical space of the school, district, state or nation.

The key to success in distance learning is the teacher. If the teacher is good, the technology can become almost transparent. No technology can overcome poor teaching which is actually exacerbated in distance education applications. When skilled teachers are involved, enthusiasm, expertise, and creative use of the media can enrich students beyond the four walls of their classroom.

Teachers need training in the system's technical aspects and in the educational applications of the technology. Areas for assistance include the amount of time needed to prepare and teach courses, how to establish and maintain effective communication with students, strategies for adding visual components to audio courses, ways to increase interaction between students and faculty, planning and management of organizational details, and strategies for group cohesion and student motivation.

The interchange of ideas requires different communication methods than in conventional classrooms: information technologies are predominantly visual media, rather than the textual and auditory environment of the conventional classroom, the affective content of mediated messages is muted compared to face-to-face interaction, and complex cognitive content can be conveyed more readily in electronic form because multiple representations of material (e.g., animations, text, verbal descriptions, and visual images) can be presented to give learners many ways of understanding the fundamental concept.

Pros and Cons of Online Classes: Advantages and Disadvantages of Online Courses

Distance learning is a hot subject today, but is it really for you? It is best not to hurry when choosing a college or university, lest you find yourself a victim of hype. Online courses are a new revolutionary way of providing education. Even traditional institutions are increasingly incorporating the Internet e-learning online interaction means and software tools into their programs.

What do the education institutions offer?

Archived video footage and virtual real-time lectures, online assignments and presentations, electronic academic material, multimedia as part of

classrooms – all these have been part of higher education for a while now.

However, Online Education means taking entire degree program online, via your laptop. This means an entirely new experience, yet not everybody is ready for it.

Taking Online Classes via Online education program requires specific learning skills, which some people lack.

The Pros of Online Classes:
The key advantages of using an online class are –

1. Time flexibility
For some people there is nothing worse than getting up before 9 in the morning. Traditional higher education often requires just that. But with online education students have the possibility to adjust schedules to their life, rather than adjust their life to predetermined   schedules. Other people benefit greatly from it too: parents, full-time employees, and anyone else who for this or that reason is too busy to attend traditional classes.

2. Geographic flexibility
Online institutions make possible something unprecedented: it no longer matters where you live. You can live in one of the world and study daily at an institution based in another without ever leaving your native country, or even your room, for that matter. Even in terms of local travel online education is a revolution: there are no more bus, train, or car trips, no traffic jams, no being late for the bus/train, no time and money spent on travel.

3. Class Notes
Not everybody knows how to write great class notes. Online courses provide electronic transcripts of every lecture. This is great for anyone who has short attention spans or does not like to write during lectures.

4. More educational means
Much more so that in traditional classrooms, online education incorporates online multimedia possibilities into instruction.

Possible cons of online classes include:
What are the Disadvantages of Online Courses? Here are some

1. Credits
Not all online course credits are transferable to traditional degree programs!

2. Require self-discipline

Excellent self-discipline and time management without the aid of strict schedules, attendance requirements, and personal communication

3. Lack of interpersonal interaction
No interpersonal relationships with ether teachers or students; only via email, message boards, and other online means of communication.

Disadvantages of Online Classes: Disadvantages to Consider
This article will focus on the disadvantage of taking Online Classes. Online education is not exactly a trend yet, but it is becoming increasingly popular.

The reason for this is that it offers new opportunities where none existed before – Many people wouldn't have been able to acquire the necessary higher education without it. However, like all things in life, taking Online Classes has some drawbacks and disadvantages as compared to the traditional classrooms.

That said, online classes are not perfect for everyone. To avoid getting caught in the hype and making the wrong decision, consider the pros and cons of online education.

Taking Online Classes – Disadvantages
Let us review the weaknesses :

1. Lack of Socializing
Taking courses through the net completely erases the concept of socializing. Although there are online class discussions in online education, it is still not always an easy way to interact. This method completely eliminates the possibility to meet classmates face to face in and outside the classroom.

2. Lack of Close Personal Contact with Teachers
Besides being unable to socialize with other students, there is no way to arrange personal face-to-face meetings with the teachers. This, too, can be a significant disadvantage for those students who are motivated by close personal connection, discussion, and advice. Online tutorials definitely do not provide this vital touch and online discussions may not be intimate enough to provide the same powerful stimulus.

3. Classroom Attendance – None
This may sound like a good thing to some, but for many this is a major flaw of the online system. Some simply cannot focus on their own, while sharing an actual room with other motivated students right in front of them is a great incentive to concentrate and understand. Others simply love the

atmosphere of campus classrooms and would never give them up.

4. Self-Discipline

Studying via the net from home means you have more freedom and more responsibility for managing your time and effort. It is important to know that you are able to invest enough effort into studies without the stricter discipline imposed by traditional institutions and without their added incentives of classroom attendance and personal meetings.

5. Accessibility

Most people would have no problem accessing online education and that is one of its major plusses. Still, some simply do not have the required Internet connectivity (the required bandwidth for taking online class) or no personal computer they could comfortably use for prolonged private study sessions.

For these people campus-based courses are actually much better, since they provide an environment for group and individualized study: classrooms, offices, libraries, etc.

6. Accreditation and Employment

This is one of the most serious aspects of the online   education. It is still an emerging system and many authorities and employers officially do not recognize many online diplomas. Moreover, even if a degree is from an officially accredited online institution, many employees still prefer candidates with traditional degrees.

Advantages of Online Classes: Benefits of Online Classes

Imagine a future without campuses and classrooms. Instead there will be academic cyber-space and scholarly chat rooms. Accredited academic programs world-wide will be given via the Internet, producing an unprecedented global number of world experts in every field.

This is not yet the case today, but online schools are already offering great opportunities where none existed only a few years ago.

Higher education is becoming easily available to people who would otherwise never even dream of it – Adults who work full time, family people, people from remote countries all over the world converging in world-class learning centers.

Because online education is still a new field, it is important to know exactly what it can and cannot offer you.

What are the benefits of online classes? Advantages of taking Online Classes

Some of the Pros of enrolling to Online Education and taking online courses:

1. General Convenience

Generally speaking, online classes are more convenient since you do not need to leave home to take   them. Time table is flexible and there is generally more freedom. It is also simply convenient to be able to study anywhere while being able to do many of the required things almost any time of the day, like on the train when going home from work.

2. Time Considerations

Online courses save a lot of valuable time, especially if you are an adult with a career and a family to take care of. Basically, you log on to the class/course site and you are "at the university" – no need to take long rides back and forth or trudge from one end of the campus to another (and some campuses can stretch across an entire city and require bicycles or buses).

3. Online Teaching Possibilities – New cutting edge technologies

Online classes offer many innovative possibilities of communication. Where in a traditional classroom everything would have to be done in face to face interactions, which has its advantages but is also often inconvenient or simply impossible (for some).

An online class environment eliminates certain boundaries and constraints, allowing easy near-instant access to information, resources, libraries, extensive photo and video archives, and personal meetings compressed, through the power of the Internet, from hours to minutes.

4. Whom Online Class Suits Best

- Disciplined students with excellent time management skills who do not need teachers and strict predetermined programs to do their best.
- Students who wish to study in a specific country or institution which is otherwise not accessible to them (geographic convenience).
- Students who cannot afford traditional education – Online schools are generally less expensive.
- Students who dislike campus requirements. Although for many, the campus life is the best time of their life, some people prefer

the privacy of their homes. Online education is ideal for them.

- Students who cannot afford traditional education due to busy professional or personal schedules.

Online Classes VS Traditional Classes: Comparison between the Two Methods

Nowadays it is not enough to choose the university you want to learn at. Today, you have to first decide whether you want an online degree or an offline/traditional education.

Online education is a growing force in the field of additional and higher education. It is probable that in the near future, within a decade or two, online education will be the global standard.

Considering the differences between these two methodologies of education can provide you the basic knowledge and even surprising opportunities.

Online Classes VS Traditional Classes
Attendance

Traditional institutions require physical presence and participation in classrooms. This entails extensive travel and expenses. For many only this already makes higher education impossible. Online education requires no traveling at all, saving time, money, and energy. Busy people will therefore be able to combine extensive studies with work and family. Education is available to sailors on submarines and to astronauts in space!

Virtual classrooms vs. real classrooms

There are two camps around this issue – Those who love attending campus-based lecture and those would rather stay at home. Virtual education means there are no campuses and no classrooms. For those who prefer to be at home and are comfortable with cyber-space this is a virtual paradise. For those who are technophobic, get confused by online multi-media, and who prefer direct human contact this may be a veritable digitalized hell. But the amount of people who are uncomfortable with technology and the internet is decreasing exponentially. Most people are addicted to the internet. And video communication is becoming standard nowadays, allowing top-quality group video communication online.

Traditional and Online Schedules

Online institutions deliver many or all courses via modules. These modules can be scheduled by the student him or herself to be taken virtually at any time of day or night. This is obviously impossible with traditional classes, however requires a high

degree of self-motivation and the ability to meet requirements while enjoying greater freedom.

The Value of online classes/degree earned as compared to the traditional ones

When it comes to quality, going to Online Classes becomes universal as going to a traditional college class. One has to remember that the world is changed rapidly and the online education is now a great alternative to the traditional one. Just like a person got used to choose between campus-based colleges and universities, today the online education grows to be an option. Of course, with its different varying quality of degrees, just like any on-campus degrees.

These are just some of the differences between these two educational methods.

The benefits of Taking Online Courses: Why should you take it Online?

Let us consider the advantages of taking online classes:

1. Recognition:

First things first, online courses are widely accepted and sought after by employers. It is not something that people shun away from. In fact, a research conducted by DETC has revealed that more than 70% of employers look forward to recruiting people who possess online degrees rather than their traditional counterparts.

2. Being your own boss:

Traditional education requires teachers to impart education to students and monitor and evaluate their performances as well. If you are one of those who hate being nagged by someone, then online courses are meant for you. You can study on your own and keep yourself motivated without the interference of any one.

3. Accessibility and comfort:

Online courses are a respite for all those who hate functioning in a preplanned and methodical way.

Online classes enable students to study whenever they want to and from where ever they can. They can study from within the comforts of their homes. Further, online courses suit working professionals the most.

4. Reading and not listening:

Online courses require students to study referring to online textual content sent by universities. Thus, they can escape the monotonous lectures and long classrooms hours yet be well acquainted with the study materials.

5. Individualistic minds at work:

Online courses are the best for those who hate social interactions and love to be on their own. The courses alienate all sorts of distractive elements that may be present in a traditional classroom. Thus, a student can enjoy his/her peace of mind.

6. Resource center:

Online courses enable students to refer to notes or relevant study material by visiting the archived section. This is not so in traditional classrooms. If a student misses a class lecture, he/she misses the study content as well.

You would now surely agree that **accredited online courses** have the same worth as the traditional ones.

Conclusion:

In general, new methods of educational systems to countries around the world as a necessity and need for learning and training opportunities to study in areas with different climatic features and conditions of learning and education according to their gender and cultures, has been. Each method is mentioned with regard to changes in features and creates an education system, and evaluation is used. Judgement of distance education in an educational way, first as a necessity to eliminate barriers to educational climate and geographical areas, age and gender restrictions learners began their work And more in a death education system, especially in the philosophy and goals based on theories of learning theories have evolved to find and promote professional growth. Approach to distance education with regard to the necessity of education in countries formed.

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Private extension: functions and duties

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Abstract: Diverse agricultural extension funding and delivery arrangements have been undertaken since the mid-1980s by governments worldwide in the name of "privatization." When agricultural extension is discussed, privatization is used in the broadest sense – of introducing or increasing private sector participation, which does not necessarily imply a transfer of designated state-owned assets to the private sector. In fact, various cost-recovery, commercialization, and other so-called privatization alternatives have been adopted to improve agricultural extension. The form and content of decentralization has dominated development discourse and public sector reform agenda in Kenya in the last two decades. The evolution of public agricultural extension arrived at a worldwide turning point in the 1980s, one that represented the end of a major phase in the growth of publicly funded extension in both the developed and developing world. Agricultural extension increasingly has become defined as one or other of (apparently) differentiated activities of technology transfer or rural development. In many situations, the transfer of technology, heretofore considered the purview of public sector systems, has been reconceived. Such changes suggest a refocussing of paradigms for the delivery of public sector extension.
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Introduction

Extension services may be loosely defined as including all activities involved in the exchange of information relevant to agricultural and livestock production, processing and marketing. The word "extension" has been criticized as inherently emphasizing the "top-down" dissemination of information while ignoring other types of information flow between farmers, extension and research – particularly activities that involve farmers as equal partners in the process. This paper uses the term "extension" while recognizing that extension functions are multi-faceted and go beyond "top-down" dissemination of new technologies. For example, the information flow through extension channels may include anything from advice from a consultant on refrigerated flower shipping to the feedback to researchers of results from farmer-managed varietal trials.

Private firms provide services in accordance with their specialized incentives and farmers respond in terms of what they see as most beneficial to them. As each type of extension (public and private) has limitations, the objective for farmers, and agricultural development organisations of all types (local and international) is to attain the best mixture of public, private and NGO services. As Roth (1987) asserts, the public sector in general is over-burdened by

numerous activities and moving some of them to the private sector might allow more effective implementation of essential services. While extension services cannot, and should not, be totally privatized, there is room for both some privatization of public extension activities and active promotion of private and NGO extension activities which complement rather than replace existing public extension services. The analysis in this paper draws on cases in which information exchange, feedback to research, and all other major extension functions form only one part of a larger agribusiness operation or agricultural project. This paper focuses on Implication of private extension in developing countries .

The debate on the role of the public sector is not limited to the context of agricultural extension, but encompasses the larger concerns of public policy and institutional and organizational development. Indeed, the degree of government versus private involvement in an economy is an enduring philosophically and politically vexing question. The move toward privatization and efforts to decentralize government functions relate to this theme.

There are two themes in the broader privatization debate: first, a "political economy" consideration of the role and size of government in an economy, which focusses on whether or not there is a failure of private markets; and, secondly, an expressed need to reduce government outlays. While many reassessments of publicly funded extension have reflected the second theme, it is worth considering the rationale for public versus private activity in an economy. In mixed economies, the prevailing

economic justification for government involvement in an activity such as agricultural extension is market failure, whereby the market mechanism alone cannot perform all economic functions for appropriate resource allocation. Market failure may arise because some goods or services are public goods (such as publicly funded agricultural research knowledge) which can be consumed in a nonrival fashion by all members of society without any individual's consumption reducing the amount available for other individuals. Because the benefit of providing such goods cannot be appropriated by individuals, individuals generally will not provide such goods in a society even though there may be significant gains for producers and consumers. Some extension activities are clearly concerned with public goods subject to market failure. Other activities (such as individually tailored advice) confer appropriable private benefits which could be adequately supplied by private markets. Private goods sometimes are subject to market failure, whereby the operation of private markets does not provide certain services at a socially optimal level or where external costs or benefits are accrued by others rather than the provider of the goods. Market failure also may arise when current generations place insufficient value on preservation of resources for future generations. These latter circumstances are particularly characteristic of land and water degradation (Cary, 1983). Publicly funded conservation extension is often directed to overcoming such market failures (Barr & Cary, 1992). Government support for the provision of extension services may reflect that such services would be inadequately provided without intervention or, for reasons of equity, because services would not be available to the extent thought socially desirable. Some situations for agricultural extension clearly reflect private goods; other situations clearly are characterized as public goods. There is a lot of fuzzy ground in the middle where it is not particularly clear that an extension activity is conferring a public or private good. In such situations, the extent of publicly funded extension is likely to be determined by the political influence brought to bear by relevant interest groups (Cary, 1993).

The philosophical thrust of the general privatization debate has centred, on the one hand, on whether certain government activities could be performed more efficiently by private agencies. operating in private markets and, on the other hand, on whether inequities may arise because not all individuals have access to resources to purchase privately supplied services.

services that cater primarily to large-scale farming.

The Netherlands' experience in moving to a partially privatized system highlights some of the implications for agricultural extension, particularly in developed countries. The Netherlands' approach reduced government outlays as well as the government agency role conflict between concern for farmers' interests and the implementation of increasingly stringent environmental policies. With farmers paying for an increasing share of the extension services, their representatives have more influence on the direction of the extension service. New organizational structures and linkages have had to be established to link the "privatized" and private extension services with the research institutes, experiment stations, and regional experiment farms. Consequent upon, or in parallel with, the changed Dutch arrangements, other changes have taken place in the Netherlands' extension system. There is some evidence, at least for the vegetable greenhouse sector, that the high level of cooperation among extension information organizations in both the public and private sectors no longer exists (Huang, 1992). The more commercial orientation of the system appears to be creating tensions between extension workers and their clients in a less "open" knowledge and information system, with farmers who used to share information during study-group meetings now being more reluctant to do so.

The New Zealand Ministry of Agriculture and Fisheries advisory service, now fully commercialized and receiving no direct government funding, if sold will be the first extension service fully privatized from government ownership. In 1994 the number of consultants employed in this agency was about half of the peak number of advisers employed in 1987. Some of these advisers will have retired or departed voluntarily; others have established private consulting businesses. The consequence of the changes in New Zealand has been an increase in fee-for-service consulting (the number of farm and horticultural consultants has approximately doubled), with the traditional "advisory" extension no longer existing on a large scale. While, in most cases, the changes seem to have been readily accepted, there remains concern over the effective transfer of scientific findings to agriculture (Walker, 1993). Wider structural changes have sharpened the focus and efficiency of research agencies and advisory consulting work. Traditional technology transfer extension is now largely confined to agricultural commodity boards. Agriculture New Zealand engages in some specific "public good" technology transfer projects on a contract basis to commodity research agencies and the national Foundation for Research, Science and Technology.

There has been no formal assessment of the impact of the New Zealand changes. However, there does appear to be less interaction among organizations, reduced feedback from farmers to science providers, and more limited information distribution, particularly to less well-off and poorer performing farmers (Walker, 1993).

The new developments highlight greater institutional pluralism. Extension, interpreted broadly, now is often a mixed system or a "complex" where services are provided by private and public sector entities. The larger context in which a mix of public and private services operates presents a new challenge with new potential roles and responsibilities for the public sector. A major premise of this chapter is that policy makers must consider the entire agricultural extension complex when planning to allocate funds or seeking alternative funding arrangements for the public sector.

2-Strategies for change

Public sector extension, facing criticism for its cost and its lack of efficiency and for not pursuing programmes that foster equity, is confronted with a number of possibilities for change. There has been a trend, perceptible throughout various extension systems undergoing adjustment, of greater flexibility and multiple partners in funding agricultural advisory services (OECD, 1989). Le Gouis observed three major policies adopted by government and farm organizations regarding privatization of extension:

1. Public financing by the taxpayer only for the kinds of services that are of direct concern to the general public

2. Direct charging for some individual services with direct return (in the form of improved income)

3. Mixed funding shared between public and private professional association contributions for some services where the benefits are shared. A pervading development in new forms of financial support for extension is the trend to mixed sources of funding, reflecting strategies to gain access to additional sources of funding. In several developing countries, public-private extension coordination is already established. Alternative patterns indicate a fostering of private corporate initiative, encouraging cooperative ventures by farmers, coordinating public-private extension services, and privatizing the public system (Wilson, 1991).

The need for improved and expanded extension activities, together with a strengthening philosophical view of less government involvement in national economies, has led to a number of strategies for changing the way extension services are delivered.

2-1 Revitalization

The United States Cooperative Extension Service, when criticized for lack of relevance and vision (Dillman, 1986), regrouped and reviewed the criticisms. Its Extension Committee on Organization and Policy (ECOP) organized a Futures Task Force to review issues and put forward recommendations with a view to revitalizing the system (ECOP, 1987), which has led to various alterations structurally and programmatically.1 Meanwhile, the advancement of electronic information systems is resulting in increased privatization, with important implications for the future structure of U.S. agriculture (Goe & Kenney, 1988).

2-2- Commercialization

New Zealand's Ministry of Agriculture and Fisheries' (MAF) agricultural advisory service now operates under user-pay, commercial criteria (Hercus, 1991). The MAF advisory service, renamed MAF Consulting and, subsequently. Agriculture New Zealand, has remained (temporarily) a public agency, although its employees have given up a number of public employment benefits and now receive commissions for consulting work undertaken. The agency depends for its annual budget on consulting fees received from farmers and contractual arrangements with government for the supply of policy information and rural intelligence to government.

2-3- Cost Recovery

Other public extension systems have moved toward cost-recovery approaches. Mexico has developed a fee-based system among large-scale farmers in the northwest region and plans the development of a similar arrangement among small-scale farmers in the south central region (Wilson, 1991). The Agricultural Development and Advisory Service (ADAS) in England and Wales, notionally "commercialized," operates on a partial cost-recovery basis. Clients of ADAS pay a fee for advice which formerly was free of charge. This process of cost recovery, introduced in 1987, was directed towards the agency receiving 50 per cent of its income from commercial fees by 1993-94 (Bunney & Bawcutt, 1991; Harter, 1992).

2-4- Voucher Systems

Some countries have replaced public extension delivery systems with vouchers, distributed by government services, for farmers to use in hiring private extension consultants (as in Chile). Coupons attached to agricultural bank loans, committing a certain percentage of the loan for extension services, have been used in Colombia.

4- Gradual "Privatization"

In 1990 The Netherlands "privatized" approximately one-half of its public extension service by transferring field extension personnel, with initial government financial support, to the farmer associations. The elements of the extension service responsible for linking research and the privatized extension services, policy preparation, implementation, and promotion and regulatory tasks remained under the aegis of the Ministry of Agriculture (Le Gouis, 1991). The "privatized" extension service is governed by a board on which farmers' organizations and the government are equally represented (Proost & Röling, 1991). Dutch farmers make a partial contribution to the cost of the new organization through membership subscriptions to farmer associations, as well as through direct payment for individual analyses. Farmers will eventually contribute 50 per cent of the cost of the service: special services such as individual analyses will be fully paid for by the farmer clients. The Dutch government has established new government-funded structures for integrating subjectmatter specialists into extension teams to facilitate the transfer of information and knowledge and for the provision of information on government policy (Bos, Proost, & Kuiper, 1991; Proost & Röling, 1991).

A gentler form of "privatization" has been proposed for the delivery of government extension services in the Australian state of Victoria. A review of extension services determined that, for government-provided services conferring essentially private benefits to individuals, rather than cost recovery by government fee charging, it is more desirable and more efficient that private advisers deliver such services. However, because of the complexities of extension service delivery and the varying nature and levels of development of different agricultural sectors, a number of constraints were identified which precluded universal application of such a principle (Cary, 1993).

In order for rural industry organizations to take a greater responsibility for technology transfer, the Victorian government has proposed "outsourcing" for delivery of future extension programs. Outsourcing means that the government extension agency will retain a core pool of extension project staff and "buy in" private sector professional services with skills that the agency considers unnecessary to maintain. Agricultural consultants and contract staff will be employed to help deliver services in specific projects funded by rural industry and the federal government. Such projects are likely to be broad and industry wide and not tailored to individual farm circumstances.

In most cases, governments have not actually "privatized" their agricultural extension services. In its pure sense, privatization implies a full transfer of ownership (usually by way of sale) from government to a private entity, with that entity meeting all costs and receiving any profits. In the case of extension, governments have followed a number of distinct pathways such as commercializing the service while retaining it as a public agency, shifting public sector delivery services to private sector delivery of the service while maintaining oversight and basic funding of delivery, or pursuing cost-recovery measures to pay for the service. Thus the phrase "privatization of agricultural extension" generally is misleading.

Other Arrangements

Some countries have never developed public sector agricultural extension services, leaving the function of agricultural extension to private sector commodity enterprises or industry agencies, albeit often with some government financial subsidy. In France, while chambers of agriculture and private sector companies provide extension services, the former are substantially supported financially by public funds. In New Zealand, extension services to the dairy industry for many years have been delivered by the Dairy Board consulting service, financed by the dairy industry. In other cases, nongovernmental organizations have been used to supplement public sector extension services, especially in the area of rural development (Amanor & Farrington, 1991).

This arrangement has certain advantages for increasing extension coverage and encouraging farmer participation in technology systems, but it also has certain inherent limitations. In most countries, private sector companies are already important contributors to technology transfer and the advancement of agricultural development through, mainly, contract arrangements with farmers. Rightfully, the private sector has come to be acknowledged as a major information provider to both large and small farmers involved in monocropping (Cary & Vilkinson, 1992). The characteristic of "privatized" extension systems is a focus on commercial farms. It is salutary to state the obvious in relation to decisions regarding private and public provision of extension: when extension is delivered privately, it represents a commercial decision; when extension is delivered publicly, it is a political or bureaucratic decision. In determining whether to privatize, it is important, in the first instance, to establish whether an extension programme is designed to help commercial enterprises or small-scale farming and rural development.

Conclusion:
Privatization may have some attendant disadvantages because of unequal access to resources and because of a diversity of "agencies" and the associated difficulty of coordinating external groups and other government departments. Private delivery agents will be less responsive to government policy direction, and there may be linkage problems with public applied research organizations. While the process of information transfer amongst farmers traditionally has been characterized by a cooperative, free exchange of information, industrial information traditionally has been a private good characterized by patent rights, process licensing, the use of paid consultants, and differentiated production and marketing processes. In developed economies with commercialized agriculture sectors, many of these features of industrial information transfer are becoming more common in agriculture. The trend to privatization will be stronger the more such circumstances exist. The range of different circumstances prevailing in agricultural extension worldwide suggests that a wide variety of approaches should prevail.

The rationale for private sector provision of agricultural extension services is generally based on an expectation of increased efficiency with the operation of private markets and with the resulting efficiencies contributing to the growth of a country's GNP. In contrast, the rationale for public provision of agricultural extension services is based on the following points: (1) much agricultural information is a public good; (2) only government extension services are likely to promote concern for natural resources management; (3) public sector extension may enhance the education of farmers who often lack adequate access to educational institutions; (4) the public service often provides information that reduces risk to farmers; (5) the service may provide information that reduces transaction costs; and (6) an extension service may be concerned with community health issues related to possible human hazards such as accidents and poisonings linked to agricultural chemicals. The argument for privatization is based upon:

- More efficient delivery of services
- Lowered government expenditures
- Higher quality of services

The diverse financial arrangements adopted in the last two decades by governments worldwide to fund agricultural extension services provide a valuable menu of options for consideration by other countries confronting the "privatizing" of public sector services. Still, several countries have resisted the trend toward privatization of agricultural extension, concerned perhaps by the implications reviewed in this chapter. In both developed and developing countries, renewed debate and experimentation around extension is certainly needed, but not only around allocation decisions and how best to develop cooperative arrangements with the private sector.

In most countries, government-funded extension is likely to focus its activities more selectively on public-good activities which exist and on areas where the marketplace is unlikely to provide services at a socially optimal level. Such areas will include "broad" rather than "specific" technology transfer, dissemination of environmental and resource technology, and human resource development. The move in the public sector toward privatization and efforts to decentralize government functions can serve to highlight the continuing and key role of the public sector and focus the operative question on its responsibility as a coordinating agent. Its roles of regulation and providing service for priority audiences unserved by the private sector will be undiminished.

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Using Information and communication technologies (ICT) in extension education

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Abstract: The concept of development of the rural, today, is not just project initiatives and governance; it is much more beyond that. This paper uncovers a whole plethora of ICT emergence as a technology of the new millennium. Against the backdrop of the ongoing ICT boom, this paper makes an attempt towards studying its applications and usage planning process and policy making for the rural communities focusing on how it helps in aligning the key factors and reduce the problems of alienation, fragmentation and dislocation of knowledge. Policy makers and service providers have increasingly come to view information and communication technologies (ICT), and particularly the Internet, as an important tool in providing disadvantaged groups and areas with access to information, services and markets that would otherwise be inaccessible. The concept of development of the rural, today, is not just project initiatives and governance; it is much more beyond that.
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Introduction:

The global economy requires the kind of necessity and purpose of educational institutions. Since the current trend towards reducing incomplete information and access to accurate information is growing, other schools can not control time to transfer a set of prescribed information from teacher to student during a fixed time point are, but schools must to promote Culture of "Teaching for Learning For example, acquisition of knowledge and continuous learning skills which make possible during the individual's life. According to Alvin Toffler, illiterate in 21st century, who was not read and write but those who do not know which fail to learn or remember are illiterate. (Jauhari, 2004).

In the rural context, development involves use of physical, financial and human resources for economic growth and social development of the rural economies (Burkey, 2000). The term rural development also represents improvement in quality of life of rural people in villages. As per Chambers (1983) "Rural Development is a strategy to enable a specific group of people, poor rural women and men, to gain for themselves and their children more of what they want and need." Singh (1999) defines Rural Development as "A process leading to sustainable improvement in the quality of life of rural people, especially the poor". The fact of the matter is that three quarters of the world's poor, about 900 million people are in rural areas, and the Millennium poverty target set by Millennium Development Goals (MDG), cannot be met unless the world addresses rural poverty. "Sustainable Rural Development can make a powerful contribution to four critical goals of: Poverty Reduction, Wider shared growth, Household, national, and global food security and Sustainable natural resource management" (World Bank, 1997).

Hence worldwide there is a growing emphasis on development of rural economy of the countries. Any improvement, in the social or economic status of rural areas would not just directly benefit rural poor but would also bring down the migration-pressures on cities and contribute by positive ripple effect in global stride towards development.

Institutions and experts accept Governance as a reflexive process, wherein policies, institutions, outcomes and analysis interact, to maximize the process of participatory development (UNDP, 1997; Ludden, 2005; Mehta, 2006).

Information and communication technologies (ICT), including radio and television and the newer digital technologies like computers and the Internet as potentially are introduced powerful tools and activators of educational reform and changes. different ICT, when properly applied can be developed to help access to education and the relationship between training and workshops to strengthen the increasingly digital, the quality of education also helped to create teaching and learning in an active process connected to real life high take. However, the experience of being raised by ICT in the classroom and other educational sites around the world during the last few decades proves that is not automatic fully realize the potential benefits of ICT training. (Guptaand et al, 2004)

With the help of state and local funding, information technology has been purchased for schools ever since the 1980s. The state has also found many ways to support teacher training in the use of IT, and it has also allocated funds for the production of IT programs. Instruction in the use of IT has also played an important role in teacher training organized by local school authorities (Becker, 2000).

It is against this background that the need arose to find out how far we have progressed in the application of ICT in education and what impacts these significant economic investments have had. It is also time to start a value-oriented discussion of how strongly the future of the Iran society—and with it, of education and training— will be linked to the vision of an information society brimming over with technology (Mohseni, 2003).

The importance of communication in the development process has been acknowledged for many years by the development community. FAO has spent at least thirty years pioneering and promoting - both in thinking and practice - the centrality of communication in development. The most essential ingredient of good communication – putting people at the centre of the communication process - has similarly been understood and documented for many years.

agriculture extension and farmer-outreach programs face three major challenges – cost-effective outreach, solutions tailored to needs of individual farmers and an image that is farmer-friendly. The internet and mobile networks have the potential to provide agro-information services that are (i) affordable, (ii) relevant (timely and customized), (iii) searchable and (iv) up to date. Large sections of the farming community, particularly the rural folk, do not have access to the huge knowledge base acquired by agricultural universities, extension-centers and businesses. While telecenters are beginning to dot the rural landscape [1], one of the big barriers remains the lack of agro-content that (i) is in the language of the farmers (ii) is relevant to their needs and (iii) is delivered in a form that is of immediate use to them.

Information Technology, more precisely the Information and Communication Technology (ICT), has emerged world over as a technology of the new millennium. By augmenting the process of information exchange and reducing the transaction costs, this ubiquitous technology is instrumental in increasing productivity, efficiency, competitiveness and growth in all spheres of human activity. The potential benefits of, however, can be harnessed only if the technology diffuses across the different sectors of the society. Unfortunately, we are living in a world of 'digital divide' wherein half of the world population have never made a telephone call . The digital divide is not only an international problem, but for most developing nations including is also a national phenomenon. Nonetheless, it has been argued that in an era of globalization, the ability to harness this technology for the 'rural' improves the capability of the developing country.

Information technology (IT) has connected the world globally and is now changing our lifestyle and social consciousness dynamically. Of late, it has emerged as a best tool for information sharing and mutual communication. None of the walks of life have been left untouched by the IT sector be it grain threshing or global business. Agriculture has also been greatly influenced by IT in the present era though the share of IT in agriculture is only 1.3%.

Information Technology and its Components

Induction of IT as a strategic tool for agricultural development and welfare of rural requires that the necessary IT infrastructure is in place. The rapid changes and downward trend in prices in various components of IT makes it feasible to target at a large scale IT penetration into rural. Some of the broad factors to be noted with respect to various components of IT are listed below :

1. Input devices :
Radical improvements are witnessed with respect to the means of communication by human beings with computers such as key boards, mouse devices, scanners. The advent of touch screen monitors that allow users to give input to computers by touching on the appropriate location of the monitor has made it possible to develop user-friendly interface for farmers which is easy, intuitive, circumvents language barrier and at the same time provides a relaxed environment to the users. The present day digital cameras make it possible to capture and store good quality graphics and large video clips. The small size and low weight of these digital cameras, which are increasingly becoming affordable, open up the possibilities of providing computer based demonstration clips to educate the farmers.

2. Output devices :
Monitor screens, printers & plotters, data projectors support high resolution and good quality output. The quality of these output devices have the potential of generating renewed interest in the farmers in using IT based services. The light weight portable data projectors can be easily carried by the agricultural extension personnel for serving larger audience. Similarly, speakers can also be attached to the computers to incorporate voice based trainings for farmers.

3. Processors:
The processing speeds of computers have gone up. At present, Intel P-IV based processors @ 1.5 Ghz are available in the PC range which makes it possible to undertake substantial processing of data at the client side.

4. Storage Devices :
40GB and even higher hard disk drives have become common in PC range of computers. This makes it possible to store substantial information at the local level which facilitates faster access. Similarly, high

capacity floppy disk drives, CDs make it possible to transfer large volumes of data to locations which can not be connected to networks immediately. These storage devices are also used for backup of crucial data. As a precaution, many corporates store their backups at locations away from the place of work.

5. Software :

Various operating systems are available which act as interface between the user and the machine. The graphic user interface (GUI) has become an accepted prerequisite for end users. Microsoft's 'Windows' continues to be a favourite. Application softwares which can support complex user requirements are available. Of the shelf solutions for office automation packages, groupware applications, complex database solutions, communication products, solutions based on remote sensing & geographical information systems are available. In addition, solutions based on some or all of these are also readily available. The present downward trend in the IT industry provides an opportunity get customised application for any specific task developed at an affordable price. Rapid Application Development and Deployment (RADD) is a popular model for quick development and deployment of applications. Development environment itself is simplified with tools that quicken the pace of software specialists. Project management and monitoring software are available that facilitate efficient execution of large and complex applications that are required for rural

6. Networking devices :

The capacity of modems, used to convert the data from digital to analog and vice versa, which are popularly employed to use telephone lines have increased. Internal modems are available integrated into the computer so that they are not exposed to outside environment. The capacities of other networking devices such as routers have also gone up which makes it possible to create large networks with smooth data transmission.

7. Transmission Media

: The media through which the data transfer takes place has also undergone revolutionary change. Telephone lines are still the popular source although the reliability and low bandwidth are still major issues. High capacity cables, optical fibre, radio, wireless local loops, satellite transmission and various solutions based on a combination of these are already being used in many parts of the country.

8. Other accessesories :

Uninterrupted Power Supply (UPS) devices are crucial to ensure the

longetivity of the IT equipment as well as provide backup mechanisms. The potential of solar

power packs to provide a feasible solution to shortage of power in the rural areas needs to be

exploited.

CONCLUSION

A common strategy in higher education ministries in developing countries is public and private sector partnership in strategy or pursue rapid ICT projects is based. This partnership has different forms such as grant aid private sector interaction with public assistance, donated educational equipment and components by companies to public schools, providing technical assistance for planning, management and consolidation tools and human resources at the local level. But after financial aid, testing programs based on ICT is critical.

Many of the ICT training programs based on the charitable agencies aid have been unable to have high durability. Because the government has failed in its financial assistance in this situation none of the local communities to provide resources do not needed to continue these programs. Two strategies in here "to support government and local communities to move" are important. Since the 21st century, is century of education support about youth in Asia, to find sustainable ways to bridge the digital age in Asian countries is a real priority. And work through partnership that local leaders and guides are experts it can be lasting forever.

Several recommendations that emerged from the discussions emphasized on the need to think of ICT in education beyond computer aided learning and investigate the potential other technologies like community radio and other medium. These mediums could not only be cost effective but also has a greater outreach potential. It was also pointed out that low cost software solutions for e-learning that have scopes for innovation, should be incorporated in large scale projects. With an indication to open source solutions, the sessions recommended that such solutions should become a part of the overall policy for implementating technology supported education interventions.

Sustainability and scalability of project are also issues that needed serious considerations. While moving beyond the pilot and experimental phase, projects especially those that needs a considerable financial contribution should have a viable sustainability model for up scaling. It was also recommended that implementers needs to be cautious when selecting areas for implementing ICT in education projects.

Projects should also not lose priority of the education objectives. In some cases ensuring school accountability system and teachers attendance may be more important that investing time and resources in ICT integration in schools. One fact that emerged in the sessions was that ICTs effectively computers,

initiated in government department and schools were being used as decision support in education. Essentially, clear criteria, norms and standards needs to be developed for the information that was being used for decision-making.

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4/1/2011

Water Scarcity and Need for Sustainable Water Use

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Abstract: Availability of water is the most limiting factor for agricultural sector. More than 90% of the renewable water in the country is used for agriculture, but the sector still cannot provide enough production to meet the demand of the population. On the other hand, with the current conditions the total agricultural products from irrigated farming are 56 million ton and total water used for irrigated agriculture is 83 bm^3, therefore water productivity is 0.7 kg/ m^3. For the supply of food for the year 2020 the agricultural production should increase to 160 million ton. Therefore the water productivity should increase to 1.6 kg/ m^3. Therefore, focus on efficient use of water through irrigation efficiency and improvements in management of water use will be the major challenges in the coming years. [Ahmad Reza Ommani. **Water Scarcity and Need for Sustainable Water Use**. Journal of American Science 2011;7(5):98-105]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: water, agricultural products, Extension expert

Water and Agricultural Economy

The importance of agriculture in the economy is indicated by its significant contribution to the gross domestic product (one-forth of GDP) and the provision of job opportunities to 25% of the labour force (Keshavarz, Heydari & Ashrafi, 2003). Irrigation increases cropping intensity and contributes to expansion of areas suitable for farming. It increases yields, stabilizes output, enables crop diversification, reduces risk and increases farm incomes and employment. Through irrigation is influence on agricultural incomes, irrigation has a multiplier effect on non-farm incomes. Irrigation contributes to food security and poverty alleviation. By improving agricultural productivity, irrigation contributes significantly to overall growth and development.

The issue of water scarcity is further intensified by a high dependence on water. Growing population and its needs for food and drinking water, coupled with a short vision on regional water planning and management, have resulted in an unbalance between water supply and demand. Pollution, climate change and frequent severe droughts have been making the problem even more serious and make the future pretty uncertain. Water resource scarcity and unbalance between supply and demand are leading to high competition for water and consequently greater risks of food insecurity in the region (Ommani and Noorivandi, 2003).

In most countries such as Iran, the agriculture sector is the predominant consumer of water. Historically, large-scale water development projects have played a major role in poverty alleviation by providing food security, protection from flooding and drought, and expanded opportunities for employment. In many cases, irrigated agriculture has been a major engine for economic growth and poverty reduction. However, at the same time, poor communities have tended to suffer the greatest health burden from inadequate water supplies and, as result of poor health, have been unable to escape from the cycle of poverty and disease. Thus, growing scarcity and competition for water stand as a major threat to future advances in poverty alleviation, especially in rural areas. In semi-arid regions, increasing numbers of the rural poor are coming to see entitlement and access to water for food production, livestock and domestic purposes as more critical than access to primary health care and education. Ommani and Noorivandi (2003) pointed out, that scarcity of water resource is unintelligible process. This process is dependent to social, natural and economical factors (Figure 1).

Water and Food Security

Utilization of new irrigation methods and optimum use of water is a vital element to access food security. Based on the research done by Ommani and Noorivandi (2003), both socio-economic characteristics and environmental conditions of the farm have increased the food insecurity for the Iranian farmers. They suggested that smallholder farmers with under-developed socio-economic and environmental conditions are relatively poor. They concluded that lack of sufficient farm management competencies make higher water and soil erosion, over-fertilization, inadequate application of manure, lack of fallow, overgrazing, burning of crop residue, and over-use of pesticides. Based on this research water is the resource

for food security. Water and food security interact together.

Many of the over 800 million people in the world who still go hungry live in water scarce regions. When FAO launched its Special Program for Food Security in 2003, it was well revealed that limited access to water was often a major constraint to increasing food production. A key question for the future is whether water shortage will act as a serious brake on food production during the coming decades (FAO, 2002).

FAO (2001) pointed out; that global population will continue to expand at a rate of 1.1 percent until 2015 and more slowly thereafter. Today's population of 6000 million will reach 8100 million by 2030, an increase of about 33 percent. As a result, demand for food will increase over this period but at a slowing rate. The nature of the demand will also change as incomes rise and urbanization continues. The urban population is expected to increase from 43 percent of the world population in 1990 to 61 percent by 2030.

The growing population and changes in food priorities will result in a strong demand for additional food production, though the types of grains demanded for food and feed, and the mix of grains and animal products in the diet, will change. Although net food imports into the developing countries are expected to increase, most of the increasing demand in developing countries will be met by increased local production. According to FAO (2002), increases in demand can be met in three ways:

- increasing agricultural yield;
- increasing the area of arable land; and
- increasing cropping intensity (number of crops per year).

Over the past 30 years, most of the increase came from yield, mainly as a result of the Green Revolution. This is expected to be case in developing countries over the next 30 years, with 69 percent of the increase in was resulted from yield, 12 percent increases in cropping intensity and the rest from increase in the area of cultivated land. Much of increase in crop production will come from irrigated land, three-quarters of which is in the developing countries. Currently, some 20 percent of agricultural land in the developing countries is irrigated and it provides about 40 percent of crop production in these countries (FAO, 2001).

FAO (2002) pointed out, that over the past 30 years, the irrigated area expanded at about 2 percent a year, giving a total increase of some 100 million hectares during 1962–98. Irrigated area in developing countries in 2000 was nearly doubled than, what it was in 1962. FAO (2002) expects that irrigated areas in 93 developing countries could grow by 0.6 percent yearly between 1998 and 2030. Such a rate of growth would lead to only a 23 percent increase in irrigated area over the period. However, when coupled with increase in cropping intensity, the effective harvested irrigated area is expected to increase by much more: from 241 to 323 million hectares, a 34 percent increase. Will there be enough freshwater to satisfy the growing needs of agriculture and other water uses. Agriculture already accounts for about 70 percent of the freshwater consumption in the world and is seen as the main factor behind increasing global freshwater scarcity.

Analysis of 93 developing countries by FAO shows comparatively encouraging conclusions on this question. During the period 1998–2030, irrigation water consumption in these countries is expected to grow by a total of only about 14 percent, from the current 2 128 km3/year to 2 420 km3/year in 2030. This increase is low compared to the increase projected in the harvested irrigated area. Much of this difference is explained by an expected improvement in irrigation efficiency, leading to a reduction in the withdrawals needed for irrigation water per irrigated hectare. Another reason for this reduction is due to a change in cropping pattern for some countries, such as China, where a substantial shift from rice to wheat production is expected: irrigation water requirements for rice are usually twice those of wheat.

Water Quantity
1. Renewable Fresh Water Resource
The main source of water in Iran is precipitation both rainfall and snow, estimated the mean range of 1995 to 2000 to be 415 billion cubic meters (bm^3). About 72% of the total rainfall directly evaporates and by taking in to account 13 bm^3 of water entering from the borders, the total potential renewable water resource are estimated to be 130 bm^3. Currently, the total water consumption is approximately 88.5 bm^3, out of which more than 93% is used in agriculture, while less than 7% is allocated to urban and industrial consumption. Under the present situation 82.5 bm^3 of water is utilized for irrigation on 7.5 million hectares of land under irrigated agriculture (Ommani and Noorivandi, 2003).

2. Non Renewable Groundwater Resource
Groundwater continues to be one of the dominant sources of bulk water in Iran. Its use has been essential for meeting water demands and household food security. In addition to being a regular source of water under normal climatic conditions, it plays a critical role in food supply and livelihood security during dry periods, in view of its ability to act as a buffer against drought and precipitation variability. Increased access to groundwater reduces risk substantially enabling many formers make out of poverty. From the environment perspective, groundwater plays another role of no less importance (Keshavarz, Heydari & Ashrafi, 2003).
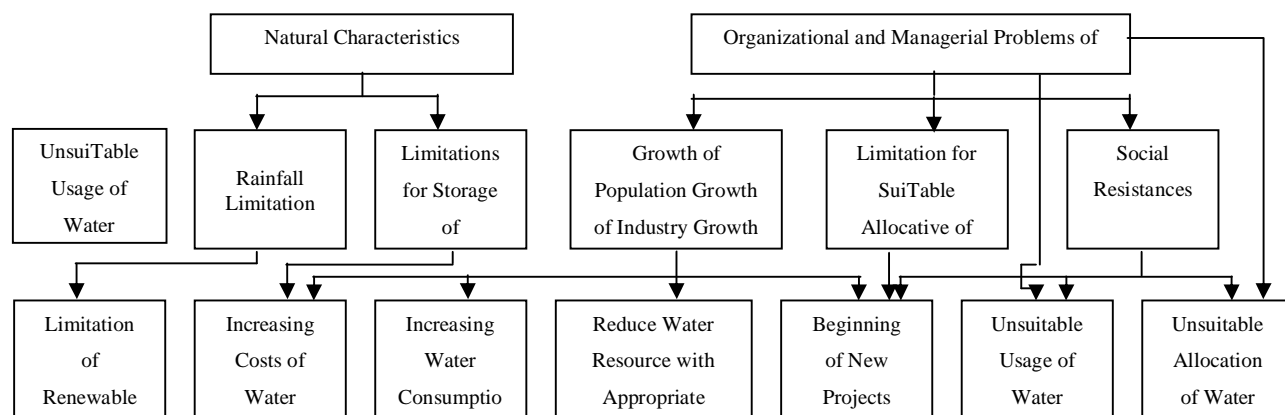
Figure 1. Factors Affected On Water Scarcity   Source: (Ommani and Noorivandi, 2003)

Shortages of groundwater in areas of excessive abstraction and groundwater pollution by various sources are now common in the region and emphasize the importance of correct estimates and proper development, regulation and protection of supplies, in order to ensure the continued availability of this key natural resource (Ommani and Noorivandi, 2003). However, the management of groundwater has not always met the required standards and there are clear indications of major problems with over-abstraction and its consequences in many parts of the region. The available information clearly indicates that groundwater over-abstraction and quality degradation are among the major emerging problems in the Iran. In several parts of the region, over-abstraction is severe and water levels are declining at rates that range from 1-3 meters per year. Water level changes and fluctuations are the most important factors influencing access to groundwater for the environment and human uses. Even small drops in groundwater level can have substantial impacts on surface water availability because of the close link between surface and groundwater (Keshavarz, Heydari & Ashrafi, 2003).

3. Water Scarcity

The demand for water in Iran continues to grow due to population growth and the push for economic development. Population growth at high rates has steadily reduced the per capita share of water resource over the past half century, offsetting socio-economic plans and putting high pressure on the limited water resource (Najafi, 2006). The international costs of strategic food security crops are

highly sensitive to variations in water supply, which directly or indirectly depend on rainfall. Under the prevailing arid and semi-arid climatic conditions in the Iran, reliable food production depends heavily on water resource (Saxena, 2006).

In today's world, water continues to be central to food security, environmental health, recreation, energy production, transportation, etc., and thus to the overall well being of the people (Keshavarz, Heydari & Ashrafi, 2003). Although most of the surface of planet earth is covered with water, only about 2.5 % of it is fresh water and less than 1% is available for human use. Saxena (2006) pointed out, that many countries of the West Asia and North Africa region are already facing severe water poverty and the situation here is likely to worsen in the years to come because of the demographic pressures and climatic change.

4. Water Quality

In Iran intensification of agricultural and industrial activities has led to the contamination of surface and ground water by fertilizers and other chemicals, a rapid rise in the level of groundwater, which leads to water logging and soil salinity, and high loads of the most common water pollutant (organic matter from domestic sewage, municipal waste and agro-industrial effluents). Similar situations exist in many other countries of the region (FAO, 2003a).

Sewage water is a source of pollution of both surface and ground water resource. It is produced mostly from large cities in urban areas. Sewage water is treated and released for agricultural use in many

countries. Industrial liquid waste is hazardous and contaminates large quantities of freshwater with small volumes produced from industrial plants. The industrial plants should be built far from watercourses and groundwater basins and should not e allowed to dump their wastes in hazardous areas without prior treatment. Pesticides, insecticides and fertilizers, which are used intensively in agriculture, might cause serious contamination to freshwater resource, and pose a threat to both human health and the environment (FAO, 2003a,b).

5. Agricultural Water and Poverty

Based on Asian Development Bank (1999) poverty is multi-dimensionally complicated, and is the result of myriad interactions between resource, technologies, institutions, strategies, and actions. The multidimensional character of poverty has been reflected in a wide array of papers, poverty reduction strategies, and policies (Asian Development Bank. 1999). World Commission on Dams (2000) pointed out, that although water provides only a single element in the poverty equation, it plays a disproportionately powerful role through its wide impact on such factors as food production, hygiene, sanitation and food security, and the environment. Indeed, development agencies, groups, and experts worldwide are increasingly recognizing the important role that water can have on poverty (World Commission on Dams, 2000). Within the water and poverty debate, agricultural water holds a unique place. While solutions to other dimensions of the water and poverty problem such as sanitation, hygiene, and potable supplies, generally call for increased expansion of services, the agricultural water problem requires drastic improvements in existing services. Furthermore, agriculture is now the world's largest user of water, consuming 80–90% of annual utilized supplies and providing livelihood for most of the world's poor.

Biltonen et al (2002) pointed out, that within agriculture, water is a vital resource for many productive and livelihood activities and many developing countries have promoted water resource development over the last 5 decades to improve social outcomes. Huge investments have been made in water resource to achieve such broad objectives as economic growth, rural and agricultural development, national food security, famine protection, and land use intensification. Hussain et al (2004) also claims that irrigation development has been regarded as a powerful factor for providing food security, protection against adverse drought conditions, increased prospects for employment and stable income, and greater opportunity for multiple cropping and crop diversification. Access to reliable irrigation can enable farmers to adopt new technologies and intensify cultivation, leading to increased productivity, overall higher production, and greater returns from farming (Hussain et al, 2004)

Hussain et al (2004) pointed out, that there are five key interrelated dimensions of the relationship between access to good agricultural water, socioeconomic uplifting in rural communities, and poverty reduction. The dimensions are production, income/consumption, employment, vulnerability/food security, and overall welfare (Figure 2). In addition, Rezaei-Moghadam and Karami (2006) described relationship between poverty and sustainability of agricultural systems. The linkage between sustainable agriculture, poverty and agricultural extension efforts and their impacts on rural centers has been discussed in this study. The findings of path analysis in three different causal models provide the complexity of relationships between variables and environmental degradation so that there is a causal relationship between poverty and sustainability. Lack of direct causal effect of use of technology and extension efforts on sustainability in three models indicated the structural and institutional limitations of extension in diffusion of appropriate technologies. Finally, recommendations regarding regional planning with respect to socio-economic characteristics and changing from transfer of technology approach to other alternatives and revising the education programs of extension agents are provided.

Based of Figure 3 negative direct causal effect of poverty on sustainability indicated the relationships between poverty and environmental degradation lack of direct causal effect of use of technology and extension efforts on sustainability indicated the structural and institutional limitations of extension in diffusion of appropriate technologies.

6. Water Scarcity and Need for Sustainable Water Use

Water scarcity, defined in terms of access to water, is a critical constraint to agriculture in many areas of the world. A fifth of the world's people, more than 1.2 billion, live in areas of physical water scarcity, lacking enough water for everyone's demands. About 1.6 billion people live in water-scarce basins, where human capacity or financial resource are likely to be insufficient to develop adequate water resource. Behind today's water scarcity lie factors likely to multiply and gain in complexity over the coming years (Molden, 2007).
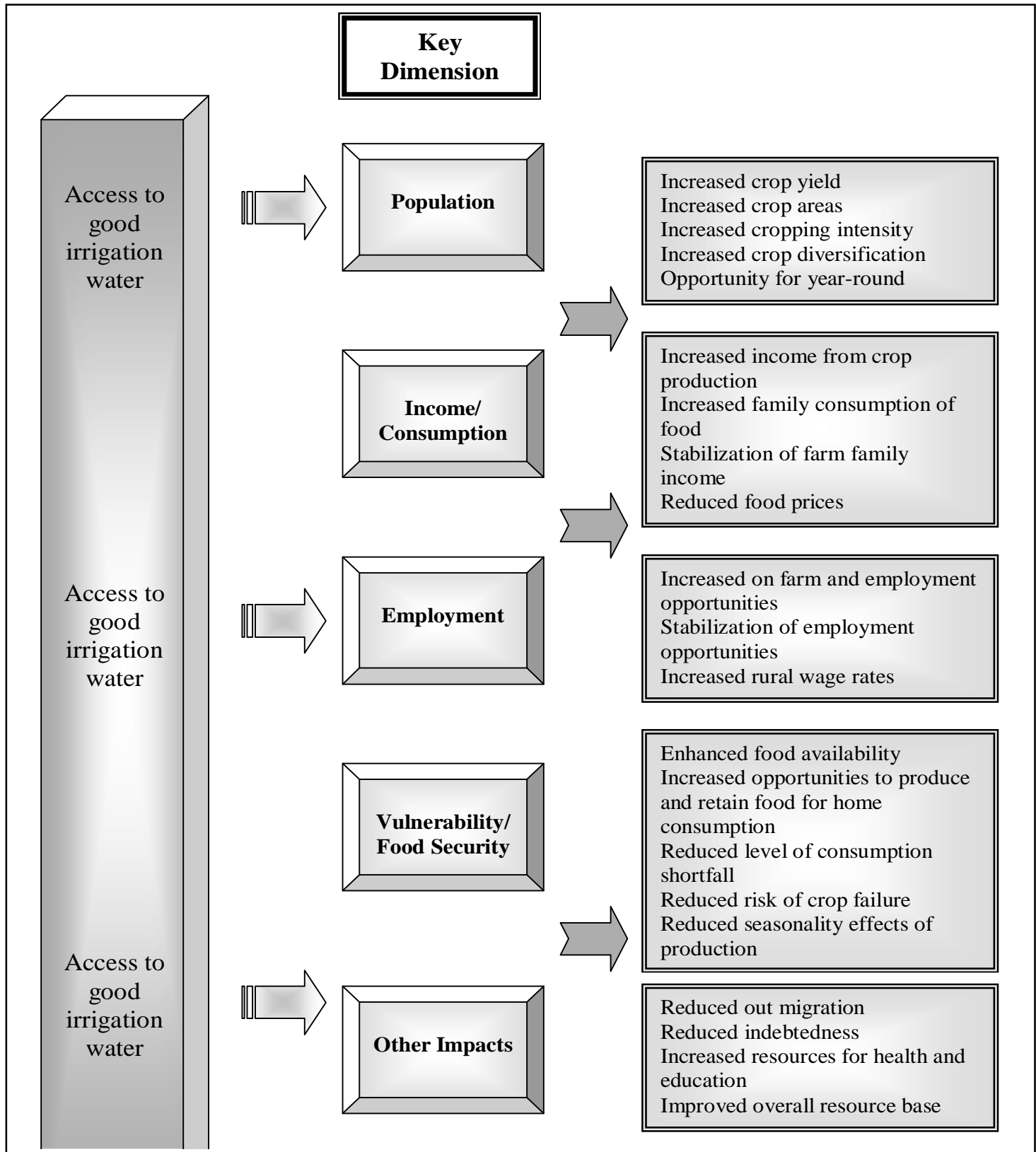
Figure 2. Agricultural Water and Poverty Reduction: Key Dimensions Source: (Hussain et al, 2004)
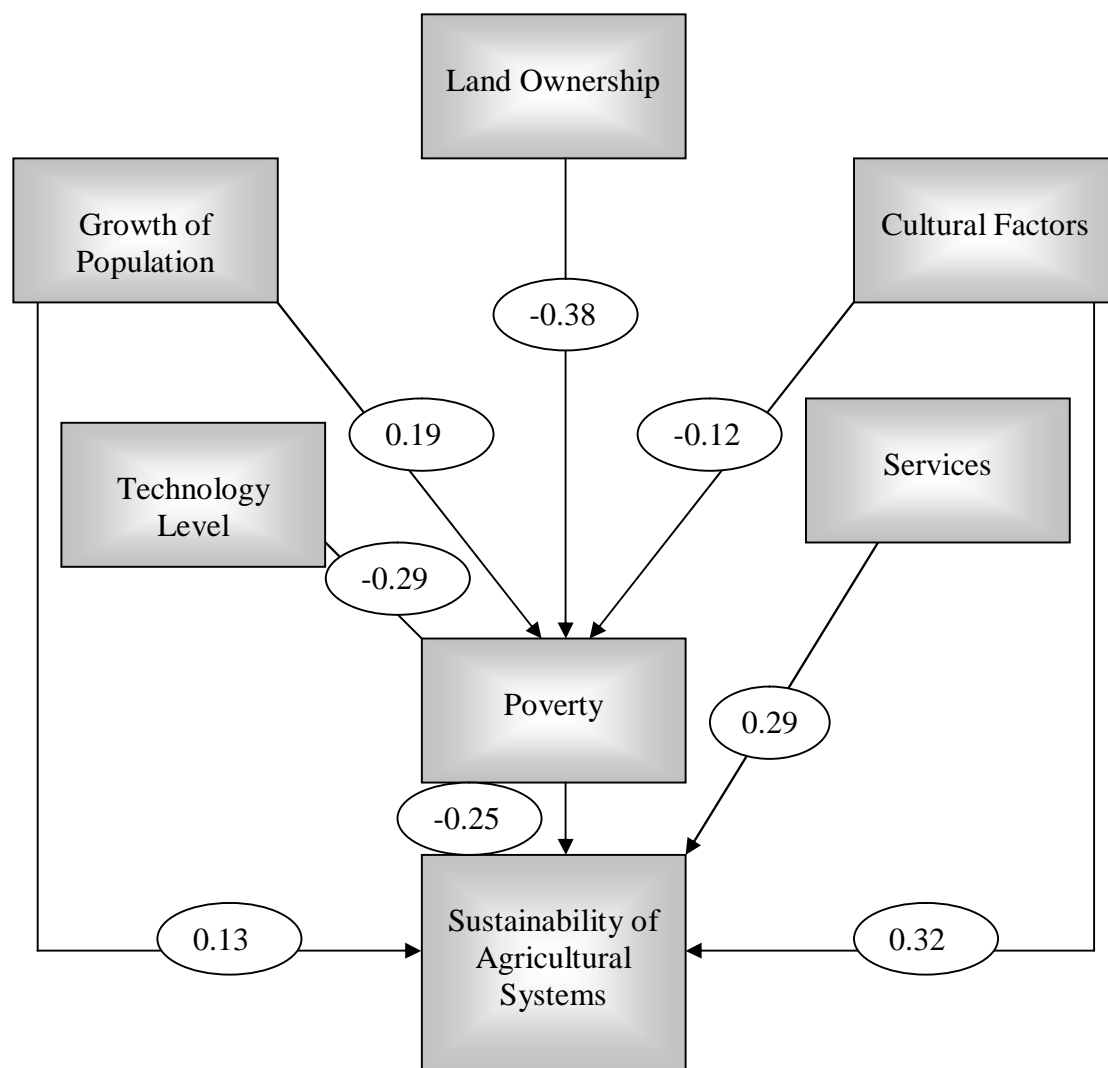
Figure 3. Relationship between poverty and sustainability of agricultural systems.
Reference : (Rezaei-Moghadam and Karami, 2006)

A growing population is a major factor, but the main reasons for water problems lie elsewhere—lack of commitment to water and poverty, inadequate and inadequately targeted investment, insufficient human capacity, ineffective institutions, and poor governance. Water and food security are strongly connected. Many of the nearly 800 million chronically undernourished people live in water-scare regions. In these areas, limited access to water often plays a major constraint to improving food production. Global population will continue to expand. The increase in population and changes in food preferences will result in a strong demand for additional food production (FAO, 2001). It is expected that much of the increase in crop production will come from irrigated lands, as irrigated agriculture is much more productive than rain-fed agriculture - irrigated agriculture contributes nearly 40 percent of world's food production on 17 percent of cultivated land. However, agriculture already counts for 70 percent of the freshwater withdrawals in the world - for developing countries this figure is even as high as 85 percent - and is seen as the main factor behind increasing global water crisis (FAO, 2003a).

The key to increase world's food production without deepening the global water scarcity is improving the efficiency in the use of irrigation water. At irrigation scheme and farm level, irrigation efficiency can be sometimes as low as 30 percent. The gains from introducing effective water management and improved irrigation and water-control techniques and technology can be tremendous both in terms of water saving as well as in increase in productivity and stabilization of erratic food production (FAO, 2003a).

7. Recommendation:

Therefore, focus on efficient use of water through irrigation efficiency and improvements in management of water use will be the major challenges in the coming years. Recent events of drought in the country have resulted in the reduction of water productivity in farming. In recent years Khuzestan Province encountered with shortage of water resource (Organization of Agricultural-Jihad of Khuzestan, 2004). Sustainable water resources management in agriculture and increasing the water use efficiency in Khuzestan Province has a vital role for conservation of water resources.

Allahyari and Chizari (2008) Indicated that Iran's extension system dos not pay enough attention to necessity characteristics of extension organization to accomplish environmentally sound agriculture and these attributes are not favorable situation. These conditions necessitate reorganizing of extension institutions to accomplish sustainability.

Considering unsustainable agricultural conditions of Iran (Ommani and Chizari, 2008), organizational recession and inability of current extension organizations (Allahyari and Chizari, 2008) to accomplish of sustainability, it seems that extension systems require a new structure and contents to achieve sustainability objectives.

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4/8/2011

Agricultural Extension and Sustainable Water Resources Management in Agriculture

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Abstract: Agricultural extension is a public service for human resource development (HRD) in the agricultural sector. Multiple studies in Iran showed that, although extension services has played a positive role in agricultural development of Iran, but there are difficulties, barriers, misunderstandings, and weaknesses in the transfer of new technology and information to farmers. Lacking the suitable linkage between extension and research organizations has been a barrier for transfer of appropriate new technology to farmers. This problem exists in water sector of agriculture. The major consumer of water in Iran is the agriculture sector. Identifying suitable extension mechanisms have important role to developing extension system. Therefore, identifying extension mechanisms for supporting sustainable water resources management in agriculture of Iran is the one of the major approaches needs to be carefully thought and accurately implemented for the extension system development. [Ahmad Reza Ommani. **Agricultural Extension and Sustainable Water Resources Management in Agriculture**. Journal of American Science 2011;7(5):106-112]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Water, Extension mechanisms, Agriculture sector

1. Challenges for Sustainable Agriculture

During the past fifty years, agricultural development policies have been remarkably successful at emphasizing external inputs as the means to increase food production. This has led to growth in global consumption of pesticides, inorganic fertilizer, animal feedstuffs, and tractors and other machinery (Ommani and Chizari, 2002). These external inputs have, however, substituted for natural processes and resource, rendering them less powerful. Pesticides have replaced biological, cultural, and mechanical methods for controlling pests, weeds, and diseases; inorganic fertilizers have substituted for livestock manures, composts, and nitrogen-fixing crops; information for management decision comes from input suppliers, researchers and extensionists rather than from local sources and fossil fuels have substituted for locally generated energy sources (Roling and Pretty, 1997).

The basic challenge for sustainable agriculture is to make better use of these internal resources. This can be done by minimizing the external inputs used, by regenerating internal resource more effectively, or by combinations of both (Ommani and Chizari, 2007).

According to various studies, the agri-food sector in Iran has not yet shown any significant development during the last decades. Despite the advancement of infrastructural services made available to rural people over the past 20 years, they still, however unfortunately, live in unequal social and cultural environments. In the third decade of rural development in, Iran, this problem will reveal

itself as societal demands which naturally bring about social challenges in future (Safaei, 1999). The most important challenges may fall in the following categories: Inadequate resource management for production and insisting degradation of soil or water resources and the associated ecological consequences and inadequate job opportunities (Safaei, 1999). Nevertheless, there is various evidence that agriculture is still far behind the real potential of the country considering its available resource. On the other hand, sustainable land and water use has not yet been reached in Iran (Darvishi, 2003).

Karshenas (1994) contended that the difficulties within Iranian agriculture have resulted from inefficient resources management by actors within the sector, rather than by a squeeze of natural resources in agriculture. Hence, more consideration to human resources in the agricultural sector is essential. Since farmers and land and water users are the primary active human resources in the agricultural sector, increasing their competence is of necessity to improve the efficiency and productivity of farming. Today more consideration to human resources in the agricultural sector becoming increasingly important because of the competitiveness within the sector. Based on the research of Karami and Rezaei-Moghaddam (1998), both socio-economic characteristics and environmental conditions of the farm have increased the poverty of Iranian farmers. They suggest that smallholder farmers with under-developed socio-economic and environmental conditions are relatively

poorer. They concluded that poverty is a major reason for unsustainable agriculture. Lack of sufficient farm management competencies effectuate higher soil erosion, over-fertilization, inadequate application of manure, lack of fallow, overgrazing, burning of crop residue, and over-use of pesticides.

In addition, Chizari, Lindner and Lashkarara (2001, p.65) reported that:

"Major barriers hampering adoption of sustainable agriculture practices included: limited financial returns for farmers, limited farmer knowledge of sustainable agriculture principles and methods, low levels of farmer education, government rules and regulations, problems with soil erosion and lack of water, and a low level of extension agent knowledge with respect to sustainable agriculture."

2. Challenges for Water and Soil Resources

Water pollution and destruction of natural resources is one of the serious problems faced by the people in Iran. Rapid population growth, industrialization and urbanization in the country are adversely affecting the environment. Though the relationship is complex, population size and growth tend to expand and accelerate these human impacts on the environment (Razavi, 2001)

Direct impacts of agricultural development on the environment arise from farming activities, which contribute to water pollution (Ommani and Noorivandi, 2003). Usage of chemical material in agricultural practices has main impacted on water resource pollution. Seepage of pollution waters that produce by agricultural practices. Karshenas (1994) claimed that the difficulties within Iranian agriculture were caused by the mismanagement of human resources and by actors within the agricultural sector, and not because of shortages of natural resources in agriculture. Main method that use for plow of lands in farms of Iran is traditional plowing. Traditional plowing cuts down and overturns up to 8" of soil. The coulter disks on traditional plows are straight disks. This way has vital affected on erosion of soil and water.

Direct impacts of agricultural development on the environment arise from farming activities, which contribute to soil erosion, land salinization and loss of nutrients (Abtahi, 2006). In Iran, like other developing countries, soil erosion is one of the most important factor that affect on agricultural productivity. The content of annual soil erosion in Iran is estimated 2.5 billion ton. This amount is equivalent with 8 percent of soil erosion at world scale (Najafi, 2005).

Nevertheless, there is a variety of evidence that agriculture in Iran still lags far behind what it could potentially achieve considering the available resource

in the country. For instance, research reveals that more than 50% of the total available land, water, and natural resource have not yet been used in agriculture and only 37% of all cultivable land and 58% of all acquirable water, have been utilized (Tahmasebi, 1998). On the other hand, sustainable land use has not yet been achieved in Iran.

Another direct impact of agricultural development on the environment arises from farming activities, which contribute to water pollution (Ommani and Noorivandi, 2003). Usage of chemical material in agricultural practices has main impacted on water resource pollution. Seepage of pollution waters that produce by agricultural practices is main factor to pollution of suberranean water resource.

Agriculture, as the single largest user of freshwater on a global basis and as a major cause of degradation of surface and groundwater resource through erosion and chemical runoff, has cause to be concerned about the global implications of water quality. The associated agrofood-processing industry is also a significant source of organic pollution in most countries. Aquaculture is now recognized as a major problem in freshwater, estuarine and coastal environments, leading to eutrophication and ecosystem damage. The principal environmental and public health dimensions of the global freshwater quality problem are highlighted below (Ongley, 1996):

- Five million people die annually from water-borne diseases.
- Ecosystem dysfunction and loss of biodiversity.
- Contamination of marine ecosystems from land-based activities.
- Contamination of groundwater resource.
- Global contamination by persistent organic pollutants.

In addition to problems of waterlogging, desertification, salinization, erosion, etc., that affect irrigated areas; the problem of downstream degradation of water quality by salts, agrochemicals and toxic leachates is a serious environmental problem. "It is of relatively recent recognition that salinization of water resource is a major and widespread phenomenon of possibly even greater concern to the sustainability of irrigation than is that of the salinization of soils. Indeed, only in the past few years has it become apparent that trace toxic constituents, such as Se, Mo and As in agricultural drainage waters may cause pollution problems that threaten the continuation of irrigation in some projects" (Rhoades, 1993).

3. Enhancing Water Conservation

FAO (2003, p. 21) claimed that the regional water demand management strategy would be based on the following domains:

- Generalization of modern and improved irrigation methods in replacement of the currently prevailing conventional, low-efficiency methods;
- Promotion of water recycling and use of non conventional water resource such as treated wastewater and other low-quality waters;
- Mobilization of the water resource still available, through infrastructure and water harvesting techniques, with due consideration to the environment;
- Adoption of irrigation water pricing to recover at least operation and maintenance costs of irrigation schemes and to enhance water conservation and higher productivity;
- Review of water-related policies with a major focus on water scarcity and drought preparedness and mitigation;
- Establishment and adoption of water regulatory frameworks and review of existing ones to introduce measures and incentives for water savings and to grantee transferable water rights;
- Irrigated crop diversification, promoting high value and water-stress tolerant crops;
- Regional cooperation on the above aspects to create synergy from investments and promote exchange of experience between countries of the region.

The problems of water scarcity, groundwater depletion, pollution, water logging and salinity are symptoms of a much deeper problem embedded in policy, institutional and market failures for the development and management of water resource in the Iran. Policy failure is attributed to low cost recovery used in producing a commodity (FAO, 2003). The institutional failure is due to lack of well-defined property rights, improper regulatory frameworks and open access that encourage depletion of natural resource such as groundwater for which the user does not pay the cost. Finally, market failure refers to the existence of natural monopoly and other external cost placed on agriculture and water sector.

4. Role of Extension Education in Sustainable Water resources management (SWRM) in Agriculture:

Environmental Education

More than half of the world's population, and more than 70 percent of the world's poor are to be found in rural areas where hunger, literacy and low school achievement are common. Education for a large number of people in rural areas is crucial for achieving sustainable development. Poverty education strategies are now placing emphasis on rural development that encompasses all those who live in rural areas. Such strategies need to address the provision of education for the many target groups: children, youth, and adults, giving priority to gender imbalances. This complex and urgent challenge should be addressed systematically, through an intricate set of policy measures, at all levels of education systems (UNESCO, 2002).

There are five key interrelated dimensions of the relationship between access to good agricultural water, socioeconomic uplifting in rural communities, and poverty reduction. The dimensions are production, income/consumption, employment, vulnerability/food security, and overall welfare (Hussain et al, 2004). In general, access to good irrigation allows poor people to increase their production and income, and enhances opportunities to diversify their income base, reducing vulnerability caused by the seasonality of agricultural production as well as external shocks. Thus, access to good irrigation has the potential to contribute to poverty reduction and the movement of people from ill-being to well-being. While there is an enormous literature on the impact of irrigation on poverty reducing intermediate variables, particularly from South Asia, no review is made here. Rather, recent case studies are presented to identify the conditions under which access to agricultural water can have significant poverty-reducing impacts. Before reviewing the case studies, it is useful to have a conceptual framework for considering the potential impacts agricultural water can have on various segments of the rural population (Hussain et al, 2004).

The world as we know it has a number of immense, human related problems and all the predictions are that these problems will get worse unless we act globally (Inman and Rogers, 2007). Education is one powerful way in which we can affect change for a different kind of world (Benn, 1999).

Extension Education and Sustainable Water Resources Management (SWRM)

The great challenge for the coming decades will be to increase food production with less water, particularly in countries with limited water and land resource. The effective and sustainable use of water for agriculture has become a global priority of vital importance, requiring urgent and immediate solutions in view of intensifying competition (Ommani and Chizari, 2006). Based of multiple researches training and education are a key input, and requirement, of sustainable development (Loucks, 2000; UNESCO, 2002; FAO, 2003).

The problem is not new and much research and investments have been made to develop more refined techniques and practices to apply water accurately to the crop according their requirements. There still exists a large gap between the availability of technologies for effective water use and the adoption of these technologies. One of the reasons is that relatively little attention is paid to establish an effective support system to assist farmers in the adoption and properly operation of new techniques and technologies.

Extension services can play an importantly role in assisting users to adopt new techniques and technologies for more efficient water use and increased production. Such services can be provided by private, public or co-operative agencies. Increasingly commercial agencies can take over the traditional role of the public agencies, although often restricted to the more lucrative parts of irrigation sector. Critical in the promotion of irrigation advisory services is the financial sustainability of such institutes, as in particular in many developing countries inadequate funding is available to finance public services (Smith and Munoz, 2002).

Sivayoganathan and Mowjood (2003) at their research with title "role of extension in irrigation water management in Sri Lanka" highlights the dynamic role of extension in effective irrigation water management by farmers engaged in both surface as well as groundwater irrigation. Irrigation water management to be effective should meet the perceived needs of the three major stakeholders namely the farmers, the system operators and the policy makers. The recent trend is the transfer of irrigation system management from the government agencies to the farmer organizations. The farmer organizations should, therefore, be strengthened by training and by the provision of necessary legal, economic and social supports so that they could play an effective role in motivating farmers to become partners rather than mere participants in irrigation water management. On-farm water management technologies for effective water use should be demonstrated to farmers and they should be encouraged to adopt the same. The village level officers from both government and non-government agencies engaged in advising farmers in irrigated agriculture should be trained periodically so that they could perform their role effectively leading to greater agricultural productivity.

Powell (1977) claimed that the contributions, which an agricultural extension service can make to improve water management at the farm level, are very essential. To be able to influence farmers in developing countries it is essential to devise systems in which relatively unskilled extension staff can communicate to the large numbers of small-scale farmers. Patterns of crop-rotation must be simple and will frequently be constrained by subsistence requirements. To establish the type of technical advice needed and communications systems to support this advice it is necessary to identify the stage of development, the aptitude and innovativeness of the farmers involved in the project.

Extension activities based on the survey information were effective in creating awareness, but did not result in widespread change (Armstrong, 2000). Also, development options that have the potential to increase whole farm profit will invariably consider the potential to increase water use efficiency (WUE). At this regard, extension approaches are very important (Armstrong, 2000).

Smith (2005) pointed out, that through a participatory approach in extension, technical staff and other stakeholders put farmers in charge of water management at field and scheme level, promote the adoption of appropriate technologies and establish the necessary local capacity to put farmers in charge of water development and management. Participatory Training and Extension (PT&E) has proved to be an effective tool for this and to establish the appropriate support structure to assist and advise farmers in irrigation development and management. PT&E is in particular useful for small holder irrigation and in the case of irrigation management transfer programs.

Bruening and Martin (1992) at their research with title "farmer perceptions of soil and water conservation issues: implications to agricultural and extension education" claimed that the following conclusions were drawn from the findings of the study;

- Groundwater and water quality issues seem to be of greater concern to farmers than soil conservation issues.
- Field demonstrations and county meetings are useful techniques to use when presenting information about soil and water conservation issues.
- Farmers explain governmental agencies such as Soil Conservation Service, County Extension Service and state university specialists as the most useful sources of information regarding soil and water conservation issues.
- Farmers believe improved communications and education are needed to ensure proper management of chemicals used in agriculture (p. 53).

Andrzej (2006) presented direct relation between water management and farmer's education. Also, Molden (2007) stated, that investments are required to build knowledge and to reform and develop institutions. Education, research, capacity building,

and awareness raising are stepping stones toward better sustainable water management in agriculture. A new cadre of policymakers, managers, and extension providers is needed, with staff trained to understand and support producers in water management investments in farms and communities. But investments are not enough.

Molden (2007) claimed that, improving sustainable water management in agriculture requires learning by doing and a flexible, adaptive approach. Adaptive management is appropriate for variable resource in a context of continually fluctuating parameters. Adaptive management incorporates an understanding of the variability within systems, as well as long-term and slow-onset changes. It allows for management practices to be responsive to these variations, some of which can be rapid (Molden, 2007).

Loucks (2000) pointed out , that a "key to sustainable water resources management is the existence of sufficiently well trained personnel in all of the disciplines needed in the planning, development, and management processes"(p. 7). In regions where such a capacity is needed but does not exist, it should be developed. Training and education are a very important input of sustainable development. Capacity building is one of the most essential and important long-term conditions required for sustainable development. Sustainable systems development and evolution cannot be achieved without local expertise, an expertise that needs to be developed and to be transferred to each succeeding generation of professionals (Loucks, 2000).

Another important factor in sustainable water resources management is that the local people must not only be capable, but must also be willing to assume the responsibility for their water resource systems (Loucks, 2000). One of the drawbacks of a centralized dominating government that takes the responsibility for local system design and operation is that the local people become accustomed to looking to government for help, rather than to looking to themselves. The ideal local water resource managers are well-trained persons who know the behavior of that system, have experience with its floods and its droughts, and know the concerns and customs of the people of the region, a group to which they belong (Loucks, 2000).

In the late 1980s, it was realized that most technologies developed by researches alone were inappropriate for smallholder farmers (FAO, 2001). Farmer participatory research became the approach to adapt technologies to farmers' conditions and by the 1990s, to develop technologies together with farmers. Farmers were now seen as partners in research and extension, and the key players in the innovation process (Anyaegbunam, Mefalopulos and Moetsabi, 2004). The understanding that the main key to agricultural development is to enhance the farmers' management and problem solving capacity and the farmers' capacities to develop, modify and diffuse new technologies and techniques themselves from farmer to farmer led to the development of Participatory Extension (FAO, 2001).

FAO (2001) also claimed that for successful and sustainable introduction, use and improvement of water control techniques and technologies farmers should be encouraged to analyze their problems, search for solutions, monitor and evaluate the selected and implemented techniques and technologies, and adjust them according to their constraints and opportunities. Participatory Training and Extension in Farmers' Water Management (PT&E-FWM) aims to ensure a sustained support to farmers in this process (Kay, 2002).

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The Speed of light
A Fundamental Retrospection to Prospection

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Abstract: Speed of light can not be achieved independently by any Body even a Photon, unless it has a source, a thrust of that speed. Further, no amount of radiation or light form can be produced *freely*, unless some amount of (mass) rest energy is converted to dynamic liberated energy. With the investigation of above query and retrospection in mass- energy relation, a paradigm shift in understanding fundamental nature of Energy and Universe is presented. [Narendra Katkar. **The Speed of light - A Fundamental Retrospection to Prospection.** Journal of American Science 2011;7(5):113-127]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Light Speed, photon, electron positron interaction, Energy, Universe

Introduction

Physics is a natural science and attempts to present general analysis of nature; carried out with the purpose to understand how the universe works. (Feynman, Leighton, Sands (1963), Maxwell (1878), Young, Freedman (2004), Holzner (2006).

Philosophy of physics is the examination of the fundamental aspects of physical world and philosophical questions are primary in modern physics, with it the understanding of matter and energy and their interactions. (Bohr, (1958), Penrose (2004), Butterfield, and Earman, (2007), Craig, and Nick, (2001), Deutsch, (1997), d'Espagnat, (1989, 1995, 2006), Bohm, (1980), , Lawrence, (1992), Stenger, (2000), Weizsäcker, (1980), Rosenberg, (2006), Godfrey-Smith (2003), Godfrey-Smith (2003).

Many physicists, Laplace, Erwin Schrödinger, Roger Penrose, Stephen Hawking, have expressed ideas concerning the philosophical inferences of their work, Hawking calls himself as an "unashamed reductionist" and discusses the subject with Penrose's views. (Laplace, (1951), Schrödinger, (1983, 1995), Hawking and Penrose (1996), Penrose, (2004), Penrose, Shimony, Cartwright, Hawking (1997).

After foundation of Quantum Mechanics, mathematical formulations has been of ever increasing applications in theoretical work and now accepted as Mathematical physics. (Geroch, (1985), Szekeres, (2004), Yndurain, (2006), Aslam, Hussain, (2007). Although, it was much earlier articulated, that mathematics does not thoroughly describe the nature of Reality.

Albert Einstein, *"as far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality."* See note.

The scientific community has responsibility to communicate to citizens of the world and the governments, the exact nature of fundamental features of their work and must enlighten all, of any uncertainty about cognizance of the phenomenon.

The following article of fundamental physics is an attempt to communicate to specialists, students, experts of other fields, governments and the citizens, the basic aspects of Energy and Universe, in an unambiguous language.

The Speed of light

"... *The most accurate standard for the meter is conveniently defined so that there are exactly 299,792,458 of them to the distance travelled by light in a standard second...***"** (Penrose, R. 2004, pp 410–1).

This is approximately 186,282 miles or 299792.458 km per second in vacuum.

Speed of light had historical investigations, which are the basis of scientific endeavors of individuals, concerning one of the most influential branches of physics, the light. (Galilei, G (1954) [1638], Rømer, O (1676), Newton, I (1704), Halley, E (1694), Fizeau, HL (1849), Foucault, JL (1862), Michelson, AA (1878), Newcomb, S (1886), Perrotin, J (1900), Michelson, AA; Pease, FG; Pearson, F (1935), Froome, KD (1958), Brillouin, L (1960), Evenson, KM; *et al.* (1972), Jackson, JD (1975).

Finally, the velocity of light in meters was determined by International Bureau of Weights and Measures (2006).

The question, never asked, is, *"How the light achieves such a speed? What is the source of that speed?"*

Einstein illustrated the equivalence of mass and energy. (Einstein, 1923, [1919] 1982). According to Einstein's equation $E = mc^2$, the energy E of a body is quantitatively equal to the product of its mass m and the speed of light c squared, or all mass has energy equal to its energy content. We might simply say all Mass is Energy. Or again, in relativity, rest mass is proportional to a body's rest energy, E=m, meaning the rest mass is the energy in the rest frame**.** (Flores, F. 2005).

The general illustration of Einstein's equation is in the interaction of sub-atomic particles. When an electron interacts with a positron, both particles are entirely annihilated; in reality, their mass is converted into a pair of gamma ray photons (Dirac, 1928, 1930, 1931).

This conversion of mass of electron e^- and positron e^+ into two photons is emblematically written as:

$$e^- + e^+ \rightarrow \gamma + \gamma$$
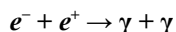
The overall energy of the two photons is equal to the amount of the (theoretical) kinetic energies of the electron and positron in addition the sum of the rest-masses of the two particles, multiplied by c^2. This raises many questions.

c^2 is a quantity, can be calculated in joules. c^2 = (299,792,458 m/s)2 = 89,875,517,873,681,764 J/kg ($\approx$9.0 × 1016 joules per kilogram).

"C" is also a symbol for light speed, which is 299792.458 km per second in vacuum. When this quantity is applied to "mass", it becomes messy.

Historically, many thinkers were involved in conceptualizing the mass – energy relation; S.Tolver Preston in 1875 gave Eα Δ mc2, (Preston, 1875), Poincarè in 1900 said mv = (E/c2)c, Poincaré, H. (1900), **Olinto** De Pretto who speculated E=mc2 in 1903-1904 (Pretto, 1904; Bartocci, 1999), Fritz Hasenöhrl in 1904 m= 4E/3c2 (Hasenöhrl, F. (1904), Einstein in 1905, 1923, Δm=L/c2 (Einstein in 1905, 1923), Planck, M, 1907. m-M = E/c2 in which the mass increased by absorbing heat (Planck, 1907, 1908), finally, the equation E = Mc**2** remained in Einstein's name.

Above interaction $e^- + e^+ \rightarrow \gamma$ $+ \gamma$ is instantaneous. The interacting particles have no net linear momentum before the interaction. This interaction achieves velocity "c" by self inter-acceleration, equal to c in a Planck time, symbolized as *tp,* which is $10^{-44.}$ Sec. (Plank Time: 2005) and the emitted photons have the speed of light.

Paul Dirac, theorizing electron-positron annihilation said, *"Such process is spontaneous, i.e. it occurs necessarily for any pair of electron and positron independently of their energy. The process does not need any previously existing radiation."* (Dirac, 1930, Heitler, 1954).

If there is no previously existing radiation and no net linear momentum with the pair electron-positron, then what is the real rest energy of electron and positron without association of kinetic energy?

"S*pontaneous*" because of particle's intrinsic attributes which are of opposite nature. Once the particles come in contact, there is nothing to hold back, neither any acceleration required.

In fact, this is an inverse interaction of negation of quantum attributes. Particles negate their charge, magnetic moment and angular momentum devoid of kinetic energy. The canceling of quantum attributes leads to the conversion of rest energy into active liberated Energy.

The Planck time, *tp* is$10^{-44.}$ Sec, where light travels in a vacuum at a distance of 1 Planck Length *lp*, which equal to 1.616252(81) ×10^{-35} meters. Classical electron radius is r_e = .817 940 2894 x 10^{-15} m. The negation interaction of above particles has same radius each, the cancellation of the same occurs in a Plank time, *tp,* in Dirac's expression, "*spontaneous*"**.**

Application of the Plank time was also conceptualized by Stephen Hawking (1974-1975)**,** who hypothesized the Evaporating Black Holes by particle pair annihilation.

c^2 is an imaginary quantity and has nothing to do with velocity in practical term, neither the quantity is exact, when applied with assumptions of mass increase. The real energy liberated from a mass is always equal to its natural energy content at rest.

$E = mc^2$ suppose to give estimation of energy out put. Example one gram of mass will generate energy out put equal to 21kt of TNT. This is based on calculation: **c^2 = (299,792,458 m/s)^2 = 89,875,517,873,681,764 J/kg ($\approx$9.0 × 10^{16} joules per kilogram).**

Is c^2 a conversion factor? This has gone terribly wrong.

The physicist at the Manhattan Project participant Serber, Robert, (1992) said: *"Somehow the popular notion took hold long ago that Einstein's theory of relativity, in particular his famous equation $E = mc^2$ plays some essential role in the theory of fission… but his theory of relativity is not required in discussing fission. The theory of fission is what physicists call a non-relativistic theory, meaning that relativistic effects are too small to affect the dynamics of the fission process significantly."*(See also Note: Conversions used)

SLAC: *"Look at an example of how this energy unit works. The rest mass of an electron is 9.11 x 10⁻³¹ kg. Using E = mc2 and a calculator we get:*

E = 9.11 x 10⁻³¹kg x (3 x 108 m/s)2 = 8.199 x 10⁻¹4 joules, convert the joules to electron volts. This gives the mass of an electron as 0.511 MeV (about half a million eV). So if you ask a high energy physicist what the mass of an electron is, you'll be told the answer in units of energy. You can blame Einstein for that!" (Special Relativity: SLAC).

This is not science.

Laboratory produced Positron was having only 85 eV kinetic energy and detected electron–positron pairs from a surface on which the low energy positron beam was impacted, confirmed energies of pair particle Ee+ + Ee−, in the range of 30 to 90 eV only. (Van Riessen et al. 2008)

Above induced positron and produced pair are not at rest.

A Laboratory produced Positron can have an energy of just 85 eV and by multiplying with the uncertain factor "c2", the rest energy of same particle, without linear momentum, suppose to be 511 keV. Indeed, this is a clear case of incongruity. Fundamentally, what are we calculating?

We neither have real rest energy of an Electron or Positron, nor do we have the particle at the speed of light to measure its total energy.

Extraordinary conclusion was drawn on the basis of the energy of motion W of an electron by Einstein, with equation:

$$\mathbf{W} = \int \epsilon \mathbf{X}\,dx = m\int_0^v \beta^3 v\,dv$$
$$= mc^2\left\{\frac{1}{\sqrt{1-v^2/c^2}} - 1\right\}.$$

Einstein said: *"Thus, when v = c, W becomes infinite. Velocities greater than that of light have--as in our previous results--no possibility of existence. This expression for the kinetic energy must also, by virtue of the argument stated above, apply to ponderable masses as well."* (Einstein, 1905).

The fallacy is mass approaches infinity as the velocity v approaches the speed of light c. In other words, it will require infinite energy to move a body at the speed of light c. (Okun, 2009).

We use special relativity with the misconstrued idea of mass increase, which gives numerical value drawn from c2 quantity to measure a particle mass, because it is impossible to evaluate mass of an immobile electron, so the measurements are carried out on electrons in motion or for that matter, all measurements on all particles are carried out with the same method of erroneously conceived relativistic mass.

The values of Planck constant, the fine structure constant and the Rydberg constant are applied to calculate the electron rest mass in kilograms (Mohr, et al. 2008).

As early as in 1938, the experiments conducted on electron deflection by magnetic and electric application, confirmed no significant distinction in mass. (Zahn and Spees, 1938)

Mass of Electron does not increase with velocity.

This implies that if mass does not increase as the velocity v approaches the speed of light c, then very fundamental basis of *'kinetic energy'* is also questionable.

Foundations of the concept of kinetic energy established by Gottfried Leibniz and Johann Bernoulli, who described kinetic energy as the living force, vis viva. Willem's Gravesande of the Netherlands provided experimental evidence of this relationship (Zinsser 2007). Gaspard-Gustave Coriolis, in 1829published the paper titled Du Calcul de l'Effet des Machines, resented the mathematics of kinetic energy. William Thomson, later Lord Kelvin, is given the credit for coining the term "kinetic energy" c. 1849 - 1851. (Smith and Wise. 1989, Merz 1912).

According to Newtonian kinetic energy in classical mechanics, the kinetic energy of an object is related to its momentum by the equation:

$$E_k = \frac{p^2}{2m}$$

Relativistic kinetic energy, according to Einstein's theory, when a body's speed is a significant fraction of the speed of light, the calculation of its kinetic energy is given by:

$$p = \frac{mv}{\sqrt{1-(v/c)^2}}.$$

And the effort exhausted accelerating an object from rest to a relativistic speed is:

$$E_k = \frac{mc^2}{\sqrt{1-(v/c)^2}} - mc^2.$$

This equation shows that the energy of a body come close to infinity as the velocity *v* approaches the speed of light *c*.

A particle of mass **m** traveling at speed *v* has kinetic energy is: $E_k = \frac{1}{2}mv^2$.

The objects comprising many particles, the kinetic energy is the sum of the kinetic energies of the particles of the compound system.

The pertinent question is, "Is there, in real terms, a quantity called Kinetic energy?" Or is it only a *transfer of velocity* by exhaustion or dispersal of energy in surrounding by the system in momentum?

The measure of a unit of momentum, in high-energy physics, in electron-volt is regularly used. A potential difference of one Volt causes an electron to put on a separate quantity of energy, kinetic, which is one eV.

In other words, the electron volt is a unit of energy equal to roughly $1.602 \times 10^{-}19$ Joule, which is equal to the amount of kinetic energy suppose to gain by a single released electron accelerated through an electric potential difference of one volt.

This misconstrued rise of energy is applied in terms as eV, keV, MeV, GeV, TeV, and some day in future in PeVs, as units of momentum calculated as increase of energy resulting from acceleration of the particle.

It is extremely misleading with misrepresented theory of mass increase by calculating the (mass) unknown rest energy of a particle in momentum, multiplied by imaginary increase of energy (or mass) with the term "kinetic energy" and again multiplied by imaginary quantity c2.

In fact, the body with momentum is releasing energy called "kinetic energy".
An accelerated quantum is radiating, there by dissipating its rest energy.

A body of about 102 grams, moving one meter releases 1 joule of energy.

Even human body at rest releases 1 joule of energy in a hundredth of a second in the form of heat.

A 50 kg mass moving at 720 meters per hour emits 1 joule of energy.

A tennis ball moving at 23 km/h also releases 1 joule of energy. (Ristinen & Kraushaar 2006).

Hence the term: **m = E/c2**

This also means:
Heavier elements become lighter by conversion of partial rest energy to radiation.

Retrospection:

Poincaré observed that the action/reaction theory applies for matter and the electromagnetic field, which has its own momentum. He called this, electromagnetic field energy a fictitious fluid ("fluide fictif") with a mass density of **E / c² (m = E/c²)**. Einstein's showed that a body losing energy as radiation or heat was losing a mass of the amount **m = E / c².** (Poincaré, 1906, Darrigol, 2005).

In his famous 1905 paper '*DOES THE INERTIA OF A BODY DEPEND UPON ITS ENERGY-CONTENT?*'

Einstein said: **"If a body gives off the energy L in the form of radiation, its mass diminishes by L/c². The fact that the energy withdrawn from the body becomes energy of radiation evidently makes no difference, so that we are led to the more general conclusion that. The mass of a body is a measure of its energy-content…"**

Now known as **m = E/c²**

Hindsight, in above equation, emitted energy E is mass m. Whatever the amount of energy E is, it is, indeed converted form of mass.

The speed of light

Above equation, **m = E/c²,** the emitted energy E is in fact the converted E, can be a photon and photon is having the velocity **c** and has the source, the **mass**. Hence, the energy of photon is equal to energy of converted mass; so also, the velocity of photon is achieved at the source, i.e. **at the moment of conversion of mass into energy.**

Therefore, E = mc, with it m = E/Eo, means without total rest energy Eo at velocity c and velocity c = E/m is the converted state, in first and last expression c is a **conversion factor, not a numerical multiplication factor.**

The quantity of E depends on energy content of transformed rest energy.

The "c2" factor is redundant and must be eradicated from all applications.

E = Mc
M at the speed of light **c** is Energy **E.**
The "c" is not a numerical factor. It is felicitator of conversion.
Consequently, each (mass) energy packet can be converted to electromagnetic energy at the speed of light.

Application of algebraic symbols and numerical values are completely misleading. There are umpteen numbers of possibilities of energy emission of multiple frequencies, correspondingly large number of opposite fractional charge emissions.

This is elucidated in later sections.

If correctly understood, in above described negation interaction, the total mass of e^- and e^+ is converted into energy when the interaction reaches velocity of light. Otherwise the total (mass) energy content should never be converted into gamma ray photons and the photons should never have the velocity **c.**

Hence the equation, for the above convergence must be:

$$(e^- \leftrightarrow e^+)\, c = 2\gamma$$

The symbol "$\leftrightarrow$" here used for interaction and charge attraction.

In electron-positron interaction, their mutual attractive force, created by opposite charges, is so strong that the spin-spin fission of the intrinsic angular momentum of both particles is accelerated to maximum, a ***self-acceleration*** in the point of contact. This is one of the most violent interactions in Universe, where the collective interactive momentum attains, extraordinary as it may sound, instantly, the speed of light.

Photon is a product, hence, like all products; the carried attributes are acquired from the source. In case of energy of gamma ray photon, it is acquired from e- and e+ interaction, the energy acquired is equal to energy of a single particle, which is 0.511 MeV (given by questionable c2 factor), (Mohr, 2008) and total energy of both particles is 1.022 MeV. The spin angular momentum is also converted from spin **½** of electron positron to spin 1of photons. In other words the net angular momentum is conserved.

Accordingly, the Speed of light is also acquired at the point of conversion, which is from sum total of angular and attractive force momentum acceleration of inverse negation.

$$(e^- \leftrightarrow e^+)\, c = 2\gamma$$

Above conversion declares:
At the velocity c, the mass does not increase to infinity. It transforms into radiation.

In retrospection, the photon is not carrying the equal charge and magnetic moment of the (mass) rest energy, which is transformed into radiation Energy. It does have electromagnetic field.

Differing to such event, by total deceleration of canceling intrinsic attribute, the phenomenon collapses in non quantum state, called *"Vacuum State"*.

Ultimate Point of integral deactivation is by total dissolution of intrinsic angular momentum. This is Absolute Conversion of quantum to non quantum state, in other words, finite to infinite state of Energy.

The idea above is extrapolated in last section.

Retrospection continued:

Einstein often had recollections of the implications of special relativity and made statement, "inert mass is simply latent energy." and did not mention relativistic mass. (Einstein, 1956). Einstein derived E=mc2 with some ambiguity that "E is the energy contained in a stationary body." (Einstein, 1976).

The idea of relativistic mass got stuck in text books, with experts, students and public as E=mc2, though the meaning of that equation was messed-up.

Einstein in his May 1921 lectures at Princeton, said that "Eo = mc2 and with c set equal to one, the energy, Eo, of a body at rest equals its mass." (The Collected Papers of Albert Einstein, 2002; Einstein, 1922).

"…many textbooks and articles credit him with the relation E=mc2, where E is the total energy, m is the relativistic mass, and c is the vacuum speed of light. Einstein never derived this relation, at least not with that understanding of the meaning of its terms." (Hecht, 2009).

Many thinkers have tried to clarify the fallacy of E = Mc2. Yet, the misconception is still clinging with experts and public. (Okun, 1989; Rindler, 1990; .Vandyck, 1990; Kolb, 1966; Adler, 1987; Aubrecht II, 2004; Easton, 1988; Hobson, 2005; Carson, 1998; Warren, 1976; Atkin, 2000).

"…modern representations of relativity, it is urged, once again, that the use of the concept at all levels be abandoned." (Oas, 2005).

In physics, the Lorentz force is the force on a point charge due to electromagnetic fields. Maxwell provided the equation for the Lorentz force in relation to electric currents. (Huray 2009)

The modern Maxwell's equations explain how electrically charged particles and objects give rise to electric and magnetic fields and the Lorentz force law summarizes above explanation by describing the force acting on a moving point charge in the presence of electromagnetic fields.

Maxwell's equations, *"together with the Lorentz force law...summarize the entire theoretical content of classical electrodynamics".* (Jackson, 1999 and Griffiths, 1999).

In electrodynamics, the Larmor formula (Larmor 1897, Jackson 1998) calculates the total of radiation by a nonrelativistic point charge as it accelerates. Any charged particle (an electron), accelerating or decelerating radiates away energy in the form of electromagnetic waves.

Bremsstrahlung also refers to radiation due to the acceleration of a charged particle. (Griffiths 1999, Haug & Nakel 2004).

Yet another aspect of motion of electron, conceived by Erwin Schrödinger in 1930, called *"Zitterbewegung"* as a result of interference between positive-negative energy wave constituents. This interference between positive and negative energy states generate a fluctuation, surprisingly at the speed of light, at the location of an electron around the nucleus, giving a circular frequency of 2mc2 / hbar, which is around 1.6×10^{21} Hz.

All above concepts illustrate that all forms of (mass) rest energy radiate, either by acceleration or interaction, even at ground state.

Accelerated charge must radiate, there by losing its rest energy through radiation.

An alpha α hits an atom or other high-speed radiating charged particles knock off electrons out of atoms and release large number of accelerated electrons called δ delta rays. The term was used earlier by J.J. Thomson. With these of positive charge δ delta rays are also emitted. Electron and positive charge interact and convert to radiation, that scatters in water and the blue light is seen. The case of Cerenkov radiation, velocity higher than the speed of light is misconstrued and not compelling.

During Radioactive decay process, as in case of internal conversion is defined as $\alpha = e / \gamma$ where e is the rate of conversion electrons and γ is the rate of gamma-ray emission. Example, the nucleus of 125I, 7% of the decays emits energy as a gamma ray, while 93% release energy as conversion electrons. Therefore, this excited state of 125I has an internal conversion coefficient of $\alpha = 13.6$.

It is assumed that a core electron is detached; creating a vacancy, an electron from a higher energy level falling into the vacancy, releases energy. This energy is released in the form of a photon, at the same time many photons knock-off other electrons, from the atoms. All radio active process is stochastic. This second evicted electron is called an Auger electron (IUPAC, 2006). Auger electrons also emitted when an electric field is produced within an atom's electron cloud on account of loss of another electron, which further creates acceleration and eject yet other electrons of the atoms orbital electrons.

In fact, there large electrons or negative charges emitted by radio activity and positive charges are also accompanied, released in opposite directions.

In particle accelerators electrons or other accelerated particles will lose their energy rapidly than other particles through Bremsstrahlung or simply, by radiating, which takes place not only during particles in flight but also in measuring devices like bubble chamber and other detection device materials like lead plates or walls, Freon gas or argon gas.

Has "Quantum electrodynamics" really solved the problem raised by Maxwell equation, i.e. accelerated charge must radiate? (Nahin, and Heaviside, [1861] 2002).

An experiment stimulated by using microwave techniques of radio-frequency transitions between 2S1 / 2 and 2P1 / 2 levels of hydrogen, in 1947 by Willis Lamb and Robert Retherford was performed to measure the interaction between the electron and the vacuum. The result showed the small shift in energy level is known as Lamb shift. This gave foundation for the contemporary QED theorized by Julian Schwinger, Richard Feynman, and Freeman Dyson. (Lamb et al. 1947)

The "Zitterbewegung" caused by interference between positive- and negative-energy waves components, also seen in stochastic electrodynamics that the Zitterbewegung is an interaction of a classical particle with the zero-point field. (Henning Genz 2002).

Zitterbewegung by another viewpoint also describes the Lamb shift, where the "Zitterbewegung" term disappears and the anticipated values for wave-packets which are of totally positive or negative energy waves, by applying a Foldy Wouthuysen transformation. (Foldy-Wouthuysen: website)

The fundamental aspect of QED is the description of light and matter interactions. QED is a mathematical theory which tries to describe all experience concerning electrically charged particle interactions by exchange of photons. (Feynman, 1985).

Richard P. Feynman, in his series of lectures on QED for public (Feynman, 1985) presented a classic non-mathematical exposition of QED.

The three basic actions relating central mechanisms of Feynman's presentation of QED are:

1: "A photon goes from one place and time to another place and time".
Yes, it does.

2: "An electron goes from one place and time to another place and time".
It may but under some conditions. .

3: "An electron emits or absorbs a photon at a certain place and time."
No, absolutely not.

The extraordinary effort to mathematically formalize the theory does not satisfy the required understanding of physical nature of phenomenon.

The mathematicians Henri Poincaré argued that the laws of science did not relate to the real world at all, but signify random conventions intended to support a supplementary suitable and "functional" depiction of the analogous phenomenon.

The unrelenting critic of QED was Dirac. Recently in 1975, he said,

"I must say that I am very dissatisfied with the situation, because this so-called 'good theory' does involve neglecting infinities which appear in its equations, neglecting them in an arbitrary way. This is just not sensible mathematics. Sensible mathematics involves neglecting a quantity when it is small – not neglecting it just because it is infinitely great and you do not want it!" (Kragh, 1990 p 184).

Feynman, even though had played significant role in the development of quantum electrodynamics, said in 1985:

"The shell game that we play ... is technically called 'renormalization'. But no matter how clever the word, it is still what I would call a dippy process! Having to resort to such hocus-pocus has prevented us from proving that the theory of quantum electrodynamics is mathematically self-consistent. It's surprising that the theory still hasn't been proved self-consistent one way or the other by now; I suspect that renormalization is not mathematically legitimate". (Feynman, 1990).

Close observation shows that:
There is no Electron around the Nucleus; therefore there is no possibility of some 'thing' called electron absorbing and emitting photon.

How does an atom emit radiation?

Vacuum-Zero Point Energy

Using Max Planck's formula (Planck, M. 1900), Albert Einstein and Otto Stern published a paper in 1913 (Einstein (1913), suggesting that an atomic system, an oscillator subsists a residual energy or vibrational energy at absolute zero equal to energy of $\frac{1}{2}h\nu$. They named this lingering energy as ***"Nullpunktenergie"*** in German, meaning zero-point energy. (Laidler, 2001).

This absolute zero is not a temperature less state; rather it was considered for ground state or the lowest energy state, also called *zero-point field*, (Gribbin,1998).

Since then, many attempts and interpretation of Zero point Energy (ZEP) have been reported. (Nernst, (1916).Marshall, (1963), Sakharov, (1968), Boyer, (1975), Boyer, (1980). Boyer, (1985), Haisch, et al. (1994), de la Pena, and Cetto, (1996). Rueda and Haisch (1998), Sciama, 1991), Haisch et al. (2001), Rueda and Haisch, (2005). de la Pena, and Cetto, (2005)**.**

The lowest possible energy, the energy at ground state of a quantum mechanical system is called Zero-point energy. All quantum mechanical systems go through fluctuations in ground state, which have associated zero-point energy, based on the Heisenberg uncertainty principle.

The uncertainty principle of all physical systems expects, even at absolute zero temperature, a zero-point energy that is greater than zero. Liquid helium-4 (4He) remains unstable liquid and does not freeze, at lowest laboratory temperature, because of its zero-point energy.

A molecule in atmosphere has energy of around 0.03 eV which corresponds to room temperature.

Therefore, fundamentally, there is no absolute inertia in physical world. All physical phenomenons are active and radiating.

To exist (physically) is to be active and thereby radiate.
Again, this means:
Heavier elements become lighter

At what moment, the becoming of lighter side is not known, yet it does.

We describe Energy with attributes and properties, hence finite aspects of Energy. We do not know, *what Energy is?*

A paradigm shift?

In reality, c is a finite speed; hence a mass requires same finite speed to travel at that velocity. Only difference is, at the speed of light, the mass, which is in fact a packaged energy, is transformed into dynamic liberated energy. "Packaged Energy" term is not to be confused with older term used by Plank for radiation quantum. In 1900, Max Planck working on radiation suggested that the energy in electromagnetic waves could be released in "packets" of energy; he called these packets "energy elements" (Planck, M. (1901).

More proper term would be "Quantized Energy" for each particle.

We can totally cancel the misnomer "***mass***" and also the imaginary quantity "***c^2***". All particles are ***Quantized Energy*** and atoms are composite packets. All dynamic energy, i.e. radiation, light, photons are released energy from these packets. Hence:

"*Everything essentially is Energy*"

Hence, the equation is:

$$E = E_0 c$$
Or
$$E_{rel} = E_0 c$$

Where, E_{rel} is, released converted energy, equal to the amount of rest energy, E_0 is quantized rest energy and c is speed of light. Again "c" here is a conversion factor, not quantitative multiplication factor. For the partial release of energy **E** would be:

$$E = E_{rel} / E_0$$
The actual rest energy E_0 is never known.

In fact, this is applicable as the second law of thermodynamics which describes the Entropy. That is a measure of the energy not accessible for practical work in a thermodynamic progression (Haddad, Chellaboina, VijaySekhar; Nersesov, 2005). In other words, as stated above, the released energy is lost and never returns to its original state, which was the quantized state.

The Planck constant was first described as the proportionality constant between the energy (E) of a photon and the frequency of its associated electromagnetic wave (ν)

The Planck constant $E = h\nu$ has the value $4.13566733(10) \times 10^{-15}$ eV.s.

In case of light quantum, Photon, supposed to be of zero mass, a calculation was made by testing Coulomb's law to very high precision. (Plimpton, Lawton, 1936), then unacceptable result of an experiment has given a maximum value of photon mass, $m \lesssim 10^{-14}$ eV/c2, (Williams et al.1971), now accepted value, based on galactic vector potential to measure the torque wielded on a magnetized ring (Lakes, 1998), gave an upper limit, reported by the Particle Data Group, is 1×10^{-18} eV/c2, (Amsler, 2008).

Considering this mass of photon as 10^{-18} eV to be real, then with the conversion factor c, this energy is the *released energy* of an electron and positron, each having rest energy equal to 10^{-18} eV or of $4.13566733(10) \times 10^{-15}$ eV These have to be the fractional charge particles, called quasielectron and quasipositron.

The quasiparticles based on a theory formulated by Robert Laughlin (Laughlin (1983) to explain the fractional quantum Hall Effect. Their charge can be of lesser amount than the electron charge e. Observed results are, as fractions of electron charges of e/3, e/4, e/5, and e/7 or one-third, one-fifth, one-seventh - or indeed, two-thirds, two-fifths or three-fifths etc. (Fractional charge, 1997), Stormer, 1999).

Consequently, these fractional charge quasiparticles must also have associated fractional mass of electron, a "*Nanomass*", nothing to do with the units of measure 10^{-9}. We should expect numerous odd denominators of these fractional masses (Lou, 2003), which in turn have fractional rest energy associated.

According to quantum mechanics, the wave equation, as developed by Schrödinger in 1926, allows us to determine a probability that an electron will be located at certain point when a measurement is made. The electron exists in a probability distribution or probability density, which appears to be rather fuzzy. This fuzziness is termed as "electron cloud." (Web: science.)

Atomic orbital is a mathematical function that describes the wave-like behavior of either one electron or a pair of electrons in an atom, (Milton et al. 2005) some times called "atmosphere" around nucleus of an

atom. If an extra electron is added to a single atom, the additional electron has a propensity to uniformly fill up a volume of space around the nucleus so that the resulting collection, termed as the atom's "*electron cloud* " (Feynman, 2006) likely to be in a general spherical region of probability relating where the atom's electrons will be found.

In fact, each point in the *"electron cloud"* contains the possibility, not only of an electron, but also of varied *"Quasielectrons"* each with fractional charge. It depends on what and how much induced impact is created, either atomic interaction or external injection, on the *"cloud",* whereby the separation of an electron or a quasielectron takes place.

The implication of quantum mechanics, as seen above is that the structure of atom is a nucleus with a "cloud" around. There is no way to determine the electron as a particle, its rest position and mass.

In fact there is "no electron" around the nucleus and an atom being a neutral phenomenon, consequently there "no charge" with the cloud and the nucleus.
The observed charge is a change of state, a transformation, including a positron.
A photon of any energy does not create on its own a positron; it is the atomic neutral phenomenon ejects the electron and positron or polarized emission.
Positron is not a freely created particle, even out of vacuum state.

Matter has property of Polarizabilities, which establishes the dynamical reaction of a bound arrangement to exterior fields, which gives insight of the interior organization. (Zhou; et. al. 2002)
In physics, polarity is a description of a binary attribute or a direction,
An electrical charge has a polarity, a voltage has a polarity, a magnet has a polarity, the spin in quantum mechanics has a polarity and quantum mechanics describes photon polarization as the sinusoidal *(having a magnitude that diverges as a sine curve)* plane of electromagnetic wave.

The other way to approximate the real rest mass quantity is by the observed electromagnetic quantity. As already understood above, all radiation has to be transformed form of some mass quantity or quantized energy.

Therefore, when we observe electromagnetic frequency of an amount of 1.24 eV, which is the visible light or about 1.6 eV to 3.27 eV(Molinaro, 2006), it is certain that an energy packet (mass) of 1.24 eV is converted to radiation. This is the partial quantity of "Electron Cloud" or of two opposite charge "cloud" parts in waves, quasielectron and quasipositron waves, which had energy content equal to 1.24 eV.

A photon with a wavelength of 532 nm (green light) would be the converted form of about 2.33 eV rest energy. Likewise, 1 eV rest energy would be equal to an infrared photon of wavelength 1240 nm.

This is given in:

$$E(\text{eV}) \approx \frac{1240\,\text{eV nm}}{\lambda\,(\text{nm})}$$

Consequently, all observed electromagnetic quantities, from Gamma rays of 1.24 MeV or above energy to extremely low frequency as low as 12.4 feV **(Femto or Quadrillionth of 1 eV)** are effectively converted energy contents of varied "electron - positron cloud" waves, partially or entirely.

Instead of creating panic of atomic structure may collapse, by conversion of electron, quasielectron or negative-positive charge transformation to energy, it would be extremely crucial to understand the nature of Vacuum Infinite Energy, also called Zero Point Energy and its relation with observed phenomenon.

Out of Vacuum

In quantum field, the vacuum condition is the quantum state with the lowest possible energy which has no material particles. The vacuum state of a quantized field is also called Zero-point field.

The vacuum state or the quantum vacuum is considered as "by no means a simple empty space" (Lambrecht 2002). The vacuum state holds ephemeral electromagnetic waves and particles burst into and out of existence. (Dittrich & Gies 2000).

A hypothetical massive scalar elementary particle, called Higgs boson, predicted by three groups of physicists: François Englert and Robert Brout; by Peter Higgs, and by Gerald Guralnik, C. R. Hagen, and Tom Kibble, which is the part of the Standard Model and is a result of the professed Higgs mechanism, proposed in 1964. This supposes to elucidate how most of the known elementary particles acquire mass.

There are no identified elementary scalar bosons of spin-0 in nature. Although statistically, there are many composite spin-0 particles.

Theory of Higgs field also implies that quantum vacuum generates mass, in the form of virtual Higgs bosons, with which particles acquire their mass through interactions with a ubiquitous field carried by the Higgs.

In fact the standard model, the "Higgs mechanism" calculates the creation of masses for the W±, and Z weak gauge bosons in the course of electroweak symmetry breaking. (**Bernardi et al 2007**)

"Physicists have now confirmed that the apparently substantial stuff is actually no more than fluctuations in the quantum vacuum". **(Battersby 2008)**

The Large Hadron Collider (LHC) experiments at CERN are for confirmation of this Higgs field, which in turn will mean that the observed Universe is a virtual reality.

Prospection

To estimate probabilities of effects between elementary particles,

Feynman diagrams are employed, which involves perturbation theory, where the amount corresponds to an infinite series, i. e. an estimation of ever decreasing terms. In this series, a Feynman diagram is suppose to be an instinctive graphical depiction of a term.

A quantum mechanical or statistical field theory is represented in graphics by Feynman diagram, corresponds a perturbative input to the shift amplitude or association function.

In fact, Feynman diagram has no physical implication. It thrives to provide merely the infinite sum over all probable Feynman diagrams which present physical results. This infinite sum is usually only asymptotically convergent, which is a formula, appropriating progressively, more exactly, as a changeable approaches limit, often infinity. (Gribbin, 1997)

"In many cases, the particle number operator does not commute with the Hamiltonian for the system. This implies the number of particles in an area of space is not a well-defined quantity but like other quantum observables is represented by a probability distribution. Since these particles do not have a permanent existence, they are called virtual particles or vacuum fluctuations of vacuum energy." (Kaivarainen and Lehnert 2005)

It is too simplistic to conceive ideas like pair particle annihilation and creation through Vacuum or a virtual particle, as Feynman diagram thrives to establish (Kragh, 1999). There has to be list minimum

information of one intrinsic attribute in Vacuum state or with the Energy in vacuum state.

The most intrinsic to every quantum mechanical occurrence is the Spin value of the angular momentum and this has to be the fundamental comparative characteristic of observed phenomenon and Vacuum-Zero point energy. As the Zero Point Energy or Vacuum Energy is non-measurable and non-observable, consequently it is non-quantum mechanical. Ultimately, it is "*Spinless"* state of Energy or Absolute Inertia.

Though it is Absolute Inertia, it is an ephemeral state of Energy.

As earlier stated, in a certain condition, there is an ultimate Point of integral deactivation, which is by total dissolution of intrinsic angular momentum, the Absolute Conversion of quantum to non quantum state, in other words, finite to infinite state of Energy.

Is the information of physical system lost by the "**Spinless**" condition of Vacuum Energy, which is a consequence of dissolution, *"loss of spin"* of a quantum phenomenon in Vacuum State?

No. it does not.

An abstract model of quantum mechanics which is not current in classical physics postulated as total information about a system is prearranged in its wave function. A unitary operator determines the progression of the wave function. Unitarity means, the information is preserved in the quantum sense.

Since the beginning of all endeavors to understand universe, more than a century back or later, a simple common sense question should have been put by the scientific thinkers:

If we wish to know the origin of Universe, the question is:

What is the origin of first particle?

The answer is: *The origin of first particle is a no-particle state, where there was no quantum.*

That is, a non quantum state, which also means, "*attributeless*" condition.

The cosmic microwave background Radiation (Penzias and Wilson1965).of 2.725K is the evidence that lot of radiation has been already gone down to 0K, hence, we find the Emptiness behind the background radiation. 0K is a least laboratory measure of heat, around − 273ºC. It is not Absolute Zero, in the sense, there is no possibility of any degree of temperature measurement at all. There are also some anisotropies

observed in the cosmic background radiation. (White 1999, Wright 2004).

If infinite lifetime attributed to finite phenomenon, example, to a photon, then it should carry same energy frequency from its source till infinity. The skies and space all over Universe must be luminous, filled with clear observable radiation.

The observed microwave background radiation and observed red shift, a correlation between distance and recession velocity which is known as Hubble's law, (Hubble, 1929, Christianson, 1995) tells us that light is indeed reducing its intensity.

In other words, as it is known, *"attenuation"*, a decrease in property or gradual loss in intensity as energy wave flux or a beam of particles, as the distance from the source increases, due to interaction with medium, scattering, spreading in three dimensions, even without interaction.

The true meaning of Entropy is gradual loss of usability of energy.

Hence, the radiation reaching its intensity to Zero, the Energy reaches the Vacuum state. This is observed in the Intergalactic space between galaxy clusters, also called voids. (Freedman & Kaufmann 2008, Lindner, et al.1995).

The causal connection of Vacuum non-observable with observable and measurable quantum mechanical phenomenon is: Spin angular momentum.

Ehv (T=0) = So.
Loss of Spin of Radiation Quantum at Absolute Zero

Here *So* is Loss of Spin of radiation quantum at Absolute Zero (not laboratory measure), in fact, in nature, this transition is gradual. Energy in radiant form is fainting or weakening. Without Loss of Spin of Radiation Quantum, there should not be "night" and there will not be Voids or Emptiness between galaxies. This is the ultimate conversion of Energy, from observable to non observable state; and it is only a *"Change of State"*.

In fact, Energy in Emptiness condition is all permeating.

A photon is not an independent phenomenon also finite, it has a source. Hence, it carries the information of that Quantum source, which is transformed into radiation quantum.

By the *Loss of Spin* of radiation quantum at absolute zero, the final stage of dissolution of radiating

Energy in Vacuum carries the Quantum Information of the source of photon in Vacuum Spinless State.

In other words, Energy in Vacuum state has Quantum Information, which is a Cosmic Quantum Code (CQC).

This is in fact the origin, the Cosmic Primal Energy (CPE) with CQC.

Consequently, it is an ephemeral condition, in the sense that it is variable and regains spin angular momentum as a consequence of CQC.

Experimental laboratory and observed model of quantum information is extrinsic property. The Intrinsic property, "the Quantum Code" of Nature is Cosmic.

Energy devoid of CQC is Infinite Absolute inertia and that is purest form of Energy, non-finite, non-quantized and non-radiant.

The fundamental basis of Universe is a Law of Absolute Transformation.

We should not be surprised, if we find whole universe is spinning inside the non spinning Vacuum Energy. Energy content of observable phenomenon is sustained by all permeating infinite and non-dimensional Energy of Vacuum state, the Cosmic Primal Energy. We can not measure the lifetime of an atom or of a quantum either by measuring the (mass) rest energy content or by calculation of radiation emission by that quantum. The lifetime is related to its origin from Cosmic Primal Energy in Vacuum state, at the same time quantized state does not have infinite lifetime because it goes back to Vacuum Cosmic Primal Energy State by radiating.

The law of conservation of energy states that energy can neither be created nor destroyed: it can only be transformed from one state to another. This conversion still retains mass in non-matter energy form. (Taylor & Wheeler, 1992).

The extension of law of mass-energy conservation is the ***Law of Absolute Transformation*** with the examination presented here. Vacuum Energy, *VE*, is Spinless Non-quantum State of Cosmic Primal Energy with Cosmic Quantum Code, CQC, which means this condition is evanescent. The observed particles are quantized Energy, *QE*, as a result of CQC with angular momentum, and all electromagnetic radiation of all frequencies is released energy, RE, of quantized energy, which is, in fact, as already mentioned, transformed condition of energy content of *QE*.

The Universe is a process of Absolute transformation, from Cosmic Primal Energy, **CPE** *to Quantum to Radiation and back to CPE Vacuum State.*

$$CPE \rightarrow QE \rightarrow RE \rightarrow CPE$$

Energy is never created neither lost.

"Everything essentially is Energy"

What is Energy? ...!!!

Conclusion

Speed of light can not be achieved independently by any Body even a photon, unless it has a source, a thrust of that speed. Further, no amount of radiation or light form can be produced freely, unless some amount of (mass) quantized energy is converted to dynamic liberated energy.

It is also most fundamental to investigate and experiment on the basis of "Loss of Spin" theory given here, the nature of Vacuum Infinite Energy, also called Zero Point Energy, which will establish its relation with observed Universe, with the understanding that observed Universe *is* Vacuum Energy with *spin.*

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Waste management in rural areas of Iran

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Abstract: The most important role of health is providing physical and mental well-being for people of society. Today, the waste problem is focused less than any other environmental hazards such water and air pollution. Purpose of this study is recognition review and analysis state of waste production resources in rural areas of central rural sub city areas of Shiraz and Zabol counties. Research method in this study based on field observation, interviews, obtains data, from the questionnaire, and analyze data by SPSS software. Findings show that most produced rubbish in rural of Shiraz is paper and textile with 63%, maximum street rubbish is animal stool with 42%, and most market waste is vegetable with 69%. In comparing with rural of Zabol, maximum domestic waste is paper 38% and major rubbish production research is dust with 64%, maximum market rubbish is vegetables 58% and major amount of street rubbish is paper with 54%. There is a significant relationship between waste production amount and rural distance to city and between waste component and method of dispose it and distance to city. the studies done in the waste management in studied rural level, shows great part of human and finance resources spend collecting and transport and no action don in the fields of production, storage, recycling and disposal.
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Keywords: Environmental health; Waste production; Rural; How disposal; Iran

1. Introduction

There is close and interacting relationship between health and development. The public health importance of the resulting nuisance has not been sufficiently characterized (Aatamila and et al., 2010). Public health and cleaning the place is necessary for individual and social health and well-being as one of the main indicators of development (Darbanastaneh., 2008). In the developed (post-) industrialized word urbanity is often found to be related to health status of the population (Kroneman and et al., 2010). Nowadays, there is many health measures related to waste (production and how its disposal) (Ahler and still., 2002). Produce and how its disposal is considerable since man begin social live of a continuous one place and its hazards and its effects. Population growth is relevant to health as it is both an indicator of, and contributor to, changes to broader social and economic conditions of an area (Fraster and et al., 2005). Rapid population growth, increased consumption, changes in life style and consumption pattern of people, which is perfect features, enhance history caused increasing waste production in different regions. Principles of health and sanitation environment in any place requires that throw away waste produced in the minimum time and away from the homes and environment and human life to the principles and sanitary disposal the action as short as possible.

On of concerns of our society is the problem the amount of daily produced waste for urban households is about 700 grams and have been reported 500 rural household (Abdoli., 1995). In rural areas a mixture of waste and recycled material are buried in that have side effects on environment, pollution of soil and ground, water and air and to the lock of recycling of valuable material and burial also have the economic mistakes (Neal., 1995). physical and chemical composition and amount of waste produced resource change with factor such as different seasons, day of the week, nation and religious accessions, food habits, income level and other factors (Omrani., 1994).

Solid waste consists of any solid material that is considered mystics in public as trash, rubbish, ashes animal bodies, urban and rural waste, human and animal waste and .... (Behnodi., 2001) Wastes from a variety of source such as domestic resources, trade, urban, industrial, agricultural, open areas and refining are produce and enter the home environment (Fataei., 2006). According to this definition that we can say produced waste resources in rural are different, varied and numerous and effective factor in production, amount properties in the rural garbage can note to year time, geography site, producer people habits, study area and location, demographic characteristics, and public attitudes and behavior, income level and many of other problems. So produced waste (food, glass, plastic, paper and ...), street waste (leaves, straws dung ...) and rubbish (paper, cloth, sand ...) and ash (Basvantapa., 2003). The waste resources in the rural waste production ;

waste-rebated health plan can not occur in satisfactory way the disposal stage and type done how causes no discomfort and disease in the village level. Not sometime all factors of situation and waste production are quite clear each community may be has special social-economic factors that affect quality, composition and amount of waste produced. Therefore, for the recognitions of a community waste production situation, the comity must be studied. Also long-term waste production situation indicates community population changes, characteristic of community and changes in energy source (Shari at panahi., 1997).

1.1. Importance research

Even if high efforts of governments and international organizations, basic health needs of many world-disadvantaged people has still not been full filled. In many countries, less than percentage15 of rural have access to health services (Djukanovic and Mach., 1985). Including important health services, the problem is total waste collection and transportation and disposal it. Being non-healthy environment in rural poverty existence in those areas, lock of awareness of the causes of disease through rural waste, lack of health services related to waste produced materials in the rural. Lack or absence of perfect system for collect transport or waste disposal and all these cases of make an unsuitable and unhealthy environment in country rural. In other hand, existing pollution problem on earth and many of the harsh environments is part of problem that has caused for our attention less that is imposed to our live and it is reflected to us. Introducing to how waste is produced in the country deprived areas (rural) and control this waste solid material is a kind of combat to this choose existence of million tones of waste in rural areas an ten thousands types of toxic and hazardous materials in it that is resulted of human daily activities, is caused of wild speared pollution in this environment and this waste materials are cause of 60 to 90 percent of cancers, directly or indirectly (Ahmadi., 2005).

Lack of management and explicit rules for collection, disposal and recycling for more than 38000 tones waste per day that almost 76 percent conversion of fertilizer and thousand tones of plastic, paper and carton, now is burial in unsuitable form or are scattered around cities near rural areas and regardless to the health risks and produce types of disease, also has economic lusts. According to a total account, or people spend about 10 thousand us dollar for waste collection and disposal (Eskafi., 1995).

With regard to text and knowledge of this fact that, there is no attention to country's rural areas in terms of health, importance of this research will be

doubled. In general, the importance of the collecting, healthy sanitation and waste recycling in rural areas won't be cleared for us, until risk of is will be known well. Waste is not only cause of diseases, degrading and undesirability of environment, also can contaminate soil, water and air and make lot of damage in natural and social life cycle.

1.2. Problem research

Population growth an scientific awareness of producers of reduce land resources, forced officials and expert to puttee waste production issue and disposal them by recycling the solid waste materials on top of their programs, more serious in part two decades, specially since 1975. Therefore, with knowledge of resources of production the waste can do considerable helps to waste recycling. Therefore, principles of economic criteria requires that paper, carton, glass and plastic and other production resources be interdicted and separated before burial in a regional operation and be re-used (Dtjoelk., 2003). populate consumption, severs integration, increasing the amount of waste produce, wrong locate for burring waste, various disease caused by non sanitary waste disposal, multiple sources of waste produced in the rural, under ground water pollution, environment destruction and .... Areas. With regard to expressed issues related to environment hazards caused by waste produce and it's dispose method and importance of it in rural areas, there is little attention to this issue and with consider to economic and spends related to it we divided that present a research named an analysis of waste production resource and method of dispose it in Iran rural regions.

2. Background

Activity and movement, that are life requirement, has remained symptoms for makes his life continued. So cleaning environment especially in rural areas is necessity of life continue (Saeednia., 1999). Consider to waste dispose and clean the environment has old history. In 1750 requires new system of solid waste collection and disposal makes common using of waste caring lorry and waste management was considered as one of society health bases, with increasing health activities (Omrani., 1994). Furthermore, beginning of waste management regard to ancient years and reusing of human stool. In agriculture. Material management in modern methods has started in united state since 1940 decade and in England since 1930 decade (Gloss and et al., 2002). Many optimization techniques have been developed for supporting decisions of municipal solid waste (MSW) management and evaluating relevant

operation and investment policies since the 1960s (Li and et al., 2010).

In Iran, waste and cleanness management is delegated to municipalities in cities and to Dehyaries (nongovernmental organization) in villages. Undoubtedly, waste management and specially collection and exiting it from environment in cities older history compared to villages. This history in Iran is regarded to Baladiye law (municipality) in 1946 and according to this law city cleaning is duty of Baladiye (municipality) and then in 1955, this duty delegated to municipality, accordant to municipality law. In relation to villages, according to, article 69, paragraph 6 of organization duties and election Islamic councils law that is adopted in first of June 1996, Dehyar duties contains, care in doing health enforcement, maintain cleanness and create a suitable context for provide environment health. In statue of organization and parliament of Dehyaries, adopted in junary 2001, improvement of village environment state and maintain of health and cleanness is described as Dehyar duties.

3. Material and methods
3.1. Study area

Shiraz County is in latitude 36 degrees and 29 minutes north and in 33 degrees and 52 minutes east, is in 1500 meters height from the sea, and has 1688.8 square kilometres equivalent is province of Fars (www.fars.ir). County population is over 1711186 that 877849 of them are men and 833337 one woman. 1324055 of this population (336447 households) are in urban areas and 386582 people (91115 households) are in rural areas. 203727 person of this population are men, 182855 women and 549 non-residents that is equal to 112 households (Census General Population and housing., 2005). Shiraz County has 6 districts, 5cities, 21 municipalities and 512 resident rural and 249 residents rural (www.aftab.ir). All of rural of Shiraz are in distance longitude between 52° 30 to 54° and latitude between 29° and 30° (Gazetteer of country rural., 1983).

Zabol city with a width equal to 15,197 square kilometers (2, 1 percent of the province is located between 30° and 7 to 31° and 29 in north latitude and 59° and 58 to 61° and 50 in east. This city is in leading of north of sistan and baloochestan province in terms of geographic location and is located in neighboring of south Khorasan province in north, Kerman province in west, and Afghanistan country in east.

Population of Zabol city is 329,317, 137,947 of them are in urban areas and 237,097 of them are resident in rural areas (Census General Population and housing, 2006). This city has 6 district center, 5 country, 17 villages and 885 rural areas. Zabol is in

210 kilometers distension to Zahedan city and is located in end of connection road of Zabol-Zahedan. This road is the most important of populated regions of Zabol country and capital of province and other regions and province of country.

3.2. Statistical analysis

This study is a descriptive-analyzing research that was performed in 2010 in ten rural, which are located in Shiraz and zabol cites. Scientific contend of study is based on library studding from available resources, books, internet sites and relative agencies. rural which are in this study are selected randomly and in different distance to shiraz and zabol cities in field observation in this research questionnaire is information collection tool that interview method was for making the completed.

Information gathering method based on field observation, interview with rural resident and for informs to waste production resource and how to dispose it, we need to make some questionnaires and this important topic has done and so some questionnaires were disturbed in each five selected villages. Questionnaires disturbing was based on sample volume rate 10 percent of the number of rural households and then for analyze the inform data, SPSS software has been used. In addition, households waste compounds of each rural determined in field status. For measuring rural health are, a table is used to make us inform to health condition of collected rural.

Also, for inform to studied rural conditions and situations, some information give related to research topic in rural. In according to give informed, people residence audition is permanent and drinking water source in this areas (all of the rural) is provided from high areas and by absorption wells. In addition, main connecting road type is asphalted and in rural roads are sand road and waste burial place in rural of shiraz is waste burial place for Shiraz city (the place is called Barmashoor) is in 25 kilometers distance to Shiraz city and in south east of Shiraz city. (Studied rural waste burial place is common with waste burial place of Shiraz city) (Table 1).

It is north worthy that state of Zabol resident villagers are permanent, villages often have not purified water and all of inter villages connection reads are soundly and created for animals and garbage in this villages are not collected and disposed (Table 2).

4. Results
4.1. An analyze on source waste production in studied rural

Table 1: features of the study rural (Shiraz).

Rural name features	Bidzard	Tofihan	Dehno	Zafarabad	Aliabad
Population*	1206	4671	1617	4112	895
Number of house holds	295	1142	412	1079	224
Total literacy	880	3402	1208	3200	643
Natural village location	a valley	a valley	a valley – a mountain	a valley – a mountain	a valley
Village distance to shiraz	20 kilometers	15 kilometers	10 kilometers	17 kilometers	6 kilometers
Altitude	1500 meters	1486 meters	1480 meters	1490 meters	1469 meters
Distance to waste burial	10 kilometers	5 kilometers	23 kilometers	5-6 kilometers	Less than 2 kilometers

Table 2: features of the study rural (Zabol).

Rural name features	Jaleei	Hasanabad piri	Toti	Rostam mahmod	Gorg
Population*	1323	900	232	308	84
Number of house holds	357	150	34	54	12
Total literacy	298	678	155	128	20
Natural village location	Desert	Desert	a valley	a valley	a valley
Village distance to shiraz	5 kilometers	25 kilometers	30 kilometers	29 kilometers	33 kilometers
Altitude	473 meters	474 meters	472 meters	472 meters	472 meters
Distance to waste burial	1 kilometers	300 kilometers	*	*	*

Produced waste in rural is consist of all of waste materials which made of done Activities in rural this material is several of production resource and physical features, too. In a rural, various parts are active and each part has a role in waste production. House holds, trade, rural, animal husbandry, open areas and heath centers parts, each one, have waste production with special features. Waste production resource has a direct effect in recycling act, collecting, separating and possibility of isolated materials (Nozarpor., 2000). In a general classification, waste materials are in 3 groups: 1) materials that are fuel or can make them fertilizer such as vegetable waste, paper and straw. 2) Materials that are fuel excursively such as synthetic material, horn and bone. Rubber and leather. 3) Materials that are not fuel and are not able to make them fertilizer such as crystal and glass stone and iron (Ahmadi zad., 2006). Great part of waste production in rural of Shiraz is produced in house hold sector that mainly consist of residual and remaining food waste (58 percent), plastic (22 percent), others (10 percent), paper (6 percent), glass (6 percent), according to correct process we can provide needed non-mineral manure in agriculture sector from this massive volume of waste produced in house hold sector (Kreith., 1997). Must produced waste by rural house holds of Shiraz are paper-texture (63 percent), sand (26 percent), and animal waste (7 percent), glass an pieces of wood (each on 2 percent) of amount of rubbish production. Other rubbish production recourse in studied areas in Shiraz are market or trade waste that the greatest part of that

is vegetable (69 percent) and finally street waste other kind of waste production in rural that animal stool with 42 percent is the greatest production resource in this sector. In table 4, the most important resource of waste production in studied rural is observed and also tables number 4-8, waste production in each rural separately. As in seen, in must rural, waste production resource is same, the must important house hold wastes food, rubbish: paper, texture, trade: vegetables and waste production resources of street is of all cases in street (leaf, straw, animal stool, paper). Other informed data is observed in table 3.

In table 4, waste production in villages of Zabol city is contained separately. According to contained information in table 5, it can be expressed that the most important source of waste production resource of the villages Zabol is domestic waste like villages of Shiraz with this different that the most amount of domestic waste in villages of Zabol is paper with 38 percent. But in villages of Shiraz it allocated to food.

Waste. Most of produced rubbish in Zabol is dust with 64percent, and against villages of Shiraz expressed that this area is desert and there exist local winds. According to the finding data, most of trade rubbish in villages of Zabol is vegetable (58 percent) and finally major source of street waste production (open areas) is paper with 54 percent in villages of Zabol. Other found information is available in contained tables. As is viewed in villages of both regions, is similar with a little difference caused of environmental and geographical conditions.

Table3: waste production resources in studied rural in percentage (Shiraz).

Waste production resources	Produced waste			
House hold	Food (58)	Glass (4)	Plastic (22)	Paper (6)	All of cases (10)
Rubbish	Paper-texture (63)	Pikes of wood and metal (2)	Glass (2)	Sand (26)	Animal waste (7)
Trade (market)	Vegetable (69)	Animal waste (16)	Broken glass (2)	Iron parts(-)	All of cases (13)
Open areas (street)	Leaf (6)	Straw (14)	Animal stool (42)	Paper (8)	All of cases (30)

Table4: waste production resources in rural in percentage (Zabol).

Waste production resources	Produced waste			
House hold	Food (29)	Glass (1)	Plastic (17)	Paper (38)	All of cases (15)
Rubbish	Paper-texture (26)	Pikes of wood and metal (4)	Glass (-)	Sand (64)	Animal waste (6)
Trade (market)	Vegetable (58)	Animal waste (12)	Broken glass (6)	Iron parts(4)	All of cases (20)
Open areas (street)	Leaf (6)	Straw (2)	Animal stool (2)	Paper (54)	All of cases (36)

4.2. Analyses of physical compounds

Results of fraction waste material have direct effects on collecting and recycling operation (Fataei., 2005). For establish management system of solid waste material in a place in original and technical form and design and process the program related to keep, collect, transport and find disposal and also regenerate the resource projects such as compost fertilizer production, getting resurge from waste, biogas production, recycling need to determine the feature exactly and physical properties recognize the waste production resource in that area. Determining the rural waste features is too difficult because of verity of production resources of and component verity.

These activities in development countries need to 2000 to 4000 dollars, in terms of diversity and complexivity (Diaz and et al., 1993). In last chapter, we painted to waste production resource in rural and in this chapter we will analyze the physical compounds in waste material. It is noted that waste produced type is different in different places and have special form. Possibility of reduction, people economic condition, season of year and many of other factors is effective on physical compounds of rural waste and pay attention to this topic in management supplies and tools and equipment is important. It is important that determine the type and intergradient is just by use it again (Eslami., 2001).

In tables 5and 6 percentage of physical composition of rural produced waste is presented. As in viewing, the maximum composition part of produced physical waste context is related to vegetable in both regions that is (average 52 percent in Shiraz) and (average 5, 44 percent in Zabol) and the minimum amount of produced waste in Shiraz is ash produced by fire (average 2 percent) and the minimum amount of produced waste in Zabol villages is glass (average 1, 5 percent). Reasons for this difference are Shiraz is nearer to capital, seasons of year and economic situation.

By reviewing physical component of waste in rural we can express there is significant relationship between distance to Shiraz and Zabol cities and waste components and it is, by increasing distance between Shiraz and Zabol and studied rural, physical component consist the rubbish, animal stool and by decreasing distance to city, amount of glass and texture and paper increase (tables 7 and 8). Waste remaining time in rural environment decrease, too. One of advantage of waste quick collecting is, prevent the fly growth because growth time for this inset is less than one week. So, garbage collection must be done before pupa generating and transport to a suitable place. For getting the best result for environment health and beauty, waste must

be collected in rural areas at least two times in winter and three times in summer (Mobaraki., 1996).

To pay attention to the researches done in rural, collecting is just one a week. This note is more important that we know 80 percent of rural waste in summer is equal with 80 percent of waste produced in a year. Another point is that amount of rural house hold must in most villages is 2-3 kilograms per day and it is considerable.

If rural distance to city increases, amount of waste produced increase, too. For example, maximum rural waste produced is in two Bidzard and Zafarabad rural with respectively 20 and 17 kilometers distance to city and minimum waste produced is for Aliabad rural with 6 kilometers distance to city. According to expressed text, there is a significant relationship between amount of waste produced and distance to Shiraz city.

Table 5: physical compounds and component materials of produced waste in studied rural (Shiraz).

Row	Material	Weight percent Minimum - maximum	Average
1	Glass	2-4	3
2	Food	29-58	43.5
3	Paper	6-8	7
4	Plastic	6-72	14
5	Texture and paper produced	14-63	37
6	Wood	1-5	3
7	Ash	0-4	2
8	Dust and sand	3-2	14.5
9	\Metal	2-8	5
10	Leaf	1-6	3.5
11	Stew	7-14	10.5
12	Animal stool	18-42	30
13	Vegetables	35-69	52
14	Animal waste	9-16	12.5
15	Animal waste	5-7	6

Table 6: physical compounds and component materials of produced waste in studied rural (Zabol).

Row	Material	Weight percent Minimum - maximum	Average
1	Glass	1-2	1/5
2	Food	3-6	4/5
3	Paper	36-70	53
4	Plastic	6-14	10
5	Texture and paper produced	11-26	18/5
6	Wood	1-4	2/5
7	Ash	0-6	3
8	Dust and sand	19-64	41/5
9	Metal	2-8	5
10	Leaf	1-6	3.5
11	Stew	5-12	8/5
12	Animal stool	9-12	11
13	Vegetables	31-58	44/5
14	Animal waste	7-12	9/5
15	Animal waste	5-7	6

Table 7: physical compounds and component materials of produced waste percentage (Shiraz).

rural	Distance to shiraz city	glass	plastic	paper	texture	wood-metal	dust and sand	leather	animal	stool	total
Tofihan	15	2	25	5	20	-	18	3	2	18	100
Bidzard	20	-	27	-	6	-	30	-	4	30	100
Zafaraba	17	-	20	15	25	5	12	-	2	13	100
Aliabad	6	10	23	2	27	27	5	5	-	9	100
Dehno	10	6	40	2	30	-	8	8	4	8	100

Table 8: physical compounds and component materials of produced waste percentage (Zabol).

rural	Distance to shiraz city	glass	plastic	paper	texture	wood-metal	dust and sand	leather	animal	stool
Zhaleei	5	3	27	6	21	-	18	-	2	18
Hasanabad piri	25	2	31	3	11	-	29	-	5	19
Toti	30	0/5	19	6	8	5/5	31	-	2	21
Rostam mahmod	29	0/5	33	8	13/5	1	25	-	-	16
Gorg	33	0/5	34	-	11	-	31/5	3	5	11

Tables 9: amount of produced waste per day for each household percentage (Shiraz).

rural	Distance to city	Less than one kilogram	One kilogram	2-3 kilogram	3-5 kilogram	5 kilogram and more
Tofihan	15	-	10	80	10	-
Bidzard	20	-	20	70	10	-
Zafarabad	17	-	30	50	20	-
Aliabad	6	10	30	60	-	-
Dehno	10	10	20	60	10	-

Tables 10: amount of produced waste per day for each household percentage (Zabol).

rural	Distance to city	Less than one kilogram	One kilogram	2-3 kilogram	3-5 kilogram	5 kilogram and more
Zhaleei	5	24	30	34	8	4
Hasanabad piri	25	23	27	35	9	6
Toti	30	31	15	45	4	5
Rostam mahmod	29	27	19	44	6	4
Gorg	33	20	19	13	39	9

This amount in Zabol villages is that produced waste in Zabol villages is for more than Shiraz villages and Gorg village is in 33 kilometers distance to Zabol and it's 39 percent of its residents produce 3-5 kilogram waste per day, in Zhaleei village, the nearest village to Zabol, and 39 percent of people produce 2-3 kg waste per day. According to expressed text it is cleared there is a significant relation ship between amount of waste produce and destination to city. This species total waste collection (once a week) and with notification to the high amount of waste production in rural, rural residents abandonee waste in rural areas or made them store in a place and stored waste been disturbed by animal and therefore resulted diseases and unhealthy

environment: waste collect by rural Dehyaries (nongovernmental organization) and under Dehyari (nongovernmental organization) controlling in studied rural areas. Waste collecting time in rural areas, in according to people saying, is in early morning horses (96 percent of waste is collected in 8 to 12 horses). In studied villages, 8 percent of is carried by engine wants and 2 percent of them by is table 9 and 10, amount of produced waste is observed for each household per day. In most of Zabol villages, 80 percent of them produced waste is not collected or if it is done, it is done manually and with using the garbage cart. If it is done, it is done manually and with using the garbage cart.

Waste transportation as one of necessary and essential element means caring material with motors and other equipment. This selection is difference that is caused of geographical conditions and existed facilities. In villages in order to waste transfer equipment such as garbage cart, cars and tractors are used.

But in villages of Zabol, there isn't any consider to geographical condition of location, either waste isn't collected in some villages. Waste collection in Zabol villages hasn't any specific time and according to talk of most of people, is some cases, waste is not collected and this topic is due to leave and accumulate by villagers and due to appear health problems and issues in village. Some of these consequences of accumulation of waste and not collect it is studied villages are:
Waste septic with going the time and realize bad and unpleased breath that pollute the natural and healthy air and annoy the village residents.

Accumulate the waste in studied villages and not burry it healthy, can contribute starry animals such as dogs, wild animals and vermin insects. This animal can be caused of transferring of disease such as typhoid, cholera, plague a Location of waste accumulate is most suitable area for growth, regeneration and development of mice's. That in addition to transferring the disease can load lot of damages to human economically.

Accumulation the waste in villages and bea using by livestock is due to transfer disease factors to villager by milk and meat and appears the disease. In other hand, livestock diseases can transfer with waste and release to other animal and also humans and cause infectious diseases among human and livestock.

Be cause of no exiting of water ways and suitable Hungarians in studied villages in other to transfer rain water in rainfall seasons, rain fall can worsen the health condition by flowing on waste and cause sepsis and publish the pollution.

Accumulation the waste in villages can cause that children and kids play in alleys because of lack of recreation center, have contact to garbage and transfer illness and pollution to their families.

Because of quantity and existence of variables such as waste production in rural, lack of attention to rural health, financial issues in services related to waste, technology effects and some restriction in the consumption of raw material and energy, problems related to management of solid waste materials in rural environment have more complexities than city environment.

In studied villages, there is many problems in management of solid material that are known (such as: waste collecting once a week, leaving the waste in village, lack of waste recycling, non-technical transport, being disposal waste place near to rural and …). There are always various function complexities. Therefore, in most areas (rural and urban) for waste management, four primal productions, temporary store, collect and dispose in used. Rural area that are in more interaction to city and it need to being near to city such as waste recycling that done just in Aliabad rural but in waste dispose step, Aliabad rural has health problems such as insemination under ground water, soil insemination, attract, regenerate and growth the vector insects and rodents and animal and this problem monitor the non-technical locating of waste disposal place and without considering. In villages of Zabol have long destination to Zabol such as Tooti, RostamMahmud and Gorg, waste collect, transfer and bury isn't done and villagers leave produced waste in live environment.

With attention to that is expressed and done studies, now in waste management in studied rural, most part of financial and human sources spend for collect and transport and there is no action in field such as produce, keep, recycling and dispose That these cases are more excessive in villages of Zabol.

This lack of balance is the best reason for dies-management in waste material work in studied villages. Due to high volume of waste production in villages and lack of interact between joyful elements in management system that there is not from waste production sources to waste dispose, it can be resulted that there is not management for solid waste material in rural areas.

Collection carring and disposar operation of waste is required to careful programming. This program should direct the operation healthy and appropriately, because programming is one of managment divices to achieve to reasonable way for dicishion . evidences shows, everywhere waste management has property function, society health get eficience.

5. Conclusion

produced waste resources in rural are different, varied and numerous and effective factor in production, amount properties in the rural garbage can note to year time, geography site, producer people habits, study area and location, demographic characteristics, and public attitudes and behavior, income level and many of other problems. Major part of waste prouduction in villages of shiraz are related to domestic waste that cartain remained food with 58 percent. Most of rubbish produced by rural households allocated to texture - paper with 63 percent. Other source of waste production in Shiraz rural areas is commercial or market waste that major part of it contain vegetable with 69 percent and animal stool is major production resource of this part with 42 percent .

The most important waste production resource as similar as Shiraz is domestic waste allocated to paper with 38 percent, but this subject in villagers of Shiraz is allocated to food. Major part of rubbish produced by Zabol villagers is related to dust with 64 percent that is against Shiraz, locating in desert and sandy being. Accordint to finding datas, major amount of commercial waste in villages of Zabol is vegetable (58 percent) , as similar as Shiraz And intaily, major source of street rubbish production (open areas) in villages of Zabol, is paper with 54 percent. In studied villages in both region, waste producton resource are similar to each other with little diffrence couse of geographical and environmental conditions. Major part of physical context composition is related to vegetables in both regions that is (averege 52 percent in Shiraz) and (averegae 44,5 percent in Zabol) and lowest amount of waste produced in villages of Zabol (averege 1,5 percent).

Resons for this diffrence is in this two region is shiraz less distanation to capital than Zabol and economic condition of people. In studied villages of Shiraz, waste collection done just once a week (this subject isn,t done at all according to villagers talk). This note when is more excessive that we recognize 80 percent of villagers waste in summer is equal to 80 percent of waste produced in a year. Another note is amount of waste produced by rural housholds in most villages is 2-3 kg per day, that is considerable in this kind. What ever distance to city is more, amount of produced waste is more too. For example most waste producion is in Bidzard and Zaffarabad villages with Respectively 20 and 17 km distance to Shiraz and lowest amount of produced is allocated to aliabad village with 6km distance to Shiraz. This casses are right in Zabol, Tooti villages is in 30 km distination to Zabol, 39 percent of its residents produce 3-5 kg waste per day. And in

Zhaleei village is the nearest village to Zabol, 34 percent of villagers produce 2-3kg waste per day.

It is clear that there is a significant relationship between amount waste production and destination to city. This kind of waste collection (once a week in villages of Shiraz and no collection in villages of Zabol) and with action to high level of waste production in villages is due to villagers leave waste in village environment or accumulate waste in residence location and accumulated rubbish become published in environment by animals and so this factors are due to creating diseases and making village environment non-healthy In most studied villages, especially villages of Zabol, there isn't a specific method to waste management and sanitation in villages and always, waste is leave around residential centers. In these villages, this material is back to live environment with factors such as children, water, wind and animals. There are many problems in solid material management in studied villages that can consider combining function. variously to solve this known problems, such as (waste collecting once a week, living waste in rural environment , non-recycling of waste, non-normative waste transferring and nearing burial location to villages and …..)

Therefore in most location (rural and urban), 4 foundation of production, temporary storage, collection and disposal are using for waste management. Existed terms in waste management are done properly, in which villages that are in a more interaction with city.

This lack of balance is the best reason for dies-management in waste material work in studied villages. Due to high volume of waste production in villages and lack of interact between joyful elements in management system that there is not from waste production sources to waste dispose, it can be resulted that there is not management for solid waste material in rural areas.

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Key Characteristics of Adult Education and Literacy Programs

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Abstract: A distinguishing characteristic of adult education programs is that program content and language must be suitable and respectful of adult clients. For example, instead of using the word "student" which may imply a traditional teacher/student relationship where a student is subservient to the teacher, all state program materials use the word "learner" or "customer." Using this type of language acknowledges the adults' existing knowledge and real-world experience and makes them the focus of the program. The Pennsylvania Adult Basic and Literacy Education Indicators of Program. Quality emphasize the importance of customer satisfaction and learner progress on individualized goals One quality area explicitly states that "program staff and learners jointly develop, regularly evaluate, and update an instructional plan that incorporates the individual's learning styles and preferences" . This is just one example of how learners and staff are equals and collaborate on the learners' participation in the program. [Ali Badragheh and Mohammad Abedi. **Key Characteristics of Adult Education and Literacy Programs.** Journal of American Science 2011;7(5):136-141]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: adult education, Literacy

Introduction:

Despite landmark reforms in public schools, too many Kentuckians continue to drop out of school, thereby perpetuating the chronic problem of adult illiteracy. Too many young Kentucky parents are unable to read and lack the basic literacy necessary to provide the necessary stimulating, supportive family environments for young children. It is known that children's literacy levels are strongly linked to the educational level of their parents and that children of parents who are unemployed and have not completed high school are five times more likely to drop out. Adult illiteracy feeds the state's unemployment, its welfare rolls, and the correctional institutions. Adult illiteracy severely hinders the life chances of young children, undermines school reform, and limits the opportunities for postsecondary education. The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

- "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients. Examples include workplace literacy (combining both basic academic skills and workplace skills), and family literacy (combining basic academic skills and other skills essential for successful parenting).

- "Education attainment" usually refers to the numbers of years of schooling completed or the level of credential (e.g., high school diploma or associate degree) an individual has obtained. Despite concerns about the meaning of credentials, there is a strong correlation between educational attainment and literacy.

The objectives related to this goal touch on several of the common elements of definitions listed above, for example:

- Different dimensions of literacy (e.g., academic and workplace skills),
- The level of education attainment (e.g., increasing the number of persons who complete postsecondary degrees),
- The needs of target groups (e.g., parents, minorities, or part-time learners),

- The need to increase the availability of particular educational services, strategies or means (e.g., accessibility of libraries to part-time learners or opportunities for parental involvement), and
- The importance of lifelong learning, both in the learning behavior of individuals and in the educational system's responsiveness to the needs of adult learners.

Adult:

Adult who is able to recognize their needs. He is who knows what will. Refers to individual adults in their lives cross and understand their responsibilities and has accepted the role is social. Adult learners are often those that distinguish each other and have many different targets at the same time and will follow a common challenge to fulfill the goals of building self motivation vectors as educational materials to learn and use the forge.

Adult education:

Several definitions of adult education has been done Community

- Adult Education is a⎤in the following examples are given of them. conscious effort by public institutions or voluntary organizations to promote community awareness comes action.
- adult education teaching is typically specific age group above the legal age⎤ limits as formal and informal, voluntary and at different levels of time, place
- Adult Education is a process in which people who⎤and education is presented. somehow been cut course they consciously to change or advance their skills in information and do organized activities.
- Adult education includes all formal and informal training and volunteer after⎤ school, which by experienced educators and aware of the system.

Educational materials on adult education with daily life, needs, goals, aspirations and past experiences of adults and their relationship helps to results learned in life and career are used.

Adult characteristics:
To understand the characteristics of adult learners, their mental and physical condition should be considered in the following referred to some of them.
Operating speed:
Slow reaction in adults is natural that necessarily means reducing the logic and practice skills, not due

to weakness and increased awareness of natural forces and their skills.
Consciousness:
no stimulus and incentives encouraging, despite inhibiting stimuli, slow transfer rate, mental, and weak inhibitors of natural forces (mostly visual and auditory) are factors that slow reaction affect individual mental and cognitive activities, but never able to understand, understanding and learning ability (which varies with the speed of learning) is not relevant.
Health:
what is most age, longer duration is necessary to be heard by listening issue. Why is that when elderly people and old could not hear well, their confidence and vulnerable to the possibility that negative beliefs about their find, they are great. Visual abilities can be like other people, usually decreases with age.
Background of knowledge - skills and beliefs of adults:
adults, social experiences, many have already learned different values and beliefs in their pronouns have stabilized, so changes in the new act very cautiously. The idea of such a manner that skill and applying them older and longer life is, Similar resistance to accept new ideas will be more and more severe. Thus, the adult criteria for the built and paid for their ideas and beliefs that are forming. Because of these criteria and the beliefs that they are afraid of failure, Therefore, to prevent it, sometimes against the resistance of new phenomena are only the material taught and its face that make reinforced concrete and tangible interference situation is.

Ways to Improve Adult Literacy

Adult literacy is a global problem. One in five adults cannot read. Here are 5 ways you can help improve adult literacy.
1. Literacy Websites

Start by researching some of the online resources available to you. Some are comprehensive directories that can help you identify help in your own community.

2. Your Local Literacy Council
Even some of the smallest communities are served by a county literacy council. Get out the phone book or check at your local library. Your local literacy council is there to help adults learn to read and children keep up with reading in school. Staff members are trained and reliable.
3. Adult Education Classes

Your literacy council will have information about adult education classes in your area. If they don't, or you don't have a literacy council, get out the phone book again. If your own county doesn't offer adult education classes, which would be surprising, check the next closest county, or contact your state education department. Every state has one.

4. The Library

Never underestimate the power of your local county library to help you accomplish just about anything. They love books. They adore reading. They will do their best to spread the joy of picking up a book. They also know that people cannot be productive employees if they don't know how to read. They've got resources available, and can recommend special books, to help you help a friend learn to read.

5. A Private Tutor

It can be very embarrassing for an adult to admit that he or she cannot read. If the thought of attending adult education classes freaks someone out, private tutors are always available. Your literacy council or library are probably your best places to find a trained tutor who will respect the student's privacy and anonymity.

Key Characteristics of Adult Education and Literacy Programs:

1- Staffing:

Successful adult education programs have staff members who are committed to adult learners and know how to make the most of available resources with limited budgets. Staff must be flexible and work hours that are more convenient to adult learners. Additionally, staff must be trained in principles of adult education and should attend professional development courses.

2- Volunteers:

Volunteers are critical to the success of adult education programs, as they often provide valuable one-on-one tutoring sessions with adult learners outside of a formal classroom. Volunteers must be trained in principles of adult education and literacy programs, as well as methods to monitor their learners' progress. Having a volunteer coordinator is important, as this person trains the volunteers and serves as their point of contact during the tutoring sessions. If volunteers need advice on how to work with their partners or need new materials to cover during their sessions, a volunteer coordinator is an invaluable resource. Without a coordinator, volunteer retention would be very low. It is important that learners be paired with volunteers for a certain period of time, as it is difficult for adult learners to make progress if their tutor partner changes constantly. Clear expectations should be established for how often and how long tutors will meet with their learners. Congregations often can serve adult learners through tutoring programs, as congregations have easy access to a steady stream of volunteers. It may be easier for congregations to operate an informal tutoring program versus a comprehensive adult education program, since those programs need a higher level of staffing.

3- Respect for adult learners:

A distinguishing characteristic of adult education programs is that program content and language must be suitable and respectful of adult clients. For example, instead of using the word "student" which may imply a traditional teacher/student relationship where a student is subservient to the teacher, all state program materials use the word "learner" or "customer." Using this type of language acknowledges the adults' existing knowledge and real-world experience and makes them the focus of the program. The Pennsylvania Adult Basic and Literacy Education Indicators of Program Quality emphasize the importance of customer satisfaction and learner progress on individualized goals (see Appendix A). One quality area explicitly states that "program staff and learners jointly develop, regularly evaluate, and update an instructional plan that incorporates the individual's learning styles and preferences" (p.7). This is just one example of how learners and staff are equals and collaborate on the learners' participation in the program.

Successful adult education programs recognize that adult learner needs and learning styles may require non-traditional methods of teaching and accommodate them whenever possible. This means holding classes and sessions outside of typical working hours for adults that work, providing one-on-one tutoring, group classes, and other methods of delivering services that are flexible. It is also important to hold the classes where it is convenient for adult learners to attend, such as local houses of worship, residential facilities, libraries, or other community centers. Understanding this key principle is difficult sometimes for organizations that have worked in child education, but not in adult education. Congregations that have held learning programs for children may feel that they are suited to take on adult education without realizing the differences in program structure and content. It is important that congregations research training opportunities before embarking on an adult education program.

4- Practical program content:

Related to the program quality area of "respecting adult learners," curriculum should be practical and relevant to the individual learner's goals. Many adult learners are interested in advancing their careers, starting a new career, transitioning into post-

secondary school, or attending other educational or training programs. Program content should help learners work on their personal educational or vocational goals. Materials from their current or future job can be utilized as part of the curriculum to make it hands-on and practical for the older learner. Some programs that have provided educational programs for children may have learning materials and textbooks that they think they can use with older learners. However, this is not an effective way to teach adults and participants may be turned off from a program that uses children's books for their teaching materials.

5- Assessment and evaluation:

To have an effective adult learning program and demonstrate program success, learners' progress must be monitored during their participation. There are many official assessments that state funded programs use for standard programs, such as the adult diploma program or GED classes. However, informal measures should also be used to monitor learners' progress and help learners' view their improvement. Seeing concrete improvement over time is important to keeping learners motivated and committed to the program.

6- Space:

The learning environment where an adult education program takes place should be well-lit, clean, and suitable for adults. Additionally, having computers available is useful for learners and staff to access online resources. Many learners want to improve their computer literacy as well as language or numerical literacy, so having a computer lab is valuable.

7- Community relationships:

It is important for adult learning programs to have working relationships with libraries, local businesses, work-ready programs, and other community resources. Since many learners attend adult education programs to advance their career goals, it is important that programs be able to refer them to job readiness or placement organizations. Libraries are also a valuable resource for organizations that are looking for materials that are appropriate for adult literacy programs. The Philadelphia Free Library has a program called the "Reader Development Program" which gives away two free library books a year to adult learners who have a library card.4 Books cover topics such as reading, writing, math, job skills, parenting, biography, fiction, GED and ESL. Program staff can also access these books for their own classes.

Conclusion:

Additional material for the next stage of learning often means to be expected when developing your

learning skills Learners to increase awareness and enjoyment of reading and studying to operate. To improve the quality of life, learning materials should reinforce the skills they acquired previous. This material should have access to information and provide new technology. should also have to make learning more fun. Additional materials should provide opportunities for literacy skills to read and to strengthen their cognitive awareness.

Incentives aimed at providing content that audiences are produced primarily to attract different groups of adults interested in design, so that their participation in learning programs are encouraged. Motivational training materials for learners and have great importance even in support of successful applications over learners, planners and executors for educational programs is important.

Material often set different types of materials and educational content in books and pamphlets, books, training guides, trainers, equipment auxiliary audio, visual and material are included such that during actual teaching sessions, are used in the transmission and content but also to achieve the goals of making education programs are important.

Track materials (continued) which increased literacy skills and knowledge gained is also effective in enriching learning environment for learners are important. Participatory materials to ensure the participation of learners in the learning process and codification are included out of class activities, dialogue, role playing, etc.

In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them. Learning activities such as activities outside the classroom, dialogue, role playing and ... Another type of content is presented. Duties are placed on the learner, a resource for developing knowledge, skills and insights he considered.

The task force's policy recommendations are guided by these principles:

- Recognize that adult illiteracy is not an isolated problem but a fundamental barrier to every major challenge facing Kentucky. Without significant improvements in adult literacy the Commonwealth will be unable to make progress on issues such as early childhood education, education reform (elementary/secondary and postsecondary), economic development, and improving the

health and well-being of Kentucky's families and communities.

- Shift from top-down implementation of a federal or state program to leading a statewide public campaign that depends fundamentally on a bottom-up commitment of communities, employers, and educational institutions. The campaign must engage all aspects of Kentucky life—all dimensions of state and local government, all education levels, the state's business and civic leaders, voluntary organizations, and all others whose work affects—or is affected by—the problem of adult illiteracy.
- The future of Kentucky depends on narrowing the disparities among counties by improving the adult literacy of the population in all regions of the state.
- Shift from an emphasis on providers to the needs of clients. Measure performance and progress in terms of impact on the quality of life and economic well being of:

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Learning styles in adult education

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Abstract: In the best of all possible worlds, you would incorporate all three learning styles into each of your lessons. However, this is just not possible in the real world of teaching. In truth, it is often not hard to include both auditory and visual learning styles in your lessons. For example, you can have instructions written on the board and say them out loud. However, it is not always as easy to include the tactile/kinesthetic learning style into your lessons. The sad truth is that many students have this as their strongest learning style. It is best to not force the issue but instead find natural places to include kinesthetic learning. If your class warrants it, you could include simulations, role-playing, debates, or the use of manipulative.

Introduction:

Adult who is able to recognize their needs. He is who knows what will. Refers to individual adults in their lives cross and understand their responsibilities and has accepted the role is social. Adult learners are often those that distinguish each other and have many different targets at the same time and will follow a common challenge to fulfill the goals of building self motivation vectors as educational materials to learn and use the forge.
Several definitions of adult education has been done Community

- Adult Education is in the following examples are given of them. conscious effort by public institutions or voluntary organizations to promote community awareness comes action.
- adult education teaching is typically specific age group above the legal age] limits as formal and informal, voluntary and at different levels of time, place
- Adult Education is a process in which people who]and education is presented. somehow been cut course they consciously to change or advance their skills in information and do organized activities.
- Adult education includes all formal and informal training and volunteer after school, which by experienced educators and aware of the system.

Educational materials on adult education with daily life, needs, goals, aspirations and past experiences of adults and their relationship helps to results learned in life and career are used.

in developed countries, adult education is a form of informal education for people above 24 years is presented. In fact, a means of expanding knowledge, skills and abilities of adults. In these countries, adult education helps adults to variable conditions of political, social, economic and cultural adjustment, and pay to fix their shortcomings.

In developing countries and backward because the problems in primary education, lack of resources and facilities, poverty, social existence, economic and cultural concept of adult education is different. In such countries the concept of adult education, literacy education is.

Concept of adult education in revolutionary countries, is a combination of these two concepts. Changes in these countries due to social, political and cultural revolution, resulting from, literacy and continuing education necessary to find because of the revolution, there is cultural poverty on the other hand the implementation of development plans and the need for skilled personnel are expert. General adult education system based on economic conditions - social and cultural community is different and each specific goals will follow. General objectives of adult education and literacy in two categories is divided into professional education.
Literacy goals include:

- Providing primary education in childhood that adults were deprived
- raising awareness for adults;
- knowledge bases and adults about their cultural heritage;
- increase confidence in adults.
  Professional education goals include:
- Equipped with the necessary skills to adults living;

- providing the necessary manpower for the country's goals;
- achieving social equality and equity and eliminate the existing differences between different classes.

Understanding and Using Learning Styles

Students, in fact all individuals, are most effective when they are taught in their personal learning style. In fact, there are three major types of learners: visual, auditory, and tactile/kinesthetic. While most individuals without disabilities can learn using any one of these styles, most people have one for which they show a stronger affinity.

Learning Styles:

1- Visual Learners - Visual learners are those who generally think in terms of pictures. They often prefer to see things written down in a handout, text or on the overhead. They find maps, graphs, charts, and other visual learning tools to be extremely effective. They remember things best by seeing something written.

2- Auditory Learners - Auditory learners are those who generally learn best by listening. They typically like to learn through lectures, discussions, and reading aloud. They remember best through hearing or saying items aloud.

3- Kinesthetic Learners- Kinesthetic, also called tactile, learners are those who learn best through touching, feeling, and experiencing that which they are trying to learn. They remember best by writing or physically manipulating the information.

Learning Style Assessments:

There are many tests available to help you and your students discover your best learning style. Generally speaking, however, if you are someone who is more likely to think in pictures, prefer to meet with someone in person, and are more likely to want visual diagrams when completing a project you have tendencies towards visual learning. Similarly, if you are more likely to think in terms of sounds, prefer to speak on the phone with someone, and want verbal instructions then you tend towards auditory learning. Finally, if you are more likely to think in terms of moving images like mini-movies in your mind, prefer

to participate in an activity when you meet to speak with someone, and tend to jump right into a project without reading directions you tend towards tactile/kinesthetic learning.

How to Effectively Use Learning Styles in Class:

In the best of all possible worlds, you would incorporate all three learning styles into each of your lessons. However, this is just not possible in the real world of teaching. In truth, it is often not hard to include both auditory and visual learning styles in your lessons. For example, you can have instructions written on the board and say them out loud. However, it is not always as easy to include the tactile/kinesthetic learning style into your lessons. The sad truth is that many students have this as their strongest learning style. It is best to not force the issue but instead find natural places to include kinesthetic learning. If your class warrants it, you could include simulations, role-playing, debates, or the use of manipulatives.

Concerns When Incorporating Learning Styles

Though rarer today then in the past, some teachers discount the importance of learning styles. They continue to teach in their one major method without trying to vary instructional methods. This is a mistake that will lead to less learning in the classroom.

On the other hand, many students and to a lesser degree some teachers make the mistake of thinking that they cannot learn using methods that are not focused on their learning style. This is also a huge mistake that in the end will result in less learning. If teachers do not help their students find ways to be successful learning information presented in any style, they are not helping them succeed in the future. The fact is that students will be faced with many different styles of teaching during the educational career. Only by finding ways to adapt and learn using other styles, will students end up succeeding.

Examples of ways that students can adapt:

- Kinesthetic learners would include writing down information that they are to learn.
- Visual learners could create word webs, venn diagrams, or other visual presentations of information.

- Auditory learners could read a passage out loud from their textbook or from handouts

1- Kinesthetic Learners:

A Look at Kinesthetic Learners:

Kinesthetic learners typically learn best by doing. They are naturally good at physical activities like sports and dance. They enjoy learning through hands-on methods. They typically like how-to guides and action-adventure stories. They might pace while on the phone or take breaks from studying to get up and move around. Some kinesthetic learners seem fidgety, having a hard time sitting still in class.

Key Learning Methods for Kinesthetic Learners:

Kinesthetic learners learn best through doing including manipulating items, simulations and role plays, and other methods that physically involve them in the learning process. They enjoy and learn well from experimenting and first hand experience. Further, they learn best when activities are varied during a class period.

Ways to Adapt Lessons for Kinesthetic Learners:

Vary instruction not only from day-to-day but also within a single class period. Provide students with as many opportunities as your curriculum warrants to complete hands-on work. Allow students to role-play to gain further understanding of key concepts. Provide students with the opportunity to work in small discussion groups as they study materials. If possible, plan a field trip that can help reinforce key concepts. Allow students to stretch partially through the class if they seem to become restless.

2- Auditory Learners

A Look at Auditory Learners:

Auditory learners learn best by listening and talking aloud. They typically notice and remember sounds. They are good at remembering things that they hear. They are also good with words and language. They often read to themselves as they study. They are also often distracted by noise and sounds.

Key Learning Methods for Auditory Learners:

Auditory learners learn best through hearing the information. They often need to read the written word aloud to help them remember key points. Verbal repetition is an effective means of study for auditory learners.

Ways to Adapt Lessons for Auditory Learners:

Provide students with oral along with written instructions for assignments. Include whole group discussion in your class. Provide students with videos to complement the written text. Allow time for students to read out loud or talk through problems they might be having. Provide breaks from silent reading periods. Also, realize that those who are strong in auditory learning typically take longer to read a passage.

3- Visual Learners

A Look at Visual Learners:

A typical visual learner uses visualization techniques to remember things. They often have a good sense of direction because they visualize maps and directions in their mind. Many prefer to read information in a textbook or on the whiteboard rather than listen to the teacher lecture. They also enjoy doodling and drawing. Visual learners typically use sight words in their everyday terminology. For example, they might say "Let's take a look at this." or "Let's look at this from a different perspective." They remember details including colors and spatial arrangements.

Key Learning Methods for Visual Learners:

Visual learners learn best by seeing what they are being taught. Visual learners typically prefer images, maps, graphs, and other visual representations over other forms of instruction. They will find that if they include images, mind maps, lists, and other visual techniques in their notes then they will have a better chance of remembering key information.

Ways to Adapt Lessons for Visual Learners:

Including diagrams, mind maps, word webs, visuals, and other forms of graphic organizers will help visual

learners get the most from your instruction. Teach students to use highlighters when going through their notes and to create flashcards when studying for tests and learning information. Try not to give only oral instructions before requiring students to complete an assignment. Further, stay away from lecture without accompanying notes and/or visuals.

Conclusion:

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning

Some research findings that can be a learning process for the Guidelines for training operations are applied, is given below:

1- - Preparation for adults to learn how much he depends on previous learning. Knowledge that has accumulated because of an ability to absorb new information more person is. Past educational experience features a diverse group of adult learners, the starting point of any activity on the diversity training is emphasized.

2- intrinsic motivation, learning a deeper and make them sustainable. When the need is met directly by the learning itself, what is learned, but is complementary learning. Creating a training activity in adult learning needs, learning ensures stable

3- Positive reinforcement (reward) learning to reinforce the negative (punishment) is more effective. Many adults because of negative experiences at the beginning of schooling, are weak and afraid. Feeling of success in adult learning for continuous learning and adult participation is essential.

4- To maximize learning, information must be provided an organized manner. Entries can be simple or complex can be arranged around related concepts are organized. Starting point for organizing content knowledge for adults and adults is linked to past experiences

5- Learning, especially regarding skills development, will be added frequently.

6 - Duties and meaningful content than meaningless subjects are learned more easily and are later forgotten. This issue, especially for older adult learners is true. Challenges of adult learning facilitators by the way that content was significantly associated with the experiences and needs of learners is.

7- Passive than active participation in learning activities, learning increases. Adult educators are allowed to participate actively in India, a stable and meaningful learning to help

8- Environmental factors affect the learning. Tangible things such as noise, crowded places, temperature, light and ... Learning process can be prevented. Other factors such as stress, ridicule, pressure, fatigue and low health can also reduce learning.

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Advances of biological taxonomy and species identification in Medicinal Plant Species by DNA barcodes

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Abstract: Medicinal Plant Species taxonomy is authenticated according to morphological features. It is a long-standing problem of mixing authentic species with their adulterants in medicinal preparations. However, DNA barcoding is a new technique that uses a short DNA sequence as a molecular diagnostic for species-level identification, Our purpose is to briefly expose DNA Barcode of Life principles, relevance and universality. Barcode of life framework has greatly evolved, giving rise to a flexible description of DNA barcoding and a larger range of applications. Similarly, a variety of single locus or combined loci have been propose as DNA barcodes for the plant identification, which are the coding regions or non-coding regions in plastids or the nuclear genome, such as *rbcL*, *matK*, *rpoB*, *rpoc1*, *psbA-trnh*, *ITS* and *rbcL+psbA-trnH*.
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Key words: DNA barcoding; ITS2; matK; psbA-trnH

1 Introduction

Traditionally, the Medicinal Plant Species taxonomy is authenticated according to their morphological features. Even until now, morphological keys still are main basis of taxonomy (Wang, 2006). However, there is a long-standing problem of mixing authentic species with their adulterants in medicinal preparations. This problem has consequences for medical safety as well as for the conservation of the authentic species (Ma, 2007; Zhou, 1995; Mao, 2004;). The classical morphological authentication approach was confronted with difficulties due to overly similar traits used for taxonomic characterization (Gao, 2009 and Ching, 1978) and an ever decreasing number of specialists.

However, the term "DNA barcode" for global species identification was first coined by Hebert in 2003 and has gained worldwide attention in the scientific community (Shilin chen, 2010). Recognition of animals, plants and fungi has been performed using this technique. DNA barcode is a short fragment of the genome and species identification using DNA barcoding has been completed in several studies (Gregory, 2005 and Lahaye, 2008) taxonomists (Schindel, 2005) and is likely to usher the taxonomic research into a new era.

Most researchers agree that the mitochondrial gene encoding cytochrome coxidase subunit 1 is a favorable region for use as a DNA barcode in most animal species and even in some fungal species, including those of the groups Ascomycota, Basidiomycota and Chytridiomycota. However, the CO1 gene and other mitoc excluded hondrial genes from plants have limited usefulness for identifying plant species across a wide range of taxa due to the low amounts of variation in the genes, as well as the variable structure of the mitochondrial genome (Pennisi, 2007; Chase, 2005, Fazekas, 2008; Chase, 2007; Daniel; 2006). Thus, screening for single or multiple regions appropriate for DNA barcoding studies in nuclear and plastid genomes in plants has been an important research focus.

2 DNA barcoding as a driving force in the Plant

First, most single-copy genes in the nuclear genome, as well as their introns, have been as barcode candidates because of the lack of universal primers for their amplification[9]. However, with the exception of 5.8S, the internal transcribed spacer (ITS) of nuclear ribosomal DNA and regions of the ITS could be potential barcodes (Lahaye, 2008 and Chase, 2007). Second, extensive studies have focused ongenes and introns of the chloroplast genome. Comparing with animals, CO1 gene evolves slower in plants. Therefore, CO1gene is not appropriate to be the standard of barcode for plant. Recently, the research and application of DNA barcoding in plant is in the exploration stage. So the most important task is to select candidate genes or DNA regions and identify a suitable DNA barcode. There are many researchers did exploration on filtrating the plant barcode, and they try to find the perfect DNA barcode from chloroplast gene.

2.1 Single fragment DNA barcode in plant

ITS2 ribosome transcribed spacer gene states in RNA gene 5.85 and 28S compartment. Its evolutive speed is faster, so that the more evolution information can be acquired. In 2010, Shiling Chen et al (2010) show the study on filtrating DNA barcode sequence in 8557 medical plant samples. The samples were about Angiosperms, gymnosperms, ferns, mosses, lichens, algae and fungi. Date show compared seven candidate DNA barcodes (psbA-trnH, matK, rbcL, rpoC1, ycf5,ITS2, and ITS) from medicinal plant species. According to the result, ITS2 sequence has the best performance, the discrimination ability of ITS2 in more than 6600 plant samples belonging to 4800 species from 753 distinct genera and found that the rate of successful identification with the ITS2 was 92.7% at the species level. At the same year, Xiaohui Pang et al (2010) show adopted ITS2 sequence identify 888 1410 1183 samples form Angiosperms, gymnosperms and Euphorbiaceae, and the identification rates are 73% 100% 90%. Therefore, The ITS2 region can be potentially used as a standard DNA barcode to identify medicinal plants and their closely related species.

Comparing with other chloroplast cording gene, *matk* evolutionary speed is faster, and it is more appropriate to PCR amplification matk gene segments. In 2008, Labaye at al (2008) show had 100% success by matk gene to PCR amplification in 1667 plant materials. However, Kress et al (2007) argued that if other Family plants have this high success rate on amplification, because the Labaye's 96% using materials are Orchidaceae. The different branch groups of *matk* gene are difficult to be extended and sequencing , because the *matk* primer is not universal. According to the result in table1, Fazekas et al (2008) had 87.6% success rate by using 10 pairs primers to amplification 251 samples form 32 genera plants. *Matk* single segment has only 56.0% success on identifying the different plants, and there are 25.5% the original forward and reverse sequencing are less than 80%. In 2007, Sass and Kress et al (Kress, 2007 and Sass, 2007) did not acquire the expected identification result in Cycadales, and its correct identification rate are 24% and 14.6% separately. Therefore, the design and effective identification in *matk* gene universal primer will be important for next stage.

Another plastid DNA region proposed is the non-coding *psbA-trnH* spacer (Kress, 2005 and Shaw, 2007). This region is one of the most variable non-coding regions of the plastid genome in angiosperms in terms of having the highest percentages of variable sites (Shaw, 2007).This variation means that this inter-genic spacer can offer high levels of species discrimination. Kress et al (Kress, 2005) compared 10 loci for authenticating closely related species in 7 plant families and 99 species belonging to 88 genera in 53 families, they found that the extended length of *trnH-psbA* is 247-1221 bp, and the space region is 119-1094 bp, they reported that the *psbA-trnH* spacer and the internal transcribed spacer could be used as a pair of potential barcodes for identifying widely divergent angiosperm taxa. Moreover, Kress et al (Kress, 2005) and Fazekas et al shown the results that *trnH-psbA* has the highest success ratio of extension and the highest exactness ratio of identification in the alternative segments. *trnH-psbA* also has the best performance on distinguishing the relate plant. Specifically, the identification ratio of *trnH-psbA* is above 90% in Orchidaceae, and 70% in Compsoneura (Kress, 2005). However, Sass et al extended two bands in Cycadales plant by using the primers from Kress. Therefore, *trnH-psbA* space region cannot be the appropriate barcode in Cycadales, and the variance of segments in *trnH-psbA* is not enough for the identification in Heracleum.L and Glyceria.

The protein encoding plastid gene *rbcL* has been proposed as a potential plant barcode by several sets of researchers (Chase, 2005 and Newmaster, 2006), usually in conjunction with one or more other markers. One benefit of this region is the large amount of existing information—there are more than 10,000 *rbcL* sequences already in GenBank (Chase, 2005 and Newmaster, 2006). However, many of these are unvouchered or erroneously identified, and none has electropherogram trace files available, so all of these would have to be repeated to meet the standards for an official "DNA barcode" designation in GenBank. Furthermore, studies by Chase & al. (2005) and Newmaster & al. (2006), which demonstrated a fair degree of success in discriminating species, used nearly entire *rbcL* sequences (at least 1300 bp long). An ideal DNA barcoding region should be short enough to amplify from degraded DNA and analysed via single-pass sequencing. One possibility is to develop primer sets for short portions of this gene to produce a barcode of appropriate length, but our attempts to develop universal primers to achieve this have been unsuccessful to date.

2.2 Combined fragment DNA barcode in plant

In higher plants, the mitochondrial genome evolves much more slowly than in animals. The COI-region is thus inappropriate for plant species distinction (Shilin Chen, 2010). The CBOL plant working group (PWG) agrees that plant barcoding will be multilocus, with one "anchor" (i.e. universal across the plant kingdom) and "identifiers" to distinguish closely related species.

Table 1 Plant DNA Barcodes Identification Rate

Gene	Species	Numbers	Identification Rate	Reference	Time
ITS2	Medicinal plant	8557	92.70%	Silin chen et al	2010
	tragacanth	41	100%	T gao et al	2010
	Gymnosperms	888	73%	pang XH et al	2010
	Rosaceae	1410	100%	pang XH et al	2010
	Euphorbiaceae	1183	90%	pang XH et al	2010
matK	Cycadales		24%	Sass et al	2007
	Relative plant	96	14.60%	Kress and Erickson	2007
	Compsoneura	8	failure	Newmaster	2008
	Relative plant	251	56.00%	Fazekas et al	2008
		1667	100%	Lahaye et al	2008b
trnH-psbA	Relative plant	99	92%	Kress et al	2005
	Pteridophytes Gymnosperms Angiosperm	251	100%	Fazeka et al	2008
	Orbanchaceae	4	100%	Han JP et al	2010
	Compsoneura		70%	Newmaster et al	2008
	Orchidaceae	1667	90%	Lahay et al	2008b
	Heracleum.L Glyceria	87	failure	Whipple et al Logacheva et al	2007 2008
rbcL+trnH-psbA	Relative plant	96	88%	Kress, Erickson et al	2007
	Gymnosperms Angiosperm	251	64%	Fazekas et al	2008
matK + atpF-atpH + psbK-psbl	Monocotyledoneae	101	93.10%	Lahaye et al	2008a
matK +atpF-atpH +trnH-psb	Monocotyledoneae	101	89.30%	Lahaye et al	2008a

There are many researches indicate that the identification ratio of single segment DNA barcode is low. Therefore, barcode selection should not only consider single segment DNA barcode, but also the multiple segments component. Kress and Erichson said (Fazekas, 2008) that *rbcL+trnH-psbA* can be the segment to create the barcode for all land plant. Chase et al emphasized *Matk* is a key factor to identify advanced plant, *rpoC1+rpoB+matk* and *rpoC1+rpoB+rbcL+trnH-psbA*. In 2008, Newmaster et al (2008) did the sampling study on Compsoneura, and did the selection test on 7 chloroplast DNA segments *UPA rpoB rpoC1 accD rbcL matk* and *trnH-psbA*. The result shows that *matk+trnH-psbA*

perform better in identification. In May 2009, CBOL analyzed 907 samples of 550 plants: 445 samples were come from Angiosperm, 38 samples were come from Gymnosperms, and 67 were come from cryptogamous plants. The selection of 7 DNA barcodes of plant were compared the candidate sequence *atpF-atpH matK rbcL rpoB rpoC1 psbK-psb1 psbA-rbcL*, then they suggested subdue *matK+ rbcL* combination to be the currency barcode for land plant. However, CBOL thought this combination is not perfect, because its success ratio of identification on species was 72%. Ren BQ et al (Ren BQ et al,2009) examination team focused on Betulales as their research objective in 2009. They did sampling analysis on 131 of all species

in the world (26 species), and evaluated 4 DNA segments *ITS rbcL matK psbA-trnH* . The result shown that *ITS +psbA-trnH* combination achieved 88% for species-level identification and this was the highest ratio in all subjects. November 2009, Global DNA barcode, the third international meeting in Mexico, not only rbcL and matk, but also *psbA-trnH* sequence gained the regard and agreement form experts. CBOL advised that the currency and ability of identification *ITS* and *psbA-trnH* is very impartant.

The full results of this study will be published elsewhere, and analyses of the efficacy of intensively trialled regions in part 2 are still ongoing. However, as a "research update", we summarise the current state of play. Two plastid gene regions, partial *rpoC1* and *rpoB*, performed well as barcoding regions in terms of being amplifiable with a limited range of PCR conditions and primer sets and, although not particularly rapidly evolving, were able to discriminate among species in many groups of organisms. A third gene region, *matK*, showed much higher levels of sequence variation and provided better species discrimination, but work is still underway to improve PCR primer sets to enhance its 'universality'. The greatest level of species discrimination was achieved when all three regions are combined (*rpoC1*, *rpoB* and *matK*), and this represents one option as a standard DNA barcode for plants.

A second option we present is *rpoC1*, *matK,* and *psbAtrnH.* This option substitutes for the relatively conserved coding region, *rpoB,* the previously mentioned, highly length-variable, non-coding intergenic spacer, *psbA-trnH*. The benefits to doing this are that additional species level resolution may be obtained, while at least part of the plant barcode (the sequences from *rpoC1* and *matK*) will be comparable and alignable across broad evolutionary distances. The downside of this approach relates to the introduction of bioinformatics challenges and problems with degraded tissue due to the variation and often larger size of the *psbA-trnH* spacer.

3 Barcode Candidates in Medicinal Plant

DNA barcoding can be regarded as a tremendous tool to accelerate species discovery and initiate new species descriptions. Moreover, it re-opens the debate on species concepts (Fitzhugh, 2006; Rubinoff 2006b; Balakrishnan, 2007; Miller, 2007 and Vogler, 2007). In addition, DNA barcodes will be a useful and powerful tool for nonprofessional users such as customs officers, traditional drug producers and managers and forensic specialists. Therefore, a rapid and simple DNA barcoding identification system, even an imperfect one, is likely to be welcomed. The search for and development of herbal medicines is rapidly increasing worldwide, so practical and accurate authentication resources are urgently needed (Sucher, 2008; Yao,

2009; Song, 2009 and Shaw, 1997). Chen et al shows the potential for a DNA barcoding technique to become a standard for the authentication of medicinal plants and their adulterants.

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Analysis situation of Activity Status in Urban and Rural Area Population of Iran

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Abstract: The study has looked into the population of Iran aged 10 and above by activity status and sex including the urban and the rural areas. An analysis of the country's population and activity status could explain the economic and social situations of the state and its people. The increasing unemployment and reduction of goods and productive services may cause some detrimental effects in the society and country's economy. Through the study's assessment on the country's population and activity status, the collaboration of the government and its various sectors can set forth to strengthen human development by investing in human resources and employment. A significant increase in the population rate of male and female students in the rural areas and with the decrease in the rate of homemakers for both sexes is a good sign. This implies that these individuals have seen the potentials of education in empowering them to develop their skills and abilities and obtain necessary knowledge of making a living and becoming a productive individual. Population growth forms formidable barriers to a country's progress and development and this phenomenon is usually attributed to socio-cultural, religious and environmental factors but with a better understanding of its occurrence will help regulate and control its growth.
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1. Introduction

Iran's population both in the urban and rural areas continues to increase over the next decades from its first national census in 1956.(Mohseni 1977) The number of employed and unemployed persons has also markedly increased from 1956 to 2006. With the rate of growth in population, it also follows that the rate of unemployment is rising fast and poses a problem to the country. In 1967, in acknowledgement to family planning as a form of human rights and foreseeing its benefits on the socio-economic situation of families, the government of Iran launched the active family planning program, which lowered fertility rates. However, after the Islamic revolution in 1979, the family planning program was eradicated and then restored in the 1990s due to population growth, which led to the country's economic crisis.(united nations 2001)

The rise in Iran's population explains the increasing social and financial discontent of unemployment in the country since they comprise a major part of the national population. Their number is gradually increasing and due to economic crisis whose detrimental effects can hit most those already suffering financially. Rapid population growth as seen by economists hinders a country's effort to meet the needs of its people. Its resources are utilized to provide for the requirements of its growing population and sectors of the country instead of venturing on more investments that are productive. In this case, the government fails to produce more job opportunities compared to the increase of work force (Popenoe 1969).

The objective of this paper is to assess the overall population rate and rate of economically and non-economically active population in the country including the urban and rural areas of Iran by sex. Specifically, it aims to find out the rate of employed and unemployed population by sex in rural and urban areas and if the trend has, either decreased or increased in a span of 50 years from 1956 to 2006.

The Associated Press (2010) has stated that in 2005, the new government promoted population growth ensuring incentives and support to families who advocated the program. But the source from which this financing will be obtained is still unsure. Advocacy to population growth can be attributed to the people's socio-cultural values and beliefs where the family is considered the center of life among the people. But with the gradual education of women and men on family planning and with the increase of health centers in Iran, it has helped in lowering the rapid population growth that has deterred economic growth in Iran over the past years. The paper will definitely be significant to government sectors of Iran. A systematic identification of the various issues, concerns, problems and, impediments to economic development would guide the proper government sectors how to extend the most appropriate and effective assistance to Iran's population control and

opening wider opportunities for employment and better incomes for the people (Copus2006).

In addition, Iran's present rapid growth of population can be attributed to certain factors such as more birth than death rates and immigration and emigration rates. Although on a national level, migration from one region to another does not change the number of population in a country, there could be adverse effects, which can be felt in urban areas where population influx is constantly on the rise thus regions tend to develop at different rates depending on the productive activity of different human endeavors. These urban areas become appealing to many who seek employment, business ventures and those educationally oriented thus, increasing the population in these areas (Hoodfar1994). Eventually these areas become more congested causing problems in housing situations, inefficiency of government services and rise in unemployment rate. A country suffering from heavy population increase becomes a ground for social and economic problems (Coleman 1980). The economy of Iran depends much on its oil industry, but on the other hand, it also has many natural resources such as agricultural lands and minerals waiting to be explored and developed for economic possibilities with the efforts of the people and the government. This paper illustrates how population growth leads to a country's numerous problems and one of these is the rise of unemployment rate in both urban and rural areas. Unemployment is a waste in the country's human resource. If these resources are fully recognized and utilized, the economy of the nation will be better.

2. Material and Methods

The study is descriptive in nature. Both qualitative and quantitative approaches were employed in the data acquisition and analysis. The study uses the data obtained from the Ministry of Interior, Statistical Centre of Iran on the country's total population, employed and unemployed persons in both urban and rural areas. The data focused only on a 50-year period from 1956 to 2006. The population obtained does not come successively but that there is a gap of 10 years from one year to the next. It was analyzed to identify Iran's population at a specific year including the number of employed and unemployed persons in urban and rural areas. This information falls under the economically active population. The unemployed as part of the data pertains to those who are looking for work.

Other data pertained to the not economically active population in both the urban and rural areas of the country include the student population, homemakers, income recipients and others. The

income recipients are persons who are receiving pension and retirement benefits.

For the purpose of quantitative analysis, the number of male and female population as well as the number of employed and unemployed population was converted into percentages. The unemployed population is specifically those who are seeking work. These percentages were then compared to identify the category and community area that would need more attention and improvements.

3. Results

Table 1 illustrates Iran's total country population and the population of the country distributed according to community type – urban and rural areas from one decade to the next beginning from 1956 to 2006. It is evident that there is a sharp increase in the total population of the country. The number of males comprises 50 to 52 per cent of the population while the number of females comprises 48 to 49 per cent of the total population which indicates that majority of Iran's population consists of males.

From 1956, Iran's total population has increased to more than 46 million in 2006. The rise in population for both male and female occurred most in the urban areas as seen in Table 1. The year 2006 has brought about the highest increase in the male population in the urban area hitting 69 per cent while the female population was at 79 per cent. It is also observed that from 1956, the total population in the urban areas was just 32 per cent and has gradually increased to 69 per cent in 2006. This is also true for both male and female population rate, which slowly rose in the decades that came after.

On the other hand, the male population in the rural areas had its highest rate of 66 per cent in 1956 but the population slowly dropped to 30 per cent in 2006. The female population has also decreased from 67 per cent in 1956 to 30 percent in 2006.

In general, as illustrated in Table 1, the total country population and the population rate in the urban areas have increased throughout the decades from the first national census in 1956 until 2006. On the contrary, the population in rural areas has decreased from 1956 to 2006 and so do both its male and female population. In 2006, almost 70 per cent of the people live in the urban areas while 30 per cent reside in the countryside.

Looking at Table 2a, there is an increase number of the total country's employed and unemployed population from 1956 to 2006. The urban areas of the country also show an increase and between 1976 and 1986 there is 7.4 per cent of increase in the employed population. Initially in 1956 from an unemployment percentage of 54, the number

decreased to 21 in 1966 and continued to maintain a low unemployment rate in 1976 with 22 per cent. Then unemployment in the urban areas rapidly grew in a span of 10 years from 1976 to1986 with 36 per cent in difference.

 As illustrated in Table 2a, between 1956 and 2006 the total number of employed persons dropped from 69 per cent to 31 percent that is About half of the initial percentage in 1956. Unemployment in the rural areas started at 45 per cent in 1956 and rapidly rose to 78 per cent by 1966.   From 1976 to 2006, unemployment continued to decrease reaching 36 per cent.   While there is an apparent increase of employed and unemployed persons in the urban areas, the rural areas of the country illustrates otherwise.

The percent of employed male population in the urban areas was doubled in 2006 from a initial mark of 30 per cent in 1956. Yet throughout the years between 1966 and 1976, there is a sudden 10 per cent rise in employment for the male population in the urban areas. In the countryside, male employment has decreased to 31.5% in 2006, which is almost half of the employed 69 per cent of males in 1956. Meanwhile in 1956 with 53 per cent of unemployed male in the city there was a rapid decrease of 30 percent, which obtained 22 per cent of unemployed males in 1966.

Table 1: Total Country Population and Population Distribution in Urban and Rural Areas by Sex, 1956 – 2006

	Total (thousand)	Employed (thousand)	Unemployed (thousand)
Total Country	6067	5908	159
1. 1956	7842	7118	726
2. 1966	9796	8799	997
3. 1976	12820	11002	1819
4. 1986	14737	13097	1640
5. 1991	16027	14572	1456
6. 1996	23469	20476	2992
7. 2006			
Community Type	Total (per cent)	Employed (per cent)	Unemployed (per cent)
Urban Areas			
1. 1956	31	30	51
2. 1966	35	36	21
3. 1976	44	46	22
4. 1986	54	54	58
5. 1991	57	58	53
6. 1996	60	60	58
7. 2006	67	68	62
Rural Areas			
1. 1956	68	69	45
2. 1966	64	63	78
3. 1976	55	53	77
4. 1986	44	45	40
5. 1991	41	41	45
6. 1996	39	39	40
7. 2006	31	31	36

Table 2a: Total Country Employed and Unemployed Population including Urban and Rural Areas 1956 – 2006

	Total Population (thousand)	Male (thousand)	Female (thousand)
Total Country			
1. 1956	12784	6542	6242
2. 1966	17000	8794	8206
3. 1976	23002	11796	11206
4. 1986	32874	16841	16033
5. 1991	38655	19997	18658
6. 1996	45401	23022	22379
7. 2006	59523	30244	29278
Community Type	Total Population (per cent)	Male (per cent)	Female (per cent)
Urban Areas			
1. 1956	32	33	32
2. 1966	39	40	39
3. 1976	49	51	48
4. 1986	55	55	55
5. 1991	58	58	58
6. 1996	62	63	62
7. 2006	69	69	79
Rural Areas			
1. 1956	67	66	67
2. 1966	60	59	60
3. 1976	50	49	51
4. 1986	43	43	44
5. 1991	41	41	41
6. 1996	36	36	37
7. 2006	30	30	30

Table 2b: Total Country Employed and Unemployed Population including Urban and Rural Areas by Sex 1956 – 2006

	Male Employed (per cent)	Male Unemployed (per cent)	Female Employed (per cent)	Female Unemployed (per cent)
Urban Areas				
1956	30	53	32	50
1966	37	22	32	13
1976	48	25	38	12
1986	54	57	53	64
1991	57	54	61	52
1996	60	60	56	52
2006	68	61	70	66
Rural Areas				
1956	69	45	67	50
1966	62	76	67	86
1976	51	74	62	87
1986	45	42	45	34
1991	41	44	38	47
1996	38	39	43	47
2006	31	38	29	33

In addition, 10 years thereafter there was just little increase to 25 per cent in 1976. But between 1976 and 1986, a marked increase of unemployment occurred arriving at 57 per cent and continued to rise to 61 per cent by 2006.

The rural areas started out with 45 per cent of unemployed males in 1956, which rose to 76 per cent in 1966. Male unemployment slowly dropped

by 2 per cent in 1976 at 74 per cent. Then in 1986, unemployment was brought down to 42 per cent reaching 38 per cent in 2006. Based on Table 2b, the rate of male unemployment in the urban and rural areas of Iran has presented some irregularities in the increase and decrease of unemployment between 1956 and 1986.

Female employment in the city has also shown a steady increase beginning 1956 to 2006. But as observed from the table, there was a decrease of employment among women from 61 per cent to 56 per cent in 1996 and rose again to 70 per cent by 2006. On the other hand, female employment in the rural areas declined from 67 per cent in 1956 to 29 percent in 2006. An irregularity was also observed from 1991 to 2006 where female employment rose to 43 per cent in 1996 from 38 per cent of employed women in 1991. This was brought down again to 29 per cent in 2006.

Table 2b also illustrates an irregularity of women unemployment for those who live in the city and the countryside. Apparently, there was instability of female unemployment from 1956 to 2006. With unemployment at 50 per cent in the urban areas, this has declined to a low 13 per cent in 1966 then arriving at 12 per cent in 1976. But by 1986, the rate of unemployment dramatically changed and rose to 64 per cent. Though this has decreased to 52 per cent in 1991 and remained steady at 52 per cent until 1996, once again, this has increased by 14 per cent in 2006 becoming 66 per cent.

In the rural areas, the highest female unemployment rate occurred between 1956 with 50 per cent of unemployment to 1976 with 87 per cent increase.

However, between 1976 and 1986, the number of unemployed women declined to 34 per cent. There was a steady increase from 1986 to 1996 then dropped to 33 per cent in 2006.

Table 3a shows the total country population as well as the total percentage rate of not economically active persons in the urban and rural areas. This consists of the student population, home makers, income recipients and others. A large number of the country's population comprise of students whose population rate from 1956 to 2006 remained high from 62 per cent to 75 per cent. Home makers in Iran apparently show gradual increase from 31 per cent in 1956 reaching 67 per cent in 2006. The population rate of income recipients also increased over the past 50 years marking its highest rate in 1991 with 81 per cent which declined to 67 per cent in 1996 but managed to increase to 75 per cent in 2006. For others who are not economically active, the population rate also rose to three times more of its

initial population rate of 21 per cent in 1956 to 63 per cent in 2006.

Table 3a: Not Economically Active Population in Total including Urban and Rural Areas 1956 – 2006

Total County	Total (thousand)	Student (thousand)	Home Maker (thousand)	Income Recipient (thousand)	Other (thousand)
1956					
1966	6717	685	4964	-	1068
1976	9158	1941	6017	-	1200
1986	13206	4443	7707	667	390
1991	19864	6531	11170	563	1601
1996	23482	9490	12095	454	1443
2006	28822	12633	13193	1298	1698
	35538	13117	16057	2974	3389
Urban Areas	Total (per cent)	Student (per cent)	Home Maker (per cent)	Income Recipient (per cent)	Other (per cent)
1956					
1966	34	75	31	-	21
1976	43	70	36	-	35
1986	53	69	45	54	49
1991	56	63	53	71	39
1996	58	62	56	81	45
2006	64	69	60	67	52
	69	73	67	75	63
Rural					
1956	65	24	68	-	79
1966	56	29	63	-	64
1976	46	30	54	45	51
1986	43	36	45	28	59
1991	41	37	43	18	54
1996	35	30	39	32	46
2006	30	26	32	24	36

The rural areas manifest some irregularities in the increase and decline in the population rate of students, income recipients and others who are not economically active. But the population rate of home makers in the rural areas has decreased from 68 per cent in 1956 to 32 per cent in 2006.

Looking at Table 3b, the number of students for the male and female population in the urban areas has shown a decrease from 1956 to 1991. The number of female students in the city was at the highest with 90 per cent while the number of male students was at 70 per cent. From 1956, it has continued to decline until 1991. It began to rise once more from 1996 to 2006. In the rural areas, the percent rate of students grew from 29 per cent to 68 per cent among males and 9 per cent to 33 per cent in 1991 among females. Sadly then this number has decreased between 1991 and 2006.

Male homemakers living in the urban and the rural areas were not stated in the census from 1956 to 1976. However, it is clearly seen that the male homemakers in the city have increased from 1986 to 2006 by 9 per cent. This is also true for female homemakers, which continued to grow in number reaching 67 per cent in 2006 from a low percent rate of 31 in 1956. If there is an increase of

male and female homemakers in the city, the countryside shows a decrease in their number. Male homemakers have decreased by 10 per cent in 2006 while female homemakers have also declined by 36 per cent.

Table 3b: Not Economically Active Population in Total including Urban and Rural Areas by Sex 1956 – 2006

	Total (per cent)	Student (per cent)	Home Maker (per cent)	Income Recipient (per cent)	Other (per cent)
Urban Areas					
MALE	44	70	-	-	21
1. 1956	54	63	-	-	38
2. 1966	63	64	-	60	53
3. 1976	58	59	54	76	44
4. 1986	59	59	58	85	51
5. 1991	66	67	60	73	58
6. 1996	72	71	63	79	66
7. 2006					
FEMALE					
1. 1956	32	90	31	-	20
2. 1966	32	86	36	-	32
3. 1976	50	77	45	42	41
4. 1986	55	68	53	54	33
5. 1991	57	66	56	56	39
6. 1996	62	72	60	50	45
7. 2006	68	75	67	70	59
Rural Areas					
MALE	55	29	-	-	78
1. 1956	45	37	-	-	61
2. 1966	37	35	-	39	46
3. 1976	41	40	45	22	54
4. 1986	39	68	40	13	48
5. 1991	32	48	40	26	41
6. 1996	27	39	35	21	33
7. 2006					
FEMALE					
1. 1956	67	9	68	-	79
2. 1966	59	13	63	-	67
3. 1976	49	22	54	57	58
4. 1986	44	31	45	45	64
5. 1991	41	33	43	43	59
6. 1996	36	27	39	49	53
7. 2006	31	24	32	29	39

An unsteady growth and decline of population rate among income recipients from the city was experienced throughout the years between 1976 and 2006. Yet during the years 1956 to 1966, there were no census noted on this particular category. The highest noted number of income recipients in the city occurred in 2006 for both male and female recipients. It differs in the countryside where the highest number occurred in 1956 for both male and female income recipients and continued to go down until 2006.

For the others who are not economically active, the population rate started low in 1956 with 21 per cent for males and 20 per cent for females. This number increased at a high rate by 2006 with 66 per cent and 59 per cent respectively for males and females living in the city. However, the opposite is experienced in the rural areas. The population rate for income recipients for both males and females

decreased from 1956 to 2006. From 78 per cent for males and 79 for females, these numbers went down to 33 per cent and 39 per cent for males and females respectively.

In general, while there is an increase in population rate for homemakers, income recipients and others in the city, a decrease in the number of these indicators of not economically population is seen in the rural areas. The student population however shows unsteady rise and fall of number between 1956 and 2006.

4. Discussion

It is evident that the rate of male and female population in the city has risen from 1956 to 2006 and so with the rate of employed and unemployed persons. With the rise of population and employment and unemployment in the urban areas, there is a decrease of population and employed and unemployed person s found in the countryside. This is due to possible migration from the rural areas to the city over the past years from 1956 to 2006. Naturally, the city becomes the center for productive activities and with many different human endeavors in business and commerce, education opportunities, industrial, cultural and political activities. These opportunities found in the urban areas become attractive particularly to those who are inclined in the field of business and educationally oriented individuals from the other rural regions of the country. Consequently, this leads to an increase in population in the cities thus causing the rural or less developed areas to lessen their work force and deprive them of other more productive ventures. For developing countries, the continued growth in the cities is an observed trend.(Appadu 2005).

While population growth for male and females in the urban areas has increased, the rate of employed and unemployed males and females has also increased. This may be considered due to factors such as the increase in birth rates and positive migration. But if not properly checked and regulated, excessive population and unemployment growth may lead to other problems such as economic, social, educational, health problems and moral degeneration.

In the rural areas however, there is an apparent decrease in population growth as well as the rate of employed and unemployed persons both male and female alike. The decline in population may be attributed to migration to the cities and improvements in family planning programs that have been introduced in the country through government information and education programs. (Dickson 2009).

A significant increase   in the population rate of male and female students in the rural areas and with the decrease in the rate of homemakers for

both sexes is a good sign. This implies that these individuals have seen the potentials of education in empowering them to develop their skills and abilities and obtain necessary knowledge of making a living and becoming a productive individual. Sadly, in the urban areas while the number of students has occasionally seen some fluctuations, the number of homemakers has gradually increased for both male and female (chihiro 2010). This may be explained by the rapid population growth in the cities resulting to a reduction in the demand for goods and services. Such decrease in production and increase in population also results to inefficient usage of human resources and lost output in the society. Repercussions may mean that due to the government's inability to generate employment for the increasing number of work force in the country, possibilities of exploitation of workers by local and foreign capitalists can happen through low wages, poor working conditions and absence of other economic benefits (osinubi 2003).

Population growth forms formidable barriers to a country's progress and development and this phenomenon is usually attributed to socio-cultural, religious and environmental factors but with a better understanding of its occurrence will help regulate and control its growth.

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Physical and Mechanical Properties of beans

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Abstract: Food properties are needed and play a significant role to predict and define the quality and behavior of seeds. In this study physical (dimension, weight, volume, sphericity, static coefficient of friction) and mechanical (maximal impact deformation, dynamic coefficient of friction) properties of four common beans are reported. As static coefficient of friction is equal to tangent of slip angle, a suitable apparatus was constructed and static coefficient of friction for four genotypes Daneshkadeh and Dehghan (white color) Naz and Sayyad (Red color) on three surfaces (rubber, tarpaulin and steel galvanized) were measured. Also dynamic coefficient of friction was determined at surface moving velocities of 4, 8 and 12 m/min. Mechanical behavior under impact load were determined in terms of average rupture force in pendulum impact, that is design and constructed. Randomize complete block design showed that, static and dynamic coefficient of friction had major difference between beans genotypes, surfaces and velocity. Mean values showed that the lowest static coefficient (0.32) occurred with steel galvanized surface and highest (0.44) on tarpaulin surface. The lowest dynamic coefficient of friction (0.24) occurred with steel galvanized surface and highest (0.385) on tarpaulin surface. It was observed that the magnitudes of physical damage in Sayad beans were higher than Naz, Daneshkadeh and Dehghan respectively. The average loss of germination to beans decreased with increasing impact energy. Naz and Dehghan had minimum mean volume and weight and Daneshkadeh had maximum sphericity and geometric mean.

INTRODUCTION and LITERATURE REVIEW

In order to design equipment for the handling, conveying, separation, drying, aeration, storing and processing of bean seeds, it is necessary to determine their physical properties. Recently scientists have made great efforts in evaluating basic physical properties of agricultural materials and have pointed out their practical utility in machine and structural design and in control engineering. Dimensions are important to design the cleaning, sizing and grading machines. Coefficient of friction is important in designing equipment for solid flow and storage structures. The coefficient of friction between seed and wall is an important parameter in the prediction of seed pressure on walls (Amin et al., 2004).

Several investigators determined the physical properties of seeds such as Shepherd and Bhardwaj (1986) for pigeon pea; Amin et al. (2004) and Carman (1996) for lentil seed; Ogunjimi et al. (2002) for locust bean seed; Yalcin et al. (in press) for pea seed; Konak et al. (2002) for chickpea seeds, Dutta et al. (1988a) and Aviara et al. (1999) for gram and guna seeds respectively.

The coefficient of friction is important parameter in the design of material handling equipment and storage structures. Methods that have been used to study the coefficient of friction of agricultural products include moving a given surface against the material (Lawton, 1980), tilting an inclined plane, (Aviara et al. (1999), Deshpande et al. (1993), Dutta et al. (1988a) and the use of shear box equipment (Osunade and Lasisi, 1994). The structural surfaces usually employed are galvanized steel sheet, wood and plywood. Studies on the angle of repose of grains and seeds have been conducted by various researchers using a specially constructed box with removable front panel (Dutta et al., 1988a; Fraser et al., 1978). The objective of this part of project was to measure the peak static and dynamic coefficient of friction for various bean cultivars against common construction materials with typical surface conditions.

The study of the mechanical characteristics in agricultural products is important in order to design equipments operating with maximum efficiency but not compromising the final product quality. The seed coat layer is thin, making them susceptible to mechanical damage during handling and drying. Generally, mechanical injury occurs during harvesting when the pods are threshed, but injury can also occur any time when the seeds are processed or handled including during planting (Copeland and Saettler, 1982). When grains are submitted to forces that exceed the resistance of the

material, grain breakage or cracks are found (Liu et al., 1990). During harvesting, handling and storage operations, the grains go through several static and dynamic pressures such as high speed impacts which cause bruises, crushes and cracks that increase the susceptibility to deterioration during storage (Bargale et al., 1995).

Bergen et al. (1993) in a study on 'Trapper' peas and 'Laird' lentils observed that seeds dropped from a greater height caused more seed damage on all three selected surfaces, namely: steel, plywood, and concrete. Seeds with lower moisture content reportedly incurred more damage. However, they did not observe any significant change in the germination percentage. Perry and Hall (1965) studied the mechanical properties of pea beans using an experimental impact machine and high-speed motion picture camera. They were able to estimate the kinetic energy, maximum total force during impact, average time of impact, and the deformation. Their results showed that pea beans were elastic since temporary deformation averaged 12.7% during impact, while permanent deformation averaged 2.7% only. In a study of damage on soybean seed quality, Paulsen et al. (1981) observed that an increase in impact velocity resulted in increased split beans. Evans et al. (1990) impacted soybean seeds in a seed impacting device at four moistures (7.2, 10.1, 12.9, and 16.2%), four impact velocities (10, 20, 30, and 40 m/s), and five seed orientations. A steel impact surface caused the most damage, while the polyurethane surface caused the least. Seed damage increased with impact velocity and decreased with moisture content. Bartsch et al. (1979) observed that impact damage for soybeans at 5 m/s and 10 m/s were statistically similar. Nevertheless, damage increased as the approach velocities increased from 10 m/s to 15 m/s.

This study was undertaken to a) determined some physical properties of bean seeds, Dimensions, volume, sphericity; b) measuring the static and dynamic coefficient of friction against three different materials; c) quantify the physical damage caused to dry beans due to impact caused by pendulum; d) determine the loss in germination to dry beans due to impact and e) compare strain energy and rebound energy for four bean genotypes, Daneshkadeh and Dehghan (white color) Naz and Sayyad (Red color).

MATERIAL and METHOD
Physical attributes

The seeds were cleaned manually to remove all foreign matter such as dust, dirt, stones and chaff as well as immature, broken seeds. The initial moisture content of the seeds was determined by oven drying at 105±1° C for 24 h (Suthar and Das, 1996; Yalcin and Ozarslan, 2004). The initial moisture content of the seeds was 8 to 10% d.b. The moisture in the seeds was allowed to equilibrate at room temperature of 27C for at least 72 h. To determine the average size of the seed, 100 seeds were randomly picked and their three linear dimensions namely, length, width and thickness were measured using a micrometer with accuracy of 0.01 mm (Altuntas et al., 2005). The sphericity and volume of seeds was calculated by using Mohsenin (1986) relationships.

Coefficient of friction

The friction device, utilized in this experiment (Figure1) was essentially a refined version of the device used by Mohsenin (1986). The static and dynamic coefficient of friction of bean seeds against three different structural materials, namely rubber, tarpaulin and galvanized iron was determined. A polyvinylchloride cylindrical pipe of 50 mm in diameter and 50 mm in height was placed on an adjustable tilting plate, faced with the test surface and filled with the 30g bean sample. The cylinder was raised slightly so as not to touch the surface. The structural surface with the cylinder resting on it was raised gradually with a screw device until the cylinder just started to slide down and the angle of tilt   was read from a graduated scale (Singh and Goswami, 1996; Suthar and Das, 1996). The coefficient of friction was calculated from the tan( ). The maximum value of friction force was obtained when box started moving, and this was used to calculate the static coefficients of friction. While the box continued to slide over the friction surfaces at 4, 8 and 12 m/min velocity, the dynamic friction force was measured. The test table height was adjusted so that the cable between the box and force gage was always in a horizontal position. The horizontal pull (friction force) was measured by the A&D Co. digital force gage with 0.1g accuracy and continually recorded on a computer. The maximum amplitude of the consequent undulating dynamic force line was the peak force. The dynamic friction force calculated by dividing the total area (integrated time base) under the force travel curve by the total travel distance (extension). The sliding friction force divided to sample weight was used to calculate the dynamic coefficients of friction. An analysis of variance evaluation was made for the peak static and dynamic friction data respectively. A Duncan rank test was used to test for significant differences between each treatment.
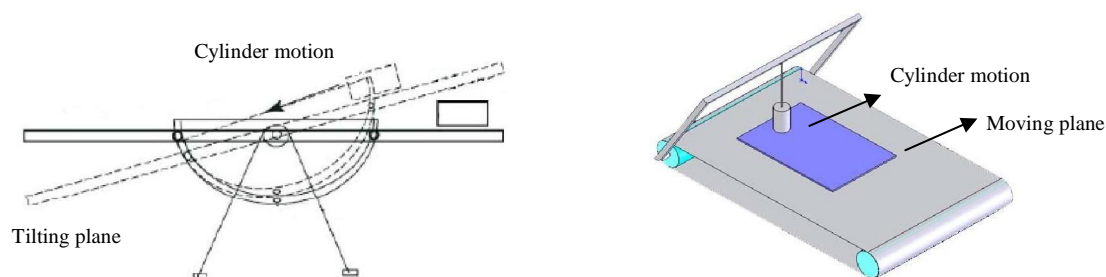
Figure1. Apparatus for measuring (a) static CoF (b) dynamic CoF

Impact damage to beans

Seeds are also subjected to forced pendulum impact that happens in threshers. The tested and untested (control) seeds were graded manually according to the guideline of the Canadian Grain Commission (1993). The seeds were sorted as cracked, split, and undamaged. Splits included broken pieces that were less than three-quarters of the whole seed and halves that were loosely held together. Cracked seeds included seeds with visibly cracked seed coats and seeds with less than one-fourth seed broken off. The percentage of cracked split, and undamaged seeds was adjusted for damage in the untested seeds. Undamaged seeds from each treatment combination were subjected to germination tests to check for internal damage. Germination tests were done by Alberta Wheat Pool at Camrose, Alberta. In each sample tested, seeds were placed evenly on two sheets of a germination paper towel, then covered with a single sheet, rolled and held in upright position. The rolled towel was moistened until its mass was about three times its dry mass (Canadian Food Inspection Agency, 1995).

From eq. (1) the impact energy (w_i) is equal to summation of rebound energy (w_R), strain energy (w_P) and energy losses (w_L). In pendulum apparatus, total impact energy and rebound energy with an estimation of friction (losses) is distinct, so strain energy will be determined (Sitkei, 1986). Coefficient of restitution could be determined by eq. (2) (Bueche and Hecht, 1997). In this equation, a and b are primary and secondary angle of pendulum rebound.

$$Wi = w_R + w_P + w_L \qquad (1)$$

$$e = \sin(b/2) / \sin(a/2) \qquad (2)$$

The experiment was set up as a factorial complete design. There were four replicates for the measurements of strain energy and Coefficient of restitution. The Mstat-c software was used to derive the least squares and standard errors for the dependent variables. The Duncan test was used to compare the means.
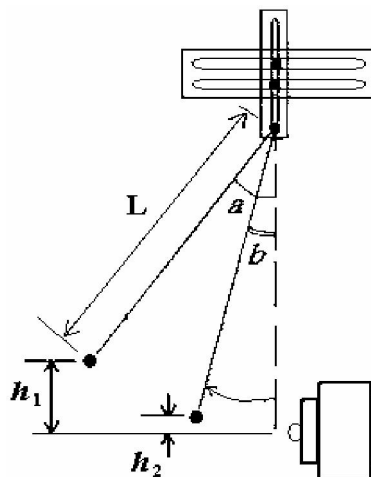
Figure 2. Impact apparatues

RESULTS and DISCUSSION
Seed physical attributes

A summary of the results of the determining physical parameters of 400 seeds is shown in Table (1). The geometric mean diameter ranged from 3.2 to 8.4 mm. The geometric mean of the axial dimensions is useful in the estimation of the projected area of a particle moving in the turbulent or near turbulent region of an air steam. The sphericity was 27.8 to 73.8 Percent which indicated that the shape of the beans makes them difficult to roll on surfaces.

Static and dynamic coefficient of friction

The ANOVA indicated that the variation of peak static coefficients of friction with cultivar and surface was significant ($P<0.05$ and $P<0.01$ respectively). Also cultivar*surface interaction was significant ($P<0.01$). These two factor interactions were further evaluated by plotting and studying interaction patterns. No consistent trends, except for surface effects, were evident. Mean value showed that the lowest static coefficient (0.32) occurred with steel galvanized surface and highest (0.44) on tarpaulin surface. For the dynamic coefficients of friction, the same effects and interactions were

found to be significant in the Anova as were found for the peak static coefficients of friction. Mean value showed that the lowest dynamic coefficient (0.24) occurred with steel galvanized surface and highest (0.385) on tarpaulin surface (Table 2).

Table 1. Some physical properties of four beans

Property	Genotype	Mean value	Minimum value	Maximum value
Length, mm	Daneshkadeh	11.39	8.88	13.13
	Dehghan	10.8	9.28	12.46
	Sayyad	11.66	10.02	13.45
	Naz	11.42	9.1	12.79
Width, mm	Daneshkadeh	6.89	5.88	7.57
	Dehghan	6.67	5.48	7.61
	Sayyad	7.19	6.31	8.39
	Naz	6.87	6.04	7.38
Thickness, mm	Daneshkadeh	5.11	3.59	6.22
	Dehghan	4.56	0.49	5.53
	Sayyad	4.44	0.399	5.62
	Naz	4.61	3.86	5.48
Geometric mean, mm	Daneshkadeh	7.37	5.9	8.4
	Dehghan	6.84	3.2	7.8
	Sayyad	7.13	3.04	8.34
	Naz	7.11	6	7.73
Sphericity, %	Daneshkadeh	64.7	60	73.8
	Dehghan	63.4	29.6	70.4
	Sayyad	61.2	27.8	66.3
	Naz	62.4	56.9	67.03
Weight, g	Daneshkadeh	0.296	0.14	0.42
	Dehghan	0.24	0.13	0.35
	Sayyad	0.289	0.2	0.44
	Naz	0.26	0.18	0.32
Volume, cm^3	Daneshkadeh	0.25	0.12	0.35
	Dehghan	0.2	0.11	0.27
	Sayyad	0.25	0.17	0.42
	Naz	0.21	0.13	0.28

Table 2. Static and dynamic coefficients of friction of bean cultivar

Material surface	Bean cultivar	Static CoF	Dynamic CoF		
			Moving velocity, m/s	4	8	12
Galva. steel	Daneshkadeh	0.296		0.23	0.22	0.18
Tarpaulin	Dehghan	0.441		0.44	0.415	0.397
Rubber	Sayyad	0.4		0.35	0.33	0.3
Galva. steel	Naz	0.36		0.34	0.26	0.22
Tarpaulin	Daneshkadeh	0.42		0.407	0.335	0.26
Rubber	Dehghan	0.465		0.439	0.407	0.35
Galva. steel	Sayyad	0.34		0.3	0.28	0.19
Tarpaulin	Naz	0.45		0.44	0.405	0.37
Rubber	Daneshkadeh	0.39		0.39	0.35	0.28
Galva. steel	Dehghan	0.277		0.255	0.23	0.19
Tarpaulin	Sayyad	0.45		0.41	0.39	0.35
Rubber	Naz	0.42		0.425	0.39	0.25

For beans, the dynamic coefficient of friction was less in value than static coefficient of friction, however for high moisture content, chopped forage or plant tissue, the dynamic coefficient of friction does exceed the peak static coefficient of friction (ASAE, 1990; Mekvanich and bagnall, 1978). The static and dynamic coefficient of friction of bean seeds on three surfaces are presented in Table (1) and it was observed that the static coefficient of friction is higher than dynamic coefficients of friction. Both the static and dynamic coefficients of friction were highest in rubber, followed tarpaulin and galvanized steel. This may be due to smoother and more polished surface of galvanized metal than other test surfaces. These results was agree with the behavior of dry engineering materials as noted by Mohsenin (1986), who observed that the friction force decreases as the sliding velocity increases.

The analysis of variance showed a significant effect of moving velocity on dynamic coefficient of friction. Generally, the dynamic coefficients of friction for bean cultivars decreased as the velocity increased. The lowest dynamic coefficient occurred at 12 m/s for galvanized steel and highest occurred at 4 m/s for tarpaulin (Table 2).

Impact force

The means of split and cracked damage in beans and the percentage of seed germination at various impact energy levels are shown in Table 3. It was observed that the magnitudes of physical damage in Sayad beans (Table 2) were higher than Naz, Daneshkadeh and Dehghan respectively. The average loss of germination to beans decreased with increasing impact energy. All two independent variables namely, impact energy and variety had significant effect ($P<0.01$) on the measured values. Figure 3, 4 shows the value of strain energy and Coefficient of restitution of four beans. Bean damage increased as the impact energy increased which was also the case for soybeans (Evans, et al. 1990; Paulsen et al. 1981). A decrease in percent germination was observed as the impact energy increased.

Germination in Naz and Sayyad (Red color) was low in high level impact energy (1.035 j).

CONCLUSIONS

Based on the results of this study, the following conclusions can be drawn:
. The value of dynamic CoF was less than static CoF and both of them were highest in rubber, tarpaulin and galvanized steel respectively.

Table 3. The means of damage in beans at various impact energy levels

Bean Genotypes		1.035	0.990	0.955	Control
Daneshkadeh	Split	30%	0	0	0
	Cracked	0	10%	0	0
	Germination	40%	60%	70%	90%
Naz	Split	40%	10%	0	0
	Cracked	0	10%	0	0
	Germination	30%	60%	80%	86%
Sayad	Split	50%	0	0	0
	Cracked	0	20%	0	0
	Germination	30%	60%	90%	90%
Dehghan	Split	20%	0	0	0
	Cracked	0	0	0	0
	Germination	50%	70%	90%	100%

(Impact energy levels, J)

. The relationship between loss of germination resulting from the impact tests using different variables were well defined. A decrease in percent germination was observed as the impact energy increased.
. To avoid bean seed damage and thereby to avoid decreased germination capacity during preparation of seeds for sowing, the impact energy level of seed should not exceed 1 J.
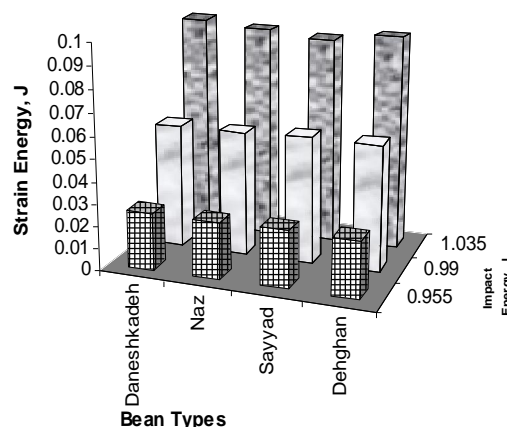
Figure3. Strain energy for four beans
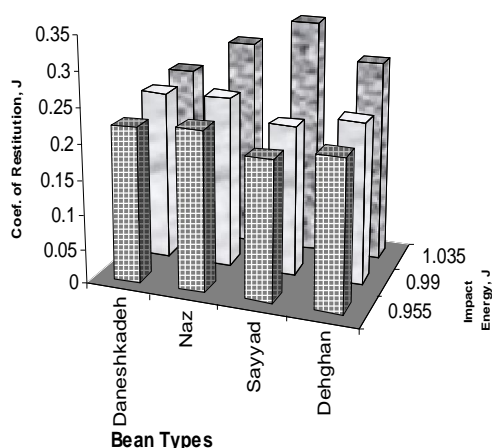
Figure 4. Coefficient of restitution for four beans

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Stimulation effect of some bioregulators on flowering, chemical constituents, essential oil and phytohormones of tuberose   (*Polianthes tuberos L.*).

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Abstract: Bulbs of tuberose plants were soaked (24h) or sprayed with solutions of spermidine and ATP at 50, 75 or 100ppm for each. Both bioregulators (especially at 100 ppm) augmented plants bulblets and flowering characteristics (No. of bulblets, fresh and dry weights of bulblets, no of days to flowering, No of florets/spike, spike length, length of rachis and fresh and dry weights of spike) Spermidine was more effective than ATP for bulblets parameters but ATP was preferred for flowering parameters, photosynthetic pigments (Chl a, b and carotenoides), chemical constituents of plants (Indoles, phenols and total carotenoides). Essential oil content of flowers was significantly improved by soaking or spraying of ATP at 50, 75 or 100ppm. The highest amount of endogenous GA3 produced with ATP at 100ppm. However, spermdine (100ppm) caused the highest amount of cytokinins. Using ATP as soaking or spraying treatment at 75 or 100ppm resulted in the highest amount of ABA.

1-INTRODUCTION

Polianthes tuberose linn (Family, Amaryllidareae) is a night blooming plant that distributed in hotter parts, mainly south America or Mexico. Besides its popularity as an ornamental garden plants with beautiful blossoms, flowers are used in perfume industry and also diuretic and emetic activity. Bulbs are used for curing raches in infant (Rammamurthy *et al.,* 2010)[1].

Spermidine is one of the major polyamine forms in plants. Polyamines are low-molecular weight polycations constitute a part of the overall nitrogen metabolism and the nitrogen source in the nutrient solution determines the polyamine synthesis and accumulation in plant (Altman and Levin, 1993)[2] . It was suggested that polyamines are able to bind with several negatively charged molecules, such as DNA (Pohjanpelta and Holtta, 1996)[3], protein (Apelbaum *et al.,* 1988)[4], membrane phospholipids and proteins (Tassoni *et al.,* 1996)[5] and pectic polysaccharides (D'oraci and Bangi, 1987)[6]. Polyamines were localized in the vacuoles, mitochondria and chloroplasts (Abd El-Wahed and Krima, 2004)[7]. They modulate several growth and developmental processes viz., cell division, differentiation, flowering fruit ripening, embryogenesis, senescence and rhizogenesis (Kakkar *et al.,* 2000)[8].

Phosphorus plays an important role in many enzyme reactions depending on phosphorylation and energy conservation and transfer for a wide range of biochemical processes (Walker, 1980[9]; Stevenson, 1986[10]; and Marshner and Cakmak, 1986[11]).

Phosphorus nutrition is doubly critical because the total supply of phosphorus in most soils is low and is not readily available for the plant use. Most of the basically adenosine- tri- phosphate (ATP) generating pathway, i.e. photophophorylation, glycolysis, TCC-Cycle, and oxidative phosphorylation are restricted [Lyons and Breidenbach (1990)[12] and Ortiz (1991)[13]]. In addition, synthesis of bioconstituents, minerals uptake, translocation and retention processes are dependent on the adenosine tri-phosphate (ATP) supply (Mengel and Kirkly, 1982). Besides the involvement of ATP in the system of gene expression and function, it is also directly involved in gene (DNA) structure (Dashek, 1997)[15]. The AMP (the hydrolytic derivative of ATP) is the main precursor of cytokinins (Jameson, 1994)[16].

Phytohormones regulate the protective responses of plants against both biotic and abiotic stresses by means of synergistic or antagonistic actions (Schemlz *et al.* 2003)[17].

The major objective of this investigation was to determine the effects of spermidine as polyamine and adenosine-tri-phosphote (ATP) on the promotion of plant growth flowering, chemical constituents, essential oil content and endogenous phytohormons of *Polianthes tuberosa* L.

2-Materials and Methods

The field experiments were carried out in Oseim district, 6 of October governorate during the two successive seasons 2008 and 2009. The aim of study was to investigate the effect of spermidine and ATP soaking and foliar application on the flowers, essential oil content and some chemical constituents of *Polianthes tuberosa L.* plants.

Experimental procedures: Bulbs of tuberose were obtained from ornamental plant research Dept., Ministry of Agric, Egypt for cultivation. The soil is clay loam in texture (sand 37, silt 28 and clay 35%), tented to alkalinity in reaction (pH 7.91). It had low content of calcium carbonate (2.04%); organic matter (1.40%) and E.C. (0.45ds/m). High in available phosphorus, potassium (3.2 and 78mg/100g soil), and low in available Fe, Mn, Zn, Cu (9.3, 3.24, 0.84, 0.89 mg/100g soil), respectively.

On April, 2008 and 2009 bulbs of tuberose plants were soaked in prepared solution of spermidine and ATP reach at 50, 75 and 100ppm for 24h. after that planted in rows, at spacing of 30 cm between bulbs within each row, and 60cm between rows. The plants were fertilized with 80: 40: 60 g/m^2 from NPK, calcium superphosphate (15.5% P_2O_5) was added before planting while the plant were fertilized with ammonium nitrate (33.5%) and potassium sulphate (48% K_2O) after 30 days from planting at two side dressings. Plants were sprayed three times with spermdine and ATP each at (50, 75 and 100ppm). The control plants were sprayed with water. The experiments were set up in a completely randomized block design with three replications. After the flowering period of each season, the following data were recorded, number of days to flowering, spike length (cm), spike diameter (cm), length of the rachis (cm), number of flowers/spike, fresh and dry weight of spike (g), No.of bullblets /plants, fresh and dry weight of bulblets (g). Treatments were arranged in a complete block design with three replicates. The data were statistically analyzed using analysis of variance according to Snedecor and Cochran (1980)[18].

Chemical Analysis : Soil surface samples (0-30 cm depth) were taken before planting from the experimental site. Soil was air-dried and sieved through 2mm sieve. Physical and chemical characteristics, were evaluated according to Ankerman and Large (1974)[18]. Total carbohydrates were determined in the ground line dry powder of tuberose plants using the colorimetric method described by Herbert et al. (1971)[20], photosynthetic pigments including chlorophyll (a and b) as well as carotenoids content were determined in fresh branchlets as mg/gm fresh weight, according to the producer achieved by Saric *et al.* (1967)[21].

Total phenols : 1gm of the fresh leaves were macerated in 5-10 ml 80% ethanol for at least 24 hr at 0°C, the alcohol was clarified the remained residue was re-extracted with 5-10ml 80% ethanol 3times. At the end, the clarified extract was completed to 50 ml using 80% ethanol. The colorimetric method of folin-Denis as described by Daniel and George (1972)[22].

Endogenous phytohormones :

The shoot of the plants of this group were frozen in liquid nitrogen and stored in deep freezer at -20°C until used for estimation of endogenous hormones.

Endogenous phytohormones were determined by using HPLC method

The frozen plant material were homogenized with absolute ice clod methanol in wavering blander and stored at 3°C for 24h. The alcohol was filtered and two subsequent extraction were carried out using 80% ice cold methanol and the alcoholic extracts were evaporated to aqueous phase as described by (Badr *et al.,* 1971)[22]. The aqueous phase was adjusted to pH 8.2 and partitioned three times against equal volumes of petroleum ether according to (Van Bragt, Laba, 1969)[24].

Separation of gibberellins, auxins and cytokinins were carried out according to Hiraja *et al.,* (1972)[25]. Endogenous hormones IAA, GA3 and were determined by their absorption at 269 nm. The peak area of the samples were compared to the corresponding peak areas of a standard solution containing known concentration analyzed using a waters 54100 high performance liquid chromatography (HPLC).

3-Results and Discussion

Bulblets and flowering characteristics

Data given in Table 1 show that soaking treatment of spermidine at 100ppm was a companied by an increase in the number of bulbets, fresh and dry weights of bulbets as well as number of florets/ spike length and length of rachis. The increment were 55.5%, 86.1% and 56.6%, 29.61, 20.3% and 4.2%, respectively as compared with control plants in the two seasons. While, the application of spermidine at 100ppm as spraying treatment caused the highest fresh and dry weights of spike (100.31 and 27.71, respectively).

Relations between polyamine and flowering processes have been observed by many investigators. In cherry flower buds, polyamines that increase rapidly with the onset of active metabolism were dected in all stages of bud development (Wang et al., 1985)[28]. Conjugated polyamines are known to be associated with the physiology of flowering metabolite synthesis

(Slocum and Galston, 1985)[27]. Spraying *Calendula officinalis* plants with brassinosteroid significantly promoted their flowering characteristics (Shalaby and Talaat, 1998)[28]. Nahed *et al.* (2009)[28] found that application of putrescine at 200 ppm had a promative effect on cormlets and florets caracters of gladiolus plants.

　　Regarding the effect of ATP, it was found that (Table 1) the best results in bulblets and florets parameters (No of day to flowering, No of florets/spike,

spike length, length of rachis, fresh and dry weight of spikes were obtained by using soaking treatment of ATP at 100 ppm.

　　Rawia *et al.,* (2009)[30] on *Matthiola incana* L. indicated that ATP application was considered the most effective treatment for increasing growth characters i.e No of flowers and dry weight of flowers. This may be attributed to the major role of ATP in plant metabolism according mengel and Kirkly (1982)[14].

Table (1): Effect of spermidine and ATP on tuberose bulblets and flowering characteristics (mean of the two seasons).

Concentration (ppm) Treatment		No. of bulblets	F.w of bulblets (g)	D.W of bulblets (g)	No of days to flowering	No of florets /spike	Spike length (cm)	Length of rachis (cm)	F.W of spikes (g)	D.W of spike (g)
Soaking										
Sperimidine	Control	12.23	17.80	2.45	91.2	20.11	68.21	2.81	80.23	18.00
	50	20.53	71.07	3.81	89.30	22.62	73.25	3.00	85.63	21.42
	75	24.11	83.50	4.51	86.10	25.14	83.11	3.62	90.21	24.11
	100	27.51	127.90	5.65	86.40	28.60	85.62	4.90	97.41	26.71
ATP	50	18.71	64.50	3.15	84.53	30.40	77.42	4.11	100.25	28.41
	75	22.82	81.20	4.18	84.53	32.11	88.32	4.71	105.3	30.18
	100	26.32	100.30	4.74	82.10	36.21	91.25	5.32	109.2	33.47
Spraying										
Sperimidine	50	17.21	86.11	2.87	89.3	22.21	70.23	2.85	77.61	16.31
	75	23.00	80.21	3.97	86.3	23.11	76.21	4.22	81.14	17.94
	100	25.21	111.41	5.00	86.00	26.71	82.74	4.28	100.31	27.71
ATP	50	16.80	61.35	1.83	84.62	26.22	72.12	3.82	78.53	17.89
	75	21.41	78.92	3.21	84.65	28.52	78.07	4.42	85.21	23.41
	100	23.58	88.31	3.97	84.69	32.22	83.51	4.58	103.43	29.84
LSD (0.05)		3.52	0.81	0.32	1.38	0.31	1.81	0.04	2.52	1.11

Photosynthetic pigments:

　　The data recorded in table 2 show that soaking treatment of ATP at 100 ppm significantly increased chlorophyll a, b and a+b to highest amounts (0.57, 0.25

and 0.82 mg /g. F.W, respectively) followed by soaking treatment of spermidine at 100ppm. Whereas, application of spermidine or ATP as spraying treatment (100 ppm) increased carotenoides content to highest

values (0.69 and 0.67 mg/g F.W, respectively) in tuberose plants as compared with control (Table 2). These results indicated that tuberose plant content of pigments responds to spermidine and ATP applicaton positively. This could be due to the spermidine capability (as polyamine) to stabiles protoplast and prevent both loss of chlorophyll during senescence in protoplast and leaves (Kaur-Sawhney, 1980)[31]. Ma *et al.,* (1996)[32] suggested that he effect of polyamines in inhibiting chlorophyll degradation may be related to the inhibition of peroxidase activity. Increasing

carotenoids content may due to convert these substances to pyruvic acid that led to enhance bioynthesis of leaf carotenoids (Martin – Tanguy, 2001)[33].

Regarding the effect of ATP, the above mentioned results are in harmony with those obtained by Rawia *et al.,* (2009)[30] who observed that the highest values of chlorophyll a and b in *Matthoila incana* plant was obtained from ATP application.

Table (2).   Effect of spermidine and ATP on photosynthetic pigments (mg/g F.w)of *Polianthes tuberose* L (mean of two seasons).

Concentration (ppm) Treatment		Chl a	Chl b	a+b	Carotenides
		Soaking			
	Control	0.21	0.09	0.30	0.23
	50	0.25	0.16	0.41	0.28
Spermedine	75	0.29	0.18	0.49	0.34
	100	0.43	0.22	0.65	0.37
	50	0.52	0.20	0.72	0.50
ATP	75	0.56	0.23	0.79	0.57
	100	0.57	0.25	0.82	0.64
		Spraying			
	50	0.20	0.14	0.34	0.52
Spermedine	75	0.27	0.17	0.44	0.60
	100	0.34	0.22	0.56	0.69
	50	0.47	0.15	0.62	0.61
ATP	75	0.49	0.17	0.66	0.65
	100	0.53	0.22	0.75	0.67
LSD (0.05)		0.002	0.004	0.001	0.004

Chemical constituents:
Total indoles :

Data presented in table 3 show that spermindine and ATP significantly affected total indoles content of *Polianthes tuberose* plants. This was shown by the increased indoles content in plants with soaking or spraying spermidine or ATP at 100 ppm which were significantly variable compared to the effect of the control. This showed that spermidine treatments enhanced phytohormons which can play an important role as regulator of growth and development of plant endogenous polyamine (Shunquan *et al.,* 2001)[34]. In the same time, role of ATP in activating most processes in plant metabolism was mentioned by Mengel and Kirkly (1982)[14].

Total soluble phenols :

Data presented in Table 3 show significant differences in total soluble phenols content of *Polianthes tuberose* plants as a result of spermidine or ATP application. Spraying spermidine treatment at

100ppm increased the phenolic content to the highest value (19.2mg/g F.w) followed by ATP at 100 ppm as soaking or spraying treatment (15.2 and 15.6, respectively). Spermidine treatment at 100ppm (soaking or spraying) was more effective than the ATP one. It could be due to the convertion of spermidine into another substance in the plant. It could derive from sugars, free amino acids, phenolic compounds and essential oil (Abd El-Wahed *et al.,* 2004)[7]. Spermidine converts to diaminopropane that can be converted into β-alanine, which in turn deaminates the production of cinnamic and para coumaric acids, respectively, from which the more complex phenolics are converted (Herrman, 1976)[35].

Total carbohydrate content :

Data in table 3 show the total carbohydrate % in tuberose plants. It can be emphasized that application of ATP at 100 ppm (soaking or spraying) resulted in the highest values of total carbohydrates (25.3% and 23.21%, respectively) followed by soaking treatment of ATP at 75ppm and spermidine at 100ppm

(22.5 and 22.2, resespectively) as compared with control. These results were confirmed by those of Dessouky (2002)[35] on *Borago officinalis* and Rawia (2004)[30] on *Mattiolia incana.*

Essential oil content (%) :

Data presented in Table 3 indicate that application of spermidine or ATP as soaking or spraying treatment significantly affect tuberose essential oil percent. It could be deduced from the present results that essential oil percent increased to highest percentage by application of ATP as soaking or

spraying treatment at 50, 75 or 100 ppm followed by similar treatments of spermidine as compared with control. These results are in close agreement with those reported by Baljieet *et al.,* (1996)[36] on *Guizatia abyssinica,* Shalan (2001)[38] on *Lagenaria siceraria,* Dessouky (2002)[36] on *Borago officinalis* and Abd El-Wahed *et al.* (2004)[7] on *Chamomilla recutita.*

Table 3: Effect of spermidine and ATP on chemical constituents and oil content (%) of *Polianthes tuberose L.* (mean of two seasons).

Treatment concentration (ppm)		Indoles mg/g F.w	Phenoles mg/g F.W	Carbohydrates (%)	Oil percentage (%)
		Soaking			
	Control	1.56	12.5	10.74	0.18
	50	2.34	13.4	15.9	0.21
Spermedine	75	2.73	14.6	20.1	0.23
	100	3.42	16.7	22.2	0.27
	50	3.11	9.3	17.3	0.32
ATP	75	3.89	10.8	22.5	0.38
	100	3.91	15.5	25.3	0.39
		Spraying			
	50	1.89	15.7	14.41	0.19
Spermedine	75	2.46	17.8	16.32	0.20
	100	3.47	19.2	18.52	0.25
	50	2.76	11.3	16.82	0.30
ATP	75	3.94	13.4	20.43	0.33
	100	3.99	15.6	23.21	0.35
LSD (0.05)		0.04	0.138	1.11	0.002

Phytohormos

The data recorded in table 4 show that the detected amounts of endogenous gibberellin (GA₃), total cytokinins and Absecic acid (ABA) content in tuberose plants significantly affected by spermidine and ATP treatments. The highest amounts of endogenous GA₃ (26.21 and 26.43ng/g) were recoded with ATP at 100 ppm as soaking or spraying treatment followed by spermidine at 100 ppm (spraying treatment) as compared with control treatment. On the other hand, application of spermidine at 100 ppm as soaking treatment resulted in the highest amount of total cytokinins (391.21ng/g fw) followed by soaking or spraying treatment of ATP which gave 382.13 and 385.00ng/g FW respectively. Also the application of ATP at 75 or 100ppm as soaking or spraying treatment resulted in the highest amounts of ABA (35.11, 37.21, 31.11 and 33.41 ng/g FW respectively) as compared with control plants.

In this respect Mahgoub *et al.* (2006)[39] reported that treated carnation plants with puterscine at the rate of 200 and 400 ppm increased the contents of

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endogenous promoters (IAA, GA₃ and cytokinins) in comparison with those obtained from the untreated plants. On the other hand, application of the same treatment caused dramatic reduction in the level of endogenous natural inhibitor (ABA).

It has been shown that polyamines interact in some way with all plant hormones. Polyamines like cytokinins have antisenescence activity (Altman, 1989)[40]. Polyamines have been ascribed various roles such as that of a new class of plant growth regulators, hormonal second messengers and as one of the reserves of carbon and nitrogen at least in cultured tissues (Slocum and Flores, 1991)[41].

In addition, the consequence of spermidine degradation can be the products of a precursor for other growth substances in plant (Abd El-Wahed, 2006)[42].

The results may be attributed to the major role ATP in activating most processes in plant metabolism (Mengel and Kirkly, 1982)[14]. The AMP (the hydrolytic derivative of ATP) is the main precursor of cytokinins (Jameson, 1994)[16]

Table 4: Effect of spermidine and ATP on endogenous *phytoromons* (ng/gm Fw) of *Polianthes tuberose* L. (mean of two seasons)

concentration (ppm) Treatment		GA3	Total cytokinines	ABA
		Soaking		
	Control	16.32	260.41	6.73
	50	18.41	280.56	15.21
Spermedine	75	22.22	385.52	22.14
	100	24.42	391.21	27.08
	50	19.75	255.1	30.00
ATP	75	24.32	367.33	35.11
	100	26.21	382.13	37.21
		Spraying		
	50	17.25	270.13	13.41
Spermedine	75	20.11	341.21	20.28
	100	22.18	356.23	24.21
	50	17.62	273.41	26.25
ATP	75	22.56	380.31	31.11
	100	26.43	385.00	33.41
LSD (0.05)		0.83	1.31	1.48

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Lens Protein Changes Associated With Cigarette Smoking

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Abstract: Purpose: Smoking is an independent risk factor that has dose-response effect. The goal of the present work is to study the biophysical and biological effects of smoking on the crystalline lens of the rabbits. **Materials and methods**: Twenty New Zealand albino rabbits used in this study were classified into five groups in which group I (n=4) served as control. The other groups were exposed to different durations of cigarette smoke (five cigarettes per day). Animals were decapitated after 2, 4, 6 and 8 weeks and soluble lens proteins were separated and the following measurements were carried out: estimation of total soluble protein, refractive index measurement, sodium dodocyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) and determination of sodium, calcium and potassium concentrations. **Results**: The results showed that, exposure of the animals to cigarette smoke resulted in decrease of the protein concentration and potassium content that was accompanied by an increase in the refractive index of the soluble lens proteins and an increase in sodium and calcium content. In addition, there were changes in the molecular structure of soluble lens proteins demonstrated by SDS-PAGE. **Conclusion**: smoking causes morphological and functional changes to the lens that may lead to cataract.
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Key words: Ultrasound, Rabbits, Lens, Refractive index, Proteins, SDS

1. Introduction

Cigarette or tobacco smoking is a well-recognized major risk factor for a wide range of diseases, such as cardiovascular, respiratory, and malignant diseases[1]. Human[2,3,4] and animal studies[5,6,7] have demonstrated that maternal smoking has several detrimental and teratogenic impacts on pregnancy and its outcomes such as placental insufficiency, foetal growth retardation, low birth weight, foetal brain damage, and sudden infant death syndrome. Smoking also has adverse ocular effects. It has been shown to be a risk factor for many common and severe eye diseases, such as Graves' ophthalmopathy[8], age related macular degeneration [9], glaucoma [10], and cataract [11,12,13]. Many of these diseases lead to irreversible blindness. The epidemiological relationship between smoking and cataracts has been well studied by case-controlled [14,15], cross-sectional [16,18], and prospective studies [19-20]. There is a dose-response relationship between the cumulative amount of smoking and the risk of nuclear cataract developing [21]. A major teratogenic component of tobacco smoke responsible for adverse effects is nicotine. A typical smoker using 20 cigarettes a day will absorb about 0.3 mg/kg nicotine daily, resulting in peak plasma nicotine concentrations in the range of 10 to 50 ng/ml[22,23,24]. The present work deals with the biophysical and biological effects of smoking on the crystalline lens of the rabbits after different periods of exposure namely 2, 4, 6 and 8 weeks to provide support for the hypothesis that cigarette smoking increases the risk of cataract formations.

2. Materials and methods

Twenty New Zealand albino rabbits with an average body weight of 2.5±0.5 Kg were selected from the animal house facility at the Research Institute of Ophthalmology, Giza, Egypt. The research protocol was approved by the local ethical committee that applies the ARVO (THE ASSOCIATION FOR RESEARCH IN VISION AND OPHTHALMOLOGY) statements for using animals in ophthalmic and vision research. The animals were classified into five groups in which group I (n=4) served as control. The other groups were exposed to cigarette smoke (five cigarettes per day) [25] by using eye speculum to insure that their eyes were exposed to smoke. Groups II, III, IV and V were exposed to smoke for 2, 4, 6 and 8 weeks, respectively. Animals were decapitated after different periods of exposure and eyes were enucleated. Then, the lenses were freed from the eye. The lenses without their capsules were weighed, homogenized separately in de-ionized water and centrifuged at 16,000 rpm to extract soluble lens proteins then stored at -20°C for the following measurements.

Estimation of total soluble lens proteins:

Total proteins in the soluble part of the crystalline lens were determined by the method of Lowry et al.[26].

Refractive index:

The refractive index of native soluble lens protein was measured using Abb's-refractometer attached with temperature control unit type W Lauda (Germany).

SDS polyacrylamide gel electrophoresis:

Soluble lens proteins were separated according to their molecular weights by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) according to Laemmli[27] using 5% stacking gel and 12% separating gel. The data represented graphically with an automatic scanner (model R-112, manufactured by Beckman).

Sodium (Na^+), Potassium (K^+) and calcium (Ca^{++}) content:

Sodium, potassium and calcium content in lens homogenate were recorded using atomic absorption spectroscopy in order to study the membrane permeability of the lens.

Statistical analysis:

Data were expressed as the mean ± SD. Comparison between groups was performed using analysis of variance (ANOVA), commercially available statistical software package (SPSS-11, for windows) was used where the significance level was set at $p < 0.05$.

3. Results:

Fig (1) shows the total soluble lens proteins of control and exposed rabbits to cigarette smoking after 2, 4, 6 and 8 weeks. The protein concentration in control (group I) was 290.7±3.5 mg/g lens tissue wet weight. After 2 week of exposure to smoke the protein content was 288.1±3.9 that indicate no change in group II. But the rest of exposed animals' groups show a significant decrease in the soluble lens protein content to 280±4 (group III), 260.4±5.2 (group IV) and 255±4.3 (group V) after 4, 6 and 8 weeks, respectively.

Fig (2) shows the refractive index of soluble lens protein for control and after exposure to smoke for all periods. It is clear from the figure that the groups exposed to smoke were characterized by an increase in the refractive index relative to control, except group II.

Fig 1. Protein concentration of rabbit lens for control and after exposure to smoking for different periods.
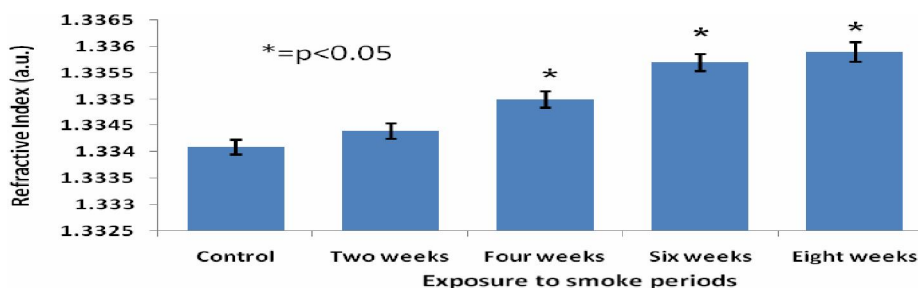
Fig 2. Refractive Index of rabbit lens protein for control and all groups exposed to smoking for different periods.

Panel (a) of Fig (3) shows the electrophoretic patterns of lens proteins for control rabbits, it was characterized by the presence of 10 peaks, which reflect the different soluble protein fractions with specific intensities and broadening that covered the molecular weight range 39 – 178 KDa. In panel (b) of fig (3), the patterns of lens proteins for group II which were exposed to cigarette smoke for 2 weeks revealed no change in the electrophoretic mobility and the intensity of all peaks proteins fractions. After 4 weeks of exposure to cigarette smoke (panel c of fig 3), the pattern revealed some shift to high molecular weight for all fractions and covered the molecular weight range 42-183 KDa. Also a decrease in the intensity of the 75 KDa peak is observed to be 0.1 compared to the control which is 0.17. Panels (d) and(e) of fig (3) shows the electrophoretic pattern of soluble lens proteins for animals exposed to cigarette smoke for 6 and 8 weeks, respectively. The two

patterns revealed propagation of the same phenomenon; shift in all fractions to high molecular weight and covered the molecular weight range 40-185 KDa and 65-195 KDa after exposure to smoke for 6 and 8 weeks, respectively. Panel (d) characterized by decrease in the intensity of low fractions mobile groups. Also panel (e) (8 weeks exposure to smoke) is characterized by reduction of fractions to 9 peaks.

The cigarette smoke influence on the concentration of cations in the lens protein homogenates was illustrated in Figs 4-6. Sodium, Ca^{++} and K^+ concentrations did not change after 2 weeks of exposure to cigarette smoke. Four, 6 and 8 weeks of exposure produced a remarkable increase of both Na^+ and Ca^{++} concentrations in exposed rabbits (Fig 4, 5). On the contrary exposure to cigarette smoke caused a pronounced decrease of K^+ concentration with respect to control samples (Fig 6).
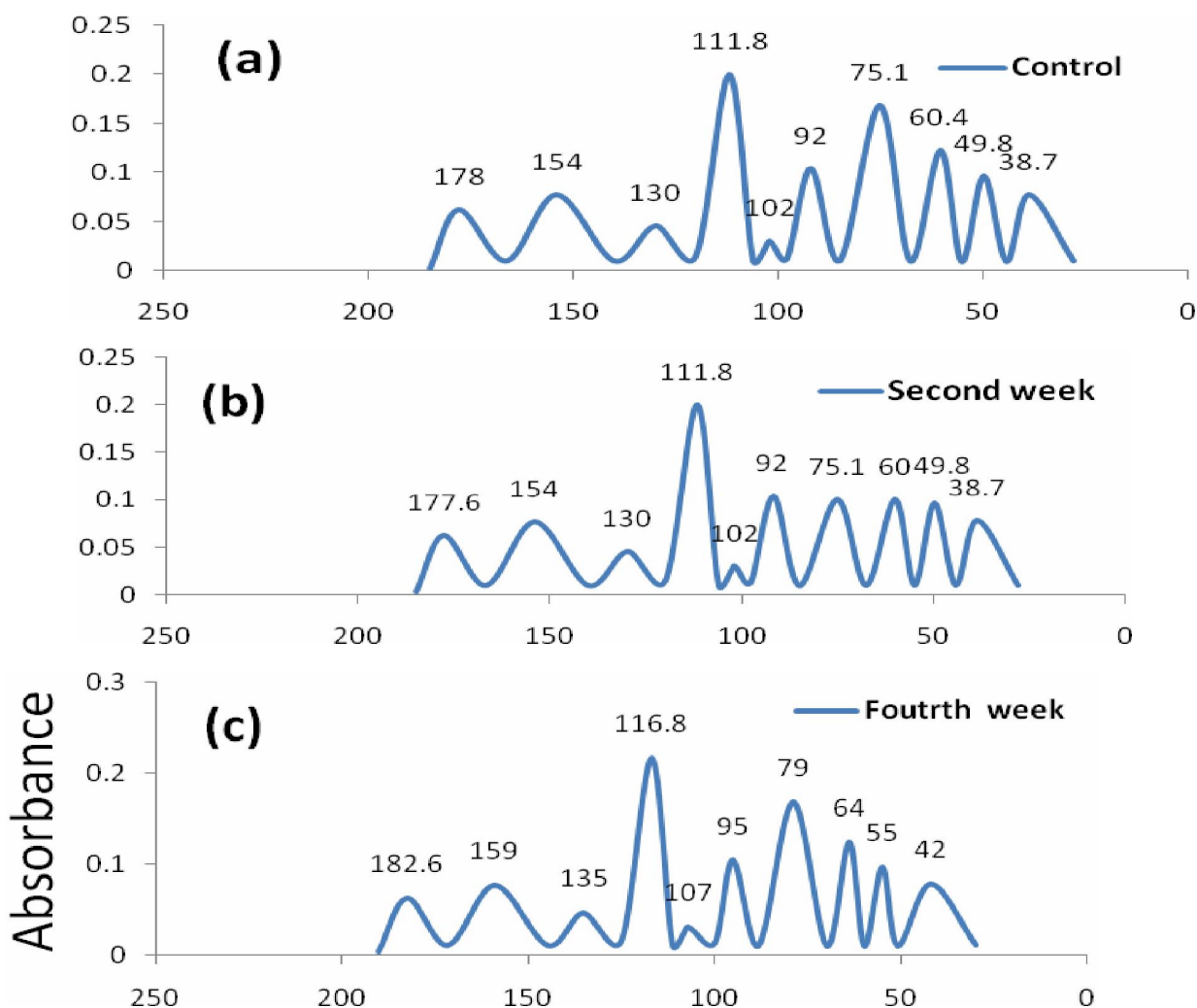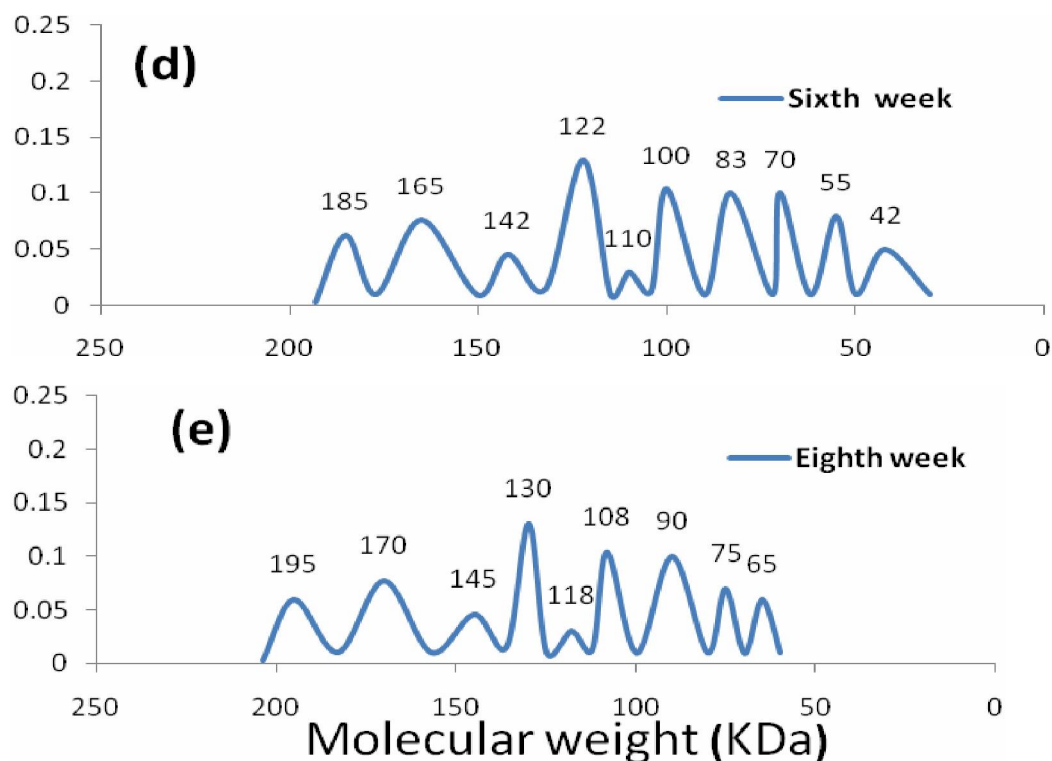
Fig 3. Electrophoretic pattern for (a) control animals, (b), (c),(d) and (e) animals exposed to cigarette smoking for 2,4,6 and 8 weeks, respectively
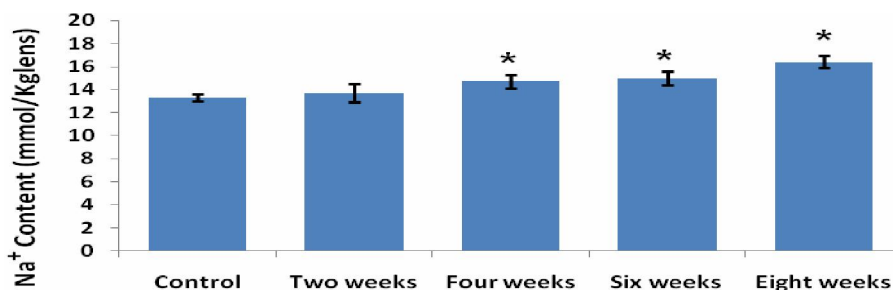
Fig 4. Sodiem concentration in lens homogenate of control and exposed to smoking for different periods.
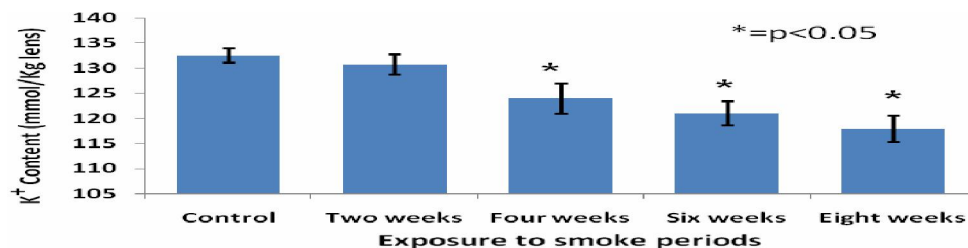
Fig 6. Potassium concentration in lens homogenate of control and groups exposed to smoking for differemt periods.

4. Discussion

Cigarette smoke contains numerous organic and metallic compounds emitted as gases and condensed tar particles, many of them being oxidants and prooxidants, capable of producing reactive oxygen species (ROS). These chemically ROS are known to be present or formed in cigarette smoke which may lead to modification of biological macromolecules [28]. Smoking causes morphological and functional changes to the lens due to its atherosclerotic and thrombotic effects on the ocular capillaries. Smoking also enhances the generation of free radicals and decreases the levels of antioxidants in the blood circulation, aqueous humour, and ocular tissue. Thus, the eyes are more at risk of having free-radical and oxidation attacks in smokers.

Total soluble lens proteins of the rabbits lens and refractive index were quantitatively changed after exposure to cigarette smoke more than 2 weeks. These changes may give an interpretation about the appearance of high molecular weight aggregates which could be attributed to the formation of new protein molecules that differ from the native protein of the control lens. Also these changes are supported by the electrophoretic studies in which shift of all fractions to high molecular weight due to either loss of surface charge or increase in the molecular weight. The present study supports the hypothesis that damage to lens cell membrane affects ion exchange mechanisms with associated formation of cataract [29,30]. It has been demonstrated that in cataract formation there is a significant increase in lens cytosolic calcium and sodium concentrations, together with a decrease in cytosolic potassium levels [31]. The results obtained in our study suggest that increased levels of calcium and sodium and decreased levels of potassium are related to the oxidative damage of cigarette smoking relative to the period of smoking time. Duncan et al.[32] studied the physiological status of human eye lens membranes of different ages in the population. One likely mechanism of cataract formation is oxidation and precipitation of lens proteins. Smoking may increase the oxidative stress in the lens that increases lipid peroxidation and decreases plasma antioxidant levels. The relationship between smoking and cataracts has been well studied [14,16,19]. There is a dose-response relationship between the cumulative amount of smoking and the risk of nuclear cataract developing [21]. Heavy smokers are more at risk than other groups. The cigarette smoking contributes to the formation of cataracts in two ways. First, free radicals present in smoke assault the eye directly, potentially damaging lens proteins and fiber cell membrane in the lens. Second, smoking reduces the body's levels of antioxidants and certain enzymes which may help remove damaged protein from the lens.

In conclusion, Smoking -if continued- may lead to cataract, perpetuate further ocular damage and lead to permanent blindness. Cessation of smoking and avoidance of passive smoking is advised to minimize the harmful effects of smoking on the eyes.

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Effect of prophylactic antibiotics (Cephalosporin versus Amoxicillin) on preventing post caesarean section infection

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ABSTRACT: Prophylactic antibiotics have been shown to be effective in reducing the incidence of febrile morbidity associated with cesarean section after labor. However, the relative effectiveness of different single antibiotics has been studied infrequently. Several new broad spectrum antibiotics are now available, and any further benefit from more traditional antibiotics for surgical prophylaxis remains untested. A randomized clinical trial for testing the efficacy of cephalosporin versus Amoxicillin in preventing post cesarean section infection, and to identify the role of health education about wound care in reducing post cesarean section wound infection. This study conducted at emergency unit of the Obstetrics &Gynecological department, Woman's Health Center, Assuit University Hospital, between 2008 to 2009. Women's undergoing emergency and elective cesarean section were recruited into the study and given either drug as prophylaxis. The sample comprised 200 pregnant women. 100 pregnant women received Amoxicillin and the other 100 pregnant women received Cephalosporin as a prophylactic antibiotic. For each group, 50 women received routine hospital wound care and the other 50 women received health education about wound care. Random assignment was done by computer generated tables. Concealed envelopes containing the random number made to be opened after deciding to include the case in the study. the -present study reported that the percent of surgical site infection (SSI) of elective cesarean section was 2.5% (0.5% in Amoxicillin group and 2% in cephalosporin group) with no significant difference between both groups. We can concluded that use of Amoxicillin as a prophylactic antibiotic as effective as Cephalosporin in preventing post cesarean section wound infection. And women that received health education about wound care are less likely to expose to wound infection than those who receive only routine hospital care, in spite that the comparative results are not significant.
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Key Words: Prophylactic antibiotics, Wound infection, Cesarean section.

Introduction

Infection is one of the most common complications of cesarean delivery. Factors that have been associated with an increased risk of infection among women who have a cesarean delivery include emergency cesarean section, labor and its duration, ruptured membranes and the duration of rupture, the use of prophylactic antibiotics or not, the socioeconomic status of the woman, number of prenatal visits, vaginal examinations during labor, anemia, blood loss, obesity, diabetes, general anesthesia, the skill of the operator and the operative technique.(John & Sons, 2007).

In the absence of prophylactic antibiotics, the rates of postpartum endometritis can be as high as 35% to 40%.This rate varies dramatically according to the clinical situation; the use of routine prophylactic antibiotics substantially reduces the rate of infection. (Peter, 2007).

Amoxicillin as a prophylaxis antibiotic do not kill bacteria, but they stop bacteria from multiplying by preventing bacteria from forming the walls that surround them. The walls are necessary to protect bacteria from their environment and to keep the contents of the bacterial cell together. Bacteria cannot survive without a cell wall. But, Cephalosporins are the most frequently prescribed class of antibiotics.(Yury,2009).

Cephalosporins are bactericidal agents, which mean that they kill bacteria. They have the same mode of action as penicillin. All bacterial cells have a cell wall that protects them. Cephalosporins disrupt the synthesis of the peptidoglycan layer of bacterial cell walls, which causes the walls to break down and eventually the bacteria die. (Jay, 2007).

General principles for the prevention of any surgical infection include skin antisepsis and antimicrobial prophylaxis. Although antibiotic prophylaxis during cesarean section has been extensively studied and generally found to be effective in preventing infection, surveys suggest inconsistent and variable application of recommendations for its use. Questions remain about the indications for prophylaxis, the choice of drug (whether a broad

spectrum or longer acting agent is better), its route, timing and frequency, the cost-effectiveness of different strategies, adverse effects of antibiotics for the woman and her infant. Particularly controversial is whether antibiotic treatment should be given to all mothers or only to those at greatest risk of infection.(John& Sons, 2007).

In women undergoing either elective or non-elective cesarean section with no signs of infection before the operation, the use of prophylactic antibiotics has been shown to reduce the risk of endometritis by two thirds to three quarters (Smaill,2007).The reduction of wound infection by three-quarters justifies giving prophylactic antibiotics for non selective C.S.(Blado,2008) .

A guideline for preventing surgical site infection developed by the American Centers for Disease Control and Prevention(CDC, 2005) recommended that sterile dressings should be used to protect the incision for 24 to 48 hours postoperatively. The guideline also recommends educating patients and their families on wound care, including symptoms of infection and the need to report such symptoms. There was no recommendation that incisions primarily closed (when the edges of the wound incision are brought together and closed with sutures, clips, glue or staples) should be covered for longer than 48 hours. (Fernadez *et al*.,2008)

Significance of the study

The use of prophylactic antibiotics to decrease the incidence of maternal infectious morbidity following Cesarean section has been systematically investigated. The rate of cesarean section is increasing and so infection due to this procedure is expected to increase. Without prophylaxis, the incidence of endometritis is reported to range from 20 to 85%; rates of wound infection and serious infectious complications as high as 25% have been reported.(John & Sons, 2007).Several types of antibiotics are used, so the investigator is interested in studying the role of use of prophylactic antibiotic with different types of antibiotics on prevention of post cesarean section infection and the effect of health education about wound care in reducing the rate of wound infection.

Objectives

To Compare the effect of Amoxicillin versus Cephalosporin in preventing post cesarean section infection ,and Identify the role of health education about wound care in reducing post cesarean section wound infection.

Research design
This study was a Randomized Controlled Trial.

Setting

This study conducted at emergency unit of the Obstetrics &Gynecological Department, Woman's Health Center, Assuit University Hospital. Between 1/10/2008 to 30/9/2009. Follow up of the cases ended in 30/10/2009.

Participants

Women undergoing emergency and elective cesarean section were recruited into the study and given either drug as prophylaxis. Excluded patients who had established infection prior to the operation, had had any antibiotic in the preceding week, those allergic to any of the drugs, premature rupture of membranes for more than 24 hrs , diabetic and anemic pregnant women.

The sample comprised 200 pregnant women. 100 pregnant women received Amoxicillin and the other 100 pregnant women received Cephalosporin as a prophylactic antibiotic. For each group, 50 women received routine hospital wound care and the other 50 women received health education about wound care through the investigator.

Tools of data collection

Data were collected using an interview questionnaire that was designed by the researchers to collect the necessary data. It based on review of related literature and reviewed by experts from nursing, Obstetrics and Gynecological nursing and medical related specialists, it contains six sections that includes the following:-
   1) Socio demographic data.
   2) Obstetrical data.
   3) Past Obstetric history.
   4) Current pregnancy data included.
   5) Data related to the current C.S delivery.
   6) Data related to the wound infection if present.
   Data collection took place within 12 months from 1/10/2008 to 30/9/2009. Follow up of the cases end in 30/10/2009. Permission was obtained from the director of Woman's Health Center at Assuit University Hospital.

The present study carried out through three phases as follow:
Interviewing phase: In which the investigator interviewed the mother, after that explained the nature of study, full history and consent obtained from the women**.**

Intervention phase:
Women were randomized to either Amoxicillin or Cephalosporin prophylactics antibiotics groups with or without health education about wound infection. Random assignment was done by computer

generated tables. Concealed envelopes containing the random number made to be opened after deciding to include the case in the study.

Then a full medical and obstetrical history were taken from the mother, Woman's vital signs, especially temperature and pulse were taken before C.S. The pregnant woman was brought into the theater for elective C.S and type of the chosen antibiotic with her. The investigator informed the anesthetist about the dose (2gm) given intravenously and time (after cord clamping) of the given antibiotic. When the pregnant woman received anesthesia spinal or general and the Obstetrician began to make an incision the time of the beginning observed by the investigator and accounted till the end of the operation.

Through this time the investigator observed the C.S operation for:

1. Any intra-operative complications occurred
2. The dose and time of the giving antibiotic.

After C.S. operation, the investigator reminded the Obstetrician not to write any type of antibiotics in the patient's sheet as a post operative treatment.

The heath education was given in the form of:

- The wound may be painful especially when you move or cough. This is due to internal pressure on the wound. Placing a hand firmly on the wound when you cough or move will counteract this pressure and reduce the pain.
- Keep the wound dry until any stitches are removed (normally about 7 days) so, no bathing allowed.
- Do not lift heavy items for at least 6-8 weeks after the delivery
- Keep the wound clean and dry.
  - Avoid wetting the dressing if it was being wet change it quickly.
  - When you change the dressing, clean the wound with sterile anti septic solution.
  - Do not soak the wound until it is healing well, such as swimming, bathing (shower is fine)
  - Change the wound dressing day after day.
  - Use sterile dressing.
  - Avoid exposure to sun rays.
  - Avoid exposure to heat. .
  - Increase intake of vitamin C like (Lemon juice – Orange) as it improves the immunity.
  - Increase intake of iron supplementation.
  - Increase intake of protein in diet. **(**Fernadez *et al.*,2008).

Follow up phase:

In the second day after operation the investigator observed the patient and the patient sheet for hyperthermia (temperature more than 38 degree)

and if recurrent as a sign of fever. The investigator gave heath education about wound care to the woman that the envelope showed that she would receive heath education about wound care .

In the third day of the operation (day of discharge of the woman), the investigator ensured that the woman had the discharge card , the treatment was free of antibiotics and informed the woman to come back in the tenth day post operative at the out patient clinic with her follow up card. Follow up of the wound was done by the investigator and the Obstetrician to observe wound status for healing process and signs of wound infection if present.

The following postpartum complications were recorded if present:

-Febrile morbidity: Temperature of $> 38^{o}$c obtained on 2 or more occasions at least 4 hours apart and wound infections.

Signs of wound infection according to Killian *et al.* 2001 are:

- Redness or excessive swelling in the wound are
- Throbbing pain or tenderness in the wound area
- Generalized chills or fever
- Pus or watery discharge collected beneath the skin or draining from the wound
- Foul odor from the wound
- Red streaks in the skin around the wound or progressing away from the wound
- Erythema, indurations ,cellulites or purulent drainage.
- Uterine tenderness after 48 hrs.
- Offensive or purulent lochia.

Then, the Obstetrician and the investigator determined if the wound was completely healed or not. If not, the mother needed to receive therapeutic antibiotic or readmitted to the hospital to be treated from wound infection. The decision of treatment was taken by the Obstetricians according to the women's health center policy.

Results:

A total of 200 women were recruited into the study, 100 each to amoxicillin and cephalosporin antibiotic groups.

Their demographic data were presented in **Table 1.** The two groups were similar in age, education , residence and parity with no significant difference.

Concerning the admission data, **Table 2.** illustrates that both groups had similar gestational age / weeks, (majority of cases were between 36-40 wks) and similar vaginal examinations with no significant

difference. It also shows that more than one third of the woman had previous C.S as an antenatal risk factor.

      Table 3. shows data related to operation characteristics of both groups. Repeated cesarean section constituted the commonest indication of C.S followed by previous C.S & postdate, and precious baby with no significant differences. The study sample shows no significant difference in the duration of C.S and majority of cases were done under spinal anesthesia.

      The study outcome measures related to wound infection are presented in **Table 4.** the incidence of post- operative wound infection was significantly higher in Amoxicillin group (12%) versus (3%) in Cephalosporin group ,(P=0.016). It also shows that there were no significant difference among both groups regarding the side effects during intrapartum period, number of dressings, place of dressing, and the duration of wound healing.

      It was also illustrated from the present study that, women who had infected wounds(3%) did not receive health education about wound care and were not significantly higher than those received health education about wound care (2%), (P=0.361).

      As regards the relation between age groups and wound healing, it was noticed that no significant difference among women of both groups regarding age groups(P=0.392).

      Patterns of wound healing were not significantly different between both groups with regards the duration of the C.S .

      Number of PV examinations in cephalosporin and amoxicillin groups presented in this study as follow, infected wounds that take more than 20 days to heal (3%) were undergone PV examinations more than 5 times in the whole duration of labor process among both groups with no statistical significance difference (P = is 0.669).

Table 1:Women's sociodemographics characteristics.

Sociodemographic characteristics	Amoxicillin group N=(100)		Cephalosporin group N=(100)		P-value
	No	Percent (%)	No	Percent (%)	
1) Age/years					**.601**
• 16-24 years	44	44%	38	%38	
• 25-30 years	43	43%	45	45%	
• More than 30 years	13	13%	17	17%	
2) Occupation					**.516**
• Housewife	94	94%	96	96%	
• Employed	6	6%	4	4%	
3) Education					**.850**
• Illiterate	20	20%	22	22%	
• Read and write					
• Basic& Secondary education	11	11%	10	10%	
• University	53	53%	56	56%	
	16	16%	12	12%	
4) Residence					**.825**
• Urban areas	27	27%	25	25%	
• semi urban	12	12%	10	10%	
• Rural areas	61	61%	65	65%	

Values are given as frequencies and percentages

Table 2:Current pregnancy status and admission data

Variable	Amoxicillin group N=(100)		Cephalosporin group N=(100)		P-value
	No	Percent (%)	No	Percent (%)	
1) Gestational age / weeks					.117
• less than 36 wks	3	3%	0	0%	
• 36-40 wks	70	70%	79	79%	
• more than 40 wks	27	27%	21	21%	
2) Current antenatal problem					.554
• Normal	17	17%	18	18%	
• Previous C.S	41	41%	46	46%	
• Contacted pelvis	6	6%	6	6%	
• P.I.H	6	6%	1	1%	
• Olighydrominous	12	12%	9	9%	
• Polyhydrominous	1	1%	-----	-----	
• Rhesus isoimmunization	-----	-----	1	1%	
• I.U.G.R	1	1%	-----	-----	
• Congenital anomalies	2	2%	1	1%	
• More than one problem	14	14%	18	18%	
3) Number P.V examination / Times					.467
○ Not done	11	11%	13	13%	
○ 1 – 5	81	81%	83	83%	
○ More than 5	8	8%	4	4%	

Table 3:Indications for C.S and operation characteristics

Variable	Amoxicillin group N=(100)		Cephalosporin group N=(100)		P-value
	No	Percent (%)	No	Percent (%)	
1) The primary indication for C.S.					.063
• Breech in primigravida	9	9%	4	4%	
• Previous 2 or more C.S.	14	14%	34	34%	
• Previous C.S & post date	22	22%	12	12%	
• Previous C.S & decrease amniotic fluid	8	8%	7	7%	
• Malpresentation(other than breech presentation)	5	5%	5	5%	
• Precious baby	13	13%	14	14%	
• Cephalopelvic disproportion	11	11%	14	14%	
• Multiple pregnancy	2	2%	1	1%	
• Eclampsia/ pre-eclampsia	0	0%	1	1%	
• Decrease amniotic fluid	8	8%	1	1%	
• Breech presentation	3	3%	2	2%	
• Others	5	5%	5	5%	
2) Duration of C.S / minute					.786
• With in 30 min.	38	38%	41	41%	
• 31 - 60 min.	60	60%	58	58%	
• More than 60 min.	2	2%	1	1%	
3) Type of anesthesia					.651
• General	3	3%	2	2%	
• Spinal	97	97%	98	98%	

Table 4:Outcomes related to wound infection between the study groups.

Outcome variable	Amoxicillin group N=(100)		Cephalosporin group N=(100)		P-value
	No	Percent (%)	No	Percent (%)	
1) Post-operative fever					**.016**
• Yes	12	12%	3	3%	
• No	88	88%	97	97%	
2) Side effects during intra-operative period					**.953**
• None	63	63%	69	69%	
• Itching	15	15%	14	14%	
• Dizziness		11%	9	9%	
• Nausea	11				
• Vomiting		6%	4	4%	
• Itching& Vomiting	6	3%	2	2%	
	3		2		
	2	2%	2	2%	
3) Number of dressings during follow up					**.631**
• less than 5	75	75%	72	72%	
• 5 or more	25	25%	28	28%	
4) Place of dressing					**.144**
• Outpatient clinic of Assuit University hospital	2	2%	0	0%	
• Other health care unit near to the mother					
• At home	13	13%	12	12%	
• Private clinic	55	55%	68	68%	
	30	30%	20	20%	
5) Wound healing duration					**.397**
• Healing within 10 days	93	93%	90	90%	
• Healing within 20 days	6	6%	6	6%	
• Infected wound and take more than 20 days to heal	1	1%	4	4%	

Discussion

Women's Health Center Assuit University Hospital is a teaching hospital. It conducts on the average 14,000 delivery a year and had a caesarean delivery rate of 40 %(unpublished from official records). Patients who undergo caesarean delivery spend an average of 3 days on the ward in the absence of post operative morbidity. Those with complications may spend up to twice as many days on the ward. As has been found in other studies, abdominal wound infection is the major post operative complication. Any

intervention which reduces this complication will therefore speed up recovery and cut down on the length of stay on the ward.

The traditional measure of effectiveness of an antibiotic used prophylactically is the subsequent presence or absence of postpartum febrile morbidity. Broad spectrum antibiotics are available, and in this randomized controlled study, cephalosporin was compared with amoxicillin.

The present study shows no statistically significant difference as regards demographic characteristics, maternal characteristics in obstetrical history, and current obstetrical history.

The present study revealed that the great majority of women were housewives (94% in Amoxicillin group and 96% in Cephalosporin group), more than one half of them were had basic& secondary education (53% in Amoxicillin group and 56% in Cephalosporin group), and the majority of women were lived in rural areas (61% in Amoxicillin group and 65% in Cephalosporin group). These sociodemographic characteristics were typical of the clients attended, the Woman's Heath Center, Assuit University Hospital, Assuit Governerate, upper Egypt. In the same line, these findings are inconsistent with Mahmoud (2007) who showed that the majority of women, who had cesarean section, were from rural areas and housewives (82.9% and 93.6% respectively). But she presented that more than half of women were illiterate. These socio demographic characteristics were also typical of the clients attended, the Woman's Heath Center, Assuit University Hospital, Assuit Governorate. But, these findings are not totally incongruence with EDHS, (2005) in Egypt, Hildingsson, *et al.*(2002) in Sweden, and Greene, *et al* .(2005) in U.S.A. who reported cesarean section increased with the women's educational level and common in urban areas.

In this study the incidence of post- operative fever was significantly higher in Amoxicillin group (12%) versus (3%) in Cephalosporin group (P= 0.016). This was inconcurrent with the study of Ghana medical Association (GMA),(2007) who reported that post-operative fever occurred in 5.6% and 7.5% in the Co-amoxiclav and triple therapy groups who compare the efficacy of co- amoxiclave (amoxicillin + clvulanic acid) and the triple therapy of ampicillin + gentamycin + metronidazole as prophylactic antibiotic during cesarean section.

Concerning the indications of cesarean section, the present study findings revealed that, the previous two or more cesarean sections included nearly one fourth of the women (24%) as a primary indication of cesarean section, 17% for previous cesarean section and post date, and 7.5% for previous cesarean section and decrease oligohydraminous. This finding is in agreement with Mahmoud (2007), in Assuit University, who found that the main indication for cesarean sections was repeated cesarean section n (20.1%). This is agreed nearly with Gulfareen *et al* (2009) who showed that the percent of repeated cesarean section as primary indication was (19.2%).

Regarding number of P.V examinations, the present study showed no significant difference between the two groups (P= 0.467). It presented that the majority of women were examined between 1-5 times (81% in Amoxicillin group and 83% in Cephalosporin group). Similar finding concerning with the study of Tippawan (2005), this study showed that more than one half (56.8%) of women were examined per vagina from 1-5 times. And all cesarean sections were included elective and emergency cesarean section. Olson *et al*, (2008) found no statistically significant difference between two groups (case and control group) (P= 0.408) and the majority of women (60.5% in case group and 61.9% in control group) were examined vaginally between 1-6 times before cesarean section.

Regarding duration of cesarean section the present study showed that majority of women (60% in Amoxicillin group and 58% in Cephalosporin group) their operation were ended within (31-60) minute. These findings were in agreement with Johnson *et al* (2006), who reported that majority of women their operation were finished within 31-60 minutes. On the other hand Tippawan *et al* (2005) showed that majority of women (62%) their operation finished in a time less than 90 minutes.

All cesarean section operations performed to the women under spinal anesthesia except 5 women that their operations performed under general anesthesia, three in Amoxicillin group and two in cephalosporin group with no statistically significant difference between two groups. On the other hand GMA (2007), found that the great majority of women (96.3% in Co-amoxiclav group and 92.5% in triple therapy group) their operation were performed under general anesthesia. And the rest of women's performed their operations under spinal anesthesia .

Although prophylactic antibiotics have been shown to reduce the incidence of postoperative infections morbidity after cesarean delivery, the most effective regimens and timing of administration have not been established, some has suggested antibiotic prophylaxis only for emergency cesarean section and others demonstrated that prophylactic antibiotics were effective and cost saving for all cesareans, elective and emergency (Johnson *et al.,*2006).

Some investigators recommended cefazolin, while cephalotin, cefazolin plus metronidazole, ampicillin, and metronidazole plus gentamicin had also been proposed by others. Controversies are also exist regarding the timing of antibiotic administration since some suggested prior incision, but others proposed after cord clamping. Neither single dose administration nor triple dose is another issue of discrepancy (Thigpen *et al.,* 2005).

As to the timing of administration, delayed administration of prophylactic antibiotics, after clamping the umbilical cord, did not result in more post operative infections. The major reason not to start prior to surgery is to prevent placental passage and fetal exposure to the drug. Moreover, there will be neither alteration of the neonatal flora nor interference with the pediatrician's assessment of possible sepsis in the newborn (Sullivian *et al.,*2007)[22].

In the present study prophylactic antibiotics were given to the women in a single dose of 2 gms Amoxicillin or Cephalosporin that was given intra operatively after cord clamping. Thigpen *et al* (2005) studied Cefazolin administration either before skin incision or right after cord clamping and demonstrated similar infectious morbidity in both groups.

Regarding side effects of the antibiotic, the present study reported that there was no significant difference between Amoxicillin and Cephalosporin. And the side effects were resolved without need to treatment, these clinical signs were very simple because the drug was prescribed for such a short interval in healthy, reproductive aged women. But, Mirghani *et al.,* (2004) noted that three patients suffered vomiting and one patient (1%) in the Ceftriaxone group developed a maculopapular skin rash; this occurred immediately after drug administration and resolved spontaneously without treatment. No patient suffered adverse drug effects in the Ampicillin / Cloxacillin group; there was no statistically significant difference between groups. With taking into consideration that the prophylactic antibiotic was given to the patients in the form of Ceftriaxone as a single dose of 1 gm or 1 gm Ampicillin / Cloxacillin intravenously at the time of induction of anesthesia.

The present study reported that the percent of surgical site infection (SSI) of elective cesarean section was 1% in Amoxicillin group and 4% in Cephalosporin group with no significant difference between them. The study which was done in 2007by GMApresented that abdominal wound infection was found in rates; 3.7% in Co-amoxiclav group and 13.1% in the triple therapy group. Co-amoxiclav was statistically found superior to the triple therapy in preventing abdominal wound

infection and uterine tenderness. With taking in consideration that group 1(triple therapy) included Ampicillin 1gm + Metronidazole 500mg + Gentamycin 80 mg all given intravenously after cord clamping and repeated 12 hours after first dose.

Concerning duration of cesarean section and its relation to wound infection, the present study reported that there is no relation between duration of cesarean section and wound infection. This is not in agreement with Oliver *et al* (2009) who demonstrated that the risk of postoperative wound infection was considerably reduced when the operation time was short. In the course of prolonged operation, there was significant tissue devitalisation resulting from tissue handling and reduced tissue perfusion

Findings of the present study regarding number of P.V examination and its relation to wound healing, reported that the women who examined per vagina more than 5 times exposed to infection by 8%, but the women that not examined per vagina exposed to infection by 4%. This means that there was a relation between the number of P.V examination and wound healing. These finding were in agreement with Oliver *et al.* (2009), who demonstrated an association between multiple vaginal examinations and post cesarean wound infection.

Regarding the heath education about wound care given to the mother and its relation to wound healing versus receiving routine hospital care, the present study showed that the women that their wounds were infected and received the routine hospital care were not significantly higher than those received post partum wound care . This ensured the association between health education about wound care and wound healing.

Conclusion

Based on the findings of the present study it concluded that: use of Amoxicillin as a prophylactic antibiotic is as effective as Cephalosporin in preventing post cesarean section wound infection, and women that received health education about wound care are less likely to expose to wound infection than those who received only routine hospital care, in spite that the comparative results are not differ significantly.

Recommendations

Based on the findings of the present study it was recommended that:
-Use of Amoxicillin as a prophylactic antibiotic be less costly compared by Cephalosporin in preventing post cesarean section wound infection. So, it should be taken in consideration the cheaper than other to be used as a prophylactic antibiotic.

-The nurse carry a vital role in reducing wound infection by introducing health education about wound care to the mothers, so there should be an encouragement from head nurses and doctors to follow this action to aid in reducing post C.S wound infection.

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Role of Fine Needle Aspiration Cytology in Diagnosis of Soft Tissue Tumors

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Abstract: Fine needle aspiration cytology has many advantages that make it a first-choice diagnostic approach in many tumors. However, its role in diagnosing soft tissue tumors has been debated and at times discouraged. The aim of the study is to review the role of fine needle aspiration cytology in diagnosing soft tissue tumors and to establish cytological criteria for the most encountered soft tissue tumors. The databases were searched up to 2010 and a comprehensive review of the relevant literature was performed, focusing on the followings: utility and limitations of fine needle aspiration cytology in the diagnosis of soft tissue tumors, diagnostic efficacy of fine needle aspiration cytology in the diagnosis of soft tissue tumors, the cytological features of the most commonly encountered soft tissue tumors, the role of fine needle aspiration cytology in differentiating benign soft tissue tumors from soft tissue sarcomas and its role in grading and exact subtyping of soft tissue sarcomas. The findings of this review showed that fine needle aspiration cytology in conjunction with ancillary studies, especially immunohistochemistry, along with the clinical and/or radiographic data can approach a diagnostic accuracy of 95% for the diagnosis of soft tissue tumors. Also, placing the sarcoma into one of the five cytomorphological group (pleomorphic, spindle, myxoid, small round/ovoid and epithelioid) is useful to reach a confident diagnosis of benignity or malignancy and to suggest a type-specific diagnosis. However, subtyping or grading spindle cell sarcomas as well as lipomatous tumors are often challenging and the use of immunohistochemistry is mandatory for proper diagnosis of these tumors.
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Key words: Fine needle aspiration cytology, soft tissue tumors, cytological criteria, immunohistochemistry

1. Introduction

Soft tissue tumors (STTs) have been considered to pose some of the greatest diagnostic challenges in surgical pathology. According to the latest World Health Organization (WHO) classification, more than 100 benign subtypes, over 50 variants of sarcoma and a number of 'border-line' entities have been described for STTs (Fletcher, 2006). According to Egyptian mortality statistics 2004, death due to soft tissue sarcoma (STS) represents 2.74% of all cancer deaths (Elattar, 2006). Fine needle aspiration cytology (FNAC) has many advantages that make it a first-choice diagnostic approach in many tumors as it is an outpatient procedure, it doesn't need anesthesia and it permits sampling of different parts of a large tumor to evaluate its heterogeneity (Domanski et al., 2005).

However, the cytological diagnosis of STTs, based on FNAC, has been debated and at times discouraged (Weiss and Goldblum, 2008). Obtaining sufficient specimens from deeply seated small and necrotic/cystic lesions is technically a potential pitfall. Sometimes only necrotic tissue is obtained. Some benign lesions can contain atypical cells such as nodular fasciitis and some malignant tumors such as synovial sarcoma (SS) or well-differentiated liposarcoma (LPS) have rather bland cytology (Maitra et al., 2000). On the other hand, Bharat et al. (2007) evaluated 127 cases of FNAC smears from STTs, diagnosed over a period of 5 years and

stated that FNAC is fairly specific and sensitive in STTs diagnosis for primary, recurrent and metastatic lesions and that some cytological types, especially round cell and pleomorphic sarcomas, can be quickly identified. In another study carried out by Kitagawa et al. (2003) to evaluate the usefulness of FNAC for the preoperative diagnosis of STTs of the hand, they concluded that FNAC is a useful diagnostic tool, especially in its ability to distinguish between malignant and benign lesions of the hand, but its main limitation in diagnosing hand tumors, is the difficulty in diagnosing schwannoma and fibrous tumors, which are common. In addition, Khalbuss et al. (2010) proved that there can be a high sensitivity and specificity in diagnosing bone and soft tissue lesions by FNAC.

So, it is apparent that there has been and stills a debate on the usefulness of FNAC in diagnosing STTs. Also the accurate cytological features for classifying and diagnosing STTs haven't yet been settled. Therefore, this study was carried out to give an overview about STTs classification, their grading and staging. Also, the role of FNAC in diagnosing STTs will be reviewed and the cytological features for classifying and diagnosing STTs as a guide for early accurate diagnosis will be studied.

2. Materials and Methods

The Databases were searched up to 2010. A comprehensive review of the relevant literature was performed, focusing on the followings: utility and limitations of FNAC in the diagnosis of STTs, diagnostic efficacy of FNAC in the diagnosis of STTs, the cytological features of the most commonly encountered STTs, role of FNAC in differentiating benign STTs from STS and role of FNAC in grading and exact subtyping of STS.

The following methodological items were taken into account: (1) type of study, (2) sample size, (3) sample selection, (4) laboratory techniques and (5) statistical analysis.

3. Review of Literature
3.1 Definition and Classification

STTs are defined as mesenchymal proliferations that occur in the extraskeletal, nonepithelial tissues of the body, excluding the viscera, coverings of the brain and lymphoreticular system (Kumar et al., 2007). The most recent classifications of STTs have been based principally on the line of differentiation of the tumor, that is, the type of tissue formed by the tumor rather than the type of tissue from which the tumor arose (Wiess and Goldbulm, 2008). The most significant conceptual changes in the last WHO classification of STTs, is that it revised categorization of biological behavior, allowing for two distinct types of intermediate malignancy, identified respectively as 'locally aggressive' and 'rarely metastasizing' in addition to 'benign' and 'malignant' types (Fletcher et al., 2002). Also it acknowledged the poorly defined nature of the categories known as malignant fibrous histiocytoma (MFH) (which in reality represents undifferentiated pleomorphic sarcoma) and haemangiopericytoma (HP) (most examples of which are closely related to solitary fibrous tumor (SFT). It also categorized the so-called angiomatoid MFH and extraskeletal myxoid chondrosarcoma (EMC) into tumors of uncertain differentiation (Fletcher, 2006).

Most benign STTs do not recur locally while locally aggressive STTs often recur locally and are associated with a local infiltrative growth pattern. On the other hand, rarely metastasizing STTs are often locally aggressive but show the well-documented ability to give rise to distant metastases in occasional cases. Malignant STTs (known as STS) are characterized by local destructive growth and a significant risk of distant metastasis, ranging in most instances from 20% to 100%, depending upon histological type and grade (Weiss and Goldblum, 2008).

3.2 Frequency of STTs in Egypt

In Egypt, according to the National Cancer Institute (NCI) records registry, the number of the newly diagnosed STTs cases from the year 2002, 2003 and 2005 constitute 2.74% of total malignancies recorded with a male predominance of 60.07% and with a high percentage of pediatrics, 28%. They were thus ranked the third amongst pediatric tumors, after lympho-hematopoietic and bone tumors (Elattar, 2006). Table (1) shows the relative frequency of the different types of STS.

Table (1): Relative frequency of the histopathological types of STS in Egypt (Elattar, 2006).

Type	%
LPS	16.04
Rhabdomyosarcoma (RMS)	13.80
Primitive Neuroectodermal Tumor (PNET)	13.06
MFH	10.07
Synovial sarcoma (SS)	9.70
MPNST	7.09
Fibrosarcoma	4.48
Leiomyosarcoma (LMS)	3.36
Alveolar soft part sarcoma (ASPS)	1.87
Vascular sarcomas	1.87

3.3 Histological grading of STS

Grading, based on histological parameters only, evaluates the degree of malignancy and mainly the probability of distant metastasis (Conidre et al., 2001). The two most widely used grading systems for STS are those of the Federation Nationale des Centres de Lutte Contre le Cancer (FNCLCC), also known as the French Federation of Cancer Centers sarcoma group and the United States National Cancer Institute (NCI) (Fletcher, 2006).

3.4 Staging of STS

The tumor size, Regional lymph node involvement, Distant metastasis staging system (TNM) used for STS was developed by the International Union against Cancer (UICC) and the American Joint Committee on Cancer (AJCC). This system incorporates histological grade as well as tumor size and depth, regional lymph node involvement and distant metastasis (Greene et al., 2002).

3.5 Diagnosis of STTs by FNAC

Diagnosis, as well as prognosis of STTs has been based on the assumption that pathologists would have significant amounts of tissue on which to render a diagnosis and grade. Although incisional biopsy is the golden standard for the diagnosis of deep soft tissue masses, reliance on minimally invasive techniques as FNAC to procure diagnostic tissue has become more common (Weiss and Deyrub, 2006). Other diagnostic methods include IHC, Electron Microsopce (EM), DNA analysis and molecular diagnostics.

FNAC has many advantages that make it a first-choice diagnostic approach in many tumors. It is an

outpatient procedure, it doesn't need anesthesia and it permits sampling of different parts of a large tumor to evaluate its heterogeneity (Domanski et al., 2005). Also, properly performed, FNAC is the least tissue-invasive diagnostic procedure and the risk for sarcoma-cell spread is negligible (Akerman, 1998). In the hands of experienced cytopathologists, FNAC in conjunction with ancillary techniques has a diagnostic accuracy approaching 95% for the diagnosis of soft tissue malignancy (Kocjan, 2004). Additionally, as therapy and prognosis are heavily dependent on the grade and stage of the tumor, Singh et al. (2007) stated that most of STS can be successfully subtyped and even graded by FNAC.

On performing FNAC to STTs, five passes at most should be made with the needle being moved back and forth through the specimen without exiting the skin surface. It's recommended to sample tissue from at least three different parts from the tumor to assess its heterogeneity (Wakely and Kneisl, 2000). The microscopic evaluation of STTs obtained by FNAC should be based on both wet fixed Hematoxylin and Eosin stain (H&E) or Papanicolaou stain (Pap) and air-dried May Griinwald- Giemsa (MGG) or Diff-Quik smears. The wet-fixed material is superior for evaluation of nuclear detail such a chromatin structure and nucleoli while the MGG staining gives excellent information on cytoplasmic detail and the background matrix (Weiss and Deyrup, 2006).

There are, however, certain limitations for the use of FNAC in the diagnosis of STTs. The main pitfall is that the needle may miss the tumor and a false diagnosis is made on the basis of cells aspirated from the tissue surrounding the tumor (Singh et al., 2007). Insufficient material obtained by FNAC may result in a false diagnosis or preclude any diagnosis at all (Fletcher et al., 2002). In addition, there are some rare STTs, in which the cytological criteria that allow their correct diagnosis as benign or malignant, as well as to type them, have not been established. Comparative histological-cytological studies of reasonably large series of these tumors are often lacking (Fuju, 2006). Examples of these tumors are lipoblastoma, chondroid lipoma, perineurioma, aggressive angiomyxoma, SFT of soft tissue, mixed tumor of soft tissue, parachordoma and spindle cell LPS (Singh et al., 2004). Another important pitfall in depending on FNAC in the diagnosis of STTs is misinterpretation of the cellular material. This mostly occurs in the diagnosis of benign lipoma variants as pleomorphic lipoma, hibernoma or lipoblastoma and in the interpretation of soft tissue metastases from pleomorphic carcinoma or melanoma as pleomorphic sarcoma. Also, metastases from renal clear cell carcinoma might be misinterpreted as pure round cell LPS (Brooks, 1996).

The benefits and limitations of FNAC in the definitive diagnosis of a STS must be weighed in relation to the proposed treatment (Akerman, 1998). The main purpose of FNAC in soft tissue lesions is to inform the surgeon whether the tumor in question is a true soft tissue lesion/tumor or a STS or a soft tissue metastasis (Kilpatrick et al., 2001). In case of sarcoma, the standard treatment in the majority of cases is primary radical surgery (a minimum of 1 cm to 2 cm margins of normal tissue), sometimes followed by radiotherapy. The type of surgical intervention depends more on the site (subcutaneous or deep), size and the relation of the sarcoma to vessel, nerve bundle and periosteum than on the histotype. Thus a reliable diagnosis of sarcoma is sufficient for the surgeon in those cases where primary radical surgery is the proposed treatment (Liu et al., 1999). When the treatment includes neoadjuvant therapy (radiotherapy or chemotherapy) followed by surgery, the FNAC diagnosis must equal that of a histopathological evaluation as regard histotype and malignancy grade (Kilpatrick et al., 2001). At present, neoadjuvant therapy is used for some cases of STS as RMS, neuroblastoma and extraskeletal Ewing's sarcoma/primitive neuroectodermal tumor (ES/PNET) family of tumors (Weiss and Goldblum, 2008).

For FNAC specimens, several studies recommend a classification approach that divides STTs into **five** major cytomorphologic subgroups based on the predominant cytological appearance of the specimen on aspiration smears: pleomorphic, spindle cell, myxoid rich, small round/ovoid cell and epithelioid. In most cases, once a cytomorphological subtype has been determined, the corresponding histological grade in many cases is definitional (Singh et al., 2004). Such classification has been used in many comparative cytological-histological studies to evaluate the role of FNAC in the diagnosis of STTs (Costa et al., 1996; Kilpatric et al., 2001; Mathur et al., 2003; Dey et al., 2004 and Bahrat et al., 2007). The most reported pitfall in this classification is that it is not possible to classify all STTs into these five groups. In addition, overlapping cytological features can occur. For example, RMS can display a variety of cytomorphological features, ranging from a small round cell to spindle cell morphology as well as the presence of a myxoid background in the botryoid forms. Likewise, SS may demonstrate a predominant epithelioid cell pattern rather than the classic spindle cell pattern (Singh et al., 2004). However, such a categorization may be useful to reach a confident diagnosis of benignity or malignancy, to suggest a type-specific diagnosis as well as in the recognition of important differential diagnoses (Akerman and Domaniski, 2003).

In the following sections, the diagnostic features of each of the above mentioned patterns will be discussed as well as the most common types of STTs belonging to

each of them and the limitations of the diagnosis of each.

3.5.1 Pleomorphic cell pattern

The typical features are a marked variation in cellular and nuclear size and shape and in case of sarcoma marked nuclear pleomorphism including atypical multinucleated tumor cells and prominent nucleoli (Akerman et al., 1980). Benign STTs in this category are nodular fasciitis and pleomorphic lipoma. Typical examples of sarcomas are undifferentiated pleomorphic sarcoma (pleomorphic sarcoma of the MFH type), pleomorphic LMS, pleomorphic LPS and the less common pleomorphic RMS (Singh et al., 2004). In most cases of pleomorphic STS, the cytological features are not diagnostic for subtyping beyond a diagnosis of "pleomorphic sarcomas, not otherwise specified" (Singh et al., 2004). Wrong (2008) have reported that, adult patients with pleomorphic sarcomas, regardless of the histological subtype, are treated similarly with complete surgical excision and radiation therapy and/or chemotherapy. This is due to the fact that prognosis and treatment responses are approximately the same across the group. The most common differential diagnostic problems arise in the separation of pleomorphic sarcomas from sarcomatoid carcinomas from various sites (lung, kidney, pancreas, and thyroid), malignant melanoma, and anaplastic lymphoma. All of these entities can present with highly cellular smears with a predominance of dyscohesive cells that are markedly pleomorphic and sometimes multinucleated. Careful review of the clinical history along with ancillary studies (panel of IHC stains) is crucial for accurate classification (Singh et al., 2007).

The following table shows the most common STTs with pleomorphic pattern and their diagnostic morphological features:

3.5.2 Spindle cell pattern

The spindle cell pattern is characterized by predominance of more or less atypical spindle cells with fusiform or ovoid nuclei and elongated uni- or bipolar cytoplasm. The cells are mostly arranged in sheets or fascicles, but dissociated cells are often present. A small population of larger rounded, polygonal or triangular cells with relatively abundant cytoplasm and nuclei of variable size and shape may be present in some sarcomas (Akerman and Domaniski 2003).

Common examples of benign tumors are neurilemoma, spindle cell lipoma, desmoid fibromatosis, SFT, HP and deep leiomyoma. Typical spindle cell sarcomas include the LMS, MPNST, monophasic SS, dermatofibrosarcoma protuberans (DFSP), spindle cell gastrointestinal stromal tumor (GIST), fibrosarcoma and angiosarcoma (Singh et al., 2004).

Table (2): The most common soft tissue tumors with pleomorphic pattern and their diagnostic morphological features (Dahl et al., 1981; Akerman and Rydholm 1983; Walaas et al., 1986; Akhtar et al., 1992; Almeida et al., 1994; Liu et al., 1999; Thirumala et al., 2000; Clayton et al., 2001; Kong and Cha 2004; and Khalbuss et al., 2010).

Tumor	Diagnostic Morphological features
Nodular fasciitis	- Abundant myxoid background. - Pleomorphic population of myofibroblasts: spindly, rounded or triangular, with cytoplasmic processes and admixture of inflammatory cells.
Pleomorphic Lipoma	- Fragments of mature fat. - A variable number of large cells with hyperchromatic nuclei and eosinophilic cytoplasm - 'Floret cells' are seen.
Undifferentiated pleomorphic sarcoma (MFH-type sarcoma)	- Cellular smears with necrosis. - Variable proportions of atypical and pleomorphic spindle cells, polygonal cells and multinucleated large cells.
Pleomorphic LMS	- Cellular smears with necrosis. - Tumor cells have marked cellular and nuclear pleomorphism with abundant eosinophilic cytoplasm. - Multinucleated tumor cells.
Pleomorphic LPS	- Presence of highly atypical multinucleated lipoblasts
Pleomorphic RMS	- Atypical rhabdomyoblasts with abundant eosinophilic cytoplasm

The group of spindle cell sarcomas is the most diagnostic challenging because of difficulties in accurately separating benign lesions from low-grade sarcomas and accurately subclassifying the sarcoma (Singh et al., 2007). Also, Domaniski et al. (2006) have shown that the two major criteria used to designate a FNAC specimen as a sarcoma, namely, moderate to high smear cellularity and hyperchromatic nuclei in almost all sampled cells; do not always allow accurate separation and/or grading among the spindle cell sarcoma group. Benign mesenchymal lesions often demonstrate marked dyscohesiveness and hypercellularity that, in some cases, result in destructive changes clinically and radiographically mimic a sarcoma (Li et al., 2001). Because metastases outnumber primary STS, nonsarcomatous malignancies must be included in the differential diagnosis of spindle cell sarcomas. Sarcomatoid carcinomas, mesotheliomas, malignant melanomas, and non-Hodgkin lymphomas associated with sclerosis present the most difficulty in accurate separation from primary spindle cell sarcomas. Correlation with the past medical history and IHC stains is crucial in rendering an accurate diagnosis (Singh et al., 2004).

The following table shows the most common STTs with spindle cell pattern and their diagnostic morphological features:

Table (3): The most common soft tissue tumors with spindle cell pattern and their diagnostic morphological features by H&E stain (Dahl et al., 1981; Akerman and Rydholm 1983; Ryd et al., 1986; Lopez et al., 1990; Kilpatrick et al., 1996; Boucher et al., 2000; Clayton et al., 2001; Sawh et al., 2001; Li et al., 2001; Domanski and Gustafson 2002; Akerman and Domaniski 2003; Singh et al., 2004; Wrong, 2008; Domaniski et al., 2006; Akerman and Domanski 2007; Owens et al., 2007 and Kaur et al. 2010).

Tumor	Diagnostic Morphological features
Neurilemoma (Schwannoma)	- Fragments with fibrillary background and spindle-shaped cells forming Antoni A, while others have loose appearance with cells having slender cytoplasmic processes (Antoni B)
Spindle cell lipoma	- A mixture of mature adipose tissue and dispersed or clustered, bland-looking spindle cells, in a myxoid background
Desmoid Fibromatosis	- Fragments of paucicellular collagenous stroma. - Fibroblasts with spindle-shaped nuclei are seen.
SFT	- Dispersed bland cells mixed with cell-tight three-dimensional fascicle-like clusters. - Nuclei with bland chromatin and
Deep leiomyoma	- Clusters of dispersed cells and small aggregates of cells with elongated, blunt-ended, or cigar-shaped nuclei.
LMS	- Cells have moderately pleomorphic elongated blunt-ended nuclei, with prominent nucleoli and intranuclear inclusions.
MPNST	- A fibrillary background. - Spindle-shaped cells with elongated, wavy nuclei. - Presence of pleomorphic and/or multinucleated tumor cells
Monophasic SS	- Dispersed spindle shaped cells and branching fragments of tightly packed cells - Cells have ovoid bland nuclei and inconspicuous nucleoli
DFSP	-Tumor cells are uniform spindle cells, either dispersed or clustered in three-dimensional cell-rich fascicles (fascicular arrangement). - Stripped nuclei are often seen.
Spindle cell GIST	- Cohesive clusters of cells with spindly, ovoid, comma-shaped nuclei and scanty cytoplasm with cytoplasmic processes.
Fibrosarcoma	- Uniform population of dispersed and clustered atypical spindle shaped cells, with fusiform nuclei
HP	-Hypercellular aspirate formed of minimally atypical spindle shaped cells arranged in fragments traversed by vascular channels.
Angiosarcoma	- Hypocellular aspirate with predominantly single spindled to rounded cells with abundant vacuolated cytoplasm and pleomorphic nuclei. - Vasoformative features: intracellular RBCs, well-formed vessels and microacinar formation.

3.5.3 - Myxoid pattern

Although myxoid changes can be seen in a variety of STTs, it's not usually consistently seen as a dominant feature of the tumor (Singh et al., 2004). Aspirates of myxoid tumors often look like droplets of glue. Under low power magnification there is an evident myxoid background matrix, faintly pink in H&E stain and faintly green in Pap stain. The cellular pattern is variable: pleomorphic, spindly or round cells (Akerman and Domanski 2003).

A myxoid pattern is common to several STTs. Examples of benign tumors are intramuscular myxoma, liboplastoma, ossifying fibromyxoid tumor (OFMT), perineurioma, parachordoma and mixed tumor of soft tissue (myoepithelioma). The most common sarcomas are myxofibrosarcoma and myxoid LPS, low-grade fibromyxoid sarcoma and extraskeletal myxoid chondrosarcoma (EMC) (Singh et al., 2004).

The following table shows the most common STTs with myxoid pattern and their diagnostic morphological features:

Table (4): The most common soft tissue tumors with myxoid pattern and their diagnostic morphological features (Akerman and Rydholm, 1983; Housini and Dabbs 1990; Szadowska and Lasota 1993; Verma et al., 1993; Lindberg et al., 1999; Minami et al., 2001; Akerman and Domanski 2003; Hornick and Fletcher, 2003; López-Ferrer et al., 2005; Jakowski and Wakely 2007; Hong et al., 2008; Ran et al., 2008; Colin et al. 2010 and Zardawi 2010).

Tumor	Diagnostic Morphological features
Intramuscular myxoma	- Scattered vessel fragments - Cells have elongated uniform nuclei and cytoplasmic processes
Lipoblastoma	- Fatty tissue fragments. - Branching strands of capillaries - Vacuolated lipoblast-like cells.
OFMT	- Mildly atypical cells which may be dissociated, or arranged in rosette-like structures,
Perineurioma	- Elongated cells with fusiform nuclei and cytoplasmic processes arranged in clusters
Parachordoma	- Cells are polygonal with abundant cytoplasm and bland nuclei. -Some cells have vacuolated cytoplasm and eccentric nuclei.
Mixed tumor of soft tissue	- Cells are spindle-shaped or rounded epithelioid-like grow in rows, clusters or groups
Myxofibrosarcoma	- Fragments of curved vessels - Atypical spindle cells with scattered large polygonal cells - Some cells have a vacuolated cytoplasm or contain droplets of mucoid material (violet in MGG stain)
Low-grade fibromyxoid sarcoma	- Homogenous population of spindle-shaped cells with mildly atypical nuclei - No vessel fragments.
Myxoid LPS	- Tumor tissue fragments with "chicken wire" capillary vessels, and vacuolated lipoblasts
EMC	- Variable arrangement of cells: clusters and branching strands. - Cells are rounded, elongated and fusiform with bland nuclei and vacuolated cytoplasm

3.5.4- Small round/ovoid cell pattern

Round cell sarcomas predominate in the pediatric population, and, in contrast to adult patients, definitive

cell typing is necessary (Singh et al., 2004). Smears are typically cellular and composed of small to medium-sized cells with rounded or ovoid nuclei and a variable amount of cytoplasm. The shape of the cells is variable: rounded, ovoid or triangular. Nuclei are often bland and nucleoli are small (Bahrat et al., 2007). This pattern is shown mainly by glomus tumor, neuroblastoma, extraskeletal ES /PNET, RMS (especially alveolar), desmoplastic small round cell tumor (DSRCT) and small cell variant of SS (Franco et al., 2007).

In rare cases, it may be difficult to correctly classify this group of sarcomas by histological examination. However, correct cell typing is often possible and achievable in 92% of all round cell sarcomas by FNAC with the judicious use of ancillary studies (IHC, EM and cytogenetics) (Liu et al., 1999).

The following table shows the most common STTs with small round/ovoid cell pattern and their diagnostic morphological features:

Table (5): The most common soft tissue tumors with small round/ovoid cell pattern and their diagnostic morphological features (Seidal et al., 1982; Silverman et al., 1988; Bennert K and Abdul-Karim, 1994; Renshaw et al., 1996; Akerman et al., 1996; Kilpatrick et al., 1999; Layfield et al., 1999; Liu et al., 1999; Silverman et al., 2000; Handa et al., 2001; Granja et al., 2005 and Fuju 2006).

Tumor	Diagnostic Morphology features
Glomus tumor	- Myxoid fibrillary background - Cells are of medium size with poorly defined cytoplasmic borders and rounded bland nuclei
Neuroblastoma	- Cells with hyperchromatic nuclei and cytoplasmic processes arranged in rosette-like structures with a central fibrillary core
ES/PNET family; classic ES	- Highly cellular aspirate. - Double cell population: *Large cells with abundant vacuolated cytoplasm and rounded nuclei (Large light cells) *Small cells with irregular dark nuclei and scanty cytoplasm (Small, dark cells).
ES/PNET family; PNET	- Pleomorphic cells with cytoplasmic processes. - Rosette-like structures.
Alveolar RMS	- Cells are small with scanty vacuolated cytoplasm and prominent nucleoli. - Rhabdomyoblasts: tadpole cells with eccentric nuclei and eosinophilic cytoplasm.
DSRCT	- Cells are small with scant vacuolated cytoplasm and rounded nuclei with small nucleoli, showing rosette-like arrangement.
Small cell variant of SS	- Small cells with scanty cytoplasm and bland nuclei admixed with large cells with abundant cytoplasm and prominent nucleoli.

3.5.5- Epithelioid Cell Pattern

The epithelioid cell pattern is created by cells with epithelioid features: rounded or polygonal cells with distinct cytoplasmic borders, abundant cytoplasm, and rounded, ovoid or irregular nuclei. Nucleoli are often prominent. The tumor cells are arranged in groups, tight clusters or are dissociated. Stripped nuclei are a common finding (Akerman and Domaniski 2003).

This pattern is the least frequently encountered group on FNAC specimens. Typical examples of benign tumors are granular cell tumor (GCT), adult rhabdomyoma and paragangliomas. The most common sarcomas are epithelioid sarcoma, clear cell sarcoma, ASPS, malignant extrarenal rhabdoid tumor, epithelioid cell gastrointestinal stromal tumor (GIST) and epithelioid variant of angiosarcoma (Bahrat et al., 2007). The cytomorphological features among this group of sarcomas show considerable overlap necessitating the use of ancillary studies with IHC to make a specific diagnosis and for separation from non-sarcomatous malignancies (Singh et al., 2007).

The following table shows the most common STTs with small epithelioid cell pattern and their diagnostic morphological features:

Table (6): The most common soft tissue tumors with epithelioid cell pattern and their diagnostic morphological features (Mondal 1995; Akhtar et al., 1994; Gupta et al., 1998; Maruyama et al., 1998; Zeppa et al., 1998; Logrono et al., 1999; Domaniski and Dawiskiba 2000, Zaharopoulos 2001; Cardillo et al., 2001; Li et al., 2001; Mallik et al., 2001; Wieczorek et al., 2001; Creager et al., 2002; Kwon et al., 2002; McGregor et al., 2003; Singh et al., 2004; Laforga 2005; Jin and Saleh 2009 and Min et al., 2010).

Tumor	Diagnostic Morphological features
Granular cell tumor	- Individual cells and cells in cohesive clusters are seen.
Adult rhabdomyoma	- Large epithelioid cells with cross striation in the cytoplasm.
Paraganglioma	- Loose clusters of cells separated by bands of connective tissue strands - Cells have pleomorphic spindled or oval nuclei. - Reddish cytoplasmic granules on MGG stain.
Epithelioid sarcoma	- Cells are medium-sized to large with large nucleoli. - Admixture of lymphocytes, plasma cells and histiocytes.
Clear cell sarcoma	- Cells in small clusters showing intranuclear pseudoinclusions and intracytoplasmic melanin
Alveolar soft part sarcoma	- Hemorrhagic aspirate - Alveolar arrangement of tumor cells can be seen.
Malignant extrarenal rhabdoid tumor	- Grey blue paranuclear cytoplasmic globular inclusions are seen in the tumor cells.
Epithelioid cell GIST	- Tumor cells are rounded with abundant cytoplasm and rounded nuclei.
Epithelioid angiosarcoma	- Both dispersed cells and branching tumor tissue fragments of tightly packed epithelial-like cells showing mild to moderate nuclear atypia.

3.6 Diagnostic efficacy of FNAC in the case of STTs

In terms of diagnostic efficacy, Khalbuss et al.

(2010) reported a high overall sensitivity of 96% and specificity of 98% for the FNAC diagnosis of soft tissue and bone lesions, and a very low rate (3%) of inadequacy. Bahrat et al. (2007) concluded that FNAC had 100% sensitivity and 87% specificity in the diagnosis of STTs. These were comparable to the results of Nagira et al. (2002) wherein the respective values were 92% and 97%. In another series, Wakely and Kenisl (2000) reported 100% sensitivity and 97% specificity in STTs diagnosis with FNAC. Layfield et al. (1986) achieved 95% sensitivity and specificity while dealing with these lesions. In Khalbuss et al. (2010) study on 1114 soft tissue and bone FNAC specimens, there were 15 false negative (FN) (malignant tumor diagnosed as benign cytologically) diagnoses that were most commonly due to sampling error and 3 false positive (FP) (benign tumor diagnosed as malignant cytologically) diagnoses, which were attributable to errors in interpretation due to the misinterpretation of reactive stromal cells with therapy-related changes as malignant cells. In Bahrat et al. (2007) study, 2 cases (1.57%) were FP and none was FN. While a study on 517 STTs aspirates by Akerman et al. (1985) revealed a 2.9% FP rate, the subsequent studies by Wakely and Kenisl (2000) and by Kilpatrick et al. (2001) yielded a single case of FN and nil FP. This was in contrast to a study by Nagira et al. (2002) who identified higher figures for false positivity and false negativity. In Khalbuss et al. (2010) and Bahrat et al. (2007) studies, the results were comparable to the documented range of <1%-5% (FP) and 2-15% (FN) (Layfield et al., 1986; Bommer et al., 1997; Kilpatrick et al., 2001 and Nagira et al., 2002). An overall concordance of 98% in Khalbuss et al. (2010) is comparable to results of Bahrat et al. (2007) and Shah et al. (2003). Also, Singh et al. (2004) reported that in the hands of experienced cytopathologists, FNAC in conjunction with ancillary techniques has a diagnostic accuracy approaching 95% for the diagnosis of malignancy. Besides, the presence of a cytopathologist for onsite evaluation and the presence of concurrent core biopsy in selected cases, which allow for optimization of the FNAC in obtaining sufficient material and provide immediate cytological-histological correlation, respectively are additionally important factors in the success of FNAC in diagnosing STTs (Khalbuss et al., 2010).

However, Khalbuss et al. (2010) reported that the more problematic group was the group of inadequate FNAC specimens. Although only one study defined adequacy in soft tissue FNAC biopsies as the presence of at least 5 clusters of 10 unobscured cells on the majority of slides (Palmer et al., 2000), yet there are no established adequacy criteria for bone and soft tissue cytology which results in variation in the number of inadequate cases by pathologist, by institution, and by

study. Also, the authors concluded that benign STTs are more difficult to subclassify than malignant lesions. In addition, there are only a few studies documenting how well FNAC can subtype previously undiagnosed STS, and the results vary widely, with an average 50–70% success rate (Akerman and Rydholm, 1983; Trovick et al., 1998; Liu et al., 1999; Kilpatrick et al., 2001; Domaniski et al., 2006 and Domaniski 2007). In a series carried out by Kilpatrick et al. (2001) on 140 patients to evaluate the role of FNAC in the primary diagnosis of STS, they found the accuracy of FNAC for histological subtyping to be greater for pediatric sarcomas (92%) (with the use of ancillary studies) than for adult sarcomas (52%). The authors further showed that if one is able to subtype or at the least, place the sarcoma into the proper cytomorphological group (pleomorphic, spindle, etc.) then a specific grade was not needed for the initiation of treatment because in most cases, the histological grade is readily apparent. In their series, the FNAC diagnosis was sufficient to begin definitive therapy in 83% of patients with STS. Jones et al. (2002) have shown similar results supporting the opinion that FNAC can accurately subtype and grade STS in most cases. In their series of 107 FNAC (77 with corresponding surgical material available), only low-grade sarcomas were undergraded in a significant minority of cases, reducing the utility of FNAC when this group of neoplasms is encountered.

As previously mentioned, many studies recommend dividing STTs into one of five major cytomorphological subtypes based on the predominant morphology: myxoid, spindle cell, round cell, pleomorphic, and polygonal/epithelioid cell. However, it should be recognized that overlapping cytological features can occur; therefore, some tumors might be considered in the differential diagnosis of more than one category. For example, features of SS could be placed in the epithelioid/polygonal, small cell and spindle cell groups (Bennert and Abdul-Karim, 1994 and Kilpatrick et al., 1999). Several studies show also that grading or subtyping of spindle cell sarcomas by FNAC alone is often challenging (Kitagawa et al., 2003; Singh et al., 2004; Bahrat et al., 2007 and Singh et al., 2007). Other studies (Palmer et al., 2000 and Kilpatric et al., 2001) have found similar difficulties when diagnosing lipomatous tumors by FNAC and recommend that deeply seated soft tissue lesions that appear predominantly fatty by current imaging techniques should be evaluated by incisional or excisional biopsy techniques. Also Singh et al. (2004) have concluded in their review of the utility and diagnostic challenges of FNAC in the diagnosis of STS that the epithelioid cell and spindle cell groups are the most challenging to accurately subclassify and grade based solely on cytomorphologic features.

Most authors agree that a definitive cytological

diagnosis must be based on a combination of the cytological findings (ie, adequate specimen, cytomorphology) correlated with results of ancillary studies (IHC, flow cytometry, cytogenetic analysis and EM), along with the clinical and/or radiographic data (Singh et al., 2004). Also, Khalbuss et al. (2010) supported the idea that the majority of malignancies involving soft tissue and bone can be diagnosed and subclassified by FNAC when adequate history, ancillary studies, and onsite evaluation are used. Ancillary diagnostic procedures especially IHC plays an important role in the workup of small round cell, spindle cell, and epithelioid sarcomas (Shah et al., 2003). Table (7) outlines the IHC screening panels for the three categories of tumors for which it is clinically most useful in the rendering of an accurate diagnosis. Also, table (8) shows the most common genetic changes used in the molecular diagnosis of STTs (Miettinen 2006 and Wardelmann et al., 2010).

Table (7): Immunohistochemical screening panels for the round cell, spindle cell and epithelioid cell sarcomas (Singh et al., 2004).

Round cell sarcomas	Spindle cell sarcomas	Epithelioid sarcomas
*RMS MyoD1 and Desmin+, CK+/-	*Synovial sarcoma CK+, EMA+, CD99+, S-100+,Desmin-	*Epithelioid sarcoma CK+, CD34+, Vimentin+, S-100-, CD30-, CD45-
*ES/PNET CD99+, CK+/-, S-100-,Desmin-, CD56-	*MPNST S-100+(weak, focal), CD34 +/-, Desmin-, CK-	*Clear cell sarcoma and metastatic melanoma S-100+,HMB45+, Melan-A+, CK-
* DSRCT CK+, Desmin+, S-100-, CD99+/-	*LMS Desmin+, Muscle actin+, Vimentin+,	*Alveolar soft part sarcoma MyoD1 and Myogenin+/-
*Non sarcomatous group: -Lymphoma: CD45+,CD99+/- -Small cell carcinoma: CK+, NSE+, Synoptophysin+ - Melanoma: S-100+,MB-45+	*DFSP CD34+, CK-,S-100-, Desmin-,Muscle actin-	*Non sarcomatous group: -Ki-1 Lymphoma: CD30+,CD45+/-, CK-, S-100- -Carcinoma: CK+, CD30 and CD34+.

4. Summary and Conclusion

Although FNAC is a widely accepted and established diagnostic technique in diagnosing the presence of primary malignancies, metastatic disease, and benign nonneoplastic lesions, but its role in the evaluation of STTs has remained controversial, especially as the primary modality for establishing an initial diagnosis. Therefore, this study was carried out to review the utility and pitfalls of FNAC in the primary diagnosis of STTs, to highlight diagnostically challenging lesions and comment on the limitations of

FNAC in providing a definitive diagnosis.

Table (8): The genetic changes used in the molecular diagnosis of some soft tissue tumors (Miettinen 2006 and and Wardelmann et al., 2010).

Tumor	Affected genes
GIST	C-KIT mutations PDGFRA mutations
ES	EWS-FLI1 EWS-ETV1 EWS-ERG
Alveolar RMS	PAX3-FKHD PAX7-FKHD
ASPS	ASPSCR1–TFE3
Myxoid LPS	FUS-CHOP
EMC	EWS1R–CHN TAF2N–CHN TFG–NR4A3
DSRCT	EWS-WT1
SS	SYT-SSX
Clear cell sarcoma	EWS-ATF1
Angiomatoid MFH	TLS–ATF1 EWS1R–CREB1 EWS1R–ATF 1
DFSP	COL1A1–PDGFB
Myxoinflammatory fibroblastic sarcoma	Amplification of VGLL3
Well differentiated LPS	Amplification of MDM2, CDK4, HMGA2
Low-grade fibromyxoid sarcoma	FUS–CREB3L2 FUS–CREB3L1

The findings of this review show that for the primary workup of STTs, FNAC has several major advantages that certainly outweigh its limitations. However, the inexperience of cytopathologists with the wide spectrum of soft tissue neoplasms, coupled with overlapping morphologic appearances of reactive and neoplastic lesions, limit the widespread usage of FNAC as the diagnostic procedure of choice in STTs. In addition, there are still some rare STTs that can't be accurately diagnosed by FNAC because the cytological criteria that allow their correct diagnosis as benign or malignant, as well as to type them, have not been well established. However, FNAC in conjunction with ancillary studies (IHC, cytogenetics, flow cytometry, EM and cytogenetic analysis), along with the clinical and/or radiographic data can approach a diagnostic accuracy of 95% for the diagnosis of STTs. Although accurate assessment of the grade of STS is difficult by FNAC, yet if one is able to place the sarcoma into one of the five cytomorphological group (pleomorphic, spindle, myxoid, small round/ovoid, epithelioid) then a specific grade is not needed for the initiation of treatment because in most cases, the histological grade is readily apparent. However, subtyping spindle cell sarcomas as well as lipomatous tumors is often

challenging. The use of IHC is mandatory for proper diagnosis of these tumors.

So, this review assures the role of FNAC in the primary diagnosis of STTs as well, in recurrent and metastatic lesions. Exhaustive trials for subtyping and grading of some confusing STTs and the probability of error have to be weighed with the option of placing such tumors in one of the cytological groups which is a trend widely accepted by many authors.

5. Recommendations

Based on the results obtained from the present study, recommendations those worth mentioning are:

- Any patient with a STT presenting with any of the followings should be referred to a multidisciplinary musculo-skeletal centre: subcutaneous tumors larger than 5 cm in diameter, any deep-seated (inter- or intramuscular) tumors and any STT clinically suspected for malignancy.

- On performing FNAC from a STT, sampling tissue from at least three different parts from the tumor is advisable to assess its heterogeneity.

- The microscopic evaluation of STTs obtained by FNAC should be based on both wet fixed H&E or Pap stain and air-dried MGG stain.

- Small, deep seated STTs are to be needled with ultra sound guidance to avoid misdiagnosing reactive cellular changes as STS.

- On evaluating the cytological smears from STTs, it's recommended to place the STT into one of the five major cytomorphological subgroups based on the predominant cytological appearance: pleomorphic, spindle cell, myxoid rich, small round/ovoid cell and epithelioid cell. This aids in reaching a confident diagnosis of benignity or malignancy and suggesting a type-specific   diagnosis.

- Optimal interpretation of cytology findings of STTs requires a combination of the results of ancillary studies (IHC, flow cytometry, cytogenetic analysis and EM), along with the clinical and/or radiographic data. Close interaction between the clinician and cytopathologist is therefore an essential component to the success of FNAC in the workup of STTs. The patient referral request should include full personal data, clinical data including site and size of the tumor, results of radiographic studies, previous biopsies if done, its result and detailed information concerning biopsy sites.

- Further correlative cytological-histological studies on large number of cases should be carried out to try to identify distinguishing cytological features for each type of STTs.

- Further scope of STT evaluation on cytology can be expanded with more studies dealing with application of ancillary techniques on aspirate samples.

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Behavioral Responses of Castrated Buck Kids at Different Ages By Using Different Methods of Castration

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Abstract: To evaluate the behavioral responses of kids to castration by burdizzo (Bur), rubber ring (RR) or control handled, 90 buck kids were used. Behavioral responses of kids throughout the 180 minutes after castration or control handled were assessed by using a video camera. Castration of younger kids (7 and 21 days) took significantly shorter time than 42 days old. RR produced the highest values of active pain behavior, frequency of elimination, less frequently suck, teat seeking or nibble at feed. The scrotal sloughing was delayed in older kids. Results of questionnaire indicated that most castrations were done at the farm; castration failure was only in some of Burdizzo especially those older than 8 weeks. It was concluded that kids castration must be done as early as possible to reduce the total pain response and for achievement of animal welfare, and Burdizzo method is the preferable technique for castration of kids at all ages.

1. Introduction:

Under general husbandry procedures in animal rearing, Castration is carried out as routine animal husbandry procedures in lambs although it has been recommended that they should only be undertaken after careful consideration of their necessity by the farmer (Anon 2007). Castration of males those not wanted as replacement bucks should be done during the first days or weeks after birth for many reasons; to prevent disruption in the flock through sexual activity of young males, castrated males can remain with their dams and female flock mates for a much longer period of time than intact males, prevent unwanted pregnancies, indiscriminate breeding and reduce fighting and injury to animals as a result of sexually related behavior and dominance amongst males and there is a belief that castration improves conformation of the body thus producing a better quality product (Archer, 2004; and Farm Animal Welfare Council, 2008).

Castration also prevents physically or genetically inferior males from reproducing and prevents pregnancy in commingled pubescent groups (Stafford and Mellor 2005). Castrated males are easier to manage, especially as they mature thus maintain general control of stock. Beside this, castration of bucks is recommended to avoid the goaty odor which taints the doe's milk. Male lambs are preferably castrated in the first few days or weeks of life because animal handling is easier and postoperative complications are fewer (Baird and Wolfe, 1998).

However, management actions can also be a source of poor welfare in the neonatal lamb, particularly carrying out painful procedures without

the use of analgesics, and disruption of the ewe–lamb bond by permanent or temporary separation (Dwyer 2008). Studies investigating differences between pain responses of lambs at different ages have been undertaken using different methods of castration and tail docking (Johnson et al. 2009).

The most widely methods of castration being used are rubber ring, burdizzo and surgical or open methods. Rubber ring castration method via application of a tight rubber ring around the neck of the scrotum using an elastrator causes ischemia, leading to tissue death and sloughing. Other methods include the application of an emasculator (e.g. Burdizzo clamp) over the spermatic cord to crush and destroys a narrow segment of each spermatic cord, causing irreversible damage to the vessels supplying the scrotum, leading to ischemia and testicular atrophy, while the third is the open or surgical castration involves excising the scrotum and underlying tissues to reveal the testes which are then removed by tearing, cutting or twisting, with or without cautery, legation or clamping. (Dinnis et al., 1997a). All three castration methods produced changes in the integrated scrotal pain scores which were significantly higher compared to control lambs (Thornton and Waterman-Pearson, 1999). Pain in animals is a complex experience, dependent not only on the severity of the insult to pain pathways and the degree of tissue or nerve damage, but also on previous pain experiences and on social position within a flock/herd. Pain associated with inflammatory diseases is probably the major source of pain in ruminant species (Fitzpatrick et al. 2006).

Melches et al. (2007) reported that long-term pain after rubber ring castration of calves can last for

at least 42 days. In addition, the prolonged wound healing and long term local pain compared to Burdizzo castration and the occurrences of local infections do not favor the rubber ring method. The Burdizzo method appears to be both effective and safe but can be difficult to apply and considerable variability in its effectiveness can occur (Hosie *et al.,* 1992). Zimmerman (1986) suggested that in animals a painful experience should result in learned avoidance and affect the animal's behavior including social behavior. Therefore we can use behavioral and physiological criteria to determine whether an experience is painful to an animal.

Castration-related responses indicating pain and distress in lambs include changes in behavior and serum cortisol concentration, and the occurrence of abnormal postures. This has been well established by several authors investigating post castration-distress over the first few hours after castration (Molony et al., 2002). After castration individual lambs expressed pain in different ways; some rolled; some wagged their tails while others head turned, stamped their feet or vocalized (Molony et al., 2002). This experiment aimed to study the behavior of castrated buck kids at three different ages after castration by RR or Bur, and to assess the suitable method for each age class depending on the response of buck kids to castration method that was less painful to the animal. Also to assess the preference of owners to any method through the results of questionnaire.

2. Materials and Methods:
Animals:
Three different ages and three methods of castration (including control handled) were used in this study to see the effect of age and method of castration on the behavior and welfare of kids.   This study was conducted on ninety buck kids aged 7, 21, and 42 days were used, in this study. For each age group, ten kids were castrated by rubber ring, ten by Burdizzo, and ten kids were control handled and used as control for both. Animals were allowed to acclimatize for a minimum of 24 hours in the pens where the castration was done prior to commencement of the study. Does were housed with their kids in straw bedded pens for the duration of the experiment (Molony et al., 2002). Green fodder and water were provided ad libitum and concentrates fed as required.
Experimental design:
Before castration, all kids received a tetanus prophylaxis of 1500 IU of Tetanus-Serum, the castrations or control handlings were performed between 0700 and 0800 A.M. Three methods were studied (control handling, rubber ring, and Burdizzo), each kid experienced only one castration method.

1- Control handling: The operator manipulated the testes for 1–2 min in order to simulate the handling associated with castration.
2- Rubber ring castration (RR): A constricting latex rubber ring was applied to the neck of the scrotum, using an elastrator after ensuring that both testes were situated distal and the teats proximal to the ring. One person held the kid while a second person applied the treatment.
3- Burdizzo castration (Bur): Each spermatic cord and associated scrotal tissue was crushed each with a Burdizzo clamp. The second application of the clamp lay distal to the first. Care was taken to ensure that the clamp crush lines did not overlap. castration and control handled were done according to (Melches et al., 2007).
Recording of behavioral responses:
Behavioral observations of kids during control handled and castration and the immediate behavioral responses of each buck kid throughout the 180 minutes following castration or control handling were assessed by using of a video camera (Hitachi) situated at a slightly elevated angle to record all activities within the pen; video taping enabled the experimental area to remain free from human presence and activity, thus lessening the risk of altering the kid's normal behavior. The video tapes were reviewed at a later date and the behavioral responses were recorded. The 180 min experimental period (post castration) was divided into 10 min observation periods and the occurrence or count of each behavior or pasture was recorded for each 1 min period (Grant 2004).
Description of behaviors was based on what reported by (Molony et al. 2002 and Grant 2004), as follows:
Foot stamp and kicking: one action was recorded when either a front or hind limbs was lifted and forcefully placed on the ground while standing or lying.
Statue standing: standing immobile for more than 10 s usually with the hind limbs slightly apart and positioned further back than normal, the back was arched, the tail tucked between the hind legs and the kid was trembling, with an obvious withdrawal from interaction with other pen members and outside stimuli.
Lateral lying with head up, or down: lateral recumbency with one shoulder on the ground, with extension of the hind limb and with the head up or down.
Abnormal ventral lying: ventral recumbency with the hind limbs partially or fully extended, or with the kid keeping the scrotal region off the ground.
 Abnormal standing/walking: Standing or walking unsteadily sometimes with tail wagging; walking on knees; moving forward with bunny hoops; circling; leaning on a support or falling, swaying.

Normal standing/ walking: standing, walking and playing, eating or investigating with no apparent abnormality.

Active pain behaviors:-

Head turning: (movement of the head beyond the shoulder), include both looking and touching at the source of pain and grooming.

Tail wagging : a single side to side tail wagging was recorded as one action. Tail wags while teat seeking was not counted.

Rolling: kid rolled from lying on one side to the other without getting up, half rolls on the back were included.

Easing quarters: one action was recorded each time a front or hind limb, including the shoulder and hind quarters was moved in a less forceful manner than stamping or kicking or the whole body was shifted or eased without moving from the place of rest, tensing of leg muscles was also included.

Licking scratum and inside of the hind leg: during standing or lying down, the kid turns its head toward the inside of hind leg and scratum with elevation one of hind legs with vigorous licking.

Restlessness, the number of times the kid stood up and lay down; each unit scored included both the act of rising and lying down, instances of the kid rising as far as its knees were included in the count.

Vocalizations; occurrence of each vocal sound was recorded.

Backward movements: the kid move few steps backward while leaning on object.

Elimination: number of defecations and urinations.

Teat seeking: kid seeks the teats with or without sucking was recorded.

Feeding: when the kid nibbles or eats feed.

Also the effect of age on time needed for castration and scrotal sloughing were recorded. The time for castration or manipulation was measured, including the time for fixation and disinfection (Melches et al., 2007).

Beside this there was a survey on kids' castration through a questionnaire to owners and veterinarians (according to Hosie et al., 1996) as follows:-

1-Why do you castrate your kid?

2- At what age do you castrate your kid?

3-Which technique have you used? And who do it ?

4- At what age do you use (Surgical removal, Burdizzo castrator, Rubber ring).

5- In case of surgical removal do you use tetanus prophylaxis? Yes or No

6-Where do you normally carry out this task?

7- Are you aware of any injuries or deaths associated with these techniques? Yes or No.

8- Do you use anesthetics when castrating?   Yes or No.

9- Are you aware of any failure with any of these techniques? Yes or No. if yes how many?

Statistical analysis: Analysis of variance (ANOVA) was performed on the behavioral data, gathered during the 180 minutes to compare differences in behavioral activities and time spent in various postures, between treatments. Data were analyzed using SPSS (SPSS 2003, SPSS Inc.), and (P<0.05) was consider as statistically significant. Data are presented as means ± SE.

3. Results:

As shown in table (1); the time needed for castration of buck kids was significantly affected both by age of kids and method of castration. Castration of older kids (21 and 42 days) took significantly longer time (P<0.05) in both methods of castration. Bur method took significantly (P<0.05) longer time than RR at all ages.

As shown in table (2); age of castrated kids significantly (P<0.05) affected the behaviors (vocalization, tail wagging and kicking) during castration process. The incidence of these behaviors during castration was greater in older kids (42 days).

Table (1) Effect of method of castration and age of buck kids on the time needed for castration each kid (min.), and scrotal sloughing in RR method

Age / Method of castration	7 days	21 days	42 days
Rubber ring	0.57 ± 0.01 [b]	2.09 ± 0.04 [a]	2.15 ± 0.25 [a]
Burdizzo	1.08 ± 0.03 [b]	3.32 ± 0.22 [* a]	4.56 ± 0.53 [a*]
scrotal sloughing (days)	14.60 ± 0.11 [c]	22.16 ± 2.18 [b]	41.56 ± 6.18 [a]

Values are shown as means ± S.E. M

[a,b,c] means with different letters in the same raw are significantly different at P<0.05

means with stars [*] in the same column are significantly different at P<0.05

Table (2) Incidence of kicking, vocalization, and tail wagging of kids during castration and handled control at different ages:

Age	Behavior	Control	Rubber ring	Burdizzo
7 days	Kicking	0.33 ± 0.11^c	1.33 ± 0.88^b	3.67 ± 0.43^a
	Vocalization	0.50 ± 0.08^c	1.40 ± 0.05^b	4.98 ± 0.24^a
	Tail wagging	0.50 ± 0.01^c	3.12 ± 0.02^b	5.20 ± 0.54^a
21 days	Kicking	0.67 ± 0.33^c	2.57 ± 0.67^b	5.47 ± 1.02^a
	Vocalization	0.33 ± 0.04^c	$2.64 \pm o.11^b$	6.67 ± 0.43^a
	Tail wagging	0.60 ± 0.25^c	$3.20 \pm 0.21^{b*}$	6.61 ± 0.51^a
42 days	Kicking	1.33 ± 0.21^c	2.89 ± 0.07^b	5.82 ± 0.53^a
	Vocalization	0.54 ± 0.21^c	4.14 ± 1.00^b	9.67 ± 0.88^a
	Tail wagging	1.20 ± 0.04^c	$5.35 \pm 0.58^{b*}$	$8.80 \pm 0.53^{a*}$

Values are shown as means ± S.E. M
[a,b,c] means with different letters in the same raw are significantly different at P<0.05
means with stars[*] in the same column are significantly different at P<0.05

The abnormal postures were virtually absent in control kids and present in those castrated at all ages used in this study for up to 180 minutes following castration (Tables 3-5). RR kids had significant (P<0.05) increase in statue standing and immobile periods, abnormal lying with full extension of hind limb, while lateral lying with head up or down, and normal standing/ walking were more in case of Bur castration technique. By age advancement of castrated kids there was significant (P<0.05) increase in the time spent doing abnormal pastures in both RR and Bur kids.

Table (3) Effect of method of castration on time (min) spent in abnormal postures by kids in 180 minutes after RR and Bur castration (7 days of age):

Behavior	Control	RR	Bur
Statue standing	0 ± 0^c	37.18 ± 0.19^a	9.53 ± 1.21^b
Lateral lying , head up	0 ± 0^c	5.37 ± 0.14^b	10.52 ± 0.12^a
Lateral lying , head down	0 ± 0^c	6.2 ± 0.15^b	14.33 ± 0.23^a
Abnormal ventral lying, full leg extension	0 ± 0^c	36.40 ± 3.05^a	27.36 ± 0.16^b
Abnormal ventral lying, partial leg extension	0 ± 0^c	20.53 ± 1.17^b	30.2 ± 0.15^a
Abnormal standing\ walking	0.21 ± 0.05^c	53.32 ± 0.11^a	36.22 ± 0.23^b
Normal standing\walking	95.11 ± 2.7^a	7.30 ± 0.23^c	18.18 ± 0.49^b

Values are shown as means ± S.E. M
[a,b,c] means with different letters in the same raw are significantly different at P<0.05

Table (4) Effect of method of castration on time (min) spent in abnormal postures by kids in 180 minutes after RR and Bur castration (21 days of age):

Behavior	Control	RR	Bur
Statue standing	0 ± 0^c	39.51 ± 3.05^a	20.42 ± 0.13^b
Lateral lying , head up	0 ± 0^c	18.53 ± 1.17^b	33.40 ± 3.05^a
Lateral lying , head down	0 ± 0^c	2.48 ± 0.15^b	10.41 ± 3.17^a
Abnormal ventral lying, full leg extension	0 ± 0^c	39.36 ± 0.32^a	29.21 ± 1.14^b
Abnormal ventral lying, partial leg extension	0 ± 0^b	8.33 ± 0.09^a	9.13 ± 0.27^a
Abnormal standing\ walking	0.18 ± 0.03^c	55.49 ± 0.18^a	$36.53 \pm o.35^b$
Normal standing\walking	107.11 ± 1.19^a	3.18 ± 0.12^c	11.52 ± 3.17^b

Values are shown as means ± S.E. M
[a,b,c] means with different superscripts in the same raw significantly differ (p 0.05)

Table (5) Effect of method of castration on time (min) spent in abnormal postures by kids in 180 minutes after RR and Bur castration (42 days of age):

Behavior	Control	RR	Bur
Statue standing	0 ± 0^c	42.29 ± 0.28^a	30.8 ± 3.17^b
Lateral lying , head up	0 ± 0^c	22.35 ± 0.37^b	36.18 ± 0.23^a
Lateral lying , head down	0 ± 0^b	1.21 ± 0.18^b	8.31 ± 1.12^a
Abnormal ventral lying, full leg extension	0 ± 0^b	$39.28 \pm o.12^a$	33.50 ± 1.09^a
Abnormal ventral lying, partial leg extension	0 ± 0^b	8.07 ± 0.47^a	7.21 ± 0.33^a
Abnormal standing\ walking	0.19 ± 0.01^c	57.47 ± 0.18^a	46.51 ± 0.15^b
Normal standing\walking	109.41 ± 2.29^a	1.11 ± 0.06^c	6.28 ± 0.19^b

Values are shown as means ± S.E. M
[a,b,c] *means with different superscripts in the same raw significantly differ (p 0.05)*

The incidence of active pain behaviors (tail wagging, rolling, easing quarters, licking scratum and inside of the hind leg, restlessness, vocalizations, and backward movements) were significantly higher in case of RR kids than Bur kids and handled control at the same ages, while the incidence of head turning increased in case of Bur kids (Tables 6 & 7).

Table (6) Effect of method of castration on incidence of active pain behavior by kids in 180 minutes after Burdizzo (Bur) castration:

Age / Behavior	7 days	21 days	42 days
Head turning	3.40 ± 0.74^b	8.12 ± 1.84^a	8.46 ± 1.33^a
Tail wagging	2.60 ± 0.51^b	5.81 ± 0.52^a	6.11 ± 0.61^a
Rolling	13.40 ± 2.29^b	18.63 ± 1.83^a	20.89 ± 4.12^a
Foot stamp\ kick	2.41 ± 0.50^b	2.83 ± 0.61^b	7.65 ± 0.41^a
Easing quarter	5.60 ± 0.31^b	9.12 ± 0.09^a	11.30 ± 0.18^a
Licking scratum and inside of hind leg	3.18 ± 0.55^b	8.42 ± 0.23^a	9.40 ± 0.93^a
Restless	$36.5 \pm o.44^c$	49.82 ± 0.95^b	85.32 ± 0.91^a
Vocalization	2.21 ± 0.11^b	3.98 ± 0.52^b	7.31 ± 0.39^a
Backward movements	2.20 ± 0.05^b	3.51 ± 1.13^b	9.28 ± 4.88^a

Values are shown as means ± S.E. M
[a,b,c] *means with different letters in the same raw are significantly different at P<0.05*

Table (7) Effect of method of castration on incidence of active pain behavior by kids in 180 minutes after Rubber ring (RR) castration:

Age / Behavior	7 days	21 days	42 days
Head turning	2.40 ± 0.51^b	2.80 ± 0.73^b	4.42 ± 0.93^a
Tail wagging	8.20 ± 0.85^b	10.21 ± 0.73^a	12 ± 2.95^a
Rolling	18.81 ± 1.85^b	24.40 ± 2.09^a	28.01 ± 3.91^a
Foot stamp\kick	4.20 ± 1.28^b	5.11 ± 2.86^b	10.04 ± 1.03^a
Easing quarter	9.08 ± 0.71^b	11.39 ± 1.57^b	18.62 ± 1.30^a
Licking scratum and inside of hind leg	9.80 ± 2.51^b	13.11 ± 3.08^b	18.08 ± 1.32^a
Restless	50.5 ± 0.13^b	58.2 ± 0.45^a	108.45 ± 0.68^c
Vocalization	4.11 ± 1.39^b	13.62 ± 0.81^b	18.21 ± 1.50^a
Backward movements	7.17 ± 1.45^c	26.12 ± 4.93^b	48.71 ± 6.95^a

Values are shown as means ± S.E. M
[a,b,c] *means with different letters in the same raw are significantly different at P<0.05*

As shown in table (8); there was significant (P<0.05) increased in the frequency of urination and defecation behaviors and significantly (P<0.05) reduction in ingestive behavior in case of RR and in older age.

Table (9); revealed that most of buck kids were castrated between one and 10 weeks of age, Burdizzo was used between 2 and over 8 weeks with % of 2 and 16 respectively, while rubber ring was between one day and 8 weeks of age with % of 17 and 2

respectively. Most farmers still do surgical castration between ages of 7 days to over 8 weeks by themselves in the farm (seventy seven percent), and small percentage (twenty three percent) of castrations were done at the clinic. Castration failure was not recorded either for surgical or rubber ring castration methods, but were noted only in 7 out of 30 kids where the Burdizzo was used especially older than 8 weeks.

Table (8) effect of method of castration on the incidence of elimination, suckling and teat seeking, and feeding behavior by kids in 180 minutes after castration and handled control:

	Age / Behavior	7 days	21 days	42 days
Handled control	Urination	2.12 ± 0.01^b	2.36 ± 0.33^b	3.31 ± 0.16^a
	Defecation	0.50 ± 0.02^b	3.11 ± 0.11^a	3.21 ± 0.30^a
	Suckling and teat seeking	$3.16 \pm 0.11^{b*}$	$6.44 \pm 0.28^{a*}$	$4.57 \pm 0.38^{b*}$
	Feeding	$0.23 \pm 2.20^{c*}$	2.64 ± 0.63^b	$6.63 \pm 2.92^{a*}$
Rubber ring (RR)	Urination	$7.80 \pm 0.21^{b*}$	$10.28 \pm 0.81^{a**}$	$15.21 \pm 0.36^{a**}$
	Defecation	$3.40 \pm 0.60^{b*}$	4.81 ± 0.92^b	$7.21 \pm 0.11^{a*}$
	Suckling and teat seeking	1.86 ± 0.03^a	1.6 ± 0.01^a	0.03 ± 0.01^b
	Feeding	0 ± 0^b	0 ± 0^b	0.21 ± 0.03^a
Burdizzo (Bur)	Urination	$6.87 \pm 3.07^{b*}$	$6.91 \pm 5.21^{b*}$	$11.61 \pm 0.12^{a*}$
	Defecation	3.26 ± 0.75^b	3.61 ± 0.81^b	$5.40 \pm 0.91^{a*}$
	Suckling and teat seeking	1.7 ± 0.01^a	0.12 ± 0.05^b	0.03 ± 0.11^b
	Feeding	0 ± 0^b	0 ± 0^b	0.58 ± 0.01^a

Values are shown as means ± S.E. M
^{a,b,c} *means with different letters in the same raw are significantly different at P<0.05*
means with stars * *in the same column are significantly different at P<0.05*

Table (9) Results of questionnaire on buck kids' castration survey:

Method of castration		Burdizzo	Rubber ring	surgical
Age (weeks)	1-2	-	17	83
	2-4	2	12	86
	4-8	2	2	96
	Over 8	16	-	84
Place of Castration	At clinic	23		
	At the farm	77		
Using of anesthesia		For older kids more than 8 weeks in case of surgical castration only		
Using of tetanus prophylaxis		in case of surgical castration only (40 %) especially over 4 weeks)		
Failure or recurrence		7	-	-
Injuries or deaths		2	2	3
Reason of castration	Prevent unwanted pregnancy	20		
	Avoid behavioral problems	27		
	Fattening	48		
	Avoid goaty odor	5		

4. Discussion:

The purpose of this study was to examine the behavioral responses of kids castrated by RR or Bur at different ages (7, 21 and 42 days of age), and to compare these responses to those seen in handled control of the same ages to those castrated. As pain is associated with suffering and distress, thus it is important to be estimated as it interferes with most behavioral patterns of animals. During castration kids did struggling behavior which increased with age of kids, as castration of younger kids (7 days of age) took significantly shorter time than older kids. The time of castration was significantly affected by age of castrated kids and age of castration. Older kids (21 and 42 days) took significantly longer time in both methods of castration. Bur method took significantly longer time than RR at all ages because the instrument had to be applied for each testicle. These results confirmed the findings of (Hosie *et al.,* 1993 and Melches et al., 2007) as they stated that castration of lambs of the Burdizzo group, took significantly longer time than the castration of lambs of the rubber ring groups.

In case of RR castration, there was significant effect of age of kids at castration on the average time taken for the scratum to drop off; it sloughed earlier in case of younger kids than in older kids because in the later there was more tissue and innervations by blood vessels and nerves, so it took longer time to slough. Kent et al (2000) recorded that 80% of castrated lambs still had scartum present after 28 days of castration by RR. In castrated lambs, Mellema et al. (2006) found that after rubber ring castration, the scrotal tissue and its contents began to dry up and fell off after an average of 24.7 ± 4.4 days. Also Melches et al. (2007) reported that in case of rubber ring castration, the testes dropped off after a (35 ± 6.9) days in lambs.

The incidence of vocalization, tail wagging and kicking, behaviors during castration were greater in older kids, (42 days) indicating the severity of pain due to more tissue damage in those kids. This result agree with (Molony et al., 1993) who found that in lambs all methods of castration at all ages produced changes in behavior that were interpreted as indicative of considerable pain. The expression of pain during castration was significantly influenced by the castration method (Molony et al., 2007). The incidence of kicking, tail wagging, and vocalization during application of Bur was greater than RR at all ages used in this study as application of Bur need sometime to apply (grasping the scratum and manipulate the testes down into the scratum by hand, manipulation of spermatic cord and squeezing the Bur totally closed, clamping it on the kid's scrotum to crush the cord for each testicle and to the difficulties

of its application. Foot stamping and kicking or restlessness made up the main part of the total active behavior after rubber ring castration (Mellema et al. 2006). In piglets, (Weary et al., 1998) recorded vocalization when castrated and demonstrated that piglets call at a higher frequency during the procedure especially during the severing of the spermatic cord.

Studies investigating differences between pain responses of lambs at different ages have been undertaken using different methods of castration and tail docking (Johnson et al. 2009). In our study it was clear that all castration methods produced changes in behavior which were significantly higher compared to handle control kids and in older kids more than younger. Johnson et al. (2009) demonstrated that very young lambs have a reduced cerebrocortical response to castration than their older counterparts and it has been assumed that they perceive less pain.

Pain is typically estimated to be mild or moderate based on abnormal postures and behaviors indicating discomfort (Molony et al., 2002).

There was significant difference in abnormal postures (statue standing, lateral lying with head up, lateral lying with head down, , abnormal ventral lying with partial leg extension, and abnormal standing\ walking) between RR and Bur kids in all kids at all ages used in this study ranged from (7-42 days). RR kids had significant increase in statue standing and immobile periods, and abnormal lying with full extension of hind limbs, by reducing total movements; this may be an attempt by the kid to decrease painful sensation, as pain might increase as a result of moving. Pain can lead to a period of hyperalgesia, which is a change in the relationship between pain perception and stimulus intensity, resulting in a decreased stimulus threshold and increased pain in response to a suprathreshold stimulus (Raja et al. 2000 and McCracken et al. 2010).

(Grant 2004) found that statue standing was highly indicative of Mulesing treatments. Lying postures and abnormal walking/standing based upon the degree of limb extension, as the increase full extension depends on testicular tissue pain. This agrees with what reported in lambs by (Molony et al., 2002), that lying with full extension of the hind limbs is associated with lambs ranked higher in the pain scale. These abnormal postures values were higher in RR kids than Bur kids at all ages, the high level of these behaviors following RR castration reflects direct pressure on the spermatic cord and scrotal skin exerted by the tight rubber ring followed by ischemic scrotal and testicular pain and due to the inflammatory response of RR produced increase sensitivity at this site. Also may be as a result of RR kids displayed agitated behavior such as incessant pacing along the pen perimeter and ischemic pain

from RR prevented kids from adopting a similar strategy as observed in castrated lambs by (Grant, 2004). In castrated lambs, Mellema et al. (2006) stated that the proportion of recorded postures that were abnormal was significantly greater after RR castration, than Bur during the first 2 h. they added that from days 1 to 6 after treatment, lambs castrated without local anaesthesia (Bur and RR) exhibited a significantly higher rate of total active behavior than control lambs.

Lateral lying with head up or down, and normal standing/ walking were more in case of Bur castration technique which produced a short burst of intense pressure but not ischemic pain from the scratum and its contents. Molony et al., (1993) postulated that this is because some afferent nociptive signals are abolished by the crushing action of the clamp on the neuron serving these structures.

Pain is related to the amount of tissue damage (Lester et al., 1996 and Molony et al., 2002 ; and Fitzpatrick et al. 2006). Castration of older kids (42 days) displayed more active pain behavior than younger ages (7& 21 days), this is because of by increasing age of kid, there was an increase in pain sensation due to more innervations by nerves and blood vessels and more tissue damage, so those kids try to alleviate pain by doing these behaviors.

Many authors (Mololny et al., 1993; Kent et al., 1995 and Goodwin et al., 2007) have favored using active pain behaviors as a mean of assessing pain following castration. In both methods of castration, it was found that the abnormal lying with full leg extension and abnormal standing\ walking were significantly increased with age as with increasing age there was more tissue damage and more pain sensation, while lateral lying with head down, and abnormal lying with partial leg extension, were significantly decreased by age. Due to the tension of the rubber ring, RR kids spent significantly more time doing abnormal postures than Bur kids which spent greater time in lying postures at the same ages. These results agree with Melches et al. (2007), who observed that rubber ring lambs exhibited more often abnormal postures than the Burdizzo lambs: a tendency towards this difference was found during the time period 20 min to 2 h after castration, and significant differences were found during the time period 2.5–9 h after castration. Age significantly affected both the abnormal postures and the time spent in lying postures (all lying postures). Normal standing behavior was very short during the observational period in castrated animals, and this have been interpreted as indicators of post-castration pain and/or distress as reported by (Mellor et al., 1991; Wood et al., 1991; Kent et al., 1995, and Lester et al., 1996).

In the same ages, it was found that RR kids had significantly more incidence of active pain behaviors (tail wagging, rolling, easing quarters, licking scratum and inside of the hind leg, restlessness, and backward movements) than Bur kids and handled control this may be due to noxious mechanical stimulation of the skin and subcutaneous tissue by the ring (as recorded in lambs by (Molony et al., 2002; Mellema et al. 2006; and Goodwin et al., 2007). The same was reported in lambs by (Kent et al., 2001), who observed fewer incidences of tail wagging, easing quarter, rolling and limb movements where castrator was applied proximal to the RR. Watts and Stookey, (2000), reported that vocalization is obviously an important part of many animals normal communication and a form of commentary on their own sense of well-being. As tissue damage increased by age, These behaviors significantly increased by age, indicating that the severity of pain increased in older kids (21 and 42 days), they also did more vocalizations than those castrated at 7 days, also vocalization was affected by methods of castration, RR castrated kids did more vocalizations than Bur at all ages. These results disagree with what reported by Grant, (2004), who stated that vocalization of the lamb did not appear to correlate well with the severity of the treatment and its expression was highly variable amongst lambs.

The incidence of restlessness and walking backward increased by age and were significantly more in case of RR indicating the severity of pain due to more tissue damage. Those animals suffered more and couldn't still in a fixed position for long time, thus they move more frequently to alleviate the pain sensation.

The frequency of urination and defecation in castrated kids was significantly affected by age and method of castration; it increased significantly in case of RR and in older ages, this indicated that those kids suffered more stress which made the kids stripping urine and increase times of defecation especially during the first hour after castration. McCracken et al. (2010) found that after tail docking in lambs, some behaviors such as urination were infrequently displayed and there was not a significant difference between the pre and post docking measurements.

There was significantly reduction in ingestive behavior (suckling and teat seeking and nibbling at feed) at different ages in this study. This may be related to reduction in appetite due to pain sensation and distress. In lambs, Mellema et al. (2006) reported that castration pain and distress should affect animal behavior, they may also affect food intake with consequent differences in daily weight gain. Our results agree with (McGlone et al., 1993, and Weary et al. 1998), they recorded reduction in suckling,

standing and increased lying time in the behavior of young pigs compared with that of intact pigs at all ages tested. Also reduction in suckling in castrated kids may be related to loss of appetite as reported in castrated cattle by (Stilwell et al., 2008).

Results of questionnaire indicated that the age of castrated buck kids were between one and 10 weeks of age, Burdizzo was used between 2 and over 8 weeks, while rubber ring was used in younger kids between one day and 8 weeks of age. Surgical castration also done between ages of 7 days to over 8 weeks, and mostly done by farmers themselves in the farm, while small percentage of castrations were done at the clinic. Castration failure noted only in case of Burdizzo especially those older than 8 weeks. This might be failure to apply sufficient crushing pressure to the spermatic cord due to short time of application as reported in lambs by Hosie *et al.,* (1996) who stated that the highest failure rate was attributed to a faulty bloodless castrator which the flockmaster believed did not achieve an adequate crushing pressure. The results also showed that in case of surgical castration, only 40 % of castrations used anesthesia and tetanus prophylaxis, and it was limited to those kids over 8 weeks. There was no significant difference in the percentage of deaths between castration methods, from 100 castrated kids of different ages, only two deaths were attributed to both Burdizzo and rubber ring whereas there were three for surgical castration. Deaths did not occur immediately after castration, but due to injury from the technique and infection to the scrotal skin, or to swelling of one or both testicles due to hemorrhage as reported by Hosie et al., (1992). The main reasons given for castration of kids mostly for fattening, to avoid behavioral problems and to prevent unwanted pregnancy, while the least percentage, was recorded for avoidance the goaty odor of milk.

Conclusion:

As some of buck kids have to be castrated for the previous reasons, thus from welfare point of view, it is important to choose the safest and less painful method to apply because the careful selection of procedures could reduce the total pain response. Despite rubber ring castration was the easier and faster, it led to long-term pain after castration and had adversely effect on behaviors as compared with Burdizzo castration.

The % of time spent doing behaviors that indicate painful sensation was increased with age which indicate that pain sensation in younger ages diminished earlier than older. The results of questionnaire revealed that using of Burdizzo and rubber ring castration still have some ignorance. The general recommendation is to castrate kids as early as possible as pain sensation diminished earlier in young

kids (7-21 days) than old (42 days) which results more tissue damage which probably increases the likelihood of post operative complications.

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Synthesis of Some New Annulated Thieno Pyridine,Pyrazolopyridine and Pyrido Pyridine Derivatives

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Abstract: The reaction of arylidenemalonitrile with cyanothioacetamide afforded pyridine derivatives. Thus compound 1 reacted further with different nucleophilic and electrophilic reagents yielding different products which were confirmed via spectroscopic analysis.

1. Introduction

No doubt that thienopyridines are an interesting class of heterocycles and their chemistry has recently received considerable attention especially because of their potential utility as antibacterial[1-4] antihypertensive[5], diabetes mellitus [6-8], as well as analgesics and antiinflammat ,sedatives, anticougulants [9-11], antiortherosclerotics [12] and as gondatropin releasing hormone antogeonsits[13]. The derivatives of thiopyridines are also useful intermediates for the synthesis of some medicines and related compounds. It was discovered that the pyridyl thiolate moiety enhances antifungal and antiinflammatory activities of several important drugs [14, 15]. Herein we report some new pyridinethione derivatives and their related product.

2. Results and Discussion

Thus pyridinethione derivative 1, which is prepared according to the literature [16, 17] was reacted with active methylene compounds namely, chloromalononitrile, and /or ethylbromoacetate in refluxing pyridine to afford the theinopyridine derivatives (3a,b) respectively. The structure of compounds 3a,b was established based on the elemental analysis and spectral data. The mass spectrum of compound 3a is compatible with the molecular ion peak at m/z=229 (M$^+$). Compound 3a is assumed to proceed via reaction of compound 1 with -halo compound to afford the S-alkylated derivative 2a followed by cyclization to 3a.

The mass spectrum of compound 3b is compatible with the molecular ion peak at m/z = 276 (M$^+$) (Scheme 1).
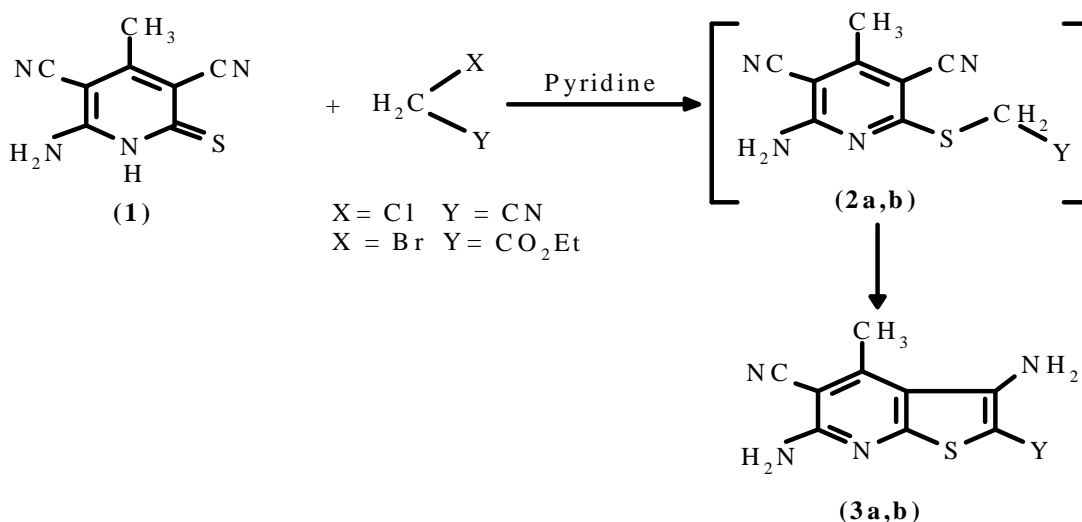
Scheme (1)

Alkylation of pyridinethione 1 with methyl iodide gave the S-methyl derivative 4 which was reacted with hydrazine hydrate to give the product 5 in a good yield [18,19]. The IR spectrum of 5 showed the presence of absorption peak at 3412-3323cm^{-1} for two NH$_2$ and 3280-3200 cm^{-1} for NH group

respectively. The ^{1}H-NMR spectrum of compound 5 exhibited a singlet at　11.64 ppm for NH group in addition to the signals of NH$_2$ and CH$_3$ in their proper positions. Accordingly this reaction product could be formulated as [3,6-d] amino pyrazolo[2,3-c]pyridine derivative (Scheme 2).
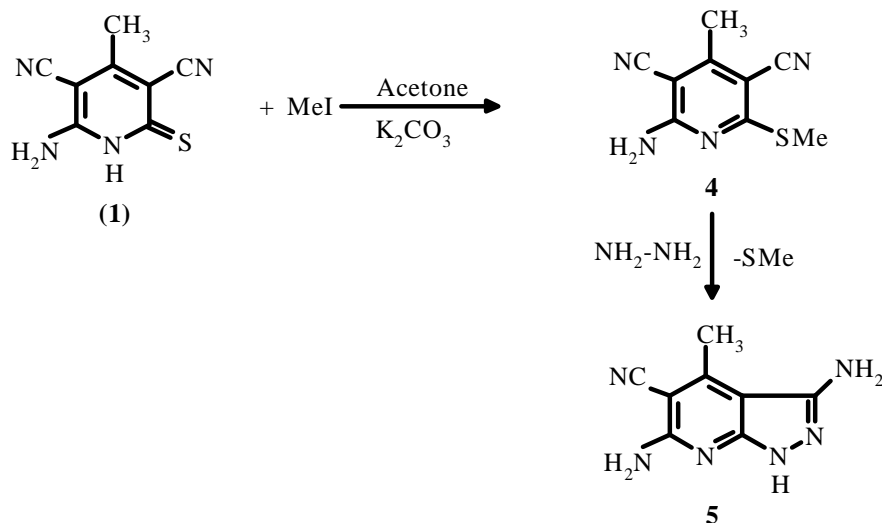
Scheme 2

On the other hand, compound 1 was reacted with hydrazine hydrate in ethanolic solution to afford the pyridotriazine derivative 6. The structure of compound 6 was established based on its elemental analysis and spectral data. The mass spectrum of compound 6 showed the molecular ion peak at m/z = 216 (M$^+$).The IR spectrum agreed well with the proposed structure. Also acetylation of the pyridine thione 1 with acetic anhydride afforded the acetyl derivative 7. The structure of compound 7 was

confirmed by its correct elemental analysis and spectral data. The IR spectrum of compound 7 exhibited the disappearance of the absorption band due to the NH$_2$ functional group at 3450-3300cm^{-1} and appearance of NH group at 3346-3181cm^{-1} and CO acetyl at 1717cm^{-1}. The ^{1}H-NMR of 7 revealed 2.50ppm (s, 3H,CH3),　3.73ppm (s, 3H,COCH3), 12.78ppm (br, 1H). Also, the mass spectrum of compound 7 was compatible with the molecular formula C$_{10}$H$_8$N$_4$OS at m/z = 232 (M$^+$) (Scheme 3).
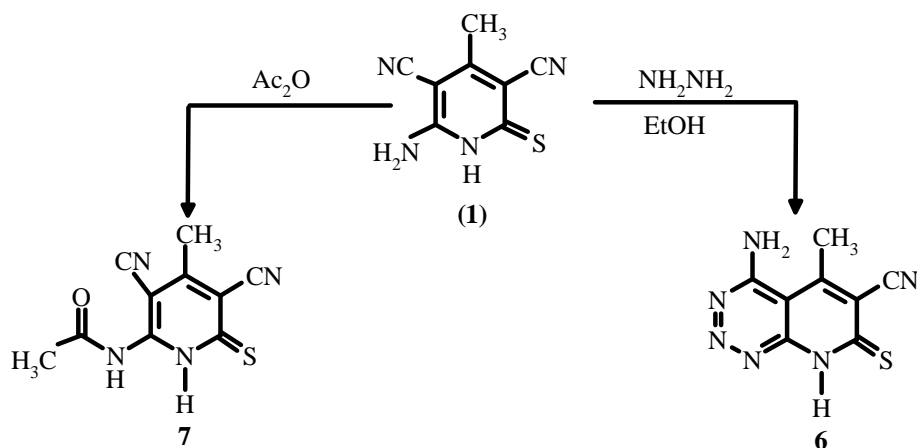
Scheme 3

Also, the reaction of compound 1 with acrylonitile afforded the N-ethylcyano derivative 8. The ^{1}H-NMR spectrum of compound 8 revealed the structure of this compound. The mass spectrum of compound 8 is compatible with the molecular ion peak at m/z = 274 (M$^+$) corresponding to the molecular formula $C_{11}H_9N_5S$.

Furthermore, compound 8 was reacted with aryl cinnamonitrile derivatives 9a-d to afford product of condensation which was formulated as structure 10a,d with the elimination of hydrogen cyanide .Structure 10a-d was established based on ^{1}H-NMR that revealed the presence of ethyl function in the reaction product (Scheme 4).

9,10 Ar , a = Ph
          Ar , b = 4-OMPh
          Ar , c = 4-ClPh
          Ar , d = 3-pyridine
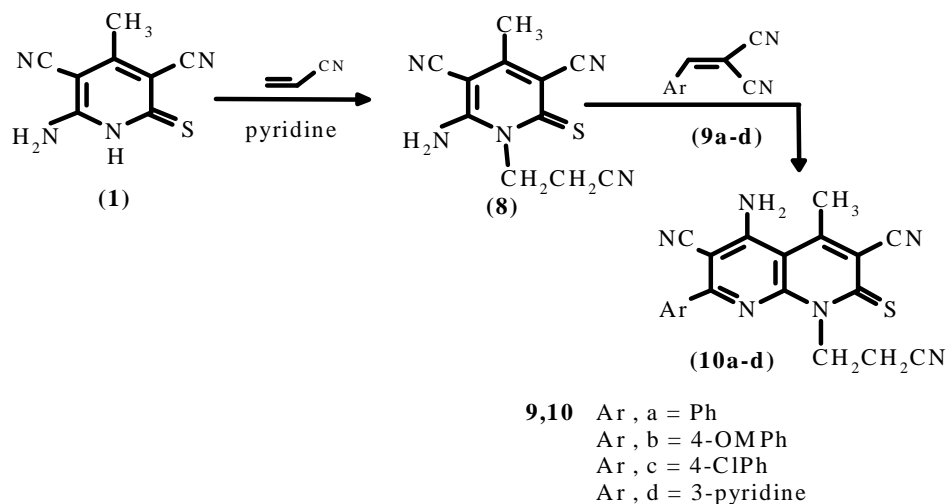
Scheme (4)

Similarly the pyridinethione (1) reacted with arylidine malononitrile 9a-d in boiling pyridine to afford the pyridopyridine derivatives 11a-d. The structures of compounds (11a-d) were confirmed by elemental analysis and spectroscopic data. The IR spectrum of compound 11a showed the presence of absorption peaks at 3319cm^{-1} for νNH$_2$, 1630cm^{-1} for νC=N and 1210cm^{-1} for νC=S functional groups. The ^{1}H-NMR spectrum of 11a exhibited signals at 3.44 ppm for NH$_2$ group in addition to the aromatic

protons. Also the mass spectrum of compound 11b showed a molecular ion peak at m/z = 347 (M$^+$) corresponding to the molecular formula $C_{18}H_{13}N_5OS$.In a similar manner, the reaction of 1 with malononitrile and formaldehyde, and/or acetaldehyde yielded the corresponding 2-thioxopyridopyridine derivatives 12a,b respectively. The structure of compounds 11and 12 were confirmed by elemental analysis and spectroscopic data (Scheme 5).

12, a, R = H
         b, R = Me

11, a, Ar = Ph
         b, Ar = 4-OMPh
         c, Ar = 4-ClPh
         d, Ar = 3-pyridine
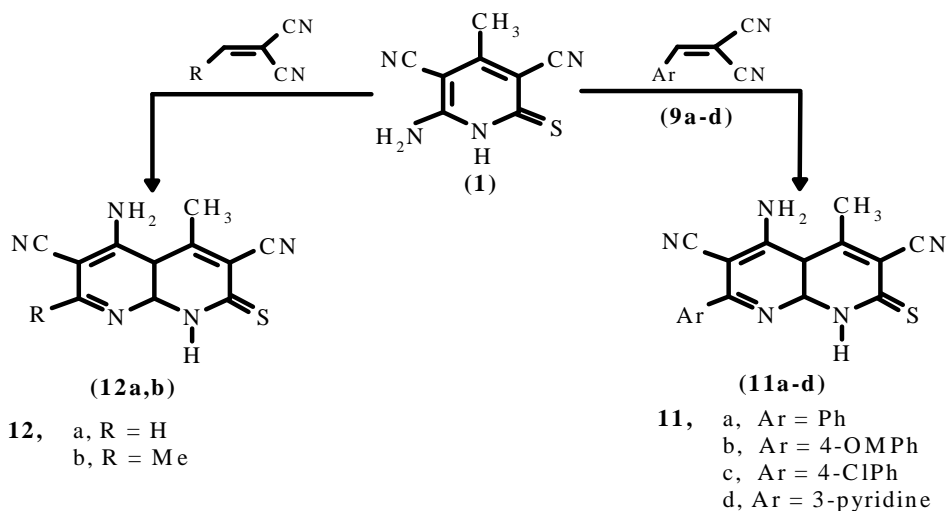
Scheme 5

The thienopyridine derivative 13 was readily obtained via the reaction of compound 1 with elemental sulphur. Subsequent treatment of compound 13 with acrylonitrile resulted only in cyanotheylation product 14. Compounds 13 and 14 were confirmed by elemental analysis and spectroscopic data. (Scheme 6).
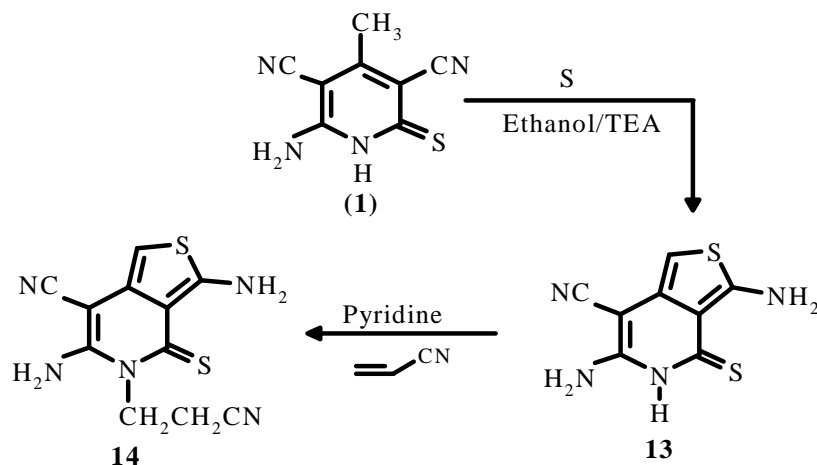
Scheme 6

3. Experimental

Melting points were taken with the help of stuart apparatus and were uncorrected.The IR spectra were produced with a Jasco FT/IR 5300 spectrophotometer using the KBr technique.^{1}H–NMR spectra were measured using a Jeol FX-100 spectrometer 60 MHz and a Varian Gemini 200 instrument 200 MHz and 250 & 300 MHz with TMS as an internal reference. Mass spectra were obtained by using of a Schimadzu-GC MS-QP 1000 EX instrument using the direct inlet system Microanalyses were performed by the microanalytical unit at Cairo University. All compounds gave satisfactory elemental analyses.

Synthesis of 6-Amino-4-methyl-6-thioxo - 1,2 - dihyropyridine -3,5-dicarbonitrile (1).
It was prepared according to the literature. The mass spectrum of (1) exhibited a molecular ion peak at m/z (160, 100%). ^{1}HNMR spectrum of (1) exhibited signals at 1.21 (3H, s,3H,CH3) 3.34 (2H,s,2H,NH2), 12.76 (br,1H,cyclic NH).

Synthesis of 3,6-Diamino-4-methylthieno [2,3-b] pyridine-2,5-dicarbonitrile (3a).
A mixture of (1) (0.01 mol) and chloroacetonitrile (0.01 mol) in 15ml of pyridine was refluxed for 5h, after cooling the obtained product it was recrystallized from DMF to give (3a). MS of (3a). $C_{10}H_7N_5S$, exhibited a molecular ion peak at m/z 229 (M^+, 100%). ^{1}H-NMR spectrum of (3a) exhibited signals at 2.50 (3H, s,3H,CH3), 3.33 (2H, s2H,NH2), 4.29 (2H, s,2H,NH2).

Synthesis of 3,6-Diamino-5-cyano-2-ethoxy carbonyl-4-methyl thieno[2,3-b] pyridine(3b).
A mixture of (1) (0.01 mol), ethylbromoacetate (0.01 mol) in 15 ml of pyridine was refluxed for 5h. The reaction mixture was then cooled and the obtained product was recrystallized from ethanol to give (3b). ^{1}HNMR spectrum of (3b) exhibited signals at 1.21 (t,CH,CH2CH3), 4.15 (q,2H,CH2,CH3), 3.32 (s,3H,CH3).

Synthesis of 2-Amino-4-methyl-6-thioxomethyl pyridine-3, 5-dicarbonitrile (4).
A mixture of 1 (0.01 mol) andmethyl iodide (0.01 mol) in 20 ml of dry acetone in the presence of anhydrous potassium carbonate (0.5g) was refluxed for 4h. The reaction mixture was then cooled poured into a beaker containing crushed ice (50 gm). The obtained product was recrystallized from ethanol to give (4). MS of (4) $C_9H_8N_4S$ exhibited a molecular ion peak at m/z (204, 100%). ^{1}HNMR spectrum of (4) exhibited signals at 2.56 (s,3H,CH3), 3.61 (s,3H, S-CH3), 3.74 (s2H, NH2).

Synthesis of 3,6-Diamino-4-methyl-1H-pyrazol [3,4-b] pyridine-5-carbonitrile (5).
A mixture of (4) (0.01 mol) with and hydrazine hydrate (0.01mol) was refluxed for 4h. The obtained product was recrystallized from ethanol to give (5). MS of (5) $C_8H_8N_6$ exhibited a molecular ion peak at m/z (188, 100%). ^{1}H-NMR spectrum of (5) exhibited signals at 2.73 (s, 3H,CH3), 5.19 (s,2H,NH2), 6.54 (s, 2H,NH2) ,11. 64 (s,1H,NH

cyclic).

Synthesis of 4-Amino-5-methyl-7-thioxo-7,8-dihydropyrido [2,3-d] [1,2,4] triazine-6-carbonitrile (6).

A mixture of (1) (0.01 mol) and hydrazine hydrate (0.01 mol), in ethanol (20 ml) was refluxed for 4h.The reaction mixture was then cooled and the obtained product was recrystallized from ethanol to give (6). MS of (6) $C_8H_6N_6S$ exhibited a molecular ion peak at m/z 218 (M^{-2}], 25, 9%). ^{1}H-NMR spectrum of (6) exhibited signals at 2.74 (s, 3H, CH3), 3.33 (s, 2H, NH2), 12.80 (s, 1H, NH cyclic).

Synthesis of N-(3, 5-Dicyano-4-methyl-6-thioxo-1, 6-dihydro- Pyridine -2-yl) acetamide (7).

A mixture of **1** (0.01 mol) and acetic anhydride (0.01 mol) was heated on a steam bath for 4hr. the reaction mixture was then cooled and the obtained product was recrystallized from DMF to give(**7**).MS of (**7**)$C_{10}H_8N_4OS$ exhibited a molecular ion peak at m/z 232 (M^+, 26%). ^{1}H-NMR spectrum of(**7**)exhibited signals at 2.50 (s,3H,CH3), 3.73 (s,3H,COCH3), 12.78 (br,1 H,cyclic NH).

Synthesis of 6-Amino-1-(2-cyanoethyl)-4-methyl-2-thioxo-1,2-dihydropyridine-3,5-dicarbonitrile (8).

A mixture of (1) (0.01 mol), and acrylonitrile (0.01 mol) in pyridine (15 ml) was refluxed for 4h. The reaction mixture was then cooled,poured into ice-HCl mixture and the obtained product was recrystallized from ethanol to give (8). MS of (8) $C_{11}H_9N_5S$ exhibited a molecular ion peak at m/z (243, 24.7%). ^{1}H-NMR spectrum exhibited signals at δ2.52 (s,3H,CH3) 2.99 (q,2H-NCH2), 3.48 (q,2H,CH2CN), 3.41 (s,2H,NH2).

Synthesis of 5-Amino-7-aryl-1-(2-cyanoethyl)-4-methyl-2-thioxo-1,2-dihydro[1,8] nphthydrine-3,6-dicrabonitrile (10a-d).

A mixture of (8), (0.01 mol) and derivatives of malonitrile namely benzylidene malono nitrile,4-methoxy benzylidene and 4-chloro benzylidene (9a-d) (0.01 mol) in pyridine (20 ml) was refluxed for 8h. The reaction mixture was then cooled poured into container of crushed ice (50 gm), neutralized with dil. HCl (5 ml) and the obtained products were recrystallized from ethanol to give (10a-d). MS of (10a) $C_{20}H_{14}N_6S$ exhibited a molecular ion peak at m/z 370 (M^+, 19.5%).^{1}H-NMR spectrum of (10b) exhibited signals at 2.43 (s,3H,CH3), 2.99 (t,2H,CH2-N), 3.44 (t,2H,CH2CN), 3.34 (s,2H,NH2).^{1}H-NMR spectrum of (10d) exhibited signals at 2.51 (s,3H,CH3), 3.01 (t,2H,N-CH2), 3.47 (t,2H,CH2CN), 3.28 (s,2H,NH2).

Synthesis of 5-Amino-7-aryl - 4 -methyl-2- thioxo-1, 2-dihydro - [1,8] naphthylridine -3 , 6-dicarbonitriles (11a-d).

A mixture of 1 (0.01 mol), substituted arylidene derivatives of malononitrile (0.01 mol) in pyridine (20 ml) was refluxed 10h. The reaction mixture was then cooled poured into ccontainer of crushed ice, neutralized with dil. HCl (5 ml) and the obtained product was recrystallized from ethanol to give 11a-d. MS of 11a $C_{17}H_{11}N_5S$ exhibited as molecular ion peak at m/z (317, 100%). ^{1}HNMR spectrum of 11b exhibited signals at 1.07 (3H, s), 2.11 (3H, s), 3.44(2H, s,) 7,19-8.03 (4H, m) 12.41 (1H, s), ^{1}H-NMR spectrum of 11c exhibited signals at 1.21 (3H, t), 2.90 (2H, q), 3.36 (2H, s), 7.37- 7.67 (4H, m), 11.05 (1H, s).

Synthesis of 5-Amino -4- methyl -2- thioxo-1,2-dihydro - 1,8 , naphthopyridine 3,6 - dicarbonitriles (12a,b) .

A mixture of 1 (0.01 mol), aliphatic aldehydes namely acetaldehyde and formaldehyde (0.01 mol) in 20 ml of alcohol in the presence of TEA was refluxed for 10h. The reaction mixture was then cooled and the obtained product was recrystallized from ethanol to give 12a,b. MS of 12b $C_{12}H_9N_5S$ exhibited a molecular ion peak at m/z = 253 (M^+, 7%), ^{1}H-NMR spectrum of 12a exhibited signals at 2.74 (3H,s), 4.69 (2H, s), 7.96 (1H, s), 8.68 (5H, s), 12.31 (1H, s). ^{1}H-NMR spectrum of 12b exhibited 2.74 (3H, s), 2.90 (3H,s), 3.34(2H,s), 7.94(SH, s), 12.05 (1H, br).

Synthesis of 3,6 –Diamino -4- thioxo -4,5-dihydrothieno [3,4-c] pyridine-7-carbonitrile (13)

A mixture of 1 (0.01 mol), and sulphur (0.01 mol) in 20 ml of alcohol/TEA was refluxed for 4h. The reaction mixture was then cooled and the obtained product was recrystallized from ethanol to give 13. MS of 13 $C_8H_6N_4S_2$ exhibited a molecular ion peak at m/z 220 (M^+, 2.9%).

Synthesis of 3,6 –Diamino -5- (2-cyanoethyl) -4-thioxo -4,5- dihyro – thieno [3,4-c] pyridine-7 carbonitrile (14)

A mixture of 13 (0.01 mol) and acrylonitrile (0.01mol), in 15 ml of pyridine was refluxed for 5h. The reaction mixture was then cooled and the obtained product was recrystallized from DMF to give 14. MS of 14 $C_{11}H_9N_5S_2$ exhibited a molecular ion peak at m/z 275 (M^+, 11%). ^{1}H-NMR spectrum exhibited signals at δ 2.98 (2H, q), 3.48 (2H, q), 3.01 (4H, br), 7.86 (1H, s), 7.97 (5H, br).

Table (1) IR spectra of synthesized compounds

Compd. No.	υ_{max} (cm^{-1})
1	3485(NH$_2$), 3283(NH), 2989 (CH–arom.), 2924(CH aliph.), 2214(C≡N), 1639 (C=C), 1269 (C=S).
3a	3326, 2225 (NH$_2$), 2978 (CH-arom.), 2926 (CH-aliph.), 2217(C≡N), 1629 (C=N), 1561 (C=C).
3b	3329, 3331 (NH$_2$), 3013 (CH-arom.), 2979 (CH-aliph), 2210 (C≡N), 1731 (C=O), 1634 (C=N), 1558(C=C).
4	3409-3345(NH$_2$), 2924(CH–arom.), 2920(CH aliph.), 2216(C≡N), 1673 (C=N), 1649 (C=C).
5	3412, 3323(2NH$_2$), 3229(NH), 2207 (C≡N).
6	3362 (NH$_2$), 3196(NH), 2974 (CH-arom.), 2936 (CH-aliph.), 2212(C≡N), 1643(C=N), 1599 (C=C), 1242 (C=S).
7	3317, 3220(NH), 3100(CH-arom.), 2980 (CH-aliph.), 2222(C≡N), 1736 (C=O), 1636 (C=C), 1272 (C=S).
8	3321, 3223 (NH$_2$), 2979 (CH-arom.), 2947 (CH-aliph.), 2217 (C≡N), 1646 (C=C), 1267 (C=S).
10a	3388, 3322(NH$_2$), 2980(CH-arom.), 2943 (CH-aliph.) 2223 (C≡N), 1698(C=N), 1652 (C=C), 1269 (C=S).
10b	3399, 3330(NH$_2$), 2983(CH-arom., 2931 (CH-aliph.), 2224 (C≡N), 1648 (C=N), 1563 (C=C), 1270 (C=S).
10c	3385, 3325(NH$_2$), 2980(CH-arom.), 2946(CH-aliph.), 2220 (C≡N), 1647 (C=N), 1563 (C=C), 1238(C=S).
10d	3323, 3226(NH$_2$), 2980(CH-arom.), 2947 (CH-aliph.), 2219 (C≡N), 1648 (C=N), 1564 (C=C), 1269(C=S).
11a	3316(NH$_2$), 3215(NH), 2917 (CH-arom.), 2849 (CH-aliph.), 2215(C≡N), 1626(C=N), 1561(C=C), 1242(C=S).
11b	3339(NH$_2$), 3210(NH), 2919 (CH-arom.), 2844(CH-aliph.), 2214(C≡N), 1556(C=C), 1256 (C=S).
11c	3464(NH$_2$), 3195(NH), 2973(CH-arom.), 3933(CH-aliph.), 2212 (C≡N), 1638 (C=N), 1598 (C=C), 1240(C=S).
11d	3317(NH$_2$), 3191(NH), 2921(CH, arom.), 2900 (CH, Aliph.), 2213(C≡), 1635(C=N), 1566(C=C), 1271(C=S)
12a	3326(NH$_2$), 3120(NH), 2927 (CH–arom.), 3050(CH-aliph), 2211 (C≡N), 1671 (C=N), 1629 (C=C), 1267 (C=S).
12b	3345(NH$_2$), 3224(NH), 2974 (CH-arom.), 2923(CH-aliph.), 2214 (C≡N), 1626(C=N) 1563 (C=C), 1248 (C=S).
13	3375, 3310 (NH$_2$), 3194(NH), 3020(CH-arom.) 2974(CH-aliph.), 2214(C≡N), 1636 (C=C), 1250 (C=S).
14	3426, 3324(NH$_2$), 2979(CH-arom.), 2946(CH-aliph.), 2212(C–N), 1647(C=C), 1269 (C=S).

Table (2) Physical and analytical data of the synthesized compounds

Compd. No	Yield (%)	M.P.	Cryst. Solvent	Mol. Formula (Mol. Wt)	Elemental analyses Calcd/Found (%)			
					C	H	N	S
1	72	210	ethanol	$C_8H_6N_4S$ (190.23)	50.51 50.33	3.18 3.15	29.45 29.33	16.86 16.99
3a	69	256	Ethanol	$C_{10}H_7N_5S$ (229.26)	52.39 54.21	3.08 3.12	30.53 30.61	13.99 13.69
3b	68	178	Ethanol	$C_{12}H_{12}N_4O_2S$ (276.32)	52.16 52.96	4.38 4.74	20.28 20.34	11.60 11.41
4	82	249	ethanol	$C_9H_8N_4S$ (204.25)	52.92 52.90	3.95 3.64	27.43 27.34	15.70 15.62
5	89	190	ethanol	$C_8H_8N_6$ (188.15)	51.06 51.29	4.3 5.1	44.67 45.19	-- --
6	91	>300	DMF	$C_8H_6N_6S$ (218.24)	44.03 44.43	2.77 2.13	38.51 38.42	14.69 14.93
7	85	260	DMF	$C_{10}H_8N_4OS$ (232.26)	51.71 51.67	3.47 3.21	24.12 24.00	13.81 13.91
8	82	262	ethanol	$C_{11}H_9N_5S$ (243.29)	54.30 54.33	3.73 3.81	28.79 28.86	13.18 13.21
10a	69	275	ethanol	$C_{20}H_{14}N_6S$ (370.43)	64.85 64.59	3.81 4.40	22.69 22.32	8.66 8.93
10b	64	277	ethanol	$C_{21}H_{18}N_6OS$ (400.46)	62.98 62.19	4.03 4.93	20.99 20.80	8.01 8.09
10c	61	278	ethanol	$C_{20}H_{13}N_6S$ (404.88)	59.33 59.10	3.24 3.79	20.76 20.77	7.92 7.43
10d	58	274	ethanol	$C_{19}H_{13}N_7S$ (371.42)	61.44 61.22	3.53 3.39	26.40 26.00	8.63 8.34
11a	75	250	ethanol	$C_{17}H_{11}N_5S$ (317.37)	64.34 64.01	3.49 3.21	22.07 22.87	10.10 10.32
11b	74	286	ethanol	$C_{18}H_{13}N_5S$ (347.39)	62.23 62.54	3.77 3.05	20.16 20.76	9.23 9.44
11c	74	>300	ethanol	$C_{17}H_{10}ClN_5S$ (351.81)	58.04 58.19	2.86 2.44	19.91 19.53	9.11 9.43
11d	75	>300	DMF	$C_{16}H_{10}N_6S$ (318.36)	60.36 60.57	3.17 3.33	26.40 26.95	10.07 10.05
12a	87	>300	DMF	$C_{11}H_7N_5S$ (241.27)	54.76 54.38	2.92 2.99	29.03 29.54	13.29 13.48
12b	86	>300	ethanol	$C_{12}H_9N_5S$ (255.30)	56.45 56.38	3.55 3.91	27.43 27.16	12.56 12.47
13	78	294	Ethanol	$C_8H_6N_4S_2$ (222.29)	43.22 43.01	2.72 2.81	25.20 25.98	28.85 28.09
14	72	>300	DMF	$C_{11}H_9N_5S_2$ (275.36)	74.98 74.32	3.29 3.09	25.43 25.59	23.29 23.64

Antimicrobial Activity

The newly synthesized compounds were screened for their antibacterial activity against two species of Gram positive bacteria, namely Bacillus subtilis and *Staphylococcus aureus* and two species of Gram-negative bacteria *Escherichia coli* and *Pseudomonas aeruginos* (Table 3). (In nutrient agar broth) and antifungal activity (in Dox's medium and saboured's agar) by the agar diffusion method [20,21] at a concentration 20 mg/ml using DMSO as solvent and blank. The compounds were tested also for their activities against antifungal such as *Candida alicans* and *Candida parapsilosis* (Table 4).

The antimicrobial screening results were measured by the average diameter of the inhibition zones, expressed in mm.

As shown in the results, all tested compounds displayed significant activities against bacteria, while compounds 1 and 13 were very active against all the tested organisms among all the tested compounds.

Table (3): Antibacterial activity of synthesized compounds

Compd. No	*Bacillus subtilis*	*Staphylococcus aureus*	*Escherichia coli*	*Pseudomonas aeruginos*
1	++	+++	++	+++
3a	++	++	++	++
5	+	+	+++	+
6	++	++	++	++
7	++	++	++	++
8	+	+	−	++
10a	++	++	++	++
10b	++	++	++	++
10c	++	+	++	++
11	++	++	++	++
12	++	++	++	++
13	++	+++	++	++

Table (4): Antifungal activity of synthesized compounds

Compd. No	*Candida albicans*	*Candida parapsilosis*
3a	+	+
6	+	+
7	++	++
8	+	+
10a	++	++
10b	++	++
10c	+	+
11a	+	+
12	++	++
13	++	++

The present investigation deals with the preparation of thienopyridine derivatives, these compounds are at least as effective as asprine in preventing vascular events in patients at high risk, and possibly somewhat more[22,23].

One of the major classes of adenosine diphosphate (ADP) receptor antagonists are thienopyridines. Thienopyridines composes a subcategory of antiplatelet medication, known as receptor inhibitors, used commonly for the treatment of atherosclerotic cardiovascular disease[24].

The thienopyridines derivatives play an important role in antibacterial and anticancer chemotherapy. As shown in the results (Table 5) most of compounds displayed activity as antitumors[25].

Table (5): Antitumor activity of some prepared compounds

Compd. No.	% inhibition of cell viability (μg/m)		
	100	500	25
1	35	5	0
3a	20	0	0
3b	30	10	0
10a	10	0	0
10b	50	20	0
11a	30	10	0
11b	70	35	0
11c	60	30	5
12	60	30	10

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Diagnosis of Nutrient Status in Balady Mandarin Orchards of a Newly Reclaimed Area in Egypt

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Abstract: The present work aimed to determine the nutritional status of Balady mandarin orchards, through soil testing and leaf analysis, in order to work out a proper fertilization programs. A field study was conducted at El-Tall El-Kepeer, Ismailia governorate, covering 19 Balady mandarin orchards grown on sandy soils under drip irrigation. These soils are of poor fertility. However, fertilization of these orchards still depends upon the grower's inherited knowledge and in very small scale on the extension information. The trees were fifteen years old. The orchard soils had very high pH values, low to high level of EC and Na, and were low in total $CaCO_3$ and very low in O.M. The values for available nutrients in soil were found to be as very low of P, Fe, Mn, Zn and Cu. Values of K, Mg ranged between very low to medium levels, However values of Ca ranged between medium to high levels. The leaf macronutrient values were low in N, ranged between optimum to high in P and Mg, ranged between low to high in K, However values of Ca was ranged between low and optimum. The leaf micronutrient contents were as follow, Fe ranged from optimum to high; Mn, Zn and Cu were ranged from low to the beginning of optimum levels. The nutrient correlations of the leaves revealed some antagonisms between K and Ca, Mg and both of Mn and Zn. Also, the nutrient correlations of the leaves and fruits revealed some antagonisms between N in leaves and Zn in fruits, P and K in leaves and Mn in fruits, K in leaves and N, Cu in fruits, Ca in leaves and K in fruits.

Introduction:

In the past, research has been mainly focused on relatively small orchards in clay soil in Nile Delta which was highest in nutrient supply. During the recent years, the programs of agricultural development in Egypt aim to increase the cultivated areas in sandy soil. Soils in El-Tall El-Kepeer area, Ismailia Governorate are highly sand, which contains about 90% to more than 95% sand. Citrus production comprises the largest fruit sector in Egypt. Egypt has a great potential for citrus production when its ecological and other characteristics were considered. According to, Static's of Agricultural Production Requirements (2007). Production of Egypt citrus is 3.181.000 t coming from 2,109,000 t of orange, 732,000 t mandarins, 297, 000 t lemon and 43,000 t grapefruit, Besides that, there are about 42.000 ha are in the beginning of production. However, about 30% of citrus orchards in Egypt became located on poor soils and newly reclaimed areas. Poor soil fertility and poor fertilization strategies are largely a result of insufficient information on the soil fertility and plant nutritional status of crops in these areas.

One of the major deficiencies in most of the sandy citrus soils of Egypt is an acute shortage of organic matter and is commonly low in both macro and micronutrients, which can limit tree function. In addition micronutrients deficiency occurs in trees growing in such alkaline soils (Amberger, 1982, El-Fouly and Fawzi, 1982 and El-Fouly et al. 1986).

Balady mandarin is extensively grown in these sandy soils which their inherited fertility is low and pH values in the range of 8.0 to 9.0, and proper nutrients management is required to grow mandarin successfully on such soils. In the past, research has been mainly focused on macronutrients such as N and P.

Mandarin trees do much better to their nutritional status through good nutrition and controlled nutrient supply during different seasons can produce higher yield. Average recommendation will result in high yielding or large trees in the grove receiving relatively less fertilizer than they require, and low yielding or small size tree areas receiving relatively more fertilizer than necessary (Schumann et al., 2003; Zaman et al., 2005). Local over fertilization may decrease ground water quality, reduce profit margins, induce deficiency of other elements and interfere with metabolic processes. Under unsuitable fertilization, may restrict citrus yield and quality and variable rate of application avoids these problems but requires knowledge of the scale of variability of soil and tree characteristics within each field (Mulla and Bhatti, 1997).

Soil and leaf analysis can be used to evaluate the nutritional status of the trees and nutrient availability

in the soil to supply the trees with nutrients requirement (El-Fouly, 1985, Embleton *et al*., 1996). It is necessary to have information on nutrients removal for each variety grown in the region to determine proper fertilization management strategies, and make adjustments on their fertilization programs accordingly. The objective of this study was; therefore, to diagnosis nutrient status in Balady mandarin trees grown in sandy soils, to be used as a tool to optimize fertilizers use and helps in formulating the fertilization programs.

2. Materials and Methods
Field practices

The study was conducted in Baladi mandarin of fifteen years old, grafted on folk mariana rootstock and established on sand soil, located in El-Tall El-Keeper, Ismailia governorate, Egypt as a newly reclaimed area, during two successive years (2008-2009). Extensive survey was conducted covering as many as 19 orchards represent area of 20000 ha. The trees were under drip irrigation system and were uniform in growth. The trees were subjected to the same management treatments. The trees were cultivated at 4 x 4 m distance (620 tree/ha[-1]). The common fertilizer applications were used as following: 48 m^3/ ha of farmyard manure during January. NPK rates were 310 kg N ha^{-1}, as ammonium nitrate (33.5% N), 66 kg P_2O_5 ha^{-1}, as superphosphate (15.5% P_2O_5) and phosphoric acid (60% P_2O_5) and 215 kg K_2O ha^{-1}. as potassium sulfate (48-52% K_2O) kg ha^{-1} year) were applied as fertigation and distributed along the growing season. Foliar sprays of Mg nitrate were applied to the spring flush leaves.

The study were done on orchards considered to be low yielding (<22,000 kg/ha).

Soil sampling

Soil samples were randomly collected from the zone of the root tips of the trees under the end of canopy in November. Depth of the soil sampling was 0-60cm. The samples were air dried, ground to pass through a 2 mm sieve using a wooden grinding and stored in plastic bottles prior to the physical and chemical analysis.

Leaf sampling

The leaf samples were collected randomly around the tree from the fully mature leaves of spring flush. 4 to 7– month–old young shoots. Samples were washed with tap water, 0.001 N HCL and distilled water, respectively, then dried at 70°C and ground in a stainless steel mill, then passed through a 40 mesh nylon sieve and stored in plastic bottles.

Fruit sampling

The mineral analysis was done in the total fruit including the peel, pulp, and the juice to estimate the total mineral nutrient contents in the harvested fruits.

Chemical analysis

Soil samples were analyzed for texture, pH and electrical conductivity (EC) using water extract (1:2.5) method, for total calcium carbonate ($CaCO_3$%): calcimeter method and for organic matter (O.M%) using potassium dichromate (Chapman and Pratt, 1978). Phosphorus was extracted using sodium bicarbonate (Olsen *et al*., 1954). Potassium (K), calcium (Ca) and Magnesium (Mg) and sodium (Na) were extracted using ammonium acetate (Jackson, 1973). Iron (Fe), Manganese (Mn), Zinc (Zn) and Copper (Cu) were extracted using DPTA (Lindsay and Norvell, 1978).

Plant material was digested using an acid mixture consisting of nitric, perchloric and sulfuric acids in the ratio of 8:1:1 (v/v), respectively (Chapman and Pratt, 1978). Nitrogen (N) was determined in the dry plant material using the boric acid modification described by Ma and Zuazage (1942), and distillation was done using a Buechi 320-N$_2$-distillation unit. Phosphorus was photometrically determined using the molybdate vanadate method according to Jackson (1973).

Potassium, calcium and sodium were determined using flame photometer (Genway). Mg, Fe, Mn, Zn and Cu were determined using the Atomic absorption spectrophotometer (Perkin Elemer 1100 B). The soil data were evaluated using the criteria published by Ankerman and Large (1974), Lindsay and Norvell (1978) and Peryea (2000), whereas the leaf analysis data were evaluated according to the criteria reported by (Jones *et al.*, 1991) in Plant Analysis Handbook. Data were subjected to statistical analyzed using Costate Statistical package, in order to calculate means, standard deviations (SD) and the possible correlations (r) (Anonymous, 1989).

3. Results and Discussion:
Soil properties and its nutrients status:

From Table 1. it can be noticed that soil texture is sandy, It's known that coarse-textured soils lack both nutrient and water holding capacities. Also, soil pH had high value, the range was between 8.30-9.10 and the average was 8.80$\pm$0.18. Under such high alkaline conditions, availability of some nutrients is expected to be low. The average of electric conductivity (EC) was in the medium level (0.30$\pm$0.18); however the range was between low and very high levels (0.14-0.76). The soil found to be low in $CaCO_3$; contained lower than 2% $CaCO_3$ which is expected to haven't effect on the nutrient availability

(Ankerman and Large, 1974). The soil of the orchards was very poor in organic matter content, the range was between 0.13-0.27 and the average was 0.20±0.03%. Soil organic matter is used as an indicator of soil fertility. It is well known that soil organic matter had a strong positive relationship with total N content in soil, thus it is also, expected to be low.

Table (1): Range, Mean±SD of physical-chemical characteristics of the soil

Character	Range	Mean±SD	Available nutrient content	Range	Mean±SD	Evaluation
Sand %	88 - 91	90±1	Macronutrients, (mg/100g)			
Silt %	02 - 04	03±1	P	00.22 - 00.55	00.40± 00.10	Very low
Clay %	05 - 09	07±2	K	11.50 - 38.00	25.00±12.59	Medium
Texture	Sandy		Mg	22.00 - 62.00	41.20±12.49	Medium
pH(1:2.5)	8.30 - 9.10	8.80±0.18	Ca	105.00 - 320.00	233± 52.05	High
E.C dS/m	0.14 - 0.76	0.30±0.18	Na	08.00 - 38.00	15.45 ± 06.75	Very low
$CaCO_3$ %	0.80 - 2.00	1.44±0.30	Micronutrients, (mg/Kg)			
O.M %	0.13 - 0.27	0.20±0.03	Fe	01.60 - 04.10	2.65± 0.73	Very low
			Mn	00.30 - 01.50	0.84± 0.34	Very low
			Zn	00.20 - 00.70	0.44± 0.19	Very low
			Cu	00.10 - 00.60	0.29± 0.12	Very low

Table 1. contains also, the range and the average values of the major nutrient availability in the soil samples, available P-content was ranged between 0.22-0.55 and the mean was 0.40±0.10 mg/100g soil. According to data mentioned by Ankerman and Large, 1974 in Table 2, P is considered very low where under the conditions of such soil (high pH), the availability of P is expected to be reduced, and plants might suffer from P- deficiency. The average of available potassium levels seem to be medium, (25.00±12.59), however the range was between very low and high levels (11.50-38.00) mg/100g soil. Therefore, potassium fertilizers must be added to compensate the K shortage in the deficient soil. The mean extractable Ca was high (233±52.05) mg/100g soil, however the range was between medium to high (105-320) mg/100 g soil. The mean extractable Mg was medium (41.20±12.49) however the range was between low to medium (22-62) mg/100g soil.

Table (2): Tentative rating values of soil fertility status

Element	Rating				
	Very low	Low	Medium	High	Very high
$CaCO_3$%	<0.5	0.5 -2	2.1-8	8.1-30	31-45
Organic matter (O.M),%	<1.0	1-2	2.1-3	3.1-5	>5.0
Electric conductivity (E.C.) dS/m	<0.1	0.1-0.2	0.3-0.4	0.5-0.7	>0.7
pH	<5.8	5.9-6.6	6.7-7.2	7.3-8.5	>8.5
Macronutrients (mg/100g)					
Phosphorus (P)	<00.5	0.5-1.1	1.2-2.7	2.8-4	>4
Potassium (K)	<11.7	11.8-20	21-30	31-47	>47
Calcium (Ca)	-	<100	100-200	>200	-
Magnesium (Mg)	<11	11-29	30-180	>180	-
Sodium (Na)	<20	20-25	26-30	>30	-
Micronutrients (ppm)					
Iron (Fe)	<5	5-10	11-16	17-25	>25
Manganese (Mn)	<5	5-8	9-12	13-30	>30
Zinc (Zn)	<0.5	0.5-1.5	1.6-3	3.1-6	> 6
Copper (Cu)	<0.3	0.3-0.8	0.9-1.2	1.3-2.5	>2.5

Source: Ankerman and Large (1974), Lindsay and Norvell (1978), Peryea (2000)

As it's known in most sandy soils, which contain inadequate levels of available micronutrients and according to data in Table 2, mentioned by Ankerman and Large, 1974, the extractable Fe, Mn, Zn and Cu

levels of the present soil samples are in the very low levels.

Nutrient concentrations in leaves:

It is well known that mandarin trees are very sensitive of nutrient deficiencies in the soil. Data of ranges and mean of nutrient leaves content in Table 3 and according to critical values mentioned by Jones *et al*. (1991), Reuter and Robinson (1986, 1997) in Table 4. Nitrogen concentration in the leaves ranged between 1.51-2.99 and the mean was 2.16+0.366%, on dry matter basis, which tends to be low. This may be due to high leaching of ammonium nitrate in such soil with 90% sand. It is recommended to add nitrogen as ammonium sulphate, which is less leaching and more efficient at sandy and high pH conditions. In this respect, Johnston (2004) reported that when ammonium sulphate is applied one pH unit can be decreased and this pH change is important for P availability supply and may be also for micronutrient availability supply. P-concentrations in the mature leaves ranged between 0.16-0.32%, and the mean is 0.23+0.044, which is ranged between sufficient and high levels and with sufficient mean. Potassium concentrations in the leaves ranged between low and high levels (0.65-1.39%), and the mean is sufficient (1.06+0.189). Magnesium concentrations in the mandarin leaves ranged between sufficient to high (0.56-0.73%), and the mean is 0.65+0.048 which, is in high level, while, Mengel and Kirkby, 1987, mentioned that Mg uptake by plants can be restricted by the high levels of Ca in the root medium, which might led to Mg deficiency in plants, in spite of its high levels in the soil. The high level of Mg in leaves may be resulted from the magnesium foliar application.

In spite of high levels of Ca in the root medium, calcium concentrations in the leaves ranged between low to sufficient (1.20-3.30%), and the mean is (2.42+0.49) which, is in low level, that is may be because the movement of calcium in the soil is slowly.

Fe concentrations can be higher than, equal to, those in normal trees. Fe-concentrations were ranged from sufficient to high (99.0-375.0 ppm) and the mean is sufficient (185.0+79). Concentrations of Mn were ranged between low and sufficient (21.5-56.0 ppm) and the mean is (28+8.6) which is at the beginning of the sufficient levels. In this respect Bergman (1972) mentioned that the nutrient element contents should lie as far as possible in the middle or even better in the upper half of the satisfactory or optimal range. As a result of factors described above most Zn concentrations in this study were low in most cases, where Zn concentration was ranged between low and beginning of the sufficient level, (13.0-39.0 ppm) and the mean is low level (18.0+6).

Zinc deficiency is widespread in citrus trees in Egypt (El-Fouly, 1985). Marshner, 1993, mentioned that in soils with very high pH and very low in organic matter, availability of Zn to plant roots is extremely low. In addition, Boaretto *et al*., 2002; Sanchez and Righetti, 2002, found that when severe Zn deficiency symptoms appear, early spring foliar sprays could increase the micronutrient concentration in the targeted organs. Also, it could stimulate vegetative growth (Swietlik, 2002). Similar results were also, found by Shaaban and El-Fouly, 2005. In this study, Cu-concentration was found to be less than the adequate range in most samples, which ranged from low to sufficient level (2.0-15.0 ppm), with mean at the beginning of sufficient level (5.5+3.2 ppm). It is well known in sandy soil that Cu-availability and consequently its concentration in leaves of grown plant are expected to be low. Deficiencies of Cu can reduce Zn uptake through root injury. It could be concluded that nutrient concentration in Balady mandarin leaves is greatly affected by soil characteristics as well as farm management, thus soil and plant analysis, crop requirement should be considered when preparing a fertilizer recommendations.

Table (3): Range, mean+SD of leaf nutrient contents.

Element content	Range	Mean+SD	Evaluation	Element content	Range	Mean+SD	Evaluation
Macronutrients, (%)				Micronutrients, (ppm)			
N	1.51 - 2.99	2.16+0.366	Low	Fe	99.0 - 375.0	185.0+79	Sufficient
P	0.16 - 0.32	0.23+0.044	Sufficient	Mn	21.5 - 56.0	28+8.6	Sufficient
K	0.65 - 1.39	1.06+0.189	Sufficient	Zn	13.0 - 39.0	18.0+6	Low
Mg	0.56 - 0.73	0.65+0.048	High	Cu	2.0 - 15.0	5.5+3.2	Sufficient
Ca	1.20 - 3.30	2.42+0.491	Low				
Na	0.09 - 0.15	0.12+0.018	Sufficient				

Table (4): Values level of leaf nutrients content of Balady mandarin trees

Nutrient	Low	Sufficient	High
		%	
N	<3.00	3.00 – 3.40	>3.40
P	0.11 – 0.14	0.15 – 0.25	>0.25
K	0.47 – 0.89	0.90 – 1.10	>1.10
Mg	<0.30	0.30-0.60	>0.60
Ca	<3	3 - 6	>6
		ppm	
Fe	<60	60-150	>150
Mn	<25	25-200	>200
Zn	<25	25-100	>100
Cu	<5	5-15	>15

Source: Jones *et al.* (1991), Reuter and Robinson (1986, 1997)

Frequency distribution (%):

Table 5 showed frequency distribution (%) of soil nutrients, as well as the leaf concentrations of these nutrients. The data showed that 100% of the soil samples contained low N, P, Fe, Mn, Zn and Cu whereas 53% contained low K and Mg, 5% contained low Ca, while, 95%, 47%, 47% of Ca, K, Mg respectively, had optimum level. Leaf samples analysis showed that 89% of N and Ca, 84% of Zn, 53% of Cu, 37% of Mn and 10% of K from leave samples had low levels, while 89% of P, 84% of Mg, 74% of K and Fe, 63% of Mn, 47% of Cu from leave samples had optimum levels. In addition, 11%, 16%, 16%, 26% of leave samples showed high level of P, K, Mg and Fe, respectively. Therefore, we can, conclude that Balady mandarin trees have the ability to accumulate nutrients in higher concentrations in their leaves relative to their soils

Table (5): Frequency distribution (%) of available nutrient through analysis of soil fertility and leaf nutrient composition

Nutrient	Soil fertility constraints			Leaf nutrient constraints		
	Low	Optimum	High	Low	Optimum	High
N	100	-	-	89	11	-
P	100	-	-	-	89	11
K	53	47	-	10	74	16
Ca	5	95	-	89	11	-
Mg	53	47	-	-	84	16
Fe	100	-	-	-	74	26
Mn	100	-	-	37	63	-
Zn	100	-	-	84	16	--
Cu	100	-	-	53	47	-

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As for correlation between leaf nutrient contents of the mandarin trees, data of Table 6., showed that there is a significant positive correlation between content of P and both of Fe, Mn, Zn and between Fe and Cu and between Mn and Cu. As well as highly significant positive correlation were found between Fe and both Mn and Zn and between Mn and Zn. On the other hand, significant negative correlation was found between Mg and Mn and highly significant negative correlation was recorded between K and Ca and between Mg and Zn. Table 6, pointed out to the importance of the balance fertilization.

Table 6. Correlation coefficient between leaf nutrient contents of the mandarin

Nutrient	P%	K%	Ca%	Mg%	Na%	Fe ppm	Mn ppm	Zn ppm	Cu ppm
N%	0.397	-0.062	0.207	0.102	0.008	0.358	0.163	0.103	0.283
P%		0.187	-0.154	-0.216	0.317	0.558*	0.490*	0.549*	0.265
K%			-0.616**	0.158	0.095	0.092	0.073	0.066	-0.055
Ca%				-0.146	-0.054	0.218	0.230	0.207	0.220
Mg%					0.016	-0.277	-0.490*	-0.576**	-0.362
Na%						-0.031	-0.003	-0.031	-0.039
Fe ppm							0.773**	0.745**	0.556*
Mn ppm								0.900**	0.477*
Zn ppm									0.384

r* 0.05 = 0.456 (significant at 5% level)   r** 0.01 = 0. 575 (significant at 1% level)

Nutrient concentrations and removal by fruits:

Tables 7 and 8 showed that Balady mandarin fruit removed the largest amount of potassium (K), followed by Calcium (Ca), nitrogen (N) phosphorus (P) and magnesium (Mg), respectively. Where a ton of fruit removed 2.06, 1.43, 1.33, 0.41 and 0.35 kg of K_2O, CaO, N, P_2O_5 and MgO, respectively. Also, Balady mandarin fruit removed the largest amount of iron (Fe), followed by manganese (Mn), zinc (Zn) and copper (Cu), respectively. Results suggest it reasonable to expect that potassium was the highest nutrient removed by Balady mandarin fruit.

Beside the nutrient removal, the behavior of each nutrient and soil properties must be take in consideration at preparing fertilization program. Fertilizing based solely on nutrient removal could lead to deficiencies or overuse of some nutrients. Leaching and denitrification of fertilizer nitrates may result in as much as 50% fertilizer nitrogen lost. Some nitrogen may be supplied from organic matter in the soil, but this amount is usually small in sandy soils. Yield nutrients removal is not a good indicator of phosphorus needs. Suitable- soil fertilized has an abundant reserve of soil phosphorus which is available to trees. Since phosphorus does not leach, it can build up to high levels in suitable-fertilized trees. Fertilization based on yield nutrients removal is better for potassium fertilization than the other nutrient. In sandy soils, potassium is not enough for high-yielding fruits. If fruits removal of potassium is greater than fertilizer applied, deficiencies can be occurring. It is worthy to mention that applying potassium as foliar spray on citrus trees gives better growth, high fruit-set and yield, (Ibrahiem *et al*., 1993). On the other hand, the uptake of some nutrients is dependent on their ratio in soil solution, for example much K reduces Mg availability in soil solution (Laegreid e*t al*.,1999). Calcium and magnesium must be considered because of the special needs for high fruit quality. The availability of iron, manganese, zinc and copper is little to do with yield removal.

Table 7. Range, mean+SD of fruit nutrient contents.

Nutrient content	Range	Mean+SD	Nutrient content	Range	Mean+SD
Macronutrients, (%)			Micronutrients, (ppm)		
N	0.47 - 1.27	0.75+0.16	Fe	11 - 87	39+25
P	0.02 - 0.26	0.08+0.06	Mn	4 - 9.5	7.2+1.4
K	0.48 - 1.34	0.98+0.21	Zn	4 - 9.0	6.1+1.4
Mg	0.10 - 0.15	0.12+0.02	Cu	0.5 - 2.5	1.2+ 0.5
Ca	0.35 - 0.85	0.58+0.13			
Na	0.02 - 0.04	0.03+0.01			

Table 8. Nutrients removed by fruits

Macronutrients removed (Kg/ton fruit)				
N	P_2O_5	K_2O	CaO	MgO
1.33	0.41	2.06	1.43	0.35
Micronutrients removed (g/ton fruit)				
Fe	Mn	Zn	Cu	
70	13	11	2	

As shown in Table 9, a positive significant correlation was found between the content of K, Cu in both of leaves and fruits. However, highly significant negative correlation was found between the following nutrients, N in leaves and Zn in fruits and K in leaves and Mn in fruits. In addition, significant negative correlation was found between P in leaves and Mn in fruit, K in leaves and both N and Cu in fruit, Ca in leaves and K in fruits, as well as between Mg in leaves and Cu in fruits and between Cu in leaves and N in fruits. We can, therefore, conclude that when we want to improve the quality of fruits we must considering leave nutrients content.

Conclusion:
In our study we showed that there is nutrient deficiency and imbalance nutrition in Balady mandarin orchards. Nutrients concentration in mandarin leaves is greatly affected by soil characteristics. Balady mandarin trees have the ability to accumulate nutrients in higher concentrations in their leaves relative to their soils. Crop nutrient requirement should be considered when preparing a fertilizer recommendation. Leave nutrient contents and their effect on the fruit nutrients should be consider, to improving fruit quality.

Table 9. Correlation coefficient between leaves and fruit nutrient contents of the mandarin

Fruit \ Leaf	N%	P%	K%	Ca%	Mg%	Na%	Fe ppm	Mn ppm	Zn ppm	Cu ppm
N%	-0.354	-0.292	-0.377	-0.446	-0.071	-0.247	0.339	-0.001	-0.608**	0.044
P%	-0.290	-0.082	0.001	0.051	-0.018	-0.119	0.047	-0.469*	-0.166	-0.059
K%	-0.464*	-0.160	0.494*	0.032	0.037	-0.336	-0.058	-0.651**	0.296	-0.485*
Ca%	0.102	0.269	-0.467*	-0.249	-0.136	0.079	0.007	0.190	-0.325	0.356
Mg%	-0.105	0.075	0.221	0.053	-0.238	0.201	0.117	0.176	-0.406	-0.458*
Na%	-0.105	0.304	0.143	-0.079	-0.210	-0.202	-0.084	-0.112	0.073	-0.328
Fe ppm	-0.418	-0.040	-0.161	-0.284	-0.095	-0.140	-0.081	-0.392	-0.140	0.218
Mn ppm	-0.321	0.205	-0.035	-0.237	-0.222	-0.127	-0.292	-0.329	-0.065	0.214
Zn ppm	-0.215	0.225	0.058	-0.066	0.058	-0.118	-0.212	-0.433	0.085	0.187
Cu ppm	-0.530*	-0.139	-0.305	-0.271	0.218	-0.157	-0.125	-0.061	-0.046	0.465*

r* 0.05 = 0.456 (significant at 5% level)   r** 0.01 = 0. 575 (significant at 1% level)

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Using Condition Monitoring to Estimate Repair and Maintenance Costs of Tractors in Iran

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Abstract: One of the most aspects of managing of agricultural machinery is control and estimating of repair and maintenance costs. So, this is necessary to introduce mathematical methods to define repair time and machine condition. It reduces repair costs and increases the chance of machine service. In this research, condition monitoring was established to introduce this mathematical model for tractors in Iran. The study was done on MF285 and MF399 as the most conventional tractors in Iran. 120 tractors were selected randomly and their repairing and maintenance costs as well as working time were recorded. The costs for usual methods and control monitoring methods were compared by F test in SPSS software. Results show that the effects of CM can reduce costs in comparison with usual method significantly (Sig=0.002). Finally by assuming cumulative working time (X) as independence and cumulative costs based on definite percent of initial price (Y) as dependence variable a mathematical model was introduced. Powered regression introduced this model as $Y=0.0028\ X^{0.981}$ which can used to estimate repairing and maintenance costs for selected tractors.
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Key words: Condition monitoring, Tractor, Repair and maintenance, Model

1.   INTRODUCTION

With regard to the importance of technical and economical management in agriculture sector and control costs in the production fields, our knowledge about the present situation in different parts of these sections plays a major role. Using of agricultural machinery is of the most important parts in this section and investment in this field causes the highest cost of production processes (Ward, Nulty & Cunney, 1985). Therefore machinery management including control of the amount of expenditures related to maintenance and repair machinery is one of the most important parameter that a manager must make do with it.

Today, tractor is one of the most important power sources in agriculture. Effect of tractor power on agriculture is considerable (Rotz, 1987). Good machinery management yields 25% less machinery repair cost .poor machinery management yields 25% greater repair costs. (Singh, 2006). Machinery costs fit into two broad categories:

Fixed costs - Those costs associated with how long a machine is owned, rather than how much it is used.

Fixed costs represent more than one-half of the total cost of owning a piece of machinery.

Operating costs - Those costs associated with the amount of machine use (Rotz & Bowers, 1991). Precise information and close to the reality about the time and the type of ravages for agricultural machines plays an important role in programming to do preventive repairs and increases the reliability of machines and implements. There are three types of maintenance tasks: breakdown, corrective and preventive. The principal difference in these occurs at the point when the repair or maintenance task is implemented. In BM[1], repairs do not occur until the machine fails to function. Preventive and corrective maintenance tasks are implemented before a problem is evident (Mobley, 2008). The difference between them is that in corrective maintenance a problem must be existing then repair it. The main activities which help programming of corrective and preventive maintenance is the CM[2] of

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[1] breakdown maintenance
[2] condition monitoring

machine systems. It means that checking machine parameters can help to inform machine condition. It may lead to activities which reduce needed repair. Oil analysis is the main CM technique for reciprocating machinery maintenance and fault diagnosis (Lindley, Higgins, Darrin & Mobley, 2008).

In 1974, Hunt gathered the information about repair and maintenance cost for 745 agriculture machinery working in corn fields of Illinois for 8 years. He suggested a practical model based on power formula to calculate accumulated repair and maintenance cost by working hours (Hunt, 2001). In 1986, Morris studied about repair and maintenance cost for some agriculture tractors in England. The cost was calculated by type of the machines and annual working hours in his method. This manner expressed the cost using percentage of primary purchase cost (Morris, 1986). In 1999, a same studding was done by fuel in 8 area of South Africa. Repair and maintenance costs for 282 tractors were gathered and analyzed by him. At the end, a power formula as same as the previous equations was suggested. This recently advancing formula includes management and operation factors (Fuls, 1999).

Improved reliability results in lower maintenance costs. If the assets are not breaking down, a greater percentage of maintenance work can be performed in a planned and scheduled manner, which enables the workforce to be at least twice as efficient. Reducing these losses will also result in requirement of
• Fewer spare parts
• Less overtime
• Fewer contractors (Massoudi, 1994).

Oil analysis is the main CM technique for reciprocating machinery maintenance and fault diagnosis. The object of this research was to choose and to investigate the best oil for Dump Truck HD325-5, used for transportation of minerals, by OCM method (Oil condition monitoring). The results from this article have enhanced understanding on the dependent and independent roles of oil analyses in predicting which oil is more suitable for a machine in working condition (Mollazade & Ahmadi, 2008).

2.   MATERIAL AND METHOD

Reduction of repair and maintenance cost using CM method was the main goal of this research. The cost for two types of conventional tractors in Iran called MF285 and MF399 were investigated by analyzing their engines and gearboxes oil for 3 years. Lubricating oil analysis, as the name implies, is an analysis technique that determines the condition of lubricating oils used in machine. In this case viscosity, contamination, fuel dilution, solid content, fuel soot, oxidation, nitration, total acid and bases number and particle content were checked during tests. The costs were compared with costs calculated by breakdown maintenance (BM) method to determine the effect of CM method on reduction of costs. For this comparison the costs were determined by CM and BM methods using annual working hours. The tractors were classified according to their age in unit year into 15 groups from 1 to 15. Also, for per class, the mean annual repair &maintenance costs and Accumulated working hours were calculated. The information about random annual working hours and costs were gathered by using face to face questionnaire. The costs for CM and BM were compared together by F-test. With regard to this goal, SPSS15 computer software was used. By the way, the software provided a regression analysis to determine relationship existed between the costs (based on percentage of primary purchase price) and the annual working hours for each method.

The amount of fixed costs that affected by the life and the purchase price with regard to the fact that elective systems for two years with equal method has been chosen for every two methods of the amount of the weekend.

3.   RESULTS

The costs of spare parts, repairman vague, oil, filters and timeliness were investigated for BM and CM methods separately for MF285 and MF 399, respectively as shown in table 1.

Table 1. The mean annual repair and maintenance costs for MF285 and MF399 tractors

	Type of maintenance	Repayment cost ($/hr)	Oil and fuel ($/hr)	Filters ($/hr)	Total ($/hr)
MF285	BM	0.33	0.35	0.07	0.75
	CM	0.13	0.3	0.02	0.45
MF399	BM	0.35	0.39	0.15	0.89
	CM	0.13	0.36	0.10	0.59

Table 2 includes variable costs, fixed costs, incomes, benefits and benefits per costs. According to the results shown in table 3, there is a significant difference between costs in CM and BM method similar to the significant difference existed between their incomes.

Table 2. The mean annual fix and variable costs and Income for MF285and MF399

	Type of maintenance	Variable costs ($/hr)	Fix cost ($/hr)	Income of trait ($/hr)	Profit of trait ($/hr)	Profit per cost ratio
MF285	BM	3	1.5	15	10.5	2.33
	CM	2.72	1.5	17.22	13	3.08
MF399	BM	3.5	2.7	19	12.8	2.00
	CM	3	2.7	20.18	14.48	2.54

Table 3 present the obtained data from 60 sample tractors MF285 and MF399, including annual use and cost were used to calculate the accumulated working Hours and repair and maintenance cost. The presented data in these tables were used to comparison repair and maintenance costs, predicted between BM and CM and determine the repair and maintenance cost model. According to the tables 3 and 4 by using F-test deference between the amounts accumulated R&M in methods BM and CM at the level of 5 %(table 4).

ANOVA table a show that the cost of repair and maintenance cost in two methods has been mentioned in the 5% signification difference exists (Table4). With regard to the average cost in two method can be said that the amount of in method BM more than the method of CM.

To determine the relationship between accumulated costs and accumulated working hours, some mathematical formula including liner, power, exponential and logarithmic equations were used. The power formula shown in table 6 for kind of tractors in type of maintenance. Formula is available for estimating repair costs realizing that repair/maintenance cost have a variable structure as the machine ages.
$Y=aX^b$
Where X is the accumulated working hours for the tractors and Y is accumulated repair and maintenance costs.

Table 3. The accumulated repair and maintenance costs and working time of MF285 & MF399

| | MF 285 | | | | F399 | | | |
| | BM | | CM | | BM | | CM | |
Age	Ac.W.T[4] (hr)	Ac.R&M[3] costs ($)	Ac.W.T (hr)	Ac.R&M costs ($)	Ac.W.T (hr)	Ac.R&M costs ($)	Ac.W.T (hr)	Ac.R&M costs ($)
1	1212	7.458	1500	4.017	1230	4.479683	1480	3.874032
2	2292	15.032	3040	8.097	2550	10.97468	3000	7.715272
3	3452	23.587	4590	12.185	3820	18.03473	4550	11.58028
4	4708	33.183	6190	16.393	5085	25.63217	6030	15.23938
5	6028	43.55	7720	20.409	6325	33.51639	7560	18.99839
6	7660	56.68	9330	24.629	7663	42.43068	9170	22.93338
7	9164	69.038	10910	28.763	8943	51.30111	10670	26.58388
8	10708	81.936	12440	32.763	10376	61.58213	12163	30.20457
9	12292	95.36	14070	37.019	11740	71.67636	13793	34.14486
10	13868	108.89	15650	41.141	13230	83.01392	15286	37.74371
11	15116	119.72	17180	45.130	14582	93.55889	16816	41.42263
12	16436	131.27	18760	49.24	15912	104.1534	18396	45.213
13	17860	143.83	20240	53.09	17142	114.1341	19876	48.75608
14	19460	158.07	21760	57.05	18462	125.0289	21396	52.38806
15	21084	172.642	23310	61.08	19732	135.681	22946	56.08508

Table4.ANOVA table for cost of tractors in type of maintenance (BM&CM)

	Sum of square	df	Mean Square	F	Sig.
Between groups	2375.781	1	2375.781	16.115	0.002
Within groups	17396.444	118	147.427		
Total	19772.226	119			

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[3] Accumulated repair and maintenance costs
[4] Accumulated working time

Table 5.The equations for types of tractor in type of maintenance

Type of tractors	Type of maintenance	R2	Equation
MF285	BM	0.98	Y=0.205(x/100)1.229
	CM	0.98	Y=0.208(x/100)0.975
MF399	BM	0.98	Y=0.586(x/120)1.1
	CM	0.98	Y=0.328(X/120)0.992
Generally	BM	0.98	$Y=0.285(X/100)^{1.22}$
	CM	0.98	$Y=0.28(X/100)^{0.981}$

Table 6. Developed models for tractors in type of maintenance

Researcher	Types of maintenance	Cumulative repair and Maintenance costs*		Developed models
		5000 hours	10000 hours	
Bowers	BM	43	86	$Y = 0.076(X/120)^{1.26}$
Ward	BM	49	183	$Y=0.042(X/120)^{1.895}$
ASAE	BM	30	120	$Y=1.2(X/1000)^{2}$
This research	CM	44	87	$Y=0.1088(X/120)^{0.9766}$

*based on percent of list price
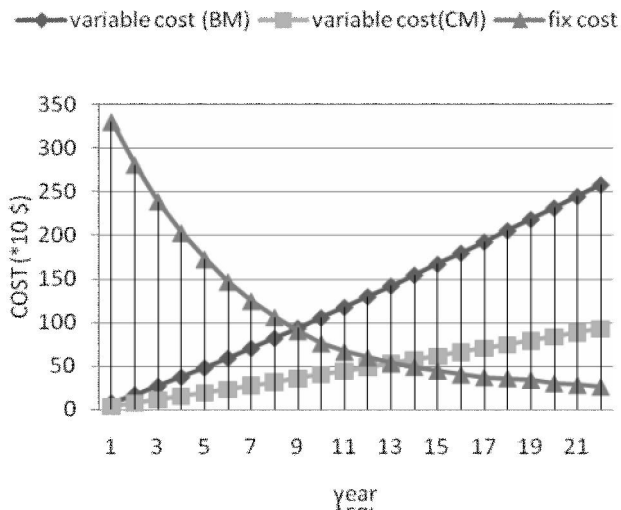
Figure1. Rapier and maintenance cost of tractors BM and CM method in Iran

Figure2. Comparison of results with other researchers

The figure 1 shown increased of R&M cost in BM and cm method. With regard to the chart, the trend of increase cost of CM method much less than BM method. According to figure 2, repair and maintenance cost is increased with a lower gradient in the CM method than the BM methods suggested by other researchers. So, CM can reduce the repair and maintenance costs to an acceptable level. By the way, it increases the reliability of machines and decreases the timeliness costs using reduction of the breakdown times for machines.

The relations with relations which have already been achieved by the researchers compared the formula get the method of condition monitoring of the amount of increasing the costs of buildings with sloping shows less. The rate is increasing the costs of buildings in this method is very much lower than breakdown maintenance method.

Therefore it can be concluded by the use of that supervision and using the situation can take care of the cost of repairs in an acceptable level and reduced the other side regarding the number of casualties happened during research, which is very much lower than usual method is can be said that this method can be the amount of reliability machine to take higher and the expense of stopping the decrease.

4.   DISCUSSION

Using CM, reduced maintenance costs amount to very much.these results are in harmony with data have been published by Massoudi (1994).

The obtained results showed that amount of costs in two ways CM and BM were observed, the average cost in BM method, much larger than average cost in CM method is. the obtained results seem to be in accordance with the published data by Mollazade & Ahmadi (2008).

ANOVA table a show that the cost of repair and maintenance cost in two methods has been mentioned in the 5% signification difference exists (Table 5).

Trend of increasing costs in the way CM, much slower method is BM method. the obtained results deference   to be in accordance with the published data by ward (1985); bowers (2005); ASAE (2000).

5.   Conclusion

Therefore it can be concluded by the use of that supervision and using the situation can take care of the cost of repairs in an acceptable level and reduced the other side regarding the number of casualties happened during research, which is very much lower than usual method is can be said that this method can be the amount of reliability machine to take higher and the expense of stopping the decrease.

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Characteristics of educators in adult education

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Abstract: Complex role of adult learning and training process is significant, his role gradually changed from the donor information and active for many years will assume that the principles and techniques that are used in teaching children to contribute equally in the adult learning process On the other hand is effective in children for adult education teachers were employed. Later that person was well trained (ie the experts), who could well slow or a group leader to manage the program, was selected as an adult educator. Thus learners directly in adult education programs that are based on experience were used, and adult As a mature child which has its own characteristics and is unique is that the principles and techniques of the different techniques used for the education of children is needed. As a result the role of adult educator gradually from non-skilled person without the expertise of individual specialists and trained to be changed and Instructors for training and educational opportunities were provided at all levels are therefore unable to work for educators from institutions with short-term training courses for users of the guidance program (project leaders) through summer workshops for professional leaders through programs Training of Master and PhD levels in schools of higher education courses were provided.

Introduction:

The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills

Adult illiteracy is like a disease that infects virtually every dimension of Kentucky life. Adult illiteracy saps the energy and capability of Kentucky's people and its economy. Adult illiteracy feeds the state's unemployment, its welfare rolls, and the correctional institutions. Adult illiteracy severely hinders the life chances of young children, undermines school reform, and limits the opportunities for postsecondary education.

Characteristics of adult education:
flexibility in time:

In the past, usually one of the obstacles in the way of learning and development of adult education was being inflexible and time courses were programs. But now most countries have to consider that the speed limit of time and learning ability and facilities must be adults. Flexibility in time means that not only should the time classes and programs for adults is appropriate, but necessary facilities should be provided for independent study.

Flexibility in the location:

One of the aspects of flexible space is that individuals can, regardless of their residence to the study and advancing their knowledge and skills pay. For example, adults in remote villages should like people who live in the city use of educational programs. After flexibility in other places is that the issue of specificity of location is not considered primarily educational.

Flexibility in age:

Educational opportunities for certain age should not use it for all regardless of their age, is possible. In fact, educational programs must use people of different ages to prepare.

Flexibility in admission:

No adult should not only be deprived of education because of the necessary conditions for admission in the class does. Of course this is not such a person without academic records to participate in university classes is accepted, Adoption order is that the adults in educational programs at different levels, according to the possibility of using the opportunity that is provided must be based on the experience and knowledge and their knowledge is.

To combine education and job responsibilities:

Adults should be able to work during that time engaged in training classes take them. In other words, their presence in the class should be considered part of their work. This means that low-literate or illiterate working people who are allowed to work an hour of your daily spending surpassed participation in educational programs.

The role of adult educator:

Complex role of adult learning and training process is significant, his role gradually changed from the donor information and active for many years will assume that the principles and techniques that are used in teaching children to contribute equally in the adult learning process On the other hand is effective in children for adult education teachers were employed. Later that person was well trained (ie the experts), who could well slow or a group leader to manage the program, was selected as an adult educator. Thus learners directly in adult education programs that are based on experience were used, and adult As a mature child which has its own characteristics and is unique is that the principles and techniques of the different techniques used for the education of children is needed. As a result the role of adult educator gradually from non-skilled person without the expertise of individual specialists and trained to be changed and Instructors for training and educational opportunities were provided at all levels are therefore unable to work for educators from institutions with short-term training courses for users of the guidance program (project leaders) through summer workshops for professional leaders through programs Training of Master and PhD levels in schools of higher education courses were provided.

Other procedures, where the role of teacher has changed the theoretical concepts first, an understanding of adult learning was unfounded on the principle that the concept of adult education is based on transferring knowledge to them and saying what they should know or duty to interpret absorption educator their training. In recent years the practice has changed and the role of educator as a "change agent" and reform as a donor and an "auxiliary roles" or "facilitators" were raised as his understanding of

adult personal and community among people. In addition, a person well trained teacher who is fluent in adult education as a change agent responsibility is beyond routing plans and activities, In recent years the practice has changed and the role of educator as a "change agent" and reform as a donor and an "auxiliary roles" or "facilitators" were raised as his understanding of adult personal and community among people. In addition, a person well trained teacher who is fluent in adult education as a change agent responsibility is beyond routing plans and activities. His role in the educational process as a facilitative (helpful), leader (leading), incentives, consultant and source of information (not move), regular (planned), judge poster and ..... Is. The ultimate goal of people helping him to his ability to help raise up to be adult. Fact that the adult educator role of a marginal position in society has changed to a central location for this position change the natural outcome of many social problems such as wars, crime, illiteracy and disease .... Can easily be resolved through processes of adult education.

Although two decades of adult education a fundamental instrument of national policy and local governments, state and national cost millions of dollars for adult education began (1950), and cost requests in the years 1960 million by the sectors of trade, industry, universities, religious institutions and government agencies will pay increased. Where adult education resources in 1950 are allocated only for the welfare of individuals found with increasing social problems such as urban crisis, Nvady inequality, unemployment and illiteracy .... In these areas was also widely added. So the mission developed its adult education and its usefulness for human growth and development became clearer.

As indicated earlier, a strength of adult education in Kentucky is the dedication of the many teachers often serving under difficult conditions, without adequate support, and often with compensation and benefits less than teachers in the public schools. Testimony before the task force characterized the work of adult educators as "missionary" work. Recognizing the seriousness of the adult literacy issue in Kentucky, it should be a major concern that the Commonwealth does not have a comprehensive approach to the professional preparation, development, and support of adult educators.

The challenge for Kentucky will be to move from a system that still depends on teachers with limited training in working with adults, to one in which professional competence in working with adults is a basic requirement. Any strategy to make this transition must involve both professional development and support for the teachers now in the

field as well as a new system for a new generation of adult educators.

Beyond the issues relating directly to DAEL(Department of Adult Education and Literacy), the task force heard a number of concerns about the Commonwealth's overall approach to adult literacy.

- Lack of coherent statewide leadership and coordination among multiple complementary initiatives aimed at the same problem.
- Lack of continuity in state leadership. Cited in particular was the difficulty sustaining a high level commitment to the issue long enough to make a difference because of changes in priorities of the state's political leaders. A high level of turnover in the leadership of the Department of Adult Education and Literacy has also contributed to the instability.
- Tendency to think of adult education as a separate categorical program rather than a strategy that cuts across the mission and responsibility of multiple Commonwealth programs and initiatives (e.g., early childhood education, welfare reform, economic development, and corrections).
- Multiple uncoordinated categorical federal initiatives that tend to drive (and fragment) policy for an overall state effort that is largely funded by Kentucky.
- A tendency to commingle and confuse different functions. The most important distinction is between functions focused on the needs of clients (adult learners, employers, communities, regions, and the Commonwealth as a whole) and functions associated with the operations and performance of providers. It is important that each of these functions receive attention, yet the tendency is for one (e.g., overseeing a network of providers) to drive out attention to overall system strategy.
- Inadequate coordination of services to meet the needs of individual adults, communities, employers, and regions is hindered by:

- Vertical financing and regulatory relationships between separate federal and state programs and local providers and administrative units. These vertical relationships can hinder the horizontal coordination of services for individual adult learners, communities, and employers.
- Turf wars among providers, local politics, and long-standing conflicts among neighboring counties.

- Inadequate links with and leverage of other public and private initiatives and investments to reach the target population. Major sources of help include employers, postsecondary education, and workforce development.
- Lack of a state financing policy and strategy for provider performance incentives and collaboration, and tax and other employer incentives for leverage of non-state resources.
- Lack of programmatic and administrative flexibility to meet the rapidly changing needs of adult learners, employers, regional economies, and communities.

Conclusion:

Curriculum content only from the training provided to learners or not, but put together their learning through activities that can inform or does, skills and attitude to achieve. In this case, apart from learning that the assays taught learners directly to sustainable and effective learning occurs in his.

Another way of providing content that is educational activities outside the learning environment possible for learning more and better enables adult learners. For example, hits, field trip experiences for learners or transfer is provided, develop knowledge, insight and skills they will.

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning.

Some research findings that can be a learning process for the Guidelines for training operations are applied, is given below:

1- - Preparation for adults to learn how much he depends on previous learning. Knowledge that has accumulated because of an ability to absorb new information more person is. Past educational experience features a diverse group of adult learners, the starting point of any activity on the diversity training is emphasized.

2- intrinsic motivation, learning a deeper and make them sustainable. When the need is met directly by the learning itself, what is learned, but is complementary learning. Creating a training activity in adult learning needs, learning ensures stable

3- Positive reinforcement (reward) learning to reinforce the negative (punishment) is more effective. Many adults because of negative experiences at the beginning of schooling, are weak and afraid. Feeling of success in adult learning for continuous learning and adult participation is essential.

4- To maximize learning, information must be provided an organized manner. Entries can be simple or complex can be arranged around related concepts are organized. Starting point for organizing content knowledge for adults and adults is linked to past experiences

5- Learning, especially regarding skills development, will be added frequently.

6- Duties and meaningful content than meaningless subjects are learned more easily and are later forgotten. This issue, especially for older adult learners is true. Challenges of adult learning facilitators by the way that content was significantly associated with experiences and needs of learners is.

7- Passive than active participation in learning activities, learning increases. Adult educators are allowed to participate actively in India, a stable and meaningful learning to help

8- Environmental factors affect the learning. Tangible things such as noise, crowded places, temperature, light and ... Learning process can be prevented. Other factors such as stress, ridicule, pressure, fatigue and low health can also reduce learning.

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The role of indigenous knowledge for sustainable development

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Abstract: Indigenous knowledge is local knowledge that is restricted to one specific culture and/or certain society. Indigenous knowledge is different with scientific knowledge that was established by universities and scientific communities. This knowledge is basis for decision making at field of agriculture, health, education, food and natural sources . Indigenous knowledge is set of all knowledge and skills that people enjoy in one geographical area (in one environmental conditions) that most of their skills and knowledge be transmitted to next generation , and new generation would be adapted with them and add to it . Many experts believe that for making a sustainable development, Indigenous and modern knowledge should be combined. Nowadays, so much efforts have done to make use of Indigenous knowledge but main part of these efforts were done for derivation and making it scientific. [Khatereh siyar. **The role of indigenous knowledge for sustainable development.** Journal of American Science 2011;7(5):237-241]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: sustainable development, indigenous knowledge

Introduction:

The importance of Indigenous knowledge and effort in compilation of that with modern knowledge were considered and it was tried to make general and stable view in relation with environment and the way of living through this way (Popzan, 2002). Our today's world is the contradictions and collision's world. Contradiction between cultures, religions, different societies and countries. In recently years, from Renaissance till now, as much as human had developed, they also had contradictions and collisions in their world (Azkia and imani, 2008). One of these contradictions is the contrast between tradition and modernism. Maybe we can find these contrast roots in colonial era, the time when colonists promote their innovation in their colonies. Mostly these techniques and innovations show their Indigenous knowledge and the way of their living is foolish and inefficient and tried to enter industrial ways in to their life to increase production efficiency through this way. Thus the way of their living which was been formed during thousands of years has gone to be forgotten little by little (Bouzarjmehri, 2004). We can say, agriculture part is bearing the most damage in this rapid industrialization process. Absolving old and compatible ways in agriculture part and replacing and using of implant, harvest patterns without any proportions with environment has caused decrease of production efficiency, soil erosion and hard destruction of environment during a long time. Finally, at the end of the 20th century decades, some solutions were suggested to solve these inconsistencies and problems. So

By first of 21 century, world see some sings of great concerns about social, economic and environmental system sets. It is expected that world population reach to 8 billion people at 2025. Increased

Consumption and poverty have led to high pressure on environment. At so many areas, environment condition is more fragile than before. We have faced decay at environmental issues, especially at vast parts of developing areas of world, in spite of considerable improvement of rivers conditions and air quality at some area such as Europe and north of America. Increased consumption, rare sources and factors such as population growth and imbalanced growth, would endanger, development of different countries (Popzan, 2002). Obviously, economic development can follow unexpected social and environmental affections involving weather changes, using freshwater sources inordinately, decrease living diversity and increase inequality (Gigler, 2003). Sustainable development is outcome of development that follow multi dimensional economic activities with protect environment and its related social issues. So in current decade, presenting indigenous knowledge issue was reinforced in order to present modern approach of development, in which the issue of human-oriented of development would be insisted. In this modern attitude toward development process, environmental, social and cultural concerns were emphasized over economic interests. Indigenous knowledge is part of national capital of each nation which encompasses their beliefs, values, practices, tools and local acknowledges. This is the same knowledge that , different nations had found their

foods from nature , prepared their clothing , settled in home , educated their children , organized their society and kept health of themselves and poultries , during the centuries thereby(Eshraghi, 2004) .

Compilation of Indigenous and modern knowledge:

Many experts believe that for making a sustainable development, Indigenous and modern knowledge should be combined. Nowadays, so much efforts have done to make use of Indigenous knowledge but main part of these efforts were done for derivation and making it scientific (Burger, 1997).

Amiri Ardakani and Shah vali (2003) believe that the undesirable outcomes of development on people and rural environment is the result of using new science by scientist, so by blending and making relation between modern and Indigenous knowledge we can solve this problem.

Millar believe that by combining Indigenous and modern knowledge we can make trust between researchers and rural people, because by using this way researchers and rural people know themselves as a partner that are responsible for a common process and product. Millar believe that the trust is the reason for future development (Penny, 2001).

Experts believe that there is no way to reach sustainable development except to combine Indigenous and modern knowledge.

Indigenous and modern knowledge will complicate when:

1- We solve structural barriers such as political, economical, cultural and social difficulties.
2- We correct the thoughts on educational systems by emphasizing on learning and thought process and also correct the thoughts on research systems by emphasizing on audience and beneficiaries needs.
3- We solve communication barriers that cause inactivity on relation process and steady and dynamic flow of knowledge between peasants, experts and scholars. (Emadi and Amiri Ardakani. 2004).

Concept and nature of indigenous knowledge:

Indigenous knowledge is local knowledge that is restricted to one specific culture and/or certain society. Indigenous knowledge is different with scientific knowledge that was established by universities and scientific communities. This knowledge is basis for decision making at field of agriculture, health, education, food and natural sources (Warren, 1993).

Indigenous knowledge is set of all knowledge and skills that people enjoy in one geographical area (in one environmental conditions) that most of their skills and knowledge be transmitted to next generation , and new generation would be adapted with them and add to it (Merrewij , 1999) .

Since, each knowledge is consequent of individual interaction with environment, so indigenous knowledge is consequent of indigenous people interaction with their environment. Chambers with emphasis on people's role at development process believes that "rural people's knowledge" term is more eloquent than other terms for indigenous knowledge. Our purpose of rural people are producer farmers , input buyers , agriculture production sellers and etc. "people" in above phrase emphasis that this knowledge is more verbal and less has been written . This word also referred to whole knowledge system which contains concepts, beliefs, and attitudes and also contains gain, store and transmitting knowledge process (Rajasekaran, and Babu, 1996).

Sustainability and sustainable development:

Sustainability is meaning to make economic, social and environment's views in harmony with our constant needs. Sustainability includes widespread and comprehensive points and is depended on interference in social issues. It is concentrated on future and today's issues and is a world movement and in harmony with our authorities (Kolawople, 2001).

The correct concept of Sustainability has fallowed a certainly and warranty of life satisfaction quality for everybody. Of course for reaching to this constancy, it is not enough to decrease pollutant activities or prevent of increasing levels of consumption, but also we should make a suitable schematization for decreasing poverty and making activity for reaching to equanimity and improvement of chances in and out of countries. Sustainability had implication on steady and sustainable conditions. Steady condition encompasses distant horizons (Dewes, 1998).

The concept of sustainable development is a complicated concept that is explained by different people in different ways. From international viewpoint, the more famous definition of sustainable development is obtained through 1978 reports by Brandt land commission with this title" our common future" that is defined as fallow: sustainable development is a development that contain our modern needs without making any problems in providing future generation's needs.

Sustainable development recognize that social, economic and environmental results are related to each other and they should be equally in harmony for making decisions process. Decisions which are based on Sustainability will help future generation in reaching to a well environment and success economic (Box, 1999).

Infrastructural information in sustainable development:

Ideal and infrastructural information in sustainable development consist of:

1- Environment and economic integration: economic decisions should be made according to their effect on environment.
2- Making guarantee between generations: decisions should be made according to their effect on future generation's environment
3- Social justice: all the people have this right to have an environment to grow on it and be successful
4- Environmental protection: it is needed to protect of natural sources and support plants and animals.
5- Quality of life: a widespread definition of human welfare should be given which is more important than economic welfare.

Reaching to sustainable development through Indigenous knowledge:

Dictated pattern's failure through western development countries to third world countries show that Indigenous knowledge is necessary to reach development.

Untrop believe that usage of local knowledge is efficient and useful in development and Indigenous knowledge's researchers believe that they achieved to an important source for innovation in agriculture methods and a good farming production to improve the rural people's life. On his idea, some of researchers call Indigenous knowledge as a good supplement and replacement for modern knowledge and they have tried to spread the usage of this knowledge all around the world. These plans as a "communion research with farmers" or "first is the first" are introduced. In this research method, private organs and local groups have the main role and unlink the current research plans, the tests are done with the farmers attendance in their farms and not in research centers and far from environment condition. The ways that farmers and rural people use for management of their living environment are the most scientific ways, although we couldn't understand it at the first sight (Chambers, 2000).

Eshraghi (2000) explained that by introducing sustainable development model or development environmental model and according to world food organization (FAO), sustainable development will create when applied technologies in rural development are in proportion with rural people's knowledge and also are acceptable by them. Also he says that one the main ways to reach sustainable development in society is that to have enough and

necessary attention to the rural's Indigenous or local knowledge (Merrewij, 1998). It is also explained that attention to this knowledge needs a complete recognition of rural people and their knowledge that through assembling of this knowledge we can find a correct way to reach a sustainable development and we should know that the movement toward sustainable development is not possible without correct using of Indigenous knowledge. Many development experts believe that the Sustainability of this concept is at the studying of this knowledge and in becoming popular in development. Indeed, Indigenous knowledge with its holist features had known the relation between nature's components better and had smoothed the way to Sustainability of development (Gigler, 2003).

We can summarize the usage of Indigenous knowledge in development as fallow:

1- Protection and maintenance of natural sources. Indigenous methods in management of natural sources are suitable pattern for managing natural sources in sustainable development.
2- The success of sustainable development plans is depended to rural people's communion at designing, schematization, performance and assessment. Use of Indigenous knowledge is necessary for rural people's communion.
3- Indigenous and modern knowledge should be combined because according to our needs and vulnerability of remained natural sources, none of them are able to remove our needs a lonely.
4- For recognizing development needs, trouble shooting problems should be polestar from rural people's view and recognizing problems and making efficient relation with rural people are possible through Indigenous knowledge.
5- In industrial countries, Indigenous methods are forgotten completely because of using modern knowledge in production process. As Indigenous methods are the most suitable way for achieving sustainable development goals so, many efforts were done to make this knowledge alive.

As a result not only we shouldn't forget the Indigenous knowledge but also we should use of this knowledge in developmental plans. Using Indigenous knowledge in developmental projects will help to have sustainable development in villages. So developing and not developing that were using of western development patterns for many year, should use of their Indigenous and local knowledge which is the result of many years experience and by helping

these plans they can reach to a sustainable development (Brouwer, 1998).

Sustainable agriculture
Sustainable agriculture is kind of agriculture that is toward human's interests and has more efficiency of using resources, and also is in balance with environment. This definition is in harmony with changing social and politic factors at agriculture development .and also it referred to kind of agriculture that is enable to produce enough foods without destroying world sources or polluting environment. It is also kind of agriculture that is follow with social values, agriculture family's welfare and supplying needed foods.
Generally sustainable agriculture is every kind of production system which follows theses goals:
More complete mixing of natural processes such as food cycles, nitrogen fixation, and relation of pests and natural disasters with agriculture productions processes.
Decreasing use of that non-farming, outside and non-renewable inputs in order to reduce damage to environment or less damage to farmers and consumer's health.
More fair access to interests and productions opportunities and progress in order to access to forms of agriculture that is fairer, and also increasing self reliance between farmers and villagers (Chambers, 2000).
Using more potential biologic and genetic aptitude of plant and animal species.
Using more local knowledge including innovative approaches that scholars didn't understand it completely or farmers didn't accept it extensively.
Combined agriculture would prepare this opportunity for common systems to apply needed reforms without creating inclusive changes in it toward organic systems. Therefore, aforementioned systems are considered as medium between common intensive agriculture and organic agriculture methods.
Two principles have especial importance at sustainable agriculture that is:
at early 1980's, with the emergence of new concepts, renewable agriculture and sustainable agriculture evolved and indeed it was based on "ecological interplay affect". now, this concept forms alter indigenous agriculture philosophy.
Sustainable agriculture presented from 1987 at global scale. In this principle, "agricultural interplay affects with society" is presented. Three issues are important about sustainability: first is enough income especially between poor people. Second is increasing access opportunity to food and its consumption. This means that more food should be prepared through increasing production and improving marketing. Third issue

contains protecting and improving natural resources (Louise, 2000).

Conclusion:
Indigenous knowledge has been manifested at sustainable process and improving extension programs at industrial countries of world, very well. Indigenous knowledge related to agriculture, medicine, food and architecture has been widely used At European countries, USA, Canada, Australia, by new names.
At one research as a name of "analyzing position of indigenous knowledge at sustainable rural development" that was done by Buzarjomhore (2005) it was signified that although there are some differences between indigenous and formal knowledge, but they should not be compared, because they are complementary of each other and it is possible to gain successes by synthesizing them that is impossible lonely. Base on new paradigms of rural development in order to solve rural problems, we should first refer to indigenous solutions and if it was working, then we should reinforce it; if not we should test and use outside solutions. Findings of one research done by Emadi and Amiri (2004), as "Synthesizing indigenous knowledge and formal knowledge as necessity for accessing to sustainable rural development", has shown that dominated belief among educated groups toward Indigenous s and their knowledge is precondition of every interaction, synthesis and relation. Creating revolution in formal education systems in order to attending empirical knowledge area is considered as one of main necessity of this synthesis that is outcome of years of researches. Researchers attention to "exploiter's accumulated experimental and historical wisdom" is one of other necessities of this revolution by using cooperative, qualitative and filed methods. Also, applying mutual extension ways and creating revolution at communication system between governmental, education-extension centers and farmers and rural people so that they be interacting, was considered as precondition and necessities. At researches as "indigenous knowledge at development process" done by Karimi (2003) , findings show that indigenous knowledge is principal factor and main source at the field of research of sustainable development, decreasing poverty , enabling local men and attracting their participation at activities and rural development programs, developing and producing appropriate technology, self-reliance of rural societies and country.

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Socio-economic analysis of foreign immigrants in South East Iran

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Abstract: Beginning of immigration refer to age of times that human lives on the earth. The first human for keep from damage and problem's choosing immigrant as a solution. In between international immigrant with notice to it effect's in era and destination is the most important. Analytic Situation of Pakistani immigrant to Iran is the main goal of this research. The all of society that use in this research is N=1350 person from Pakistani immigration that lives in Konarak and Chabahar that the 219 person with simple Random Sampling method chosen and for analytic this data and information use from Excel and Spss 16 software's. The results show the main reason of immigrant Pakistani to these two cities is finding job and suitable work. Two stimulant consist of economic and other reason such local convenience, better life, more security has direct effect on other behavioral this reason has most important in between other reason.
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Keywords: International immigrant's, Pakistani immigrants, Southern East of Iran.

1. Introduction

The history of immigration refer is to age of human in the earth. For first human immigration chosen as the suitable method to critical with problems rake of feed, security is some of dials that first human choose immigration. In Throughout history, the type of immigration with notice to environment and age is different. From beginning of 17-century social thinkers tries that can in between different event's social and economic, finding the reason of immigration (Jamshidian, 2002).

In a few past decades with notice globalization in international, volume of immigrant has increase. In 1960 total of international immigration alone consist of 76 million people that figure in 2000 reached to 175 million people. As a result, the growth of population between 1960 and 2000 (percentage2.9) is most than growth of total world population (percentage2.5) (Iom, 2005). In the entire world, special in after of the world war II, immigrants as an effect event chosen and was different sciences and theorists about the causes and factors which discussion began (tahrkhani, 2002).

Immigration is one of four dials change of population in world and with notice to its nature condition long effect has short effect in different periods that cause parity or impurity in structure, number of population has, and with notice to this, dial countries divide to sending immigration. Accepting immigration and countries without effective immigration event. Thus phenomena such as attitudes change and turmoil in the interaction, the release of individual family supervision, increase unskilled work force, create problem's in planning process of housing, health, study and welfare services

and other problem's cease to landlady government and nation look to them as the reason of problem's and censed to name them unsuitable immigrants. Cultural critical between native and immigrant people cense to insecurity immigrants and between native has provide the field of many social slope (zareh shah abadi, 2002). Immigration event is the most notice event in third and developing countries (National Youth Organization, 2002).

Basic and rapidly change in human social, attractive cities, welfare and increase the need of today human cense created new type of immigrant. Following this, a new perspective in immigrant in this standpoint, immigrant is affected by social change and needs. This landscape immigration's is a dial for indefeasible equilibriums so be in social in important. With past of time and spread over industry, high immigrant to cities increase to level of destructive environment of cities and increase the unemployment. That from field of negative image of this event form is the minds new theory point on destructive role of immigration. Industry growth rapidly and expansion communication and transport in international space cause local and regional looking effected by social event's and globalization. National border other cannot stop as an element for solubility, so spread type of international immigrants (Jamshidiha, 2002). Immigrant has many reasons that some of them consist of repulsion and some of them effected by attraction elements that. This dials has too in international. With notice to create economic gaps international level, the most important dials for immigration's is economically. Immigrant's for job is a special type for immigration, this type of immigration in world level is foreign event that

immigration of worker's from east southern of Asia to neighbor countries is such. Immigration of Pakistan people to neighbored countries and special to Iran is a kind of international immigration's that in resent years has growth way. In Iran, the good region for Pakistani worker who come's to Iran for work is east southern of Iran that Chabahar and Konarak is then. In this field to analytics situation of worker's in southern part of Iran with notice job and business attention to reason of immigration:

What is the main reason for immigrant is Pakistani to Chabahar and Kanarak?

What is the relationship between individual characteristics and professional status of immigrants and their job in Iran?

Studies and reviews relation with immigrant is a long time consist of research fields, in this way research and studies about this subject consist of below title:

Ghazi (1994) indexes success in job is job goals, job pleasure, job security, accessible to entertainment and lateral activities, job satisfaction, welfare equipment, good human relation, suitable equity are important dials (hemati and Jamali, 2007).

Shahnoshi et al (2000) has reviews social - economic dials about Afghan worker in Khorasan field. result this research shows that be Afghanian worker's in this region cause to immigrants of farmer families but prepare the field of immigration families that don't have enough land for agricultural activates, in total effect of Afghanian workers on Khorasan agricultural activates was negative.

Zareh shah abadi (2002) has a research with title of role Iraq immigrant and social damage in Yazad. In this research sample social chosen with sudden method and analytic with Spss software with notice to this results Iraq immigrant in increase of swindler and addictive to drug, behavioral damage, steeled, involvement has a direct damage but increase of knowledge and age and see don't each effect.

Jamshidian and Babai (2002) Factors Affecting Afghan refugee return, relying on residents Golshahr Mashhad city using the theory of absorption and excretion of Everett Lee has done. for this research to provide policies against refugees in Iran are Afghans.

Karimi moghari (2004) with use from regression formula analytic the effective of Afghan immigrants an earning workers business in Iran. Results show Afghan workers in rich province such Tehran, Esfahan, Khorasan and … busy to work that demand for work is high.

Sajad pour (2005) study a practical framework in international immigrant management in Iran. In this research, we have four main subject immigrant and development, easy of immigrant legal of immigration and forces immigration analytic. Also in

this research main organization that effect an immigrant i.e. government's, international organization's, international immigrant management and Trans many of human are notice able.

Immigration is one of the elements of change population and with that native addition that long-term changes and has short-term effects in much aspect consist of on population numbers and structure dimensions, economic, social, political etc and cause imparity in population structure (Jahani, 2006). Immigrant in total mains have the main home town and settlement in other part for temporary and always but immigrant is main movement of population is leave their country of main home to another longer place without come back to their home town (Javan, 2004). In other definitions, immigration is a shape of geography movement that tare between to region people from region with bad economical and social condition immigrant to other place, higher wages and better economic and social conditions, into (Mohtamedi, 2005). Change of population analytic in demographic study, that has many kinds, but in this research, we chose two kind of this:

Inner immigrations: all movement of population inside of a country border is this, from city to city, rural to city and rural to rural (tagavi, 1990).

Foreign immigrants: immigrant of people from one country to another country is this that one of them is stray and political immigrant's that occur in visual condition. Inner immigrant name's also that people self-action to immigration and unapplicant immigrant take in a large scale and they settlement in camp (jamshidiha, 2002).

2. Elements of immigrant

In landscape of immigrant, two theories of "functionalism" and "dependence" are most important theory in immigrant. In side this two theory, systemically theory of immigrant has proponent too and letter's pull and push theory accept from people. The first theory about immigrant presentation from Raven Eshtain English economist in 1855. He designs observation as "immigration law" that in it distance dials, pull and push factor, interaction dials and place and space visual settlement. Durkheim increases of population are most important reason for immigrant and believes that the from seventeenth century immigrant start formal i.e. a time that population increase and work divide in social presentation in formal (Therkhani, 2001).

Functionalism theory to emphasize performance and consequences of the phenomenon of immigration. According to this view, when a social system does not meet the needs of activists, the

probability that they meet the immigration needs to throw many hands

Immigration dependence theory (or contrast vision), the phenomenon of migration in the context of global capitalism and the development of concepts undeveloping be considered. From this perspective, migration is a side effect of unequal development and the other factor in the development and deepening inequality in society. Supporters of this theory, the solution to the issue of immigration in the context of overall development strategy examined. Until the unequal status between urban and rural, rich and poor and backward countries should not follow from the developed or reduced to minimize the migration is not possible.

Pull and push theory that according to Herbel study in the first a 1930-decade start immigrant cause from two elements: Push forces are some element is that because a person left the hometown and are element is that cause Tedious.

Pull forces are some element's that cause person attraction to another are. In this field Ores Lee theory has more standard that mention four element that is effective in immigrant: element of offspring region, element of destination region, element of intervention cause and problems and personal elements in immigration are noticeable.

Extensive immigrants cause from ware or natural challenge such certain, the earthquake and governments national local problems. Immigrant in public condition, search a place with work and live. Economical cause and try to believe is most important reason for immigration and search of people such: (Green and Green, 1993), (Altonji and Card, 1991), (Winstein, 2002), (Dunlevy and Saba, 1992).

Fawst et al, which four factors theoretically decisions are effective for immigration: (1) Ecological pressures, (2) surly element, (3) economical element and (4) mind theory (jalalyan and Muhammadi Yeganeh, 2007).

Economic perspective, migration mechanism for redistributing the workforce considers. Classical economists Adam Smith, including immigrant workers as well as the economic law of supply and demand described (Zanjani, 2001). The other important theory in immigration is international theory of immigration. From that features is wide look to immigration cause from control and political control, formal control. Apposite this theory this kind and don't attention to other, Dial send with notice to this event in economical condition and our dissuasion is according to this theory (jamshidiha, 2002).

Due to the expansion of population in Asia and sensible differences in income level, livelihood type of political events in various countries and its

continent recent decades, immigrants to center of regional and international. These countries of the region immigrants have not the same situation. Some countries far from major migration streams and some other major immigration centers are located. The high number of immigrants in south-central Asia with notice to put India, Pakistan and Iran are in this pout of world. India is second century in accepting immigration with 7 and 8 thousand in 1990, Iran and Pakistan from accept Afghan immigrant one important countries (Zanjani, 2001).

3. International immigrations

One of immigration with very important in international immigration. With notice to this point, that has a small different between international immigration and foreign immigrant: international immigration has taken between to undepended country. But foreign immigrant has take in international depend countries that one of their country not depend. Foreign immigrant's by effected today happen in a high scale some element's such education, communication, internal immigrant go up the hope to live has many effect in international immigration. That has many kind that consist of: (1) immigration for work, (2) for away elite brain drain, (3) political immigrants the developing and south countries are send immigration and develop and industry play attention immigration (National teenager organization, 2001).

Notice to international immigration has important from this aspect fore send immigration has economical, political and social several effect. Immigration in this shape has three general elements: first immigration, the country is main place to immigrants and tired good place (janshidiha and Anbari, 2004). Immigration and transport has many reasons in each region so without any program for advance of population cense to unsuccessful in social, economical, and cultural planning. Some of effect of immigration an legal from Pakistani, Afghani and Iraq, use suitable from equipment and condense of population in a region in some part's such Chabahar and Konarak is cause from without planning international immigration (Ashofteh tehrani, 2002).

Effect international immigration for special age and sexual change in economical of sending immigrant's country sleep effect of these factors is the internal migrations. The effects of Asia and Africa, where immigrants comprise more men are intensified (Mahdavi, 2003).

Iran in terms of immigrants resettled will be divided into two groups: The first groups of refugees form. During the past two decades, Iran is one of the main destinations mainly Afghan and Iraqi refugees have been. Iran between 1993 and 2003 hosted the

first or second largest number of refugees worldwide has purported. According to the Iranian government, only 308,000 refugees in 2002 were returned to their country. The second groups of Iranian immigrants in the workforce also comprise two categories. The first group includes immigrants who as a skilled work force in Iran and the second group include immigrants who labor as unskilled, low-level tasks have been allocated to (UNHCR, 2004).

Access to better financial and economic situation, the main factors had been migrated to the Pakistani.

Between personal and professional characteristics of immigrants and their employment, status has a positive relation.

Iran country in the northern hemisphere with an area of 1,648,195 million km between latitude 25 degrees 40 minutes North 44 degrees 63 minutes east and southwest Asia is located. Country's population, according to last census in 2006 against 70 million 472 thousand and 846 person and is based on the results of 48 million 245 thousand and 75 person from the population in cities and 22 million 227 thousand and 771 person live in villages. The country north of Armenia, Azerbaijan and Turkmenistan, the three former Soviet republics and the Caspian Sea, east of Afghanistan and Pakistan, with Turkey and Iraq from the west and south, the Persian Gulf and Oman Sea is a neighbor. 252 mm average rainfall country meters and under the condition that 179 mm (71%) directly due to the high evaporation potential in the country (1500-2000 mm) is evaporation. Height above sea level in different regions of the country - 40 to 5670 meters, which makes changes influence on diversity and climate change are areas (Gytashnasy Comprehensive Atlas, 2006 - 2007).

4. Chabahar and konarak

Chabahar Township of the southern provinces of Sistan and Baluchistan is. The city with the location 60 degrees 37 minutes' east longitudes and 25 degrees 17 minutes north latitude and within 756 kilometers south of Zahedan, Tehran and in the 2406 km asphalted route Zahedan - Konarak is located. This township has a number of city 5 centers and 3 Section, 11 villages and 592 inhabitants, is a rural. Chabahar has a desert climate is hot and dry. Average annual rainfall in the city 114.2 mm and average temperature in 2009 from +40.8 till +9.8 degrees change. According to latest census conducted in 2006 against the city with a population of 214.017 persons (Hossini and Jamali, 2007).

Konarak township with 11.567 km and is the central city of Konarak. Total population in 2006 is equal to 68.065 persons. Appellation in the city over language that remains is that this place was many

trees along anthem that is why this small town became famous Konarak port. Konarak a climate is hot and humid. The air at the height of summer due to monsoon winds "Monsoon" is mild (Hossini and Jamali, 2007).

Table 1: Population change cities studied (the person) during a 50-year period from 1956 to 2006

	1966	1976	1986	1991	1996	2006
Chabahar	2828	5922	20544	30038	34618	71070
Konarak	2506	5069	10076[1]	10965	14941	28685

5. Material and Methods

In this paper, survey research methods and descriptive - analytic. The statistical population of all research Pakistani immigrants living in the cities that comprise Konarak and Chabahar sample size using formula Cochrane 219 were selected. These methods were selected by simple random sampling. The main tool of this study is a questionnaire. For this purpose, after understanding the factors affecting migration phenomenon, with a field study techniques required information was collected in Excel and Spss software and data processing were done, then using different indices and statistical models, the results obtained In the descriptive tables and graphs (frequency, percentage and cumulative frequency) and analysis of data from the Pearson correlation coefficient was used.

6. Results

So says population society of this research in all of Pakistani immigrants that live in Chabahar and Konarak sample chose from Random Sampling method and questions that consist of information about marital status, age, sexual, education, employment status, family member, immigration reason, live place mind long time that immigrants and question ask them about job and earning that it's result is below:

The results of this table shows that from sexual visual 96.35 percent of this immigrant are man and only 3.65 percent of them are women.

Table 2: distribution of respondents by gender in the cities of Chabahar and Konarak

Sex	frequency	Percent	Cumulative percent
Man	211	96.35	96.35
Woman	8	3.65	100
Total	219	100	196.35

[1]. Population of Konarak city in <u>1365</u> is without the population of military units.

That not boss of family. However, can say the most of Pakistani immigrant's in this two city are man and look for work with unsuitable skills. have undo main between sexual visual and aspect of Pakistani work force in Iran is small and they say come to Iran for work and send their earning for their family in Pakistan.

Table 3: diffusion of answer according to their educational in Chabahar and Konarak

Educational	Frequency	Percent	Cumulative percent
Illiterate	28	12.79	12.79
Elementary	90	41.10	53.89
Guidance	101	46.12	100.01
Total	219	100	166.69

Pakistani immigrants living in cities Konarak and Chabahar in Sistan and Baluchistan Sunni (100 percent sample) and the existence of other religions and ethnic groups among the refugees is very scarce. Terms of the housing situation, around 85/8 percent respondents have leased housing. In contrast, only about 14.2 percent of the rest of them live in homes Maliki. Immigrants often live in urban fabric and to the end of tenancy may go neighborhood to neighborhood.

Fig 1: Iran's geographic Location and the cities studied

Over 72.7 percent of married respondents and about 27.3 percent of the rest were single. Half of immigrants (50%) of respondents have declared that his wife is Iranian and 22.7 percent of wives were Iranian, the rest immigrants 27.3 percent to the question "Will your wife is an Iranian?" Have not

responded. Pakistani immigrants in sex ratio is unbalanced because of the difference in migration between the sexes is that Pakistani immigrants to the country of Iran constitute more men.

From total answer's 12.79 percent illiterate, elementary with 41.10 percent and guidance period with 46.12 percent with 101 person frequency and all of this immigrant's. Accept their degree from Lahore and Karachi cities.

Considering that the number of literate people and school and a college education among the respondents is low. With notice to less the of immigrant's with advance and high education is main problem in develop current. Many of this immigrants work in low work with low wage diffusion of answers with age in Chabahar and Konarak.

According to figure No. 2, 10.50 percent in the age category 15-19 years, 21.92 percent in the age category 20-24 years, 6.39 percent in the age category 25-29 years, 18.72 percent in the age category 30-34 years, 11.87 percent in the age group 35-39 years and 30.59 percent more in the age category 40 years are.

Data's of this chart show that many of person that answer to questions and migrants living in cities and middle-aged people off at an early age and are ineffective. Therefore, attention to their views is very important.
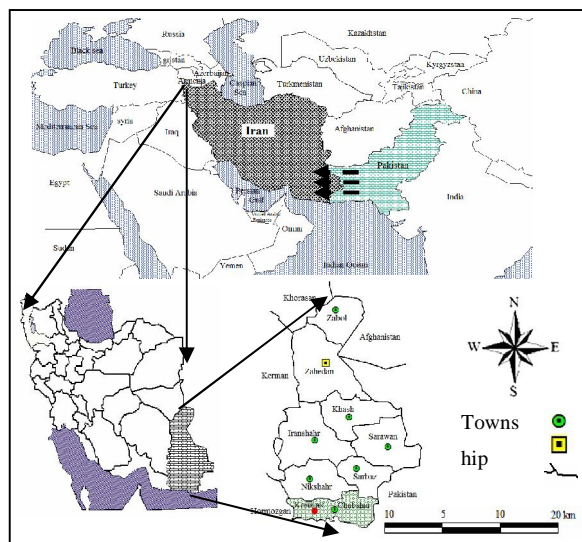
Fig 2: diffusion of answer according to their gender in Chabahar and Konarak

From total answer's 23.29 percent of those younger than 5 years, 27.40 percent between 5-10 years, 17.35 percent between 10-15 years, 16.44 percent between 15-20 years and 15.53 percent of people in more than 20 years have been living in Iran.
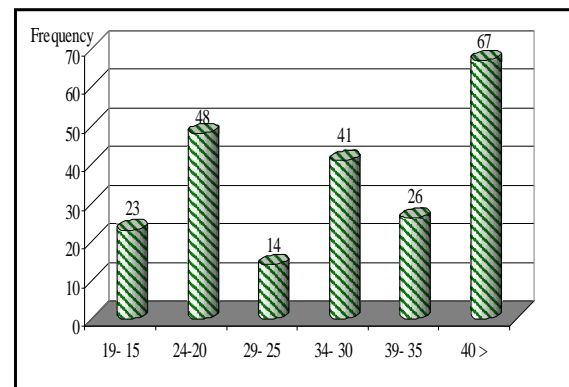
In these boys, 5-10 year is of live with 60 frequencies in Chabahar and Konarak and result is that number of Pakistani immigrant in Iran has an increase process and this need to a punctual programming.

With notice to languages is an element for communication between people. Figure 4 Total

numbers of immigrant's familiar language shows, according to this Figure of all the respondents of this research are familiar with Urdu. Of these 99 cases only in Urdu, the number 78 with Urdu and Persian, the number of 10 with Urdu and English languages and 32 people with all three languages Urdu, Persian and English were familiar. So with the 45.21 percent with Urdu, 35.62 percent Urdu and Persian are, Urdu and English is 4.57 percent and 14.61 percent speaking with 3 languages.

Fig 3: Age diffusion of answer's according to period of live in this two cities
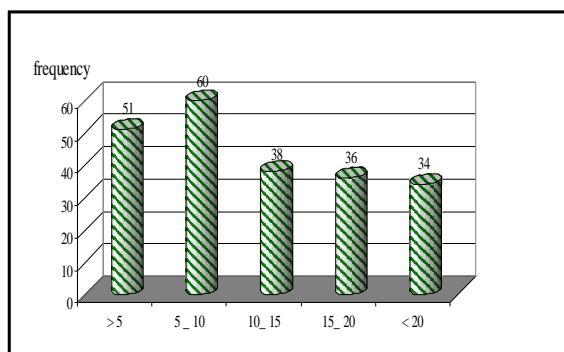
Fig 4: knowing of Pakistani immigrant with foreign languages
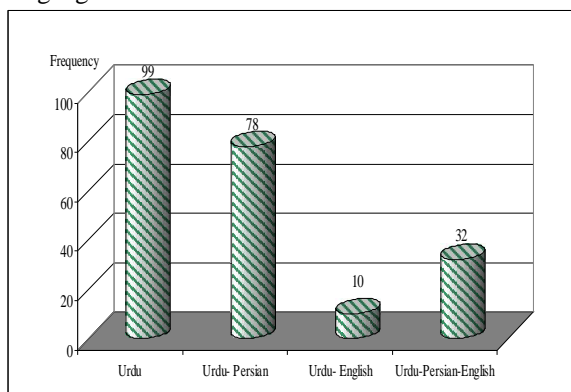
Show almost reason of immigration consist of:
Immigrant's for work with high lavish with 171 person,
Pilgrimage with 12 person,
Tourism with 10 person,
Visit the family with 17 person,
In addition, etc with nine people.

Nearly 80 percent of answer person in says reason that them immigration to Iran un satisfaction economical in their country, two dials in immigration of Pakistani to Iran are important: get job and security and they point to this different between Chabahar and Konarak with they country and Stated

that security, comfort living, income and better position in the desirable expression of their country have the same agents hands and make them migrate to Iran.

Figure 6 shows the equipment that Pakistani immigrant's have 4.57 percent with 10 lavish have car, 44.57 percent with 98 person lavish has motor's transport element and 4.57 percent with 10 lavish has self settlement and 46.12 percent of them don't have any of this equipment and any of immigrant don't have land.

Fig 5: Causes and factors affecting migration to the Pakistani in these two cities
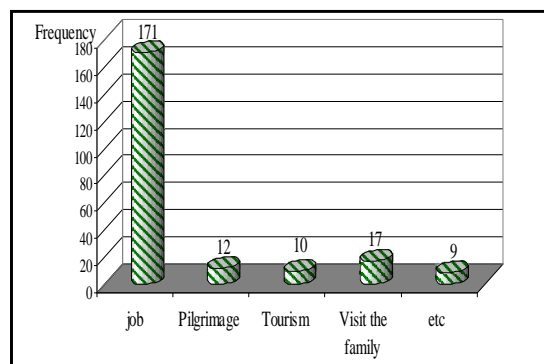
Fig 6: the owned facilities and Equipment Pakistani immigrant in Iran
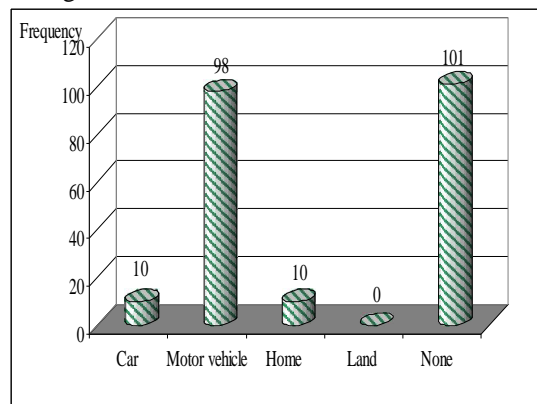
As you will see more facilities, owned immigrants possess equipment that can quickly exchange and possession sale and it requires no registration document, or if the property was abandoned in an emergency, is not high price and are less damaged.
Table 4 is that all the active population is employed in the cities of immigrants is studied.
With notice to the findings, more subjects and 93.61 percent employed and approximately 6.39 percent of the subjects of this research have introduced its unemployed.

Job distribution of immigrants on the 26.94 percent of respondents with the highest frequency Cosmetics has jobs. Abacus (with 10.05 percent), mechanics (with 24.13 percent), masonry buildings (with 6.39 percent), fishing (with 4.11 percent), carpentry (with 3.65 percent), unskilled labor (with 4.57 percent), Engine building (with 9.13 percent), Shopkeeper, do (with 5.48 percent), and student job Assistant with 5.03 percent, with wire Rule 39.6 percent, and repair work with 5.02 percent next business had been expressed by the respondents. As you can see in the table with the Cosmetics jobs as the most Frequency first job was between immigrants. Notice to that these jobs among local people as low value job is considered and the requirement does not do much.

Situation of immigrant's show person depend on which of job grope and has which kind of production relation and what were can earning his money and this between women and man immigrants with notice to native of their works are different notice to high immigrant's and low education season to low production. 97 percent of immigrants are main. In other words, the existence of circumstances disparate between immigrants in most areas, the amount of jobs there. Distribution of immigrants in cities studied of this research function facilities and employment opportunities, fieldwork and job skills immigrants and local social base and their lives are.

Table 4: Job diffusion of Pakistani immigrants in Chabahar and Konarak cities

Job status	Frequency	Percent	Cumulative Percent
Engine building	20	9.13	9.13
Cosmetics	59	26.94	36.07
Sartorial	22	10.05	46.12
Mechanics	29	13.24	59.36
masonry	14	6.39	65.75
Serviceman	11	5.02	70.77
Fishing	9	4.11	74.88
Carpenter	8	3.65	78.53
Worker	10	4.57	83.1
Shopkeeper	12	5.48	88.58
Assistant	11	5.03	93.61
Unemployed	14	6.39	100
Total	219	100%	805.9

Looks immigration between people have a Positive relation with un satisfaction from live, if in hometown of person not maybe of accept their needs immigration is a natural work. Analytic of sample society of this research point to this fact and show 90 percent of Pakistani immigrants with notice from their live conditions immigrant to Iran. From immigration need to enough fields in together countries does not notice to this cease field the immigration. One of positive element on immigration in Pakistani to Iran is economical bases. This main marrow's of economical and finance condition cease people immigrants for this purports notice to

economical dial's as undependable shifty and stimulus as depend shifty are analytic first assumption: has a positive relation between finance condition and immigrants. First hypothesis: relationship between access to financial and economic components and motivation to migrate there.

Notice to table 5 components and indicators to find work and job of fit (R=0.639, P= 0.059), Don't have suitable settlement in home town (R= 0.487, P=0.05), Weak of finance ability (R=0.446, P=0.05), Love to work in Iranian job (R= 0.521, P=0.05), Increase the rights of immigrants and job rewards than before migration (R=0.706, P=0.000), Information of immigration about job (R= 0.425, P = 0.049), Increase of earning between age of immigration (R= 1.000, P = 0.001), Earning with job of immigrants (R =0.491, P= 0.045), Period of live in Iranian (R= 0.679, P= 0.045), Earning of immigrant with notice to their job skills (R= 0.491, P = 0.05) with regard to test the significance level smaller than the error rate are allowed 95 percent confidence accepted hypothesis test based on Pearson correlation test can say that this variables have positive correlation with Iran are the Pakistani immigration.

Table 5: result of assumption on effect the most important elements relate to immigration of Pakistani to Iran.

Components	Correlation Coefficient (R)	Permissible error rate
Find suitable job	0.639	0.05
Don't have suitable settlement in home town	0.487	0.05
Weak of finance ability	0.446	0.05
Weak of security good job	0.639	0.01
job security than in immigrants before immigration	0.674	0.01
Love to work in Iranian job	0.521	0.05
Have job security high before immigrant	0.752	0.01
increase the rights of immigrants and job rewards than before migration	0.706	0.05
Access to job purposes Iran	0.518	0.05
Increase of finance position	0.639	0.01
Information of immigration about job	0.425	0.05
Increase of ability and job skills	0.617	0.01
Increase of earning between age of immigration	1.000	0.05
Earning with job of immigrants	0.491	0.05
Period of live in Iranian	0.679	0.01
Earning of immigrant with notice to their job skills	0.491	0.05

According to the refugees, what economic and financial situation in connection with their jobs and income, more facilities available in the destination they are given motivation and attitude to immigration is more of Iran.

Table 6: correlation analytic of immigrant's characteristics with their job variable

Independent variables	Correlation Coefficient (R)	significant
Job look	0.311	0.01
Job goals	0.596	0.01
Job satisfaction	0.277	0.05
Sheet of support from immigrations	0.169	0.128
Sheet of job ability of immigrants	0.442	0.01
Sheet of corporation immigrants with organization	0.513	0.01

Also, find suitable job (R=0.639, P=0.000), Job security than in immigrants before immigration (R=0.674, P=0.000), Have job security high before immigrant (R = 0.752, P = 0.000), Increase of finance position (R = 0.639, P=0.000), Increase of ability and job skills (R=0.617, P=0.000), Period of live in Iranian (R=0.679, P=0.000) So, with 95 percent confidence accept our assumption and according to test of Pearson correlation can say that these variables have positive relation. Indeed with to above dials and cumulate correlation rate of job security in the most important dials in immigration of Pakistani to Iran as incontinence of suitable economic condition in of spring and don't have suitable settlement, not suitable habitant and etc element are in next dials. Second hypothesis: between individual characteristics of immigrant and their economical application have a positive relation.

Analytic this table shows the sheet of job ability with correlation rate has a positive relation this mean with increase job skills of immigration accept this price, findings show between variable of Correlation with organization's and job shifty application has a positive relation. So the second assumption supports. Correlation analysis of individual characteristics and professional variables on job performance is shown in table 6. According to the results obtained between Sheet of job ability of immigrants (R=0.442, P=0.000) with the dependent variable performance and occupational status and a significant positive relationship was found. This means any size the ability of immigrants to use more professional job performance, they will increase. Research findings showed that between the independent variable with Sheet of corporation immigrants with organization (R=0.513, P=0.000) and variables related to job performance is positive and significant. Similarly, Job look and Job goals with (R=0.311) and (R=596) in level 0.01 and 0.000 significant relationship exists. Other variable such as job satisfaction with 0.277 at 0.042 positive and significant relationships exists. So many researchers as important features in the physical and mental stress have increased job performance, which include: Ahmadi (2001) The

relationship between career motivation with job performance, Ghosh (2000), Pour safari (1999) and Rezaei (2001) Relationship between job satisfaction and job performance have been confirmed.

7. Discussion
International immigration is one of main season for economical depends between developed countries and developing countries in 21 century. In the first, this century estimate 175 million people near 3% of world population consist of immigrations people and most point to below dials: Most of Pakistani immigrants in Iran are man and a few of them are women and this cause to weak condition. Many of them have guidance educational with high lavish and has high age above 39 year's old and many of them in recent 3.60 years come to Iran and many of them speaking to Urdu, after Urdu, after English and a few number of them can only speaking English for their needs and many of Pakistani immigrants says their situation with before of immigration to Iran is different from economically dimension and 27 of them says economically situation of them don't change between before immigration of less of them says (5%) them economical situation after immigration to Iran get institution.

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Clinical value of transforming growth factor beta as a marker of Fibrosis in adolescents with Chronic Liver Diseases

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Abstract: Background: Hepatic fibrosis is the final common path of liver injury in most chronic liver diseases and can lead to cirrhosis, which is responsible for the majority of clinical complications. Our aim is to asses the clinical value of serum Transforming growth factor (TGF) as a fibrogenesis marker in adolescents with chronic Liver Diseases**. Methods:** We measured serum levels of TGF- in 25 adolescents with chronic liver disease and 25 healthy controls, and determined their relationship to frequently used liver function tests and liver biopsy findings. **Results:** Serum Transforming growth factor was significantly higher in patients than in controls as ($P < 0.001$). Significant positive correlation between TGF and TSB as r is 0.4682 and p is < 0.05. High significant positive correlation between TGF and (stage, grade of liver fibrosis, PT and duration of illness)as p is $< 0.001$and r is 0.9409, 0.7447, 0.5293 and 0.5952 respectively. Highly significant negative correlation with prothrombin concentration (PC) and serum albumin level as p is < 0.01 and r is -0.6460 and -0.5371 respectively. Sensitivity of TGF in diagnosis of fibrosis was 65% , specificity 94% and area under curve (AUC) was 0.812.The cut-off value of TGF used to discriminate significant fibrosis was 22.6 ng/ml and it was a dependant predictor factor for diagnosis of fibrosis with positive predictive value 75.5% and negative predictive value 90.4 %. **Conclusions:** TGF- had the ability to discriminate patients with significant fibrosis. and may be useful in reducing but not replacing the need for liver biopsy.

Introduction:

Chronic liver diseases (CLDs) are defined as the continuity of clinical and biochemical evidence of hepatic dysfunction for longer than six months *(1).*.Hepatitis B and C (HBV, HCV) are, and will remain for some time, major health problems in Egypt. Both infections can lead to an acute or silent course of liver disease **(2).** Hepatic fibrosis is the final common path of liver injury in most chronic liver diseases and can lead to cirrhosis, which is responsible for the majority of clinical complications. Fibrosis is characterized by excess deposition of extra-cellular matrix (ECM) components including different collagens and non-collagenous proteins such as laminin, fibronectin, undulin, and so on (3). The key cellular mediator of fibrosis is the hepatic stellate cells (HSCs) which when activated serve as the primary collagen-producing cell. Hepatic stellate cells (HSCs) are activated by a variety of mechanisms, including cytokines, chemokines and others (**4**). Transforming growth factor-beta (TGF-) is released by activated HSCs and is considered the key profibrogenic cytokine in liver disease, with participation in most critical events during liver fibrogenesis **(5).** Liver biopsy is essential in establishing the diagnosis, and in assessing the degree of fibrosis. Although liver biopsy has long been considered to be the gold standard of fibrosis assessment, the procedure is invasive, potentially associated with complications, and provides only a semi-quantitative assessment. Its repetition is required for following up the disease progression and monitoring treatment efficacy. This repetition is not easily accepted by patients especially in the pediatric population. Moreover, the diagnostic accuracy of liver biopsy in the staging of fibrosis is seriously affected by errors in sampling and inter-observer variation (**6) and (7**). These drawbacks justify an intensive search for non-invasive alternatives that are safe, inexpensive and reliable (**8**). Non-invasive diagnosis of liver fibrosis has been extensively evaluated in adult populations (**9), (10) & (11**). In contrast, in pediatric population, data are lacking and liver biopsy is still the only reliable tool for diagnosing the histological features (12). **Our aim is** to asses the clinical value of serum Transforming growth factor (TGF) as a fibrogenesis marker in adolescents with chronic Liver disease.

Subjects and Methods:

A mixed retrospective and prospective study was conducted from October 2009 to June 2010.Twenty five patients with chronic liver disease (group 1) were chosen from hepatology clinic of Benha university hospital (Kalyobia Governate)and the Liver Institute (Menofia Governate). Twenty five healthy children matched for age, sex, locality and socioeconomic state served as control (group 2).

Written consent was taken from parents before including their children in the study**.** Patients were included if their ages ranged from 10-16 years and with chronic liver disease. Patients with gastrointestinal bleeding (acute attack), chronic renal failure, hepatic encephalopathy were excluded from the study. All cases were subjected to: full history taking, complete clinical examination including ; Liver (surface, edge, consistency and span), spleen(surface, edge, consistency and size), presence or absence of ascites. Presence or absence of manifestation of liver cell failure (edema, bleeding tendency, jaundice and angiomas).Laboratory investigations including: complete blood count,fasting blood sugar, blood urea and creatinine, liver function tests including(ALT, AST, serum bilirubin (total and direct), serum albumin, prothrombin time and concentration. TGF was measured using DRG TGF ELISA kit. Ultrasonography-guided liver biopsy was done for chronic hepatitis patients. Liver biopsies were performed using true cut needle. Biopsy specimens were fixed in formalin and embedded in paraffin. Liver fibrosis and necroinflammatory activity were evaluated according to Ishak staging and grading score where histological activity index (HAI) ranged from 0 to 12, while fibrosis score ranged from F0 to F6 (**13).**

Results:

Demographic data among studied groups, including sex, residence and mean age (13.06±2.5) years in group 1 compared to (13.1±2.1) years in group 2 are shown in table (1).Chronic hepatitis C was the most common etiology of chronic liver disease among our cases (44%) followed by autoimmune hepatitis (24%),chronic hepatitis B (16%),glycogen storage disease (8%),congenital hepatic fibrosis and Alpha1 anti-trypsin deficiency (4%) each as shown in table (2). Table (3) shows clinical characteristics of studied cases. Table (4) shows laboratory data of studied groups and revealed highly significant difference between patients group and control group as regard serum transaminases level, albumin level ,total &direct billirubin, prothrombin time and concentration, also serum level of TGF was highly significantly elevated in group (1)than in group (2) as (P < 0.001). Grading of liver fibrosis revealed that; there were 8,9,5,2 and 1 patients in grade 2, 3, 4, 7and 8 respectively. Staging of liver fibrosis revealed that; there were 8, 7, 2, 5 and 3 patients in stage **1, 2** , **3**, **4** and **5** respectively. Figure (1) shows significant positive correlation between TGF and TSB as r is 0.4682 and p is < 0.05. High significant positive correlation between TGF and (stage, grade of liver fibrosis ,PT and duration of illness)as p is < 0.01 and r is 0.9409 , 0.7447, 0.5293 and 0.5952 respectively are shown in figures 2,3,4and 5. Highly significant negative correlation with PC and serum albumin level as p is < 0.01 and r is -0.6460 and -0.5371 respectively as shown in figures 6 and 7. Sensitivity of TGF was 65% , specificity 94% and area under curve (AUC) was 0.812 as shown in figure 8.The cut-off value of TGF used to discriminate significant fibrosis was 22.6 ng/ml and it was a dependant predictor factor for diagnosis of fibrosis with positive predictive value 75.5% and negative predictive value 90.4 %.

Table (1) Demographic data among studied groups

	Cases(25)	**Control(25)**	**Z / (t)**	**P**
Age (years) Range Mean ±S.D	10-16 13.06±2.5	10-16 13.1±2.1	0.45	> 0.05
Sex Male female	13 (52%) 12 (48%)	11 (44%) 14 (56%)	0.56	> 0.05
Locality Urban No % rural No %	10 40 15 60	11 44 14 56	0.28	> 0.05

Table (2) Distribution of studied cases regarding the etiology of liver disease

Etiology	Frequency	
	No	**%**
Chronic Hepatitis C	11	44
AIH (Autoimmune hepatitis)	6	24
Chronic Hepatitis B	4	16
GSD1(Glycogen storage disease type 1)	2	8
Congenital hepatic fibrosis	1	4
Alpha1 anti-trypsin deficiency	1	4
Total	25	100

Table (3) Clinical characteristics of studied cases

	Frequency	
	No	**%**
Hepatomegaly	16	64
Splenomegaly	16	64
Jaundice	10	40
Pallor	7	28
Portal hypertension	5	20
Ascites	3	12
Lower limb edema	1	4

Table (4): Laboratory data in studied groups

	Group 1 (25)	Group 2 (25)	(t)	P
AST (IU/L)				
§ Range	12- 430	17- 40		
§ Mean+S.D.	72.3± 88	23.3± 5.6	2.7	< 0.01**
ALT (IU/L)				
§ Range	10- 625	15- 36		
§ Mean+ SD	77.4± 120	22.8± 6.1	2.25	< 0.05*
Total billirubin mg/dl				
§ Range	0.3- 6.6	0.2- 1		
§ Mean+SD	2.6±1.8	0.66±0.24	5.4	< 0.001**
Direct billiruban (mg/dl)				
§ Range	0.09-2.1	0.01-0.18		
§ Mean+SD	0.81 ± 0.71	0.056±0.05	5.3	< 0.001**
S albumin (gm/dl)				
§ Range	2.1-4.8	3.8 – 5.1		
§ Mean+SD	3.3 ± 0.72	4.43 ± 0.44	6.2	< 0.001**
Prothrombin time PT(sec)				
§ Range	11.5- 18	11- 13		
§ Mean+SD	13.4±1.8	12.2±0.44	3.2	< 0.01**
Prothrombin concentration PC %				
§ Range	54- 100	95- 110		
§ Mean±SD	84.8±16.9	99±3.1	4.2	< 0.01* *
TGF (ng/ml)				
Range	12.3- 45.1	9.8- 20.7		
Mean±SD	25±10.3	14.9±3	4.6	< 0.001**

* significant value; ** high significant value
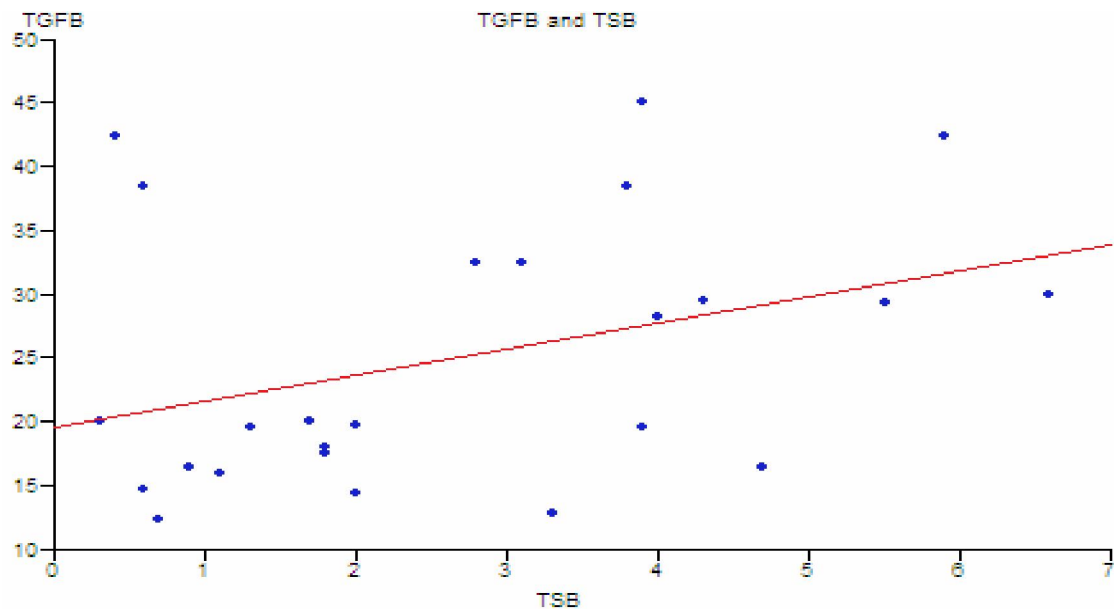
Figure 1: Correlation between TGF and TSB.
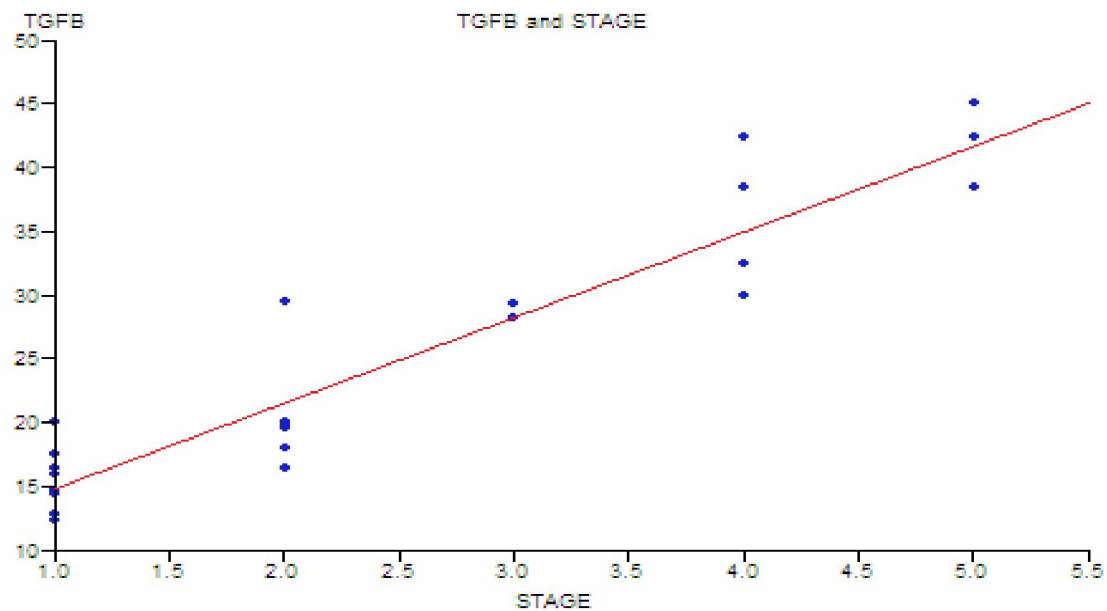
Figure 2: Correlation between TGF and stage of liver fibrosis
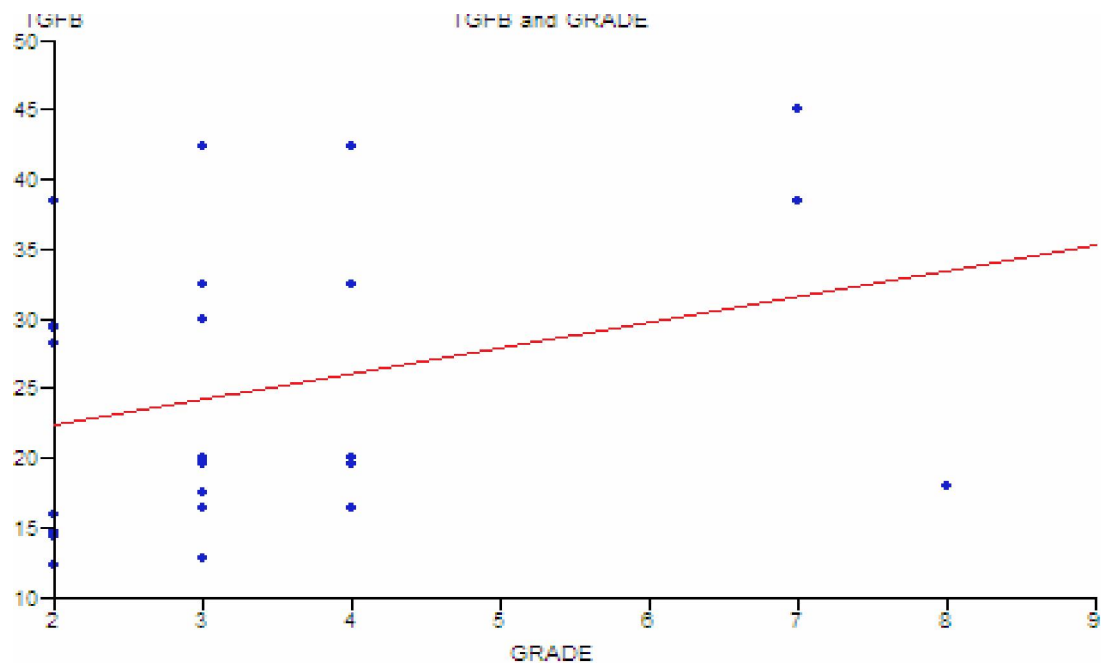
Figure 3: Correlation between TGF and grade of liver fibrosis
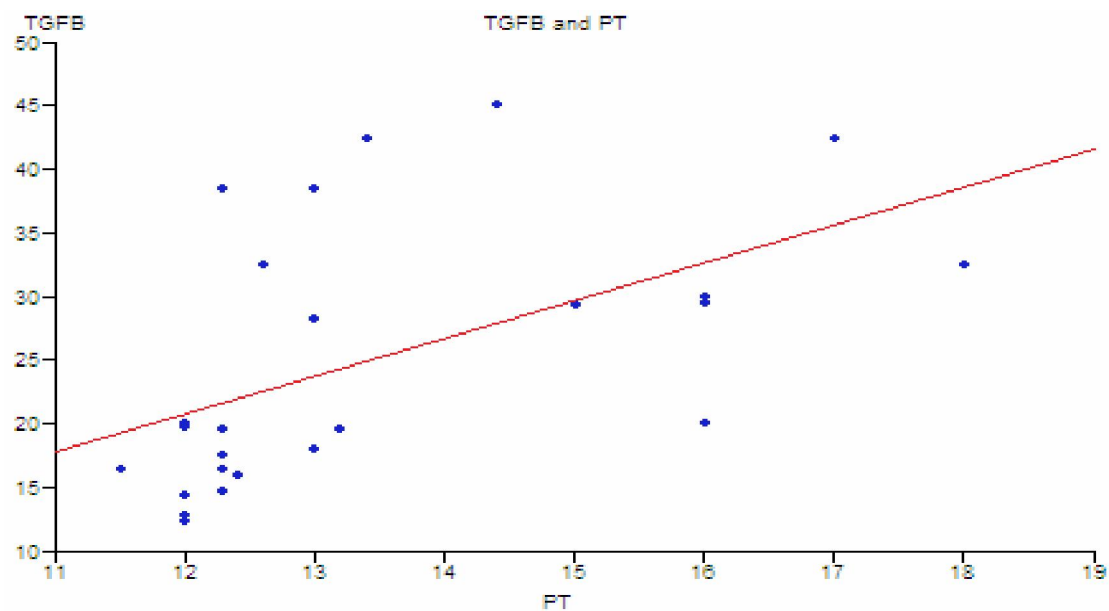
Figure 4: Correlation between TGF and PT.
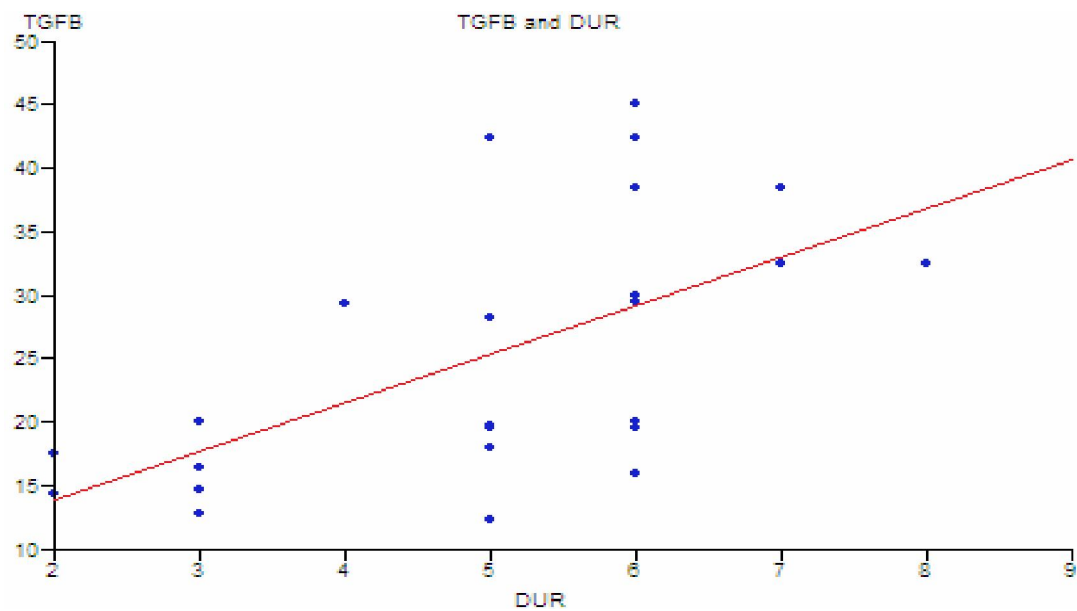
Figure 5: Correlation between TGF   and duration of illness.
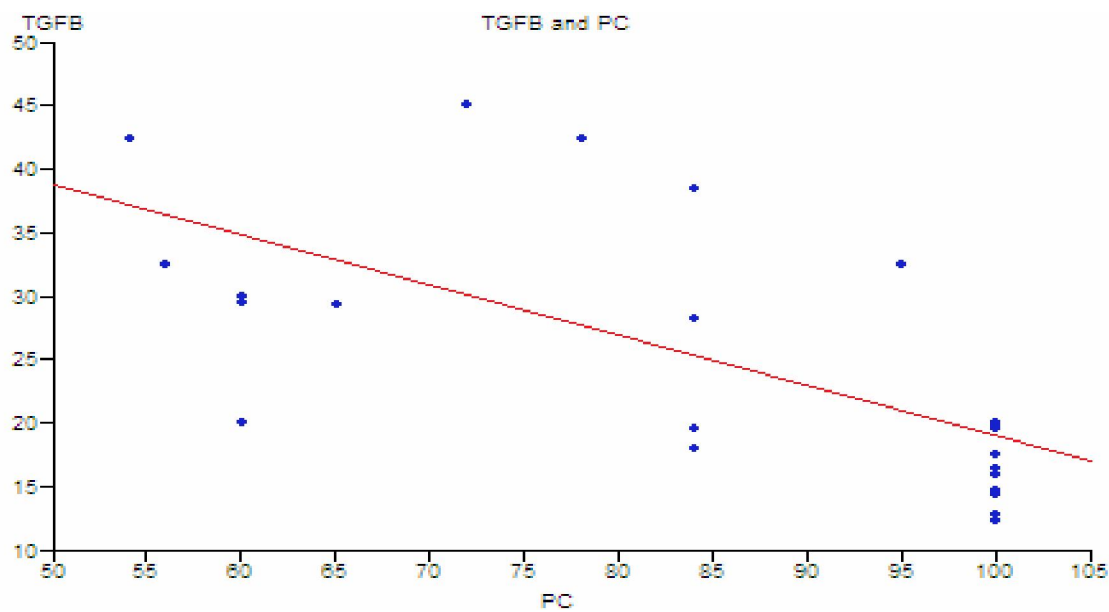
Figure 6: Correlation between TGF   and PC.
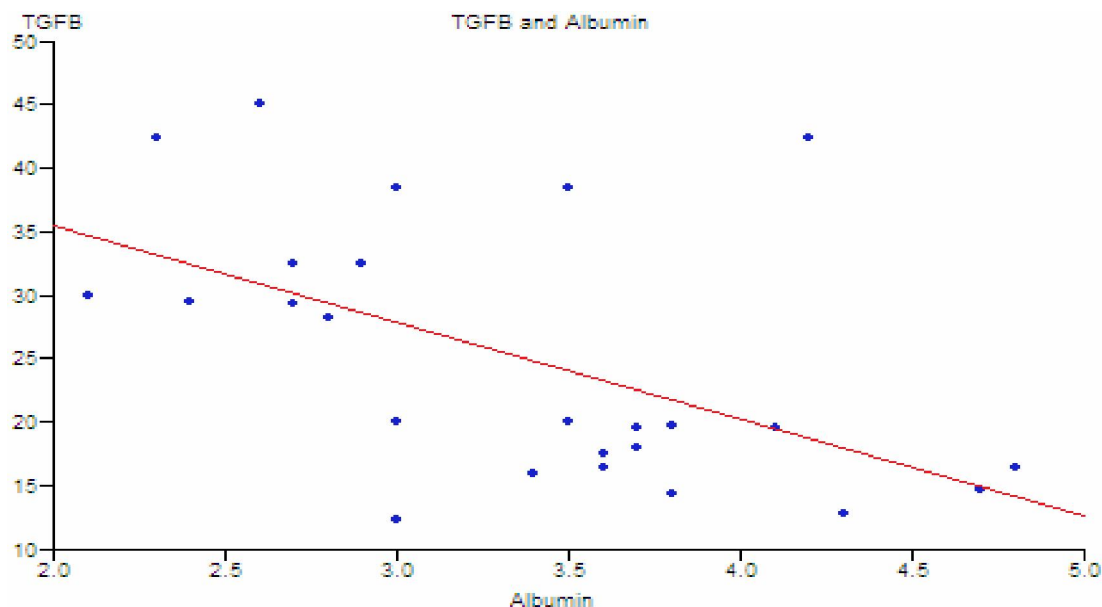
Figure 7: Correlation between TGF and serum albumin level.
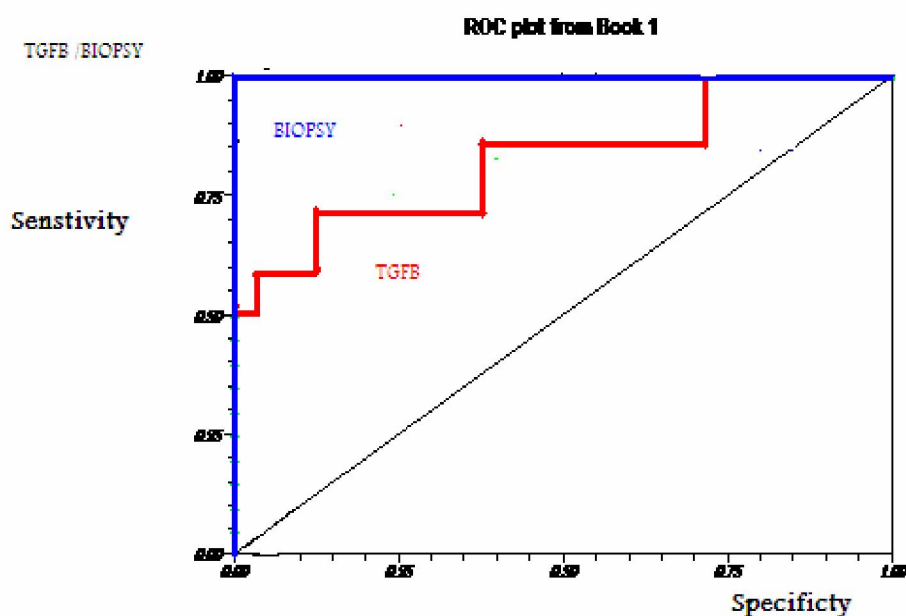
Figure 8:Nonparametric receiver operating charachteristic(ROC) curve for assessing the diagnostic value of TGF as an indicator of liver fibrosis.

Discussion

In the normal liver, HSCs express very little TGF- , and hepatocytes essentially none. When injury strikes, inflammatory cells are drawn to the site of injury and HSCs undergo activation and becoming fibrogenic **(14)**,**(15)**.

The current study revealed that, serum level of TGF- was highly significantly elevated in patients with chronic liver disease than control. This significant elevation might reflect the fibrogenic process in the liver.

Luo et al.,2001(16) found a significant elevation of TGF- 1 in liver cirrhosis, yet its correlation with activity was moderate.In another Egyptian study done by **Abdel-Ghaffar et al.,2010 (17)** they found that; TGF- 1 was significantly increased in children with chronic liver disease than control. There are conflicting results in literature as to which TGF-beta level increase or remain unchanged in patients with chronic hepatitis.

Hong-Lei Weng et al., 2009(18), reported elevated TGF- 1 serum levels in patients with chronic hepatitis B virus (HBV)/hepatitis C virus (HCV) infections. On the other side **Liberek et al.,2009(19)** reported that ; in chronic hepatitis group of patients the plasma TGF-beta level did not differ from the control group and did not correlate with grading and staging of the liver tissue fibrosis. These contradictory results may be attributed to the heterogeneity of populations, races, diseases, and other confounding factors. Our results showed that,TGF- correlated positively with PT, TSB, stage and grade of liver fibrosis and negatively with PC and serum albumin levels. Our results are in agreement with **Flisiak and Prokopowicz**, **2000(20)** as they found a correlation between elevated TGF- and impairment of some synthetic liver functions, and *Filiask et al., (2002)*(21)who reported that, TGF correlated significantly positively with liver fibrosis. Also in accordance with our results, **Iagoda et al. , 2006(22)** studied correlations between growth factors and histological changes in the liver in 48 patients with chronic viral hepatitis and hepatic cirrhosis ,they showed that the blood level of transforming growth factor-beta1 (TGF-beta1) increases according to increase in histological activity and the degree of hepatic fibrosis and that there is a positive correlation between TGF-beta1 and the degree of hepatic inflammation and fibrosis. The stimulatory effect of TGF-beta on collagen synthesis by fat-storing cells is observed *in vitro* at a concentration of 10 ng/ml **(20)**. In our study, the level of circulating TGF-beta was two fold increase and a level more than 22.6 ng/ml had a sensitivity of 65% and specificity of 94% in identifying significant fibrosis. In the study of **Abdel-Ghaffar et al.,2010(17)** they found that, TGF- 1 more than 54.8 ng/ml had a sensitivity of 78.6% and specificity of 71.4% in identifying significant fibrosis. The difference in the results between our study and other studies could be explained by the difference in the mean age of the cases and accordingly the aetiology of chronic liver disease. **Hong-Lei Weng ,2009**(18) reported that,TGF- 1/Smad2 signaling in liver fibrogenesis is not a generalized feature and detected in an etiology-dependent manner.

In conclusion, TGF- may be used to predict significant fibrosis and/or cirrhosis in children with chronic hepatitis B & C and other causes of chronic liver disease. That is to say, non-invasive markers will likely reduce but not replace the need for liver biopsy, which may be useful in monitoring of disease development and treatment effectiveness and might be an inseparable part of assessment of chronic hepatopathies.

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Codification of the Strategy Map in Small, Auto-parts Manufacturing Companies (Case Study: Sahand Khodro Company of Tabriz)

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Abstract: One of the issues which hinder the execution of strategies in organizations is that it remains in a general level of actions and orientations. In response to this problem, the strategy map attempts to illustrate the organization strategies in terms of cause-effect relations and show how these strategies can change into measurable objectives and specified operations which must be followed by organizational units and also employees. By translating its strategy into the logical structure of the strategy map, Sahand Khodro Company created a common, tangible reference point for all its employees and personnel. In this study, we have translated the strategy of Sahand Khodro Company into operational objectives and evaluators from four aspects of the strategy map. By codifying the strategy map, Sahand Khodro Company was able to achieve greater profitability and better response in relation to all the beneficiaries involving customers, employees, director and owner of the company and the society.
[Samad Khabbaz Bavil and Armin Rajabzadeh and Mohammad Behravesh. **Codification of the Strategy Map in Small, Auto-parts Manufacturing Companies (Case Study: Sahand Khodro Company of Tabriz).** Journal of American Science 2011;7(5):260-267]. (ISSN: 1545-1003). http://www.americanscience.org.

Introduction

With the emergence of post-industrial era, the organizational environment has been dynamic, full of changes, and complexity has been the predominant issue in organizations. Changes have been so intense that predicting functions have lost their validity and new, unexpected challenges have emerged. Markets have become intensively competitive; learning faster and earlier than other rivals, has provided advantages in competition and, consequently, organizations have focused on science, knowledge and information. Nowadays, many organizations are mainly concerned about codification and implementation of strategies which ensure their success and survival in ever-changing, complex environmental circumstances. The strategy map provides a means for organizations to codify and execute strategies in different aspects of the organization and manage their strategic performance [1]. This is a framework for performance evaluation which uses a series of financial and non-financial scales to take a deep look at the performance of the organization. One of the issues which hinder the execution of strategies in organizations is that it remains in a general level of actions and orientations. In response to this problem, the strategy map attempts to illustrate the organization strategies in terms of cause-effect relations and show how these strategies can change into measurable objectives and specified operations which must be followed by organizational units and also employees [2]. The strategy map is very useful for all the organizations which suffer from the unclear relations between their codified strategies and executive, everyday operations [3]. The strategy map not only allows for the establishment of this kind of relation and picturing the strategy, but also is a means to test the logic and effectuality of codified strategies and to supplement them, if necessary.

A Look at the Auto-parts Manufacturing Industry and Sahand Khodro Company

Today, the automotive industry has a great role in the economy of countries all around the world. Likewise, the automotive industry of Iran has an important role in the production and employment status of the country. Automobile manufacturing companies submit the production of required parts for assembling the automobiles to auto-parts manufacturing companies in order to reduce their production expenses and increase the quality of their products. Therefore, the auto-parts manufacturing industry has always been known as the supplement of the automotive industry. Auto-parts manufacturing companies are very smaller than automobile manufacturing companies in scale but

are greater in number and provide more employment compared to automobile manufacturing companies. Auto-parts manufacturing companies shall choose appropriate strategies regarding their actual and future situation and circumstances. Appropriate strategies help their survival and development in the competitive field of auto-parts manufacturing industry. Sahand Khodro Company of Tabriz is an auto-parts manufacturing company which produces parts for Pride, Peugeot and also tractors. This company is geographically situated in the south-east of Tabriz, in the industrial site of Shahid Rajaee. Sahand Khodro Company is a small company in size, acts as a workshop and has a staff of 24 people. The strategy map has been used to codify and implement the strategy of Sahand Khodro Company. The strategy map is a highly effective method in codifying and implementing appropriate strategies in various organizations with different scales. The necessary information for the codification and implementation of the Sahand Khodro Company strategy was obtained by studying the general conditions and characteristics of the Iranian Auto-parts Manufacturing industry and its active companies; and also through interviews with executive director, production manager, quality manager and the employees of this company. It is hoped that by codifying and implementing an appropriate strategy through codifying the strategy map, Sahand Khodro Company could turn into a primary and successful company in the auto-parts manufacturing industry of the country and serve the Islamic community of Iran.

Mission Statement of Sahand Khodro Company

Sahand Khodro Company's organizational belief is based on satisfying its customers by providing their needs and considers the satisfaction of its customers as the key to the company's success. Also, the company regards its personnel and man force as its greatest capital and intends to make them effective, capable and enthusiastic by increasing their authorities and capabilities through related education and providing their welfare. Sahand Khodro Company will try to improve the quality of its auto parts and reduce the production costs and the final price of its products, and thus increase its productivity. In addition to maximizing its development and profitability, the company pays special attention to social, moral and religious issues and values of the society and a clean environment, so to gain credit and reputation among people and fulfill its duty and responsibility towards the society. Sahand Khodro Company intends to turn into a creative, innovative organization in order to become a vanguard company in the internal competitive market in the near future, and in the long

run, gain a better position in the auto-parts manufacturing industry of Asia and the world.

The Strategy of Sahand Khodro Company of Tabriz

The Strategy of Sahand Khodro Company is:

60% increase in the net profit in a course of two years.

This strategy is based on the two following principles:

1. Reducing the final price and improving productivity based on the value chain of the company,
2. Producing a higher amount of products (actual – new)

In order to implement the chosen strategy of Sahand Khodro Company, the strategy map has been applied. If the implementation of the strategy using this method proves successful, the profit margin of the company will increase in both of the above principles and Sahand Khodro Company will become a strategy-based organization. In order for Sahand Khodro Company to become a strategy-based organization, the strategy shall be translated into operational terms.

Codification of the Strategy Map of Sahand Khodro Company of Tabriz

To implement its strategy, Sahand Khodro Company should translate the strategy into phrases which are clearly understandable by all of its employees. Thus, Sahand Khodro Company of Tabriz should provide a framework for the conscious and continuous analysis and transmission of the strategy. The new framework is a logical and exhaustive structure for the analysis of the strategy which is known as the strategy map. The strategy map provides the design base of the balanced assessment method which is considered the corner stone of a new system of strategic management. The strategy map provides a means to analyze the process of value formation through the use of invisible assets, from the point of view of the company owner. The strategy maps establish the assessment and evaluation technology for management in knowledge-based economy. By translating its strategy into the logical structure of the strategy map, Sahand Khodro Company creates a common, tangible reference point for all its employees and personnel. Here, we have translated the strategy of Sahand Khodro Company into operational objectives and evaluators from four aspects of the strategy map.

The Financial Aspect

Gaining acceptable financial outcomes in economic companies and organizations is extremely necessary for their survival and development; therefore, financial evaluators are an integral part of the codification of the strategy map in profit-making organizations [3, 4, and 5]. Sahand Khodro Company started its strategy map by defining its high financial

targets i.e. 60% increase in the net profit in a course of two years. The director of Sahand Khodro Company was aware of the fact that increasing the profit in such level, considering the long history of auto-parts manufacturing industry and the existence of numerous, big competitors and also the large number of new and small rivals was truly a difficult task. Sahand Khodro Company decided to improve its net profit through two financial purports: productivity and growth. The productivity purport was consisted of two elements:

1. Reducing the final cost,
2. Increasing the application of assets

The reduction of the final cost could be evaluated through a comparison between the company's cash operational costs and the average of the related industry. The productivity of assets enabled Sahand Khodro Company in achieving a higher level of activity in accordance with its strategy without increasing the levels of its assets. To achieve this goal, Sahand Khodro Company can use the cash circulation evaluator, without considering capital expenses, in order to indicate the benefits related to cash making resulted from the existing assets plus the profit resulting from the reduction of the commodity supply.

The financial growth aspect of Sahand Khodro Company involves two different components. First, is the growth in the rate of the production operations with the aim of increasing the sales of its main product i.e. the Spindle (In Persian: Meel-Mahak). In addition to the mere growth in the production operations, Sahand Khodro intends to increase the sales rate of its main product compared to other rival producing companies. Thus, it uses the production - sales ratio evaluator in comparison with the whole industry. The second component of growth indicates the opportunity and possibility of the company in producing and selling products to its customers, other than the gearshift rod. For example, parts like spacing washer, differential case pin, etc. Sahand Khodro Company determined a financial growth target for developing revenue sources from these lateral products which is assessed by the evaluator of revenues from products other than the gearshift rod and their profit margin. Therefore, the financial aspect involved objectives and evaluators for both strategies of growth and productivity. The strategy map of the financial aspect of Sahand Khodro Company of Tabriz is shown below:

The Strategy Map: The Financial Aspect
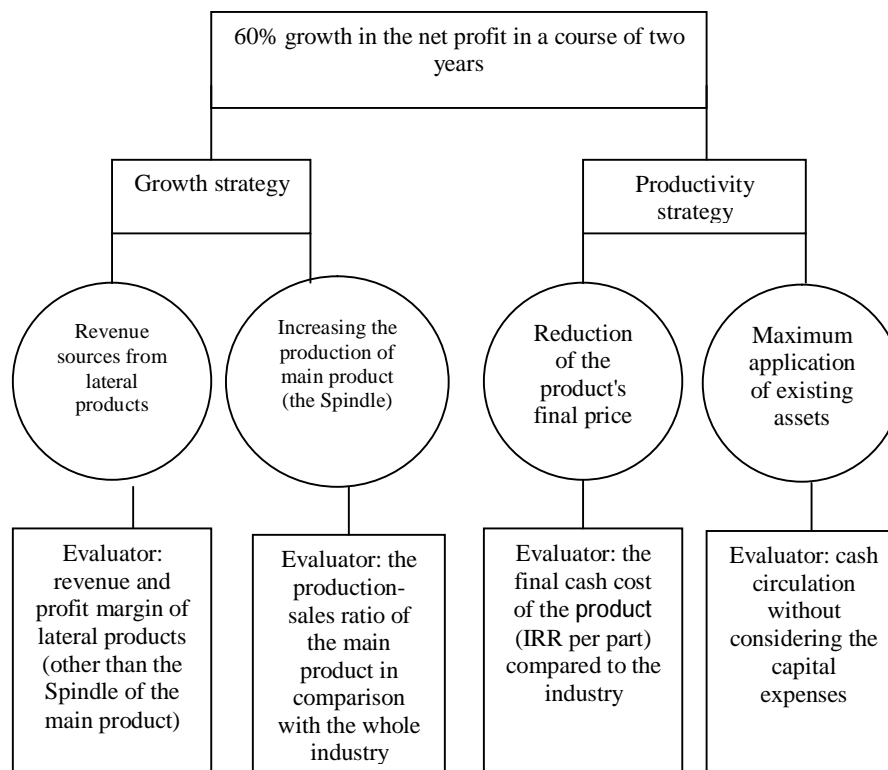
The Customer Aspect
The customer aspect enables organizations to evaluate and improve the main evaluation criteria of the

customers' status such as satisfaction, loyalty, keeping and maintenance, getting new customers, etc [6]. Sahand Khodro Company should try to secure the

consent of customers who are generally sensitive to both price and quality by reducing the final cost throughout the value chain, including the gearshift rod, and also by increasing the quality of its products and reducing the wastage. Thus, for the customer aspect, Sahand Khodro Company selected the market share evaluator for all of its products. However, the important point is that Sahand Khodro Company cannot solely rely on the market share evaluator in its customer aspect. The company needs to define values which should be considered in attracting and keeping the customers and building good relations with them in the target market. These values are as follows:

1. On-time delivery of orders
2. Proper documentations regarding products and customers

3. Friendly and capable employees
4. An internet website for the company
5. The possibility of a quick and easy purchase for the customers
6. Reputation and credit of the company

In this situation, Sahand Khodro Company will have a series of simple objectives and evaluators for assessing the customers' attitudes. One of these evaluators is related to the market share and the other is a summary of the customers' desired values (the company's rank given by customers) and is expected to motivate and lead to acceptable results. The strategy map of the customer aspect of Sahand Khodro Company of Tabriz is given below:

The Strategy Map: The Customer Aspect
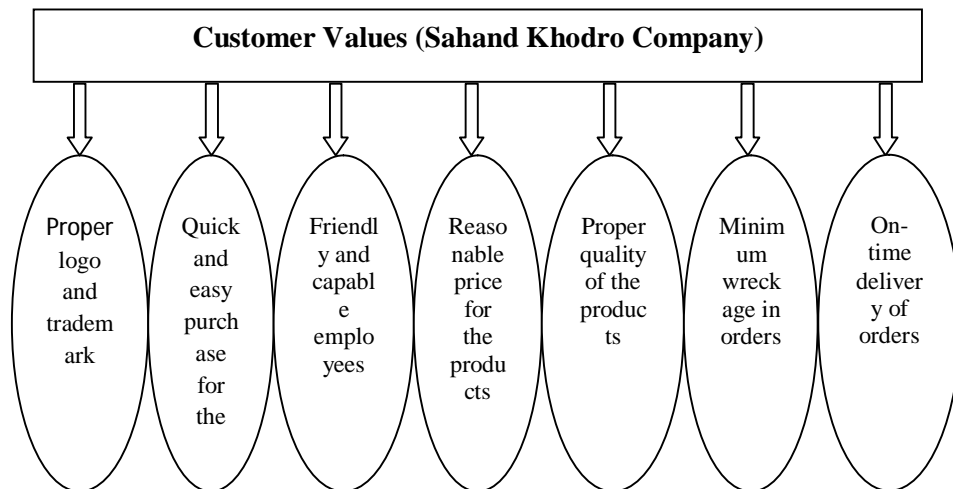
The Aspect of Internal Business Procedures

The internal procedures create and present the acceptable values to customers. The performance of internal procedures is an effective factor in improving the subsets in the financial and customer aspect of the codification of the strategy map [5, 7, and 8]. In the internal procedures, Sahand Khodro Company has described numerous objectives and evaluators for the part-production operations and presenting them to the customers. These evaluators have an emphasis on low final cost; proper and stable quality; short stop-time for equipments; very few dangerous and health-impairing events; safety and the environment. Since increasing the final price of the company's products was not possible, Sahand Khodro Company decided to increase its profit by stabilizing the prices and reducing their total costs. Sahand Khodro Company also intends to

increase its financial and revenue sources by increasing the variety of its products. Quality evaluators such as observing the technical characteristics and on-time exposition of products supported some of the customers' desired values but most of them were related to the operational prominence in production and distribution operations. Significant objectives relating environmental, health and safety factors used evaluators such as the number of safety events, work environment satisfaction of employees and the number of the workers' holidays. On the other hand, some benefits resulting from the improvement of environmental, health and safety performance were effective in lowering the final cost and increasing the productivity. The strategy map of the aspect of the internal procedures of Sahand Khodro Company is demonstrated below:

The Strategy Map: The Aspect of Internal Procedures

Being a good citizen:	**Achieving operational prominence:**	**Customer management:**	**Creating privileges:**
* Improvement in environmental, health, and safety conditions - work environment satisfaction of employees - Safety events - Number of holidays	* Reducing the final cost of products - The final cost of activity compared to rivals * On-time production and in accordance with characteristics - Complete and on-time delivery of orders - Proper quality of the produced parts * Improving the management of assets - level of assets - the rate of inadequate assets * Improving the performance of production machinery - The rate of unexpected anticipations	* Customer satisfaction - Quality of products - On-time delivery * Increasing the customers - The number of new customers and their orders	* Producing new and various products - Profitability rate of new products - Number of orders for new products

The Aspect of Learning and Growth

The most fundamental objectives involve those which are categorized as the aspect of learning and growth, such as: skill and creativity of employees, organizational culture, team-work, etc. This aspect is the final source of creating constant values [7, 9]. In codifying the strategy map in Sahand Khodro Company, three groups of strategic objectives were determined in the aspect of learning and growth:

1. Critical abilities and skills
    *   Helping and encouraging employees in gaining wider knowledge about the production business and auto-parts sale
    *   Creating skill levels and capabilities that are essential for mission execution.
    *   Developing the necessary skills in order to improve the integral thought of employees about business and education.
2. Access to strategic information
    *   Developing necessary strategic information for executing the strategies
3. Organizational empathy
    *   Promoting a realization about the strategy of the organization, through creating an environment in which capable and motivated employees are working to materialize the mission statement.

Evaluators supporting these three targets were the most difficult ones that had to be determined. Ideally, Sahand Khodro Company wanted to determine the personal skills and information which one should have in order to improve the performance of internal procedure and transmission of the customers' desired values. The strategy map and the evaluators of the aspect of learning and growth of Sahand Khodro Company are shown below:

The Strategy Map: The Aspect of Learning and Growth

The aspect of learning and growth: a ready and motivated work-force		
* organizational capital and proper work environment	* information technology and resources	* development of human resources
Evaluators: - Proper organizational culture - Smart and intuitive leadership - Team-work among employees - Organizational unison (employees and directors)	Evaluators: - Improvement of information processing - Directors and employees' proper access to information	Evaluators: - Training employees - Increasing the capabilities of employees - Creating self-control

By presenting all the objectives and evaluators in one map and establishing a relation among them, the strategy map of Sahand Khodro Company is formed which clearly expresses how the company achieves its strategic objectives.

Conclusion

Sahand Khodro Company created a common reference point for its employees by translating its strategy into a logical structure of a strategy map. By connecting traditional processes like the service compensation system and dedicating resources to the execution of the codified strategy map explaining the strategy, Sahand Khodro Company created a strategic management system in the company. The strategy map explained the strategy and at the same time, the new management system connected all the organization components to the specified criteria in the strategy map. In a course of 6 months after the execution of the strategy map in Sahand Khodro Company, the following results were obtained:

1. The production rate of the main product showed a 14% growth compared to the same period in the previous year and the final cost of the product was reduced by economization in the production scale.
2. According to the facilities and machinery of the company, a new product was added to its productions and the production rate of two lateral products was increased.
3. All orders were delivered to the customers on time and the quality of all the sent goods were confirmed by customers.
4. The rate of the produced parts not in accordance with the characteristics (wastage) showed 40% decrease compared to the same period last year and thus, the wastage costs of the company decreased.
5. The safety events in the company showed 50% decrease and the number of employees' holidays showed 30% decrease compared to the same period in the previous year.
6. Creativities and intuitions of employees in their everyday tasks were supported in a way that out of 16 suggestions, 12 cases were confirmed by the director of the company.
7. Three training courses were held for employees in applying the strategy map, increasing crucial capabilities and skills, using strategic information, and creating an empathy atmosphere and team work.
8. An atmosphere and culture of competition in achieving the determined criteria in the strategy map was created for employees in the organization and the personnel tried their best in order for the realization of the strategy.

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The strategy Map of Sahand Khodro Company of Tabriz
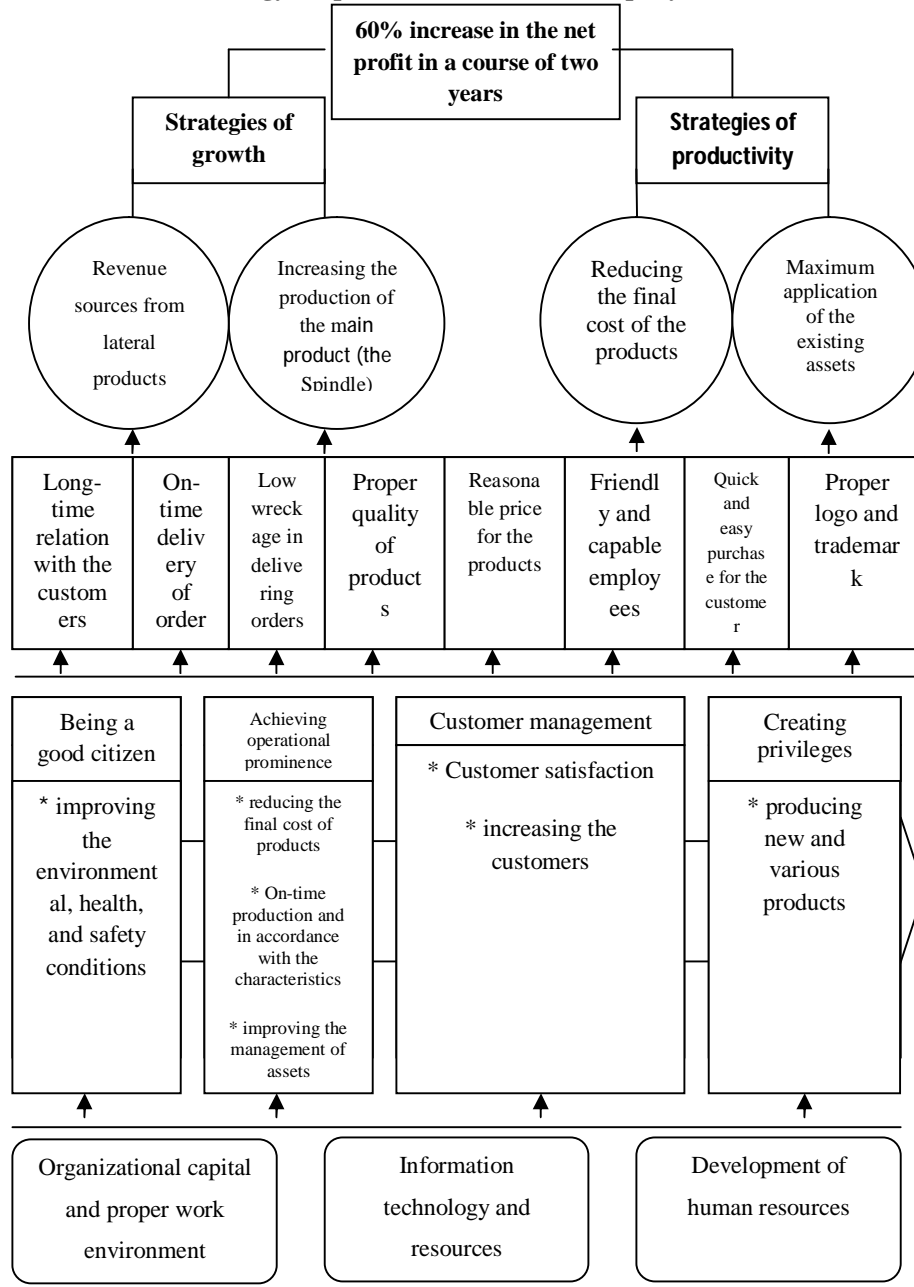
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Prediction of Traditional Climatic Changes Effect on Pomegranate Trees Under Desert Condition in EL-Maghara, Egypt

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Abstract: The main aim of this study is to combat and forecasting climate changes, with some soil managements in El-Maghara Research Station at North Sinai, Egypt, on pomegranate trees. The applied treatments were irrigation intervals and soil mulching with drip irrigation in the desert sandy soils and its impact on the water use efficiency and saving of irrigation water. A field experiment was carried out through split plot design during the three seasons 2008, 2009 and 2010 with pomegranate trees have 9 years age, planted at distances 3.6 X 3.6 meters (324 tree/fed). Experiments included 72 test unit consists of three irrigation intervals (2, 4 and 6 days) and three soil mulching practices under the trees (control without mulch, bitumen mulch and olive pomace mulch) and four replicates each have two trees, as the amount of irrigation water was calculated according to Penman - Monteith equation for data the last 10 years of the meteorological data of the region. The results were analyzed statistically, which were as follows: (1) There is a detected local climatic change for the main meteorological data of the site compared either with 10 or 30 years recorded data. These changes are partially caused by the global climatic change in one hand and to the local Oasis effect in the site in the other hand. These changes play a positive role in enhancing the yield of pomegranate trees referring to the horticulture references. (2) A significant increase of the values of pomegranate fruit yield, crop water use efficiency, water economy, water saving, total revenue and total profit by increasing of air temperature and humidity of the atmosphere and increasing the irrigation period to 6 days. Olive pomace mulch under the trees, gave a higher yield than bitumen mulch, and without mulch. (3) Significant decrease values of water consumptive use, crop coefficient of pomegranate, irrigation water use efficiency coefficient and environmental stress coefficients by increasing the irrigation period to be 6 days. Olive pomace mulching under the trees gave a higher yield than bitumen mulch and then without mulch. (4) The highest for the application of economic olive pomace mulch under irrigation with a period of 6 days. In all cases, the applied treatments get higher investment ratios (IR) than the traditional one (2.25 LE/IL). The study recommends with using drip irrigation every 6 days by the amount of irrigation water calculated according to Penman-Monteith equation without addition leaching requirements, with plants residues mulch such as olive pomace under the trees, which gave the highest return of one pound investment with ~ 3.07 LE., taking into account the vulnerability of the study area to the phenomenon of the Continental and Oasis effect, under conditions similar to the study area.

1- Introduction

Climatic change is nowadays one of the highly negotiable issues, which are not likely to be achieved soon (IPCC, 2007). Mark and Piet Rietveld (2009) stated that the climate change is almost invariably considered an issue of global interest, and therefore, also judgments about mitigation and adaptation costs to be made now, differ widely. Supit *et al.,* (2010) stated that the recent changes in the simulated potential crop yield and biomass production caused by changes in the temperature, and global radiation patterns are examined, using the Crop Growth Monitoring System. Peter *et al.,* (2005) stated that the oasis self-supporting mechanisms due to oasis breeze circulation are proposed and simulated numerically.

Excessive evaporation from the oasis makes the oasis surface colder than the surrounding desert surface.

Pomegranate trees (*Punica granatum. L*) are widely grown in the warmest area of the Mediterranean basin and Southern Asia. This tree species is well adapted to arid soils, where long periods of soil water deficit are usually present during the dry season. For sustainable water use agriculture, crop-specific and water-saving irrigation techniques that do not negatively affect crop productivity must be developed. Worldwide, successful attempts have been documented regarding the use of water regimes and mulching techniques to improve water use efficiency in various tree crop species. Thus conserving water is an important aspect for agricultural expansion, particularly in arid and

semiarid regions where the water deficit and high temperature are the main limiting factors for plant growth and productivity. Sheets *et al.,* (2008) reported that the pomegranates are native to be grown in ancient Egypt and can be grown in tropical to warm temperate climates. Bakeer (2009) concluded that anti-transpirants of kaolin at 6 % with olive pomace mulching within trees by the regulated deficit irrigation 75 % of crop evapotranspiration showed an increase in water use efficiency to improve vegetative growth, leaf nutrient content, blooming & fruiting, fruit set and yield. While it decreased fruit split, and fruit physical and chemical properties as well as economic revenue of pomegranate trees grown in El-Maghara, Egypt.

Allen *et al*. (1998) stated that mulches are effective in reducing ET of crop and crop coefficient values decrease by an average of 10 – 30 % due to the 50 – 80 % reduction in soil evaporation, but crop growth rates and yield were increased using mulches. Seidhom and Evon (2006) found that a significant increase of fruit yield, water consumptive use, irrigation water use efficiency coefficient, crop coefficient, environmental stress coefficient, water use efficiency, water economy and investment ratio by using black plastic mulch under olive trees followed by gravel mulch, with wider irrigation interval of 6 days, at El-Maghara, Egypt.

Lawand and Patil (1994) and Chopade *et al.,* (2001) observed that the pomegranate fruit yield/tree was greatest at an irrigation water (IW)/cumulative pan evaporation (CPE) of 0.8 with a constant depth of 50 mm. Abou-Aziz *et al.,* (1995) and Afria *et al.,* (1998) recorded that when soil reached 60 or 40% of field capacity, the irrigation regime resulted in the highest pomegranate fruit numbers and yields (36.8 and 69.2 kg/tree, respectively, averaged over both years). Prasad *et al.,* (2003) stated that drip irrigation at 8 liters h^{-1} day^{-1} for 3 h increased the pomegranate yield from 17.7 kg $plant^{-1}$ under the control to 28.2 kg $plant^{-1}$. Narendra and Shallendra (2007) reported that the highest yield of pomegranate is (48.46 kg/tree). Shallendra and Narendra (2005) found that 8 liters of water per hour through trickle irrigation gave the highest number of fruits per plant, fruit weight, fruit length, fruit diameter, total soluble solids content, sugar content, pomegranate yield and water use efficiency and the lowest acidity.

Farshi, (2001) found that irrigation water use efficiency (IWUE) in drip irrigation was better than for surface irrigation and WUE of pomegranate increased from 2.1 kg/m^3 for surface irrigation, to 9.2 kg/m^3 for drip irrigation. Irrigation water savings of 58% were achieved for drip irrigation. Singandhupe *et al.,* (2003) concluded that irrigation at 100% pan evaporation resulted in 18.1% higher pomegranate

fruit yield. El-Kassas, *et al., (*1992) and Gupta *et al.,* (1999) observed that mulching produced the highest pomegranate fruit yields (72.6, 71.9 and 68.2 kg/tree, respectively). Singh *et al.,* (2003) found that mulching reduced fruit cracking of pomegranate, with dried grass or farmyard manure being the most effective and increasing yield. Hasan *et al.,* (2002) stated that the total water consumption and water use efficiency were highest under the highest soil moisture regime with black polythene mulch.

This work is an attempt to clarify the effect of climatic changes on pomegranate trees under irrigation regimes and soil management conditions through mulching treatments and on improving water use efficiency, water economy and productivity of pomegranate grown in sandy soils.

2- Materials and Methods

This investigation was carried out during the three successive seasons of 2008, 2009 and 2010 to study the effect of climatic changes on yield and water use of pomegranate trees at El-Maghara area under some irrigation intervals (IF): (2, 4 and 6 days) and soil management (SM) conditions through mulching treatments viz: Control Without Mulch (CWM), petroleum as Bitumen Emulsion Mulch (BEM) and plant residues as Olive Pomace Mulch (OPM).

El-Maghara Experimental Station, of the Desert Research Center located in North Sinai Governorate, Egypt (latitude 30.35 N, longitude 33.20 E and 200 meter above sea level). The used climatic data of El-Maghara area were collected from the meteorological station in this station, to calculate reference evapotranspiration (ETo) using Penman–Monteith equation by using CROPWAT, software version 5.7 (Smith, 1992). Maximum and minimum air temperature, wind speed, relative humidity, sun shine hours, total rain and reference evapotranspiration are presented in (Table 1).

Seventy two healthy "Manfalouty" pomegranate trees (Punica granatum. L) about 9 years old nearly moderate vigor and productivity planted in sandy soil (mechanical and chemical analyses are shown in Tables 2a,b) were determined according to Richards (1954). Water of an artesian well was pumped from a depth of 288 m in El-Maghara area of Sinai and used for irrigation by the drip irrigation system.

The quality of tested irrigation water used in this study is presented in (Table, 3). Saline ground water (about 2800 to 3200 ppm) was used for irrigation viz drip system. The analysis of irrigation water belongs to high salinity, medium sodium, i.e., C4S2 water class (Richards, 1954). It is also evident that water quality of such a source shows a pronounced

variation throughout the year being of higher salinity   in summer than in winter.

Table (1). Measured climatic data of EL–Maghara region during the period of ten years from 1998-2007.

Elements	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Avg.
Max. temp. (°C)	19.15	20.72	22.64	24.81	28.45	32.17	34.08	34.07	30.61	27.82	24.63	21.49	26.72
Min. temp. (°C)	4.54	4.97	7.22	9.87	12.63	15.87	18.25	18.79	15.95	12.84	9.94	6.60	11.46
Relative Humidity %	80.90	77.90	76.44	73.48	75.49	76.35	75.72	76.90	75.84	77.29	77.45	75.80	76.63
Wind speed (km/day)	177.91	184.25	215.02	209.80	192.05	173.45	160.18	165.46	154.85	166.22	173.76	174.07	178.92
Sunshine hours (hr)	7.55	7.98	8.18	9.43	10.79	12.53	12.30	11.31	10.42	9.14	7.71	6.94	9.52
Total Rain (mm)	4.53	5.38	2.11	0.41	0.26	0.00	0.00	0.00	0.00	2.95	7.87	11.51	35.01
Potential evapotranspiration (mm/day)	2.09	2.68	3.51	4.40	5.21	6.06	6.23	5.84	4.79	3.63	2.70	2.24	4.11

Table (2a). Some physical properties of the experimental soil site.

Soil depth (cm)	Particle size distribution (%)				Texture class	Particle density (g/cm³)	Bulk density (g/cm³)	Total porosity (%)	Organic matter (%)	Moisture content (%)		Available soil water	Infiltration rate	
	Coarse sand	Fine sand	Silt	Clay						Field capacity	Wilting point	%	cm/hr	Class
0-30	0.00	98.00	1.00	1.00	Sand	2.65	1.55	41.51	0.24	10.23	4.45	5.88		
30-60	0.00	98.50	0.80	0.70	Sand	2.63	1.58	39.92	0.23	9.98	4.51	5.67		
60-90	0.00	99.00	0.50	0.50	Sand	2.64	1.60	39.39	0.19	10.35	4.64	5.65	32.65	Very rapid
90-120	0.00	98.50	0.70	0.80	Sand	2.65	1.57	40.75	0.28	9.87	4.41	5.56		
120-150	0.00	99.50	0.30	0.20	Sand	2.63	1.56	40.68	0.22	10.18	4.39	5.45		

Table (2b). Some chemical properties of the experimental soil site.

Soil depth (cm)	CaO₃ (%)	P^H soil paste	E.Ce (dSm⁻¹)	Soluble cations (me/l)				Soluble anions (me/l)			
				Ca^{++}	Mg^{++}	Na^+	K^+	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-
0-30	5.89	7.70	0.60	2.50	1.50	1.26	0.05	_	1.80	2.11	1.40
30-60	3.80	7.70	0.70	3.00	2.00	1.57	0.08	_	1.80	2.85	2.00
60-90	4.35	7.40	1.10	3.50	2.00	3.04	0.05		2.40	2.09	6.10
90-120	5.98	7.60	1.20	3.50	2.50	4.04	0.03	_	3.00	1.97	5.10
120-150	4.44	7.60	0.60	2.50	1.50	1.56	0.03	_	2.40	1.09	2.10

Table (3). Chemical analysis of the irrigation water.

Season	pH	E.C.		S.A.R	R.S.C. (me/l)	T.D.S. (ppm)	Units	Soluble cations				Total	Soluble anions				Total	Class
		ppm.	dSm⁻¹					Ca^{++}	Mg^{++}	Na^+	K^+		$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-		
Winter	8.12	2805.14	4.38	9.02	-10.5	2670.91	ppm	228.46	42.30	565.80	26.98	863.53	0	268.44	1546.57	126.59	1807.38	$C_4 S_2$
							epm.	11.40	3.48	24.60	0.69	40.17	0	4.40	32.20	3.57	40.17	
							%	28.38	8.66	61.24	1.72	100.0	0	10.95	80.16	8.89	100.0	
Summer	8.36	3194.76	4.99	8.19	-11.7	2967.81	ppm	267.13	70.26	582.59	44.97	964.94	0	453.91	1616.69	159.22	2002.86	$C_4 S_2$
							epm.	13.33	5.78	25.33	1.15	45.59	0	7.44	33.66	4.49	45.59	
							%	29.24	12.68	55.56	2.52	100.0	0	16.32	73.83	9.85	100.0	

S.A.R = Sodium adsorption ratio, R.S.C. = Residual sodium carbon,   T.D.S. = Total dissolved solids,   epm.= equivalent per million

Irrigation treatments were applied from 1st February and continued until September 20th, then stopped until harvest date October 5th, after that completed irrigation until the end of October for three seasons and were programmed according to irrigation intervals proposed during the afternoon based on calculation of water requirements for irrigation water applied, based on climatic data obtained from the meteorological station of El-Maghara average ten years (1998-2007) Table (1).

In the winter (beginning of February), a mulch practice was done by using different materials, such as olive pomace (Table 4a), bitumen emulsion (Table 4b) and control with bare soil (no-mulching). The soil around pomegranate trees was removed by hand hoeing to the depth of about 15 cm in the beginning of February, then adding olive pomace from olive portion of pulp. While, bitumen emulsion was applied on the soil surface around the trunk of pomegranate trees in a circle of 1.5 m half diameter.

Table (4a). Chemical analysis of olive pomace.

Organic Mater (%)	C/N Ratio (%)	Moisture (%)	N (%)	P (%)	K (%)	Ca (%)
40.0	11.32	22.6	3.0	0.08	0.47	0.47

Table (4b). Physical and Chemical Properties of Bitumen Emulsion

Chemical name(s):	Cationic: KSS60 + 65;
	Anionic: SS60; Feltec 60/3 + 60/5 KRS60, 65 + 70; KMS 60 + 65; FS60 + 65
pH:	2 to 2.4 - Anionic - Basic nature Cationic - Acid nature
Boiling point/range:	100°C (Contains 40% water)
Melting point/range:	Liquid at ambient temperature
Explosive properties:	Potentially low
Density at 20°C, kg/	1,0 gm/cm3 at 25°C
Solubility - water:	Highly soluble
Solubility - solvents:	Soluble
Viscosity	@ 40°C, mm2/s: Base bitumen - 2000 AMU
Protonated amine	70 wt.%
Ammonium salt	30 wt.%

All trees received the recommended doses of organic manure in winter, 15-20 m^3/fed (25 kg/tree) and mineral fertilization of (NPK): 100-200 kg/fed ammonium nitrate in two doses in March and May after the fruit eased, 75 to 100 kg/fed calcium superphosphate and from 50 to 75 kg/fed potassium sulfate in March), respectively.

The amount of irrigation water was calculated without addition leaching requirements using the equation of Doorenbos and Pruitt (1984) and Kaller and Bliesner (1990):

Diw = ((ETo X Kc X Cr X No. T.) / Ea) - Pe.
　　　Where:

Diw = Applied irrigation water (liter/tree/day)
ETo = Potential evapotranspiration (mm / day)
Kc = Crop coefficient from FAO56.
Cr = Canopy cover represented by the shadow area 1.5 m half diameter under trees at mid-day which in average = 7.07 m2.
No. T. = No. of trees/fed = 324 tree.
Ea = Irrigation system efficiency (%) = 85 % for drip irrigation.
Pe = Effective rainfall (mm) = 0.30 rainfall.
The amounts of applied irrigation water are shown in Table (5).

Table (5). Irrigation water applied to pomegranate trees grown in El-Maghara area.

Items	Feb.	Mar.	Apr.	Ma.	Jun.	Jul.	Aug.	Sep.	Oct.	Avg.
ETo (mm/day) avg.10Years	2.68	3.51	4.40	5.21	6.06	6.23	5.84	4.79	3.63	4.71
Crop coefficient Kc (FAO)	0.4	0.5	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.69
W.R. (m^3/fed/day)	2.89	4.73	7.12	9.84	13.07	13.45	12.59	10.33	7.83	9.09
I.R. (m^3/fed/day)	2.65	4.64	7.10	9.83	13.07	13.45	12.59	10.33	7.71	9.04
G. Period (days)	28	31	30	31	30	31	31	20	26	28.67
WR (m^3/fed/month)	81.02	146.53	213.46	305.10	392.20	416.87	390.25	206.51	203.58	2355.51
I.R. (m^3/fed/month)	74.24	143.86	212.95	304.78	392.20	416.87	390.25	206.51	200.47	2342.12
WR (liter/tree/day)	8.93	14.59	21.96	30.38	40.35	41.50	38.85	31.87	24.17	28.07
I.R. (liter/tree/day)	8.18	14.32	21.91	30.34	40.35	41.50	38.85	31.87	23.80	27.90
Irrigation Time (hour/day)	0.41	0.72	1.10	1.52	2.02	2.08	1.94	1.59	1.19	1.40

WR: Water requirements, IR: Irrigation requirements, ETo: Potential evapotranspiration, Emitters discharge 20 L/h

Soil moisture was measured with both tensiometer and gravimetric method at depths of 0 - 30, 30 - 60 and 60 - 90 cm. The values of soil moisture content which gravimetrically determined were employed for calculating the crop water consumptive use using Doorenbos and Pruitt (1984) equation as follows:

ETa = ($M._2$ % - $M._1$ %) x d_b x D x 1000　mm
Where:
ETa = Actual evapotranspiration (mm).

$M.2$ = Moisture content after irrigation (%).
$M.1$ = Moisture content before irrigation (%).
db = Bulk density of soil (g / cm3)
D = Active root depth (m).

Crop water use efficiency (WUE) was calculated by dividing the crop yield by the amount of seasonal evapotranspirations according to Giriappa, (1983). Water economy was calculated by dividing the crop yield by the amount of water added as kg/m3 according to Talha et al. (1980). Crop coefficient was

calculated by dividing the actual evapotranspiration (ETa) by potential evapotranspiration (ETo) according to Yaron et al. (1973). Environmental stress coefficient (Ks) was calculated by dividing the actual evapotranspiration (ETa) by maximum crop evapotranspiration (ETc calculated from ETo avg. 10 years and Kc FAO) according to Allen et al. (1998). Irrigation water use efficiency coefficient (IWUE) was calculated by dividing actual evapotranspiration (ETa) by the applied irrigation water (Diw) as reported by Norman et al., (1998). At the end of the experiments, pomegranate yield was recorded. Moreover, in the three seasons, the fruit of each treated trees were harvested on 5th October, then fruits were counted and weighed in kg. Data were statistically analyzed using Snedecor and Cochran (1989). Investment Ratio (IR) = (total revenue, LE / total cost, LE) according to Rana et al. (1996).

3- RESULTS AND DISCUSSION

3.1. Detection of Climatic Changes:

EL–Maghara region, about 90 Km south El-Arish city, North Sinai Governorate, Egypt, with altitude of about 200 meters above sea level, latitude $30^{o}35`$ N. and longitude $33^{o}20`$ E. Olive, guava, pomegranate trees and some vegeTables, medicinal and aromatic plants are grown in the area.

The climatic change is nowadays one of the highest negotiable issues through either scientific reports or multimedia. Meanwhile, there is no unique vision about this issue as some of the scientists believe that changes going toward increasing global temperature, while others referring that to the traditional meteorological cycle of cooling and heating. However, the majority of negotiations is dealing with the required precautions in the face to the worming phenomenon up to the studied simulation models.

Therefore, meteorological data were collected for a period of 30 years (1961-1990) as well as meteorological data of the recent period of 10 years (1998-2007) of the studied area in order to detect the occurrence of changes in the different climatic elements.

Meteorological data for about 30 years (1961-1990) of EL–Maghara region (Table 6a) was collected from the Climatic Atlas of Egypt (1996) and compared with measured climatic data of EL–Maghara region during the ten years period from 1998-2007 (Table 1).

Table (6a). Meteorological data for about 30 years (1961-1990) of EL–Maghara region.

Elements avg. 30 years	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Avg.
Max. Temperature (^{o}C)	17.5	17.5	22.5	27.5	30.0	32.5	32.5	32.5	32.5	27.5	25.0	20.0	26.46
Min. Temperature (^{o}C)	7.5	7.5	7.5	12.5	15.0	17.5	20.0	22.5	17.5	15.0	12.5	7.5	13.54
Relative Humidity (%)	65.0	60.0	60.0	55.0	50.0	50.0	50.0	60.0	55.0	65.0	60.0	60.0	57.50
Wind speed (km/day)	172.40	176.61	210.24	208.67	185.52	167.47	157.63	163.87	150.00	166.40	173.23	169.52	175.13
Sunshine hours (hr)	7.70	8.20	8.30	9.60	10.90	12.60	12.40	11.40	10.60	9.30	7.80	7.00	9.65
Total Rain (mm)	10.0	10.0	10.0	5.0	1.0	0.0	0.0	0.0	0.0	5.0	10.0	10.0	61.00
Potential evapotranspiration (mm/day)	2.18	2.72	3.89	5.22	6.09	6.70	6.60	6.05	5.40	3.90	3.09	2.45	4.52

Meteorological data for the three studied years (2008, 2009 and 2010) of EL–Maghara region (Table 6b) were summarized as follow:

Table (6b). Meteorological data for 2008, 2009 and 2010 years of EL–Maghara region.

Elements 2008	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Average
Max. Temperature (^{o}C)	16.60	16.57	21.85	23.17	29.19	35.2	36.33	36.63	33.66	30.64	27.68	21.27	27.40
Min. Temperature (^{o}C)	3.38	4.11	7.17	9.25	13.36	17.97	20.42	20.02	17.17	14.34	10.78	6.86	12.07
Relative Humidity (%)	78.16	77.43	73.22	63.26	66.09	65.26	58.33	62.03	63.34	67.29	73.16	68.31	67.99
Wind speed (km/day)	141.8	173.8	190.6	203.8	140.6	146.2	139.0	168.2	156.0	181.7	140.9	150.70	161.10
Sunshine hours (hr)	7.27	7.72	7.78	9.01	10.25	11.86	11.66	10.67	9.94	8.71	7.31	6.58	9.06
Total Rain (mm)	5.68	10.24	3.21	0	0	0	0	0	0	3.65	4.36	5.20	32.34
Potential evapotranspiration (mm/day)	1.84	2.23	3.29	4.39	5.09	6.34	6.60	6.44	5.35	4.24	2.87	2.28	4.25
Elements 2009	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Average
Max. Temperature (^{o}C)	17.64	17.63	22.93	24.24	30.56	33.55	35.89	36.44	32.56	30.05	28.98	22.32	27.73
Min. Temperature (^{o}C)	4.08	4.87	8.08	10.48	14.73	18.11	20.61	19.78	17.07	14.36	12.89	6.05	12.59
Relative Humidity (%)	78.5	77.22	81.27	73.09	79.16	81.68	77.54	71.08	62.99	67.85	67.46	64.01	73.49

Wind speed (km/day)	202.7	198.2	203.9	245.1	208.9	180.7	164.2	171.5	178.2	155.8	180.2	145.20	186.22
Sunshine hours (hr)	7.20	7.64	7.7	8.92	10.15	11.75	11.54	10.56	9.84	8.62	7.23	6.51	8.97
Total Rain (mm)	3.19	3.04	0	0	0	0	0	0	0	0	0	1.67	7.90
Potential evapotranspiration (mm/day)	2.10	2.39	3.23	4.38	5.29	6.01	6.31	6.22	5.40	3.94	3.31	2.48	4.25
Elements 2010	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Average
Max. Temperature (^{o}C)	18.78	21.15	24.48	25.37	26.89	31.23	34.87	34.88	30.3	29.3	26.11	22.28	27.14
Min. Temperature (^{o}C)	3.83	5.24	8.04	10.13	12.31	15.94	19.6	19.06	15.46	13.71	10.17	7.19	11.72
Relative Humidity (%)	67.63	66.83	68.63	70.33	71.33	72.13	68.63	70.33	64.69	60.92	71.38	68.13	68.41
Wind speed (km/day)	96.34	146.9	271.7	126.8	153.8	135.0	142.1	197.4	128.8	142.9	184.2	241.90	163.99
Sunshine hours (hr)	8.00	8.54	8.67	10.02	11.36	13.12	12.92	11.91	11.06	9.72	8.15	7.30	10.06
Total Rain (mm)	4.28	1.47	0	0	0	0	0	0	0	3.00	6.00	15.00	29.75
Potential evapotranspiration (mm/day)	1.93	2.76	4.26	4.29	5.07	5.91	6.46	6.46	4.92	3.96	3.10	2.87	4.33

To compare the results of average climate values, Table (6$_c$) shows the results compared to the values of the average climate data of the studied area for a period of 30 years (1961-1990), 13 years (1998-2010), 10 years (1998-2007), 3 years (2008-2010), and the actual values of years 2008, 2009 and 2010, as the data show the following:

Table (6$_c$) Comparison between meteorological data of the studied three years and both average 10 and 30 years of El-Maghara area.

Differences	Comparison with 10 years (1998-2007)				Comparison with 30 years (1961-1990)					
Meteorological elements	2008	2009	2010	3 years (2008-2010)	2008	2009	2010	3 years (2008-2010)	10 years (1998-2007)	13 years (1998-2010)
Max. Temperature (^{o}C)	0.68	1.01	0.42	0.70	0.94	1.27	0.68	0.96	0.26	0.42
Min. Temperature (^{o}C)	0.61	1.13	0.26	0.67	-1.47	-0.95	-1.82	-1.41	-2.08	-1.93
Relative Humidity (%)	-8.64	-3.14	-8.22	-6.66	10.49	15.99	10.91	12.46	19.13	17.59
Wind speed (km/day)	-17.81	7.30	-14.93	-8.48	-14.02	11.09	-11.14	-4.69	3.79	1.83
Sunshine hours (hr)	-0.46	-0.55	0.54	-0.16	-0.59	-0.68	0.41	-0.28	-0.13	-0.16
Total Rain (mm/year)	-2.67	-27.11	-5.26	-11.68	-28.66	-53.10	-31.25	-37.67	-25.99	-28.68
Potential evapotranspiration (mm/day)	0.14	0.15	0.22	0.16	-0.27	-0.27	-0.19	-0.24	-0.41	-0.37

To detect the variations in meteorological elements among the three sets of collected data; i.e. 30 years (Table 6$_a$), 10 years (Table 1) and the last 3 years (Table 6$_b$), the last Table showed these comparisons. From the Table it can conclude to the following:

1. Remarkable increase in average maximum temperature values when comparing the three years values of 2008, 2009 and 2010 with corresponding ones of both average 10 and 30 years bases which could be contributed to the enhance in growth parameters (Supit *et al.,* 2010).
2. Remarkable decrease in average minimum temperature values for the three years of 2008, 2009 and 2010 only when compared with 30 years, while fluctuated on 10 years base. This is clearly reflected on achieving the needed chilling hour's requirements which help in breaking the dormancy phase (actually ranged between 250 and 400 hours) (Sheets et al., 2008) compared with the reference one which is between 100-200 hours.
3. The net result of 1 and 2 is wider temperature range of fluctuation for the last years 2008-2010 which reflect partial continental phenomena (Stefan et al., 2007).

4. The relative humidity values become higher when compare the last 3 years 2008-2010 with 30 years data; while lower when compare with 10 years values (Peter et al., 2005).
5. Generally, the wind speed values of the last 3 years 2008-2010 tend to be lower than both 10 and 30 years values.
6. Generally, the rainfall of the last 3 years 2008-2010 give lower values on both bases of 10 and 30 years values (IPCC, 2007).
7. The net conclusion of all elements on reference evapotranspiration (ETo) values for the last 3 years 2008-2010 give contradictory trends being lower than average 30 years (may be due to higher relative humidity values), while higher than the 10 years values (may be due to lower relative humidity values) (IPCC, 2007).
8. The last two columns in Table (6c) define the "Oasis effect" for the experimental site through the following:
a- Definite increase in average maximum temperature values (IPCC, 2007).
b- Definite decrease in average minimum temperature values, therefore, definite wide temperature range (IPCC, 2007).

c- Sensible increase in average relative humidity values (IPCC, 2007).
d- Clear decrease in average rainfall values (IPCC, 2007).
e- Clear decrease in potential evapotranspiration (ETo) (IPCC, 2007).

From all these observations it can conclude to sensible climate variations for the site which should be faced by proper irrigation application which is the main target of this research. Not worthy to mention that the studied area is a typical site for the "Oasis effect" criteria as the cultivated site is surrounded by mountainous heights which cause heat convection to the cultivated core of the area. So, blowing of the wind loaded with high temperature in the waves caused a rise in the values of evapotranspiration at the edges of the region and cold the core of the cultivated areas (Sheets et al., 2008) and (Peter et al., 2005). Furthermore increasing the values of relative humidity and reducing the values of evapotranspiration within the studied region (Supit et al., 2010). Peter et al., (2005) and Stefan et al., (2007) they found that altitude and surrounding by mountains have a large effect on crop evapotranspiration. Therefore, as they conclude, resolution of land use data and digital elevation models would be needed to reliable model irrigation

water requirements for larger regions or the entire country of Oman.
On global base, there are climate changes slightly each year, which can forecast an increase in the average air temperature by about 3 degrees Celsius during the next hundred years, which need several efforts to mitigate and adapt to projected climate change. (IPCC, 2007) pointed out to the global climatic change, and further changes are expected regardless of the efforts to reduce global emissions of atmospheric CO2 which increased from an industrial concentration of 280 to 379 ppm in 2005 (IPCC, 2007).

The product of these variations reflects a definite decrease in both potential and actual evapotranspiration mean values (ETo & ETa) for the site under the pomegranate trees.

9. From the horticulture point of view, the pomegranate trees enhance production with wider temperature ranges which is clearly noticed in Table (6c). Furthermore, it needs sufficient chilling hours through winter season (October – March) which also detected from recorded meteorological data as shown in Table (6b) as previously mentioned in point 2.

Interrelation among both potential and actual evapotranspiration, crop production and water use efficiency:

Table (6$_d$) Data of average potential evapotranspiration, actual evapotranspiration, pomegranate yield and water use efficiency for the studied three years (2008-2010).

Growing seasons	2008	2009	2010	Average
Potential Evapotranspiration ETo (m³/fed)	2887.04	2833.41	2894.46	2871.64
Actual Evapotranspiration ETa (m³/fed)	1870.46	1911.52	1966.12	1916.03
Fruit Yield (kg/fed)	6227.28	7019.68	7855.35	7034.10
Water Use Efficiency (kg/m³)	3.36	3.70	4.02	3.69

The data in Table (6$_d$) indicate the following:
  a- Fluctuation of ETo average data over the studied years from 2008-2010.
    Which discussed before, an enhancing the growth of pomegranate trees.
  c- The general results, despite the effect of treatments, in gradual significant increase in pomegranate production over the three years. However the cumulative increase in trees production through 2008 to 2010 reaches about 23%.
3.2. Actual Evapotranspiration (ETa):
  EL–Maghara area affected by the phenomenon of what is known "Oasis effect" as it surrounded by mountains and dry desert areas as mentioned before.
  Data presented in Table (7) show a significant decrease in actual evapotranspiration (water

  b- Successive increase in ETa average values indicating definite effect of climate changes,

consumptive use) with increasing irrigation intervals, but exhibit a highly significant decrease in water consumptive use under olive pomace mulch (OPM) for pomegranate trees. The data also show significant interaction between the applied 6 days irrigation interval and olive pomace mulch (OPM) treatment. Water consumptive use of pomegranate increased by progress of the trees age. Table (7) gives the daily actual evapotranspiration values (liter/tree/day) as detected by field measurements throughout the growth three seasons.

Table (7). Actual evapotranspiration (liter/tree/day) of pomegranate grown in El-Maghara region.

I.F.	S. M.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AGU.	SEP.	OCT.	liter/tree /day	liter/tree /season	m³/tree /season	m³/fed
2 (days)	CWM	7.00	10.94	18.38	26.02	34.29	35.32	33.26	27.09	18.86	23.46	6080.01	6.08	1969.92
	BEM	6.79	10.48	16.87	25.52	33.94	34.95	32.92	26.81	18.66	22.99	5955.76	5.96	1929.67
	OPM	6.50	10.15	16.12	25.10	33.30	34.30	32.30	26.31	18.31	22.49	5824.37	5.82	1887.10 a
4 (days)	CWM	6.86	10.13	15.77	25.59	33.87	34.88	32.85	26.75	18.63	22.81	5907.48	5.91	1914.02
	BEM	6.58	9.83	15.55	24.89	33.31	34.31	32.31	26.31	18.32	22.38	5793.70	5.79	1877.16
	OPM	6.36	9.54	15.30	24.39	31.75	32.70	30.80	25.08	17.46	21.49	5565.52	5.57	1803.23 b
6 (days)	CWM	6.72	9.90	16.04	25.03	33.16	34.15	32.16	26.19	18.24	22.40	5800.34	5.80	1879.31
	BEM	6.50	9.76	15.47	24.04	32.06	33.03	31.10	25.33	17.63	21.66	5608.85	5.61	1817.27
	OPM	6.22	9.25	14.93	23.54	30.92	31.85	29.99	24.43	17.01	20.90	5413.98	5.41	1754.13 c
Avg.2008		6.61	10.00	16.05	24.90	32.95	33.94	31.97	26.03	18.12	22.29	5772.22	5.77	1870.20 c
2 (days)	CWM	7.14	11.36	18.52	26.65	35.35	36.41	34.29	27.93	19.44	24.12	6250.36	6.25	2025.12
	BEM	6.93	10.81	17.07	26.09	34.50	35.54	33.47	27.26	18.98	23.40	6062.70	6.06	1964.31
	OPM	6.65	10.48	16.26	25.52	33.87	34.88	32.85	26.75	18.63	22.88	5924.97	5.92	1919.69
4 (days)	CWM	6.93	11.17	17.11	26.16	34.22	35.25	33.19	27.03	18.82	23.32	6042.52	6.04	1957.78
	BEM	6.72	10.61	15.86	25.59	33.30	34.30	32.30	26.31	18.31	22.59	5851.96	5.85	1896.04
	OPM	6.50	10.04	14.69	25.10	32.45	33.42	31.48	25.64	17.85	21.91	5674.49	5.67	1838.54
6 (days)	CWM	6.79	10.96	16.16	25.52	33.65	34.66	32.64	26.59	18.51	22.83	5914.92	5.91	1916.43
	BEM	6.65	10.32	15.57	24.96	32.88	33.86	31.89	25.97	18.08	22.24	5761.02	5.76	1866.57
	OPM	6.43	9.97	14.98	24.46	32.03	32.99	31.07	25.30	17.61	21.65	5607.47	5.61	1816.82
Avg.2009		6.75	10.64	16.25	25.56	33.58	34.59	32.58	26.53	18.47	22.77	5898.94	5.90	1911.26 b
2	CWM	7.35	12.80	18.88	26.94	36.27	37.36	35.18	28.65	19.95	24.82	6432.38	6.43	2084.09
	BEM	7.07	12.44	17.85	26.72	35.21	36.26	34.15	27.81	19.36	24.10	6246.57	6.25	2023.89
	OPM	6.86	12.16	17.18	26.01	34.43	35.46	33.40	27.20	18.94	23.52	6094.86	6.09	1974.73
4	CWM	7.07	12.54	17.06	26.87	34.78	35.83	33.74	27.48	19.13	23.83	6178.29	6.18	2001.77
	BEM	6.79	12.08	16.75	25.64	34.08	35.10	33.06	26.92	18.74	23.24	6022.97	6.02	1951.44
	OPM	6.58	11.69	16.44	25.31	33.16	34.15	32.16	26.20	18.24	22.66	5872.92	5.87	1902.83
6	CWM	6.96	12.37	17.28	25.65	34.29	35.32	33.26	27.09	18.86	23.45	6078.91	6.08	1969.57 a
	BEM	6.72	11.95	16.62	25.17	33.30	34.30	32.30	26.31	18.31	22.77	5903.08	5.90	1912.60 b
	OPM	6.50	11.45	16.21	24.67	32.66	33.64	31.68	25.80	17.96	22.29	5776.70	5.78	1871.65 c
Avg.2010		6.88	12.16	17.14	25.89	34.24	35.27	33.22	27.05	18.83	23.41	6067.41	6.07	1965.84 a

(IF): irrigation intervals, (SM): soil management, (CWM): Control Without Mulch, (BEM): Bitumen Emulsion Mulch, (OPM): Olive Pomace Mulch. a, b, c, letters indicated to significant differences between treatments.

Comparing the values of water consumption under olive pomace mulch and bitumen emulsion mulch shows the following:

i- Dark color of bitumen emulsion mulch enhance heat reservation under trees canopy, so providing sufficient energy to processes and conditions related to plant growth. These include movement and uptake of soil water and nutrients, chemical and biological reactions, microbial activities, root growth …..etc.

ii- Evaporation has been highly retarded under olive pomace mulch than that under bitumen emulsion layer as the former can catch moisture than the latter.

iii- It is also noticed that the control plots suffered from weed growth which consume some of the added water, so the residual for trees decreased than planned amount, thereby plant growth appreciably decreased.

Similar results were obtained by Hasan *et al.,* (2002) who found that the total water consumption and water use efficiency were highest under the highest soil moisture regime with black polythene mulch. Seidhom and Evon (2006) found that, mulching significantly reduce evaporation losses.

3.3. Fruit Pomegranate Yield:

Supit et al., (2010) found that the recent changes in the simulated potential crop yield and biomass production were caused by changes in the temperature and examined global radiation patterns, using the Crop Growth Monitoring System.

It is quite evident from Table (8) that the tree yield increased significantly with increasing irrigation intervals. The higher value of tree yield was achieved by irrigated trees at 6 days, followed by 4 days. While, the interval 2 days recorded the lowest values of tree yield. The results go in line with those

reported by Abou-Aziz et al., (1995), Afria et al., (1998) and Sheets et al., (2008) witch noticed that when soil reached 60 or 40% of field capacity, irrigation regime were resulted in the highest pomegranate fruit numbers and yields.

Table (8). Fruit yield of pomegranate crop grown in El-Maghara region.

Irrigation Intervals	Soil Management	1 st. season (2008)		2 nd. season (2009)		3 rd. season (2010)	
		kg/tree	kg/fed	kg/tree	kg/fed	kg/tree	kg/fed
2 (days)	CWM	13.81	4475.25	15.75	5101.79	18.65 c	6041.59
	BEM	15.45	5005.80	17.61	5706.61	23.64 b	7658.87
	OPM	18.61	6029.64	21.96	7115.01	25.12 a	8140.01 c
4 (days)	CWM	15.56	5042.25	17.74	5748.17	18.83	6101.12
	BEM	21.05	6820.20	24.00	7775.03	25.47	8252.44
	OPM	22.50	7290.00	25.65	8310.60	27.23	8820.90 b
6 (days)	CWM	15.00	4860.00	17.10	5540.40	19.41	6287.22
	BEM	20.92	6778.08	23.85	7727.01	27.20	8813.81
	OPM	30.08	9744.30	31.34	10152.54	32.66	10582.16 a
Average		19.22 c	6227.28	21.67 b	7019.68	24.24 a	7855.35

(CWM): Control Without Mulch, (BEM): Bitumen Emulsion Mulch, (OPM): Olive Pomace Mulch. a, b, c significant differences

In relation to the specific effect of soil management the olive pomace mulched trees showed to be most effective treatments in tree yield, followed by bitumen mulched trees as compared with unmulched trees (control) (Table 8). The same results were obtained by Patra et al., (2004) who found that all the mulching treatments resulted in higher yield per hectare compared to the control. The same trend obtained by that Singh et al., (2003), Seidhom and Evon (2006) and Bakeer (2009).

Considering, the interaction effect of irrigation intervals and soil management on yield, data in Table (8) indicate that irrigated at 6 days with olive pomace mulching trees recorded the highest values of tree yield during the three seasons. However, irrigated at 2 days with non-mulching within trees gave the least values in this concern. However, pomegranate fruit yield increased by progress of the trees age.

From Table (8) it is clearly noticed the following:

Irrespective to mulching treatments clearly yield increases upon increasing irrigation intervals. These findings may be explained by the effect of expanding irrigation period on enhancing root elongation, while mulching to accelerate this result which in turn reflected on yield of trees. These findings are mainly due to stimulation of concurrent flow of water and heat and partial aeration, which increase the yield. On the other hand, data show that variation in yield due to alternate bearing, and yield improved. These results are in agreement with findings of Singh et al., (2003), Seidhom and Evon (2006) and Bakeer (2009).

3.4. Water Use Efficiency of Pomegranate Crop (W.U.E.):

Data presented in Table (9) reveal that the influence of increasing irrigation intervals on WUE is significant differences. Whereas a mulch treatment significantly increases upon applying mulching treatments compared to the control (irrigation interval at 2 days without mulch). The highest value of WUE is associated with irrigation interval at 6 days by using olive pomace mulch were reached 5.55, 5.59 and 5.65 (kg/m3) followed by using olive pomace mulch irrigated at 4 days were reached 4.04, 4.52 and 4.64 (kg/m3) for the three seasons, respectively. WUE of pomegranate increased by progress of the trees age.

Peter et al., (2005) and Supit et al., (2010) they found two mechanisms to reduce heat and moisture exchange between the oasis and the surrounding desert: (1) the updraft over the desert reduces low-level hot, dry air flowing from the desert into the oasis; and (2) the downdraft increases the atmospheric static stability that reduces the oasis evaporation, and thus increasing WUE. However, olive pomace mulches may be associated with pronounced increases in soil temperature. So, it is suggested that this result activate both water and nutrient consumptions by root of trees which affect the crop yield. Also, may due to stimulation of concurrent flow of water and heat and partial aeration, which increase the yield. Similar results were obtained by Hasan et al., (2002) Seidhom and Evon (2006) and Bakeer (2009).

Table (9). Water use efficiency and water economy of pomegranate crop grown in El-Maghara region.

Irrigation Intervals	Soil Management	1 st. season (2008)		2 nd. season (2009)		3 rd. season (2010)	
		Water Use Efficiency (kg/m^3)	Water Economy (kg/m^3)	Water Use Efficiency (kg/m^3)	Water Economy (kg/m^3)	Water Use Efficiency (kg/m^3)	Water Economy (kg/m^3)
2 (days)	CWM	2.27 c	1.90	2.52	2.17	2.90	2.56
	BEM	2.59 b	2.13	2.90	2.42	3.78	3.25
	OPM	3.19 a	2.56	3.71	3.02	4.12	3.46 c
4 (days)	CWM	2.63	2.14	2.94 c	2.44	3.05	2.59
	BEM	3.63	2.90	4.10 b	3.30	4.23	3.50
	OPM	4.04	3.09	4.52 a	3.53	4.64	3.74 b
6 (days)	CWM	2.59	2.06	2.89	2.35	3.19 c	2.67
	BEM	3.73	2.88	4.14	3.28	4.61 b	3.74
	OPM	5.55	4.14	5.59	4.31	5.65 a	4.49 a
Average		3.36 c	2.64 c	3.70 b	2.98 b	4.02 a	3.33 a

(CWM): Control Without Mulch, (BEM): Bitumen Emulsion Mulch, (OPM): Olive Pomace Mulch. a, b, c, significant differences.

3.5. Water Economy of Pomegranate Crop (W.E.):

Data in Table (9) reveal that the same trend of water use efficiency is observed in water economy of pomegranate which increased by increasing irrigation intervals. However, for mulch treatments significant increase compared to the control (irrigation interval at 2 days without mulch). The highest value of W.E. is associated with irrigation interval at 6 days by using olive pomace mulch were reached 4.14, 4.31 and 4.49 (kg/m^3) followed by using olive pomace mulch irrigated at 4 days were reached 3.09, 3.53 and 3.74 (kg/m^3) for the three seasons, respectively. W.E. values of Pomegranate increased by progress of the trees age.

These findings may be due to saving the stored soil moisture and also to high yields, thereby high water economy values. Similar results were obtained by Hasan *et al.,* (2002) Seidhom and Evon (2006) and Bakeer (2009).

3.6. Irrigation Water Use Efficiency Coefficient (IWUE):

Many indices to assess water use performance have been used and are summarized by Purcell and Currey (2003). These indices describe the conversion of available water resources into crop yield at different stages of plant growth and thus quantify the proportion of productive water use to unproductive losses. In this study irrigation water use efficiency coefficient is computed as the ratio of actual water demand and the applied amount of irrigation water (Norman *et al.,* 1998). Irrigation water use efficiency coefficient (IWUE) of pomegranate trees decreased by increasing intervals between successive irrigation and mulching (Table, 9). Amounts of applied water will be decreased to raise the irrigation water use efficiency (IWUE), which could be considered as water saving parameter as show in Table (9).

Table (9). Irrigation water use efficiency coefficient (IWUE) of pomegranate crop grown in El-Maghara region during the three seasons.

Growing seasons	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AGU.	SEP.	OCT.	Irrigation water use
Average 2008	0.74	0.69	0.73	0.82	0.82	0.82	0.82	0.82	0.75	0.78
Average 2009	0.76	0.73	0.74	0.84	0.83	0.83	0.84	0.83	0.76	0.80
Average 2010	0.77	0.83	0.78	0.85	0.85	0.85	0.85	0.85	0.78	0.82
Annual average	0.76	0.75	0.75	0.84	0.83	0.83	0.84	0.83	0.76	0.80

Regarding the irrigation water use efficiency coefficient (IWUE), Table (9) shows that the obtained values ranged between 0.63 and 0.86 with an average of 0.78 for 1st. year, 0.68 and 0.88 with an average of 0.80 for 2nd. year and 0.73 and 0.91 with an average of 0.82 for 3rd. year. These findings confirm the success of 6 days interval of irrigation than other two treatments due to low irrigation use efficiency. It is worthy to note that the efficiency of drip irrigation was assumed to have 85 % (Doorenbos and Pruitt, 1984), so adopting expanded irrigation intervals with some mulching surface application is

advised to these conditions. Similar findings were stated by Farshi (2001), Stefan *et al.,* (2007) and Bakeer (2009).

3.7. Pomegranate Crop Coefficient (Kc):

Data presented in Table (11) reveal that the influence of irrigation intervals on crop coefficient of pomegranate plant progressively increasing was not significant. However, significant decrease resulted by using mulch of olive pomace and bitumen compared to the control (irrigation interval at 2 days without mulch).

Table (11). Pomegranate crop coefficient (Kc) under El-Maghara conditions during the three seasons.

Growing seasons	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AGU.	SEP.	OCT.	Kc Season
Average 2008	0.42	0.43	0.52	0.69	0.73	0.73	0.70	0.69	0.60	0.61
Average 2009	0.40	0.47	0.53	0.68	0.79	0.78	0.74	0.70	0.66	0.64
Average 2010	0.35	0.40	0.57	0.72	0.82	0.77	0.73	0.78	0.67	0.65
Annual average	0.39	0.43	0.54	0.70	0.78	0.76	0.72	0.72	0.65	0.63

Adjusting crop coefficient in suitable environmental conditions, which could be considered as a water saving parameter. These findings may be the decrease actual evapotranspiration due to keeping soil moisture content under mulch and thus decrease crop coefficient. Similar findings were stated by Allen *et al.*, (1998) and Seidhom and Evon (2006).

3.8. Environmental Stress Coefficient (Ks):

When cultivating crops in fields, the real crop evapotranspiration may deviate from, ETc due to non – optimal conditions such as the presence of pests and diseases, soil salinity, low soil fertility, water shortage or water logging. This may result in reducing the evapotranspiration rate below, Etc. Therefore, under soil water limiting conditions, Ks < 1, and where there is no soil water stress, Ks = 1.

Likewise, the same trend of a crop coefficients of pomegranate was observed for the environmental stress coefficient which, progressively increased by increasing irrigation intervals with non significant differences and significant decrease with using mulch of bitumen and olive pomace compared to the control (irrigation interval at 2 days without mulch), Table (12).

To increase water saving and decrease water loss, we must modify the calculated irrigation water amounts to formula by multiplying with the stress coefficients Ks, IWUE and Kc or by adjusting Kc for all kinds of other stresses and environmental constraints on crop evapotranspiration, then become as;

$D_{iw} = ((ET_o \times Kc \times Ks \times IWUE \times Cr \times No. T.) /Ea) + R.$

Table (12). Environmental stress coefficient (Ks) of pomegranate crop grown in El-Maghara region during the three seasons.

Growing seasons	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AGU.	SEP.	OCT.	Ks Season
Average 2008	0.87	0.81	0.86	0.96	0.96	0.96	0.97	0.96	0.88	0.92
Average 2009	0.89	0.86	0.87	0.99	0.98	0.98	0.99	0.98	0.90	0.94
Average 2010	0.91	0.98	0.92	1.00	1.00	1.00	1.01	1.00	0.92	0.97
Annual average	0.89	0.88	0.88	0.99	0.98	0.98	0.99	0.98	0.90	0.94

This may be interpreted that due to decreasing actual evapotranspiration, decreased crop coefficient (Kc), thus decreased (Ks) and (IWUE) which could be considered as water saving parameters and suiTable environmental conditions. Similar findings were reported by Allen et al., (1998) and Seidhom and Evon (2006).

3.9. Economical Assessment:

The values of investment ratio (IR) are illustrated in Table (13). Table (13) calculate the investment rate for the applied treatments in the experiment as a rate for investing one pound as it is calculated as following: IR = total revenue / total cost, LE. However, the modified IR values calculated depend on the modified irrigation water referring to actual evapotranspiration data. Table (13) arranges the resulted IR values for all treatments in ascending order with guidance of the national IR value which is about 2.25 for this area.

From Table (13) it can be concluded the following:

1- Mulching with olive pomace gives the high values especially under 6 day's irrigation interval (3.07).
2- Bitumen emulsion mulch under 6 days irrigation interval give higher IR values regarding to olive pomace mulch under 4 and 2 days irrigation intervals respectively.
3- All treatments give higher IR values than the national one with increasing trend by increasing irrigation interval being 6 > 4 > 2 days.

These findings give a group of options which could be adapted with different conditions in the site. Similar findings were stated by Seidhom and Evon (2006) and Bakeer (2009).

Table (13). Inputs, outputs items and investment ratio (IR) of pomegranate yield grown in El-Maghara region.

Items	Soil management	2 days Irrigation Intervals			4 days Irrigation Intervals			6 days Irrigation Intervals		
		CWM	BEM	OPM	CWM	BEM	OPM	CWM	BEM	OPM
List of Inputs	land preparation, LE/fed	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
	Cultivation, LE/fed	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
	Irrigation, LE/fed	942.20	942.20	942.20	942.20	942.20	942.20	942.20	942.20	942.20
	Organic Fertilization, LE/fed	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
	Mineral Fertilization, LE/fed	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
	Mulch, LE/fed	0.00	900.00	1000.00	0.00	900.00	1000.00	0.00	900.00	1000.00
	Weed Control, LE/fed	120.00	30.00	30.00	120.00	30.00	30.00	120.00	30.00	30.00
	Pest Control, LE/fed	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
	Labors Costs, LE/fed	60.00	30.00	30.00	60.00	30.00	30.00	60.00	30.00	30.00
	Machines, LE/fed	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
	Fuel, LE/fed	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
	Harvesting, LE/fed	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Crop Transportation, LE/fed	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Rent (on season), LE/fed	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
	Total cost (LE/fed/season)	2572.20	3352.20	3452.20	2572.20	3352.20	3452.20	2572.20	3352.20	3452.20
List of Output	Yield, kg/fed	6041.59	7658.87	8140.01	6101.12	8252.44	8820.90	6287.22	8813.81	10582.16
	Price, LE/kg	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Total revenue (LE/fed/season)	6041.59	7658.87	8140.01	6101.12	8252.44	8820.90	6287.22	8813.81	10582.16
	Total profit (LE/fed/season)	3469.38	4306.67	4687.81	3528.92	4900.24	5368.70	3715.02	5461.61	7129.96
Investment Ratio (LE/ILE)		*2.35*	*2.28*	*2.36*	*2.37*	*2.46*	*2.56*	*2.44*	*2.63*	*3.07*

(CWM): Control Without Mulch, (BEM): Bitumen Emulsion Mulch, (OPM): Olive Pomace Mulch. 0.40 LE/m3 irrigation water

4- Conclusion

From the above mentioned discussion it can be conclude to the following:

1. There is a detected local climatic change for the main meteorological data of the site compared either with 10 or 30 years recorded data. These changes are partially caused by the global climatic change in one hand and to the local Oasis effect in the site in the other hand. These changes play a positive role in enhancing the yield of pomegranate trees referring to the horticulture references.

2. Enlarging the irrigation intervals from 2 to 6 days cause a gradual increase in such yield as it seems to enhance root elongation, so the shoot growth as well.

3. Saving irrigation water could be enhanced by using olive pomace mulch more than that achieved by bitumen emulsion mulch, while both were higher than that of unmulched trees.

4. In all cases, the applied treatment get higher investment ratios (IR) than the traditional one (2.25 LE/IL), but mulching with olive pomace engaged with 6 days irrigation interval give the highest IR value among all the tested interactions.

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Deterioration and Diffusion Studies of Radioactive Wastes from the Concrete   Matrix by Dynamic Method

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Abstract: In designing radioactive waste repositories, it is necessary to predetermine the degree of cement performance change due to leaching degradation. Cement is a porous material and consists of solid phases in contact and in equilibrium with a pore water solution. The progress of degradation can be expressed in terms of water exchange cycles or speed of diffusion of ions in the pore solution. Cementitious materials are fundamentally unstable in water and will change properties with time. High pH conditions of aqueous solutions in a radioactive waste repository can be brought about by dissolution of cementitious materials. In order to clarify the mechanisms involved in maintaining this high pH for long time, the dissolution phenomena of cement hydrate was investigated. In the present research, leaching tests on powdered cement hydrates were conducted by changing the ratio of mass of leaching water to mass of cement hydrate Ordinary Portland cement hydrate was contacted with pour water and placed in a sealed bottle. After a predetermined period, the solid was separated from the solution. Calcium hydroxide is one of the main reaction products resulting from the hydration of Portland cement with water. It is also one of the more soluble phases found in hydrated cement systems. Study's the influence of calcium hydroxide dissolution and its effect under the dynamic leaching system .From the results of XRD analysis on the solid phase and the calcium concentration in the aqueous phase, it was confirmed that Ca $(OH)_2$ was preferentially dissolved when the liquid/solid ratio was 30 to 35 %, and that C–S–H gel as well as Ca $(OH)_2$ were dissolved when the liquid/solid ratio was 45% or larger. The crystalline phases were identified using X-ray diffraction . The leaching of ^{137}Cs was carried out according to the ANSI/ ANS -16.1.

Keywords: deterioration ; diffusion ;solubility; cement hydrate; C–S–H gel;

Introduction

Concrete structures such as reservoirs, tanks, dams, water- supply pipes are attacked by soft water for a long time and which may result in concrete degradation as well as environmental problems. Similarly, radioactive waste facilities are designed to be placed underground 100m to 1,000m, where are underwater, and those are needed high durability for a long period over 1,000 years. Cement is considered to be an important component in low level waste (LLW) disposal systems. However, the long-term evolutions of its mechanical strength and its ability to confine radio nuclides have not yet been clarified, which has resulted in uncertainties in long-term repository performance assessment. Cement hydrates will be altered by dissolution of their minerals on contacts with groundwater: this is considered to be a major factor in changing various properties of cement hydrates. The chemical characteristics of pore water (pH, Eh, concentration of nuclides, etc.) dominated by dissolution of cement minerals are considered to influence surrounding environments such as the waste form, bentonite and rock.

Therefore, investigation of cement dissolution behavior is very important in assessing the long-term performance of the repository. The behavior of cement dissolution has been studied by many researchers. [1-4] have modeled the cement dissolution behavior and calculated the long-term evolution of its composition in the aqueous phase .[5,6] studied hydrated cement and suggested that it dissolves by competitive reactions (leaching from the surface and diffusion inside), and that the phase and the structure of the hydrated minerals will change with the progress of dissolution.

Accordingly, in assessing the long-term performance of a cement barrier, it will be necessary to define the long-term alteration behavior of the cement hydrates. Recognizing the importance of clarifying change in cement hydrates associated with the progress of dissolution in the evaluation of solubility and chemical durability and in modeling cement alteration, dissolution tests of hydrated cement have been conducted. [7-9] X-ray powder diffraction (XRD) has been used to analyze the structure of inorganic minerals. However, as the crystallinity of hydrated calcium silicate gel (XCaO–YSiO$_2$– ZH$_2$O: hereafter C–S–H gel), a primary mineral of hydrated cement, is low, it was difficult to analyze the structure by XRD. While the change in structure due to dissolution is not clear, structural changes in C–S–H gel could affect the physical properties of cement hydrates. In order to assess the long-term barrier performance of cement

hydrates, analysis of the structure of C–S–H gel is a key issue.

Portland Cement is composed of four principal phases: alite (C₃S: 3CaO·SiO₂), belite (C₂S: 2CaO·SiO₂), a ferrite phase (C₄AF: 4CaO·Al₂O₃·Fe₂O₃) and an aluminate phase (C₃A: 3CaO·Al₂O₃). The calcium silicate phase (alite and belite) accounts for 65 to 70 wt%. The hydration of the calcium silicate phase produces C–S–H gel and portlandite (Ca (OH)₂). C–S–H gel and Ca (OH) ₂ were the main products of the hydration of the Portland cement. However, as the crystallinity of hydrated C–S–H gel is low, it was difficult to analyze the structure by XRD.

The objective of this study was to know how the cement changes both its chemical and physical properties over time and how it interacts with groundwater by used the dynamic leaching test. The concentrations of calcium and silica in the leachate were measured .The crystalline phases were identified using XRD . The leaching of 137-Cs was carried out according to the ANSI / ANS -16.1 [10]

Experimental procedure
1-**Materials**

Portland cement:

The tests were conducted using ordinary Portland cement which was kindly supplied from Suez Cement Co., Egypt, the measured Blain surface area was ~ 350 cm²/kg. The chemical composition of the cement was presented in table (1) The XRD of cement is presented in fig.1n general, the major factors causing deterioration of cementations materials are water, corrosive components contained in water, carbon dioxide in the atmosphere, and heat. In repository, the concrete should be considered to be exposed to ground water containing small quantities of corrosive components , therefore , are considered to be the tow major factors for degradation of hydrated cement . The reaction is very slow due to the low diffusivity of ions through the pores in hardened cement paste. The dynamic test is to acceleration calcium (Ca), silica (Si). Specimen preparation a mortar mix of ordinary Portland cement mixed with ¹³⁷Cs were prepared at a different three water – cement ratio 0.35 , 0.45 and 0.50 . These mortars were cast in cylinder molds (2.24cm in diameter, 5 cm in height) for leaching test and curing in lab., at ambient temperature for four weeks.
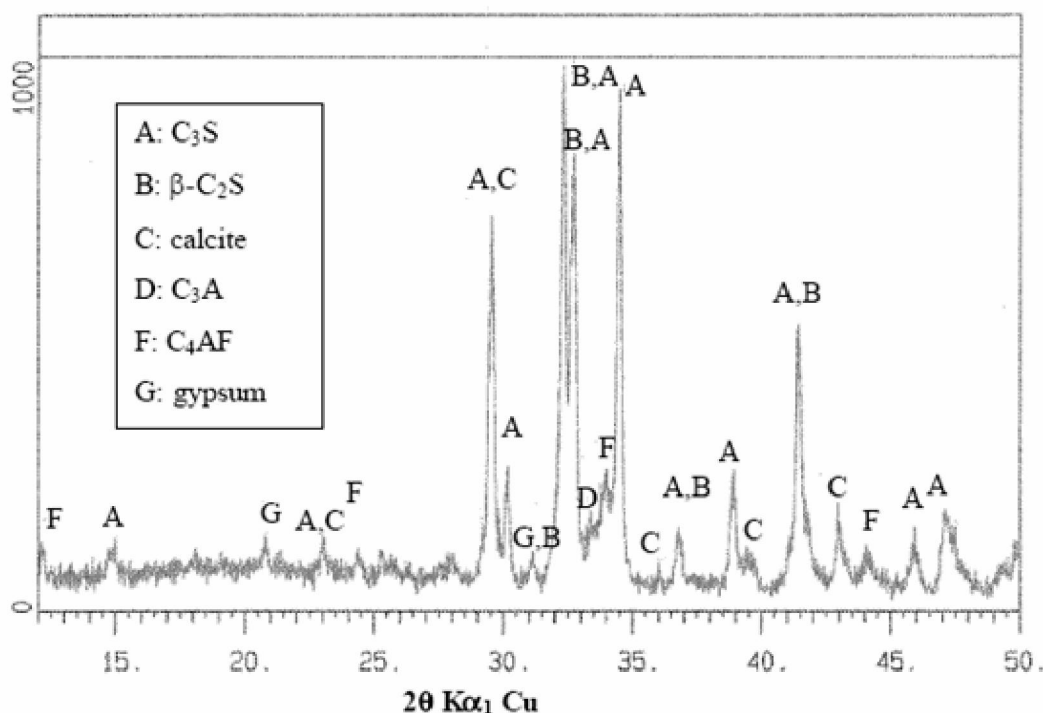
Fig 1 XR diffraction patterns of starting cement

Table (1) Chemical Composition of Materials (%)

Material	SiO₂	CaO	Al₂O₃	Fe₂O₃	MgO	K₂O,Na₂O	SO₃
PC	19.15	62.19	4.57	3.44	1.84	0.59	2.85

The apparatus and the experimental set-up for through-diffusion (leaching test)11

The whole apparatus in fig. 2 was constructed modularly and consists of transparent polystyrene allowing an easy check of the height of the solutions. The exterior measurements were about ($l \times w \times h$) $20 \times 15 \times 12$ cm. The larger cavity was the reservoir for the source concentration, its total volume being about 600 ml. With the help of a membrane pump a smaller part of the reservoir side (volume$\approx$ 50 - 55 ml) was continuously supplied with "fresh" solution from the larger part of the cavity. The pipes consist of PTFE, have a total length of about 1.0 m and an inner diameter of about 4 mm; the wetted parts of the pump are covered with PVDF, and the pump rate was about 15 - 20 ml/min, i.e. about 50 % of the maximum performance. The surplus of solution flows off an overflow back to the lower lying reservoir part of the cell. With such an arrangement a constant solution head was guaranteed. Due to the great amount of traced solution of the reservoir side the concentration on this side was kept nearly constant over a longer time span. Below the measurement cell there was a magnetic stirrer continuously mixing the solution in the measurement cell with the help of a small (Teflon covered) magnet. The temperature measured in the source solution changed in the interval of 25 - 35 °C 2, depending on the season. At the beginning of the experiments sorption of the tracer occurred at the walls of the diffusion cell and onto inner surfaces of pipes and pump. Therefore, daily and, later on, weekly checks of the reservoir concentration were performed by taking out 1 or 2 ml samples. Necessary corrections were made with the help of pre-calculated higher concentrated tracer solutions. The height of the liquid in the measurement cell had always to be at the same level as that of the reservoir side to avoid an additional driving force for diffusion due to a pressure gradient. The controlling and re-adjustment of this level after the sampling was done 'just by eye.

Table (2) Geometrical of the apparatus

quantity	symbol	unit	value
Volume of measurement cell	V	$0.1^6 m^3$	52.0 ± 0.6
Volume of the tank side	V_0	$0.1^6 m^3$	600 ± 35

When compared to the steady-state values for the diffusive flux, which was at least more than an order of magnitude larger it is evident that such additional fluxes can play a definite role only in the very early part of the tracer breakthrough curve. The volume of the measurement cell was determined to be 52.0 ml with an uncertainty of about 0.6 ml (0.6 % relative error).An ideal boundary condition at the low concentration side would had been an exact zero concentration condition which only was fulfilled at the very beginning of the experiments. For practical reasons in maximum a concentration of 1 % of that of the reservoir concentration side was accepted resulting in daily sampling, hence replacing of the whole liquid volume of the measurement side. However, in the (near) steady-state phase the concentration could periodically exceed this 1 % level of C_0, yet only in the two days absence of the experimentalists during the weekends. After the weekends the maximum concentration in the measurement cell could be a few percent, but it was always well below 5 % of C_0."
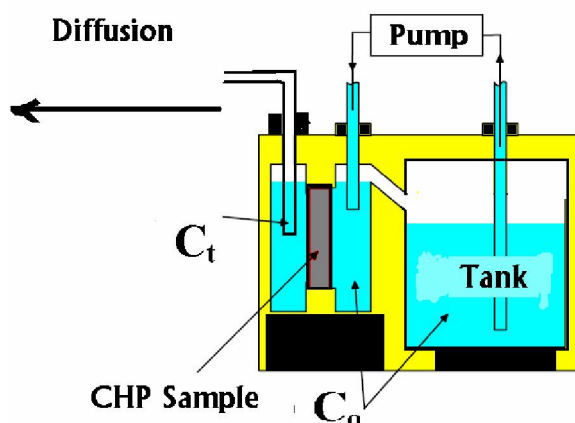
Fig 2 the sketch of the apparatus for the through – diffusion   experiment "

HCP = hardent cement pastes;

C_o   = concentration of a given ion at the beginning of the first leaching interval;

C_t   = concentration released from the specimen during the *n* th leaching interval.

Analysis of Leachants

All leachant analyses for ^{137}Cs were performed on a high purity germanium (HPGe) gamma spectroscopy system in accordance with specifications outlined in ANSI 42.14 - Calibration and Use of Germanium Spectrometers for the Measurement of Gamma-Ray Emission Rates of Radio- nuclides.[10] The 1.9 1 polyethylene leachate containers also served as counting containers so no special sample preparation was required. Count times of 600 sec and 6000 sec gave minimum detectable activities (MDAs) for Cs of 1.38 Bq and 0.44 Bq, respectively. Use of longer count times to achieve lower MDA values was not warranted since the MDA value obtained at 6000 sec was considered negligible compared with the original activity spiked into each cement specimen, A_p. Counting times were of sufficient length to ensure counting errors were consistently below 20%. Leachant analyses provided the activity of the selenium released from the specimen during the nth leaching interval (a_n.) [11] The leaching test was the a considerable amount of experimental data obtained from the samples, which maimed their dimensional integrity during leaching , indicate that internal bulk diffusion is the most likely rate – determining mechanism during the initial phases of the leaching process. Although additional mechanisms probably do occur to some degree, they are more likely to become rate determining only during later ages of leaching (19, 47 and 90). thus , the recommended data handling procedure of the standard is permissible , due to simplification of mass- transport theory (second Fick law at non- stationary stat) , for the purpose of clarifying and ranking solidified wastes , according to leachability . The solution of the mass- transport equations (second Fick law), for a specimen that be considered as a semi-infinity medium, permit the effective diffusion to be computed by:

$$D_e = \ [\ (C_n/C_o)\ /(\ t)_n\ ]^2\ [\ V/S]^2\ T \qquad (1)$$

$$T = [\ 1/2\ \ t_n^{1/2} + t_n^{1/2}\ ]^2 \qquad (2)$$

Where
De is diffusivity factor
C_n is the activity or concentration released from the specimen during the n th leaching interval ;
C_o is the total activity or concentration of a given ion at the beginning of the first leaching interval;
$(\ t\ )_n$ is the duration of the n th leaching interval seconds;
V is the volume of the specimen in cm^3 ;
S is the geometric surface area of the specimen in cm^2
interval for a semi-infinite medium .
Generally, this method to calculated "D_e " is valid up to 5 days of leaching time (abbreviated test) , where diffusion is the rate – detaining mechanism. At this point in the test , the T is the cumulative leaching time representing the " mean time " of the n th leaching specimen acts like a semi- infinite medium . from 5 days , the specimens , generally , acts like a finite medium, being the cumulative fraction leached higher than 20 % , and other methods to calculate " D" must be used . So, for example a graphical method or interpolation , from which the parameters "G" can be obtained , n this case

$$De = Gd^2 /\ (\ t)_n$$

Where
d is the diameter of the specimen in cm , ,
G is the dimensionless factor As far as the leachbility index "L" is concerned , it is a normalization factor , which is related to the specific material tested :

$$L = \log (\ \ /\ D_e)$$

Where ,   is a defined constant (1.0 cm^2 / s) . "L" also depends on the leaching condition and the leachant renewal schedule.
Leachbility studies, therefore, consider all these variables and the results are applicable only to cases where all these the same within certain error range tables 4, present cumulative fraction release (CFR) values for each formulation at leaching intervals as specified in the ANSI/ ANS 16.1 -2003.

Results and discussion

1. Composition of the Aqueous Phase

Depending on the formulation of the cement-based binder system, different crystalline phases will be present at different curing durations. This would also vary based on the disposal environment. These crystalline phases would incorporate contaminants into their matrix, generally on a preferential basis. Leaching involves the attack of water on the calcium hydroxide and calcium silicate hydrate (CSH) present in hydrated cements. Solid hydrates of cement paste are more persistent at pH above 12-13, but at a lower pH the hydration phases no longer remain stable and thus dissolve. The pore solution of a typical portland cement paste is highly alkaline, so that the leaching process starts by removing alkalis (Na+ and K+), followed by dissolution of portlandite (CH) and subsequently by the leaching of calcium from silicates. Aluminate phases are also affected; depending on the formulation of the cement-based binder system, different crystalline phases will be present at different curing durations the aqueous phase and the concentrations of Ca and Si are shown in Table 2 and the relation between the leaching period and the composition of the aqueous phase is shown in Fig. 2. The results show that the pH and the concentration of Ca increase as the leaching period is extended, which indicates that the aqueous phase and the solid phase approach equilibrium with the development of dissolution.

The leaching period for which the values become constant was about 4 weeks for samples with a small liquid/solid ratio, and 5 weeks for ones with larger liquid/solid ratio. The cumulative amounts of Ca and Si dissolved in the aqueous phase after 16 weeks of leaching are shown in Table 3. As the liquid/solid ratio becomes larger, the amount of dissolved Ca increases and the Ca/Si molar ratio of the solid become smaller. The change in the solid phase composition could have affected the dissolution rate, which is considered as a cause of this trend. The concentration of Si in the aqueous phase also converged. However, the concentration of Si in samples with large a liquid/solid ratio increased at first and then decreased, finally converging at a specific value. It is considered that a large amount of Ca in the surface layer of the sample dissolved at the large liquid/solid ratio, which temporarily reduced the Ca/Si molar ratio in the surface layer. As C–S–H gel with a low Ca/Si molar ratio in the surface layer temporarily maintains equilibrium with the aqueous phase, the dissolution rate of Si was increased The most important is a gel-like phase, designated C-S-H because it contains Ca, Si, and water (H_2O). This gel constitutes the principal binding phase. The gel phase is further restricted in composition because it largely excludes other chemical components of the paste from its crypto structure

However, after the solid phase as a whole comes into equilibrium with the aqueous phase, the solid phase becomes homogeneous, leading to an increase in Ca/Si molar ratio and a decrease in concentration of Si. The pH and Ca concentration become constant in about 4 weeks for the samples with a small liquid/solid ratio and 8 weeks for the ones with larger liquid/solid ratio. The Si concentrations were constant after 13 weeks, which was considered to indicate that the solid phase entered into equilibrium with the aqueous phase after 13 weeks of leaching.

2- Relation between the Ca/Si Molar Ratio in the Solid Phase

The relation between the Ca/Si molar ratio in the solid phase and the composition of the aqueous phase after 13 weeks of leaching is given in Fig. 3. The Ca/Si molar ratio was calculated from the amount of Ca and Si dissolved in the aqueous phase. The pH and Ca concentration decreased when the Ca/Si molar ratio of the solid was small. The difference in the aqueous phase is considered to be due to this variation .However, the Ca/Si molar ratio in the solid phase after dissolution tests was obtained by calculation. Therefore, it will be necessary to analyze the chemical composition of the solid phase to compare it with the composition of aqueous phase

Table 2 Chemical composition of leached water

Leaching Period weeks	Liquid/solid ratio (wt/wt)							
	30%		35%		45%		50%	
	Ca (mol/*l*)	Si (mol/*l*)	Ca (mol/*l*)	Si (mol/*l*)	Ca (mol/*l*)	Si (mol/*l*)	Ca (mol/*l*)	Si (mol/*l*)
1	1.54E-2	3.43E-5	1.22E-2	2.72E-5	3.53E-3	4.27E-5	3.75E-3	7.11E-5
4	2.11E-2	3.89E-5	1.00E-2	4.56E-5	4.44E-3	3.32E-5	3.87E-3	8.33E-5
8	1.04E-2	2.84E-5	1.99E-2	2.29E-5	5.25E-3	3.12E-5	5.12E-3	8.21E-5
12	2.07E-2	1.81E-5	2.09E-2	2.23E-5	6.51E-3	2.62E-5	6.64E-3	8.54E-5
16	1.87E-2	2.12E-5	2.00E-2	1.57E-5	7.23E-3	2.68E-5	7.56E-3	8.99E-5
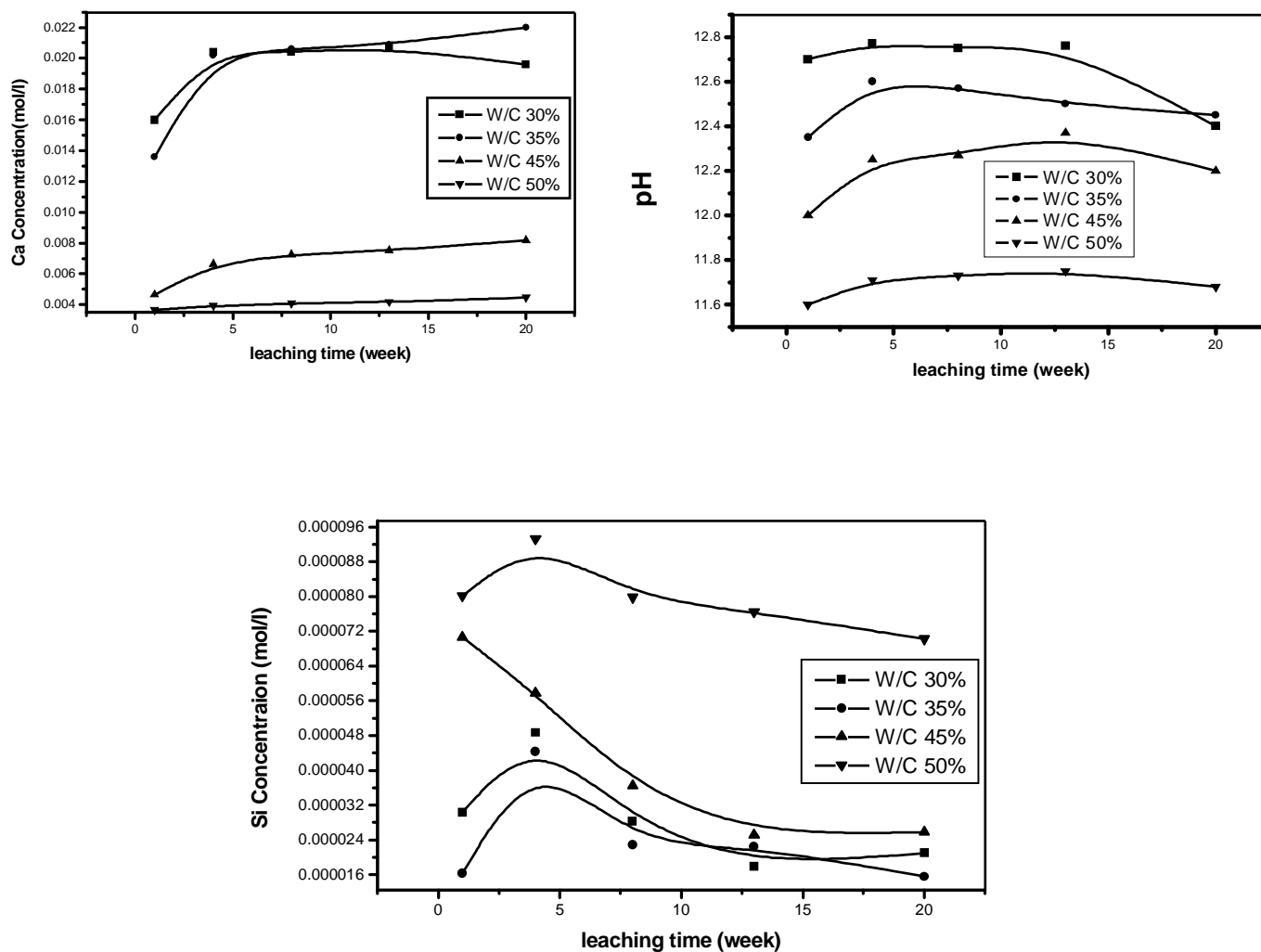
Fig. 2(A, B, C) Relation between the leaching period and the composition of the aqueous phase

Table 3 Cumulative amounts of Ca and Si dissolved in the aqueous phase after 12 weeks of leaching

W/C ratio	Ca/Si molar ratio of solid phase	Cumulative amount of element dissolved (mol)	
		Ca	Si
30%	3.04	2.07E-4	1.79E-7
35%	2.34	2.09E-3	2.24E-6
45%	1.98	3.43E-3	1.07E-5
50%	1.75	4.62E-3	2.32E-5
	1.01	5.00E-3	3.22E-4

3- Relation between Liquid/Solid Ratio and pH and Ca Concentration in the aqueous Phase

After 16 weeks of leaching is at equilibrium, the relation between liquid/solid ratio and pH and Ca concentration in the aqueous phase is shown in Fig. 4. The pH and Ca concentration are constant for liquid/solid ratios of 50% or less and decreases sharply for values of 30 lying between pH 10.5 and 12.5, is due to C-S-H dissolution. C-S-H dissolves incongruently from a C/S ratio, whereupon dissolution becomes congruent. The sudden drop in pH from pH 11.0 is due to exhaustion of the C-S-H phaseThe most important is a gel-like phase, designated C-S-H because it contains Ca, Si, and water (H20).The gel compositions is confined to a rather restricted range of compositions ranging in Ca:Si molar ratios between about 1.7. This indicates that the dissolution mechanism of the

solid phase to be dissolved had changed. A calculation using the amount of Ca(OH)2 obtained by thermal analysis and the solubility of Ca(OH)$_2$ indicates that the Ca(OH)$_2$ will saturate for a liquid/solid ratio of 30% or less, the concentration of Ca decreases with the increase in the liquid/solid ratio. This interpretation illustrates well the results shown in Fig. 4. Hence, the Ca(OH)$_2$ in OPC hydrate under the test conditions in this study is considered to reach equilibrium after 16 weeks of leaching.
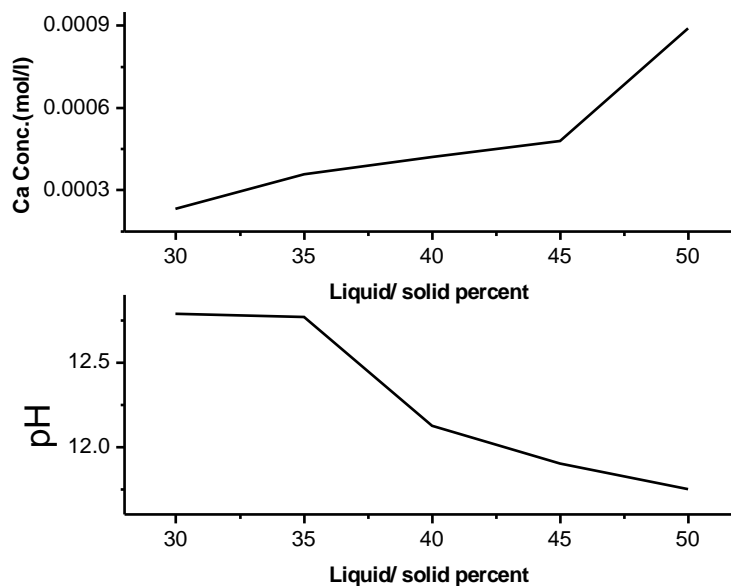
Fig 4 Relation between liquid/solid ratio and pH and Ca concentration in the aqueous phase

Phase Development in Blended Cements

      For compares one from fig.1and fig 5, the solid phases present. The most important is a gel-like phase, designated C-S-H because it contains Ca, Si, and water (H$_2$0). This gel constitutes the principal binding phase. The range of gel compositions is confined to a rather restricted range of compositions ranging in Ca:Si molar ratios between about 1. The gel is not totally without structure: it gives a very diffuse x-ray pattern which resembles an ill-crystallized version of the natural mineral tobermorite. Hence, this cement substance is sometimes referred to as 'tobermorite gel.' The analogy is not, however, satisfactory from the standpoint of either composition or structure: crystalline tobermorite has a composition which is fixed, or nearly so, at the Ca$_5$Si$_6$ ratio, and it has distinctly better crystallinity and lower solubility than C-S-H gel. Hence, a distinction should be made. The gel phase is further restricted in composition because it largely excludes other chemical components of the paste from its cryptostructure. Alumina and some of the iron oxide in cement instead combine to form an aluminoferrite hydrate hydrogarnet) and sulphoaluminate. The nature of the sulphoaluminate depends on the ratio of SO_4^{-2} to AI ; high ratios favour ettringite, 3CaO. A1$_2$0$_3$. 3CaSO$_4$- 31- 32H$_2$0, while low ratios favour "monosulphate," a calcium aluminate hydrate capable of allowing substitution of 2OH$^-$ by SO_4^{--}. In practice, the Fe content of these phases is very low, and may be neglected in their formula. The total quantities of Al, Fe, and SO_4^{-2} in a Portland cement are generally low, so the amounts of these phases which can develop is small, perhaps 10-15% of the total volume of the solid paste components. However, the chemical balance of OPC is such that not all Ca can be combined into these phases. For example, typical modern Portland cements have Ca:Si ratios ~2.5, whereas the most Ca-rich C-S-H gel has a ratio of only ~ 1.7. Therefore, much of the chemical excess of Ca appears as Ca(OH)2, portlandite. The three main phases of a well-hydrated Portland cement thus comprise an aqueous phase coexisting with two solids, Ca(OH)$_2$ and C-S-H; the former is crystalline, while the latter is amorphous. The Aqueous Phase Even at low humidities, some capillary condensation of water occurs in cement pores and of course, many repository scenarios assume flooding, so an aqueous phase is always an important constituent of cement systems. Cement-equilibrated "water" has a high pH. It is in intimate contact with high surface area solids, a situation which favors equilibration and exchange. During the first few seconds of mixing, the mix water becomes strongly alkaline. It may also become supersaturated with respect to calcium during the first few minutes or hours of hydration; the solubility of Ca(OH)$_2$ is about 1.67 g/L at 20"C, but if a cement powder is shaken with water for a few minutes, Ca(OH)$_2$ solutions containing ---2.5 g/L are readily obtained. Such solutions are very labile; if filtered from cement and allowed to stand in a sealed container,

they precipitate spontaneously. Much of the matter thus precipitated is colloidal or nearly so. If, however, Portland cement is allowed to hydrate at normal w/c ratios and the pore fluid is expressed after 28 d, super saturation will have been relieved and the pore fluid attained a steady state, or nearly so. Two factors combine to lower drastically the Ca solubility in the pore fluid relative to its solubility in water. One factor is the discharge of super saturation, which lowers Ca solubility's towards the threshold set by $Ca(OH)_2$ solubility. The other, more important, factor arises as a consequence of the alkali content of the cement ,(14,15).
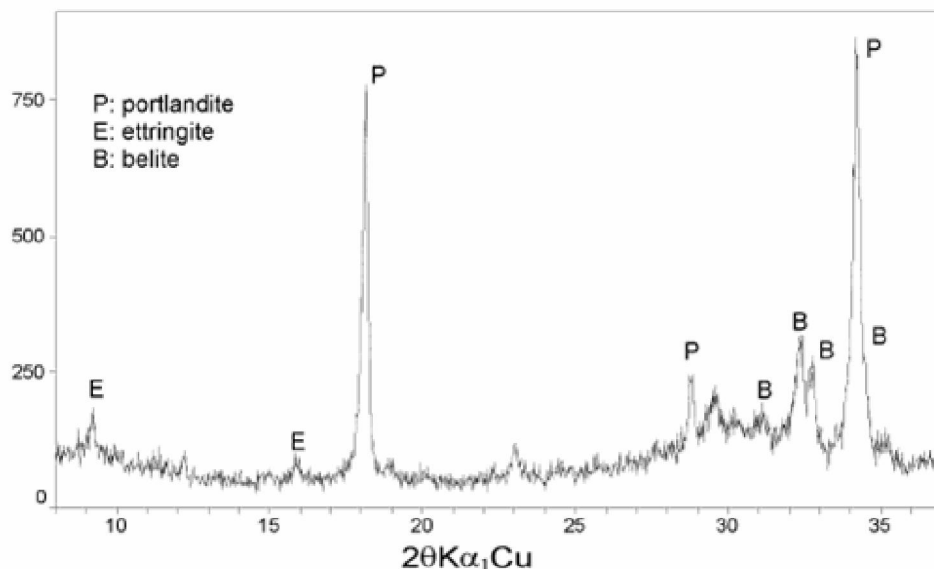
Fig 5 XR Diffraction patterns of starting cement after 16 weeks

Analysis of leach ability waste

Among radioactive wastes arising during operation of nuclear power plants, the [137] Cs isotopes deserve attention from the point of view of immobilization due to its amount, half- life and high solubility. The conventional cementation technique is widespread for solidification of low and intermediate activity wastes [16] Cs mainly remains dissolved in the pore fluid of the cement matrix, from which it can readily migrate into the biosphere. Tables 5 and 6 present cumulative fraction release (CFR) values for each formulation at leaching intervals as specified in the ANSI/ANS 16.1 procedure. ANSI/ANS 16.1 defines cumulative fractional release as the sum of all fractions leached during all previous leaching intervals, plus the fraction leached during the last leaching interval (an $/A_0$) using the initial amount of the species of interest present in the specimen as unity. All CFR values were corrected for radioactive decay back to the beginning of the first leaching interval. Uncertainties associated with each CFR value are experimental errors at the 1.0 sigma value for triplicate specimens. It clear he cumulative fraction release was increase when the W/C ratios increase .The diffusivity of the Cs through OPC at different times decrease due to caesium binding capacity of a cement matrix is significantly dependent on the chemical composition of the cement used, as the various phases formed during hydration have different binding capacity.

Table 5 Cumulative Fraction Release (CFR) values of Cs

Time (days)	30%	35%	45%	50%
0.083	3.02E-04	2.36 E-04	2.29E-03	7.45E-04
0.292	1.87E-04	2.2 7E-04	2.88E-03	1.87E-03
1	1.69E-03	2.55E-03	3.53E-03	3.39E-03
2	3.11E-03	3.26E-03	4.55E-03	4.56E-03
3	4.90E-03	5.79E-03	5.59E-03	7.35E-03
4	5.45E-03	5.9 5E-03	6.52E-03	8.69E-03
5	6.37E-03	56.37E-03	7.08E-03	1.03E-02
19	8.58E-03	7.48E-03	9.22E-03	8.58E-03
47	9.05E-03	9.95E-03	1.12E-02	1.23E-02
90	9.81E-03	1.06E-03	1.41E-02	1.33E-02

Table 6 diffusivity of the Cs through OPC at different times

Time (week)	Calculated diffusivity($m_2.hour^{-1}$)			
	30%	35%	45%	50%
1	1.32E-09	8.11E-09	2.22E-08	9.35E-08
4	9.36E-09	2.12E-08	6.82E-08	1.31E-07
8	2.01E-08	7.22E-08	1.1 1E-07	8.01E-07
13	1.11E-07	9.38E-07	2.43E-06	8.59E-06

Conclusions

In the repository environment, cements will undergo a variety of reactions. These reactions can be classified in two ways. Basically, either cement may be treated as a closed system with respect to transport of matter, or it may be treated as an open system; intermediate ossibilities exist. Obviously the subject is extremely complex, and much of the information required in order to make predictions is site-specific in open system scenarios. Nevertheless, breaking the problem into its constituent parts provides a logical framework within which the problems can be solved. Cements are attractive matrices for the immobilization of radioactive wastes; they are inexpensive, tolerant of wet materials, durable in the natural environment, and draw upon existing technology.

The specifications for cement are quite strict, and imply definite limits to chemical and mineralogical compositions, and hence to their performance Increasing the w/c ratio gives a more fluid mix (and also permits incorporating a higher proportion of liquid wastes) but the penalty to be paid is a rapid increase in the free, uncombined water content. This excess leads to a large increase in the total volume of larger pores (<0.1 μm), with corresponding increases in the permeability of the hardened product. If the role of cement is as a physical barrier, it must be formulated to a low w/c ratio; less rigorous restrictions may apply to grouts intended for space filling. Thus, in real situations, it may be necessary to compromise between fluidity, which implies higher w/c ratios, and impermeability, which implies the opposite.

The cement structures almost from the time of construction start to deteriorate in one form or another due to exposure to the environment (e.g., temperature, moisture, cyclic loadings, etc.). The rate of deterioration is dependent on the component's structural design, materials selection and quality of construction, curing, and aggressiveness of its environmental exposure

- The progress of degradation can be expressed in terms of water exchange cycles or speed of diffusion of ions in the pore solution. Cementitious materials are fundamentally unstable in water and change their properties with time.

1. Water is the single most important factor controlling the degradation processes of cement (i.e., the process of deterioration of cement with time is generally dependent on the transport of a fluid through concrete), little reduction in quantity of Ca^{++} by lowering W/C ratio inductee that.

2. The aqueous phase reached equilibrium after 16 weeks from leaching.

3. The cumulative Fraction Released (CFR) of ^{137}Cs data suggest the reducing the W/C ratio of a cement formulation plays a somewhat limited role in its ability to immobilization of wastes and the immobilization may involve chemical fixation by formation of crystalline or noncrystalline compounds and sorption .

   There are changes and some damage occurs in cement under the dynamic leaching test the XRD

4. The durability of cement based grouts under condition potentially found to be in nuclear waste repositories must studied

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Serum Fetuin-A Levels in Type 2 Diabetes Patients with Early Diabetic Nephropathy: It's Relation to Diabetes Control

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Abstract: Background and objective: Fetuin-A is a circulating calcium-regulatory glycoprotein that inhibits vascular calcification. In the present study, serum fetuin-A was studied as a novel risk factor for the development of diabetic nephropathy and the relation between its levels with the state of diabetes control. Patients and Methods: 50 patients with type 2 diabetes mellitus (T2DM) and early diabetic nephropathy, 25 patients of them have well controlled diabetes on treatment (the first group), the other 25 patients have uncontrolled diabetes (the second group), and another 25 healthy volunteers (control group)) were enrolled in this cross sectional study. Serum fetuin-A, Fasting plasma glucose (FP glucose), glycoselated hemoglobin A1c, lipid profile (total cholesterol,HDL and triglycerides), Serum creatinine, Glomerular filtration rate (GFR), Albumin excretion in urine were measured. Results: There was a significant reduction in Serum fetuin-A levels in controlled diabetic patients (314±66.8) and uncontrolled diabetic patients (252.4±55.6) compared to control group (478.6±74.4). A significant decrease was also detected in uncontrolled diabetic patients when compared to controlled diabetic patients (P<0.001). A strong inverse correlation was found between serum fetuin-A and each of F P glucose, glycoselated hemoglobin (HbA1c), serum creatinine, and urinary albumin excretion (r = -0.52, -0.55, -0.61, and -0.56 respectively; P < 0.001 for each). Whereas; GFR was significantly positively associated with serum fetuin-A levels (r = 0.53, P<0.001). Conclusion: The results of this study demonstrate that diabetic nephropathy, especially with uncontrolled diabetes, is linked to low serum fetuin-A levels which represents a novel risk factor for the development of vascular complications. This factor could be responsible for the development and progression of accelerated nephropathy especially with uncontrolled diabetes.

1. Introduction:

Various biomarkers have been studied for identification of type 2 diabetes patients at micro- and macrovascular risk. Most of these markers are inflammatory, metabolic or procoagulant molecules indicating an unfavorable metabolic and vascular status in patients with type 2 diabetes [1]. However, the different biomarkers show large variations in risk prediction depending on metabolic status and disease severity of the study groups [2,3]. Recently published data imply, that most novel biomarkers do not improve risk prediction when added to models based on conventional risk scores [4] Yet, associations of novel biomarkers such as fetuin-A with metabolic markers or complications do help to understand their role in the pathophysiology of vascular disease.

Fetuin-A, a circulating calcium-regulatory glycoprotein that inhibits vascular calcification, is predominantly synthesized in liver. It is secreted into the blood stream and deposited as a noncollagenous protein in mineralized bones and teeth. During fetal life, there is high serum concentration of fetuin-A. Its level declines following infection, acute or chronic inflammatory states and malignancy [5,6]. Low

serum fetuin-A levels have been reported in chronic renal disease and dialysis patients and is associated with inflammation and outcome [7,8]. Recent data have shown a relationship between vascular calcification and endothelial dysfunction in vascular disease [9]. Therefore, low serum fetuin-A level could be one of the contributing factors for the development of endothelial dysfunction in chronic renal disease patients.

So far, there is few data available for associations of fetuin-A with parameters of microvascular disease in diabetes. To clarify the relation between fetuin-A and microvascular complications in patients with type 2 diabetes and early diabetic nephropathy, we studied its associations with albuminuria and parameters of renal function. In addition, the state of diabetes control of these patients was assessed by quantification of the glycoselated hemoglobin A1c and its association with fetuin-A levels was assessed.

2. Methods
Study population and data collection

This study was carried out in Internal Medicine and Clinical Pathology departments, faculty of medicine, Zagazig University. This cross sectional study was conducted from January 2010 to January 2011.

This study included 50 patients with type 2 diabetes mellitus (T2DM) and early diabetic nephropathy who were recruited from the outpatient clinics of Endocrinology and Diabetes at Zagazig University Hospital and referred to the diabetes control for specialist treatment. The selection of patient groups was as follows:

25 patients were selected to have well controlled diabetes on treatment (First group): They were 13 males & 12 females, having a mean age of 53.76 ± 6.0 years, and a mean HbA1c of 6.2 ± 0.7.

25 patients were selected to have uncontrolled diabetes on treatment (second group): They were 13 males & 12females, having a mean age of 55 ± 6.2 years, and a mean HbA1c of 11 ± 2.1.

Another age and sex matched 25 healthy volunteers were chosen as a control group.

Inclusion criteria: patients with T2DM who had to have a documented history of albuminuria in at least two separate urine samples (urinary albumin > 20 mg/L as suggested by current German and international guidelines for the diagnosis of diabetic nephropathy) [10].

Exclusion criteria: We excluded patients with malignant neoplasms, severe infectious disease, severe congestive heart failure, type 1 diabetes and other renal disease by urinary sediments and medical records (macroscopic hematuria, abnormal sediment, urinary tract infection and past history of glomerulonephritis or nephro-ureterolithiasis).

All patients were submitted to full clinical assessment including history taking and through clinical examination including blood pressure measurements (systolic and diastolic) and assessment of body mass index (BMI). In all individuals, 24-h urine samples were collected and the albumin excretion rate in 24 hours is estimated. The study complied with the Declaration of Helsinki, and all subjects gave informed consent to participate in this study.

Clinical chemistry

Blood was drawn in a fasting state under sterilized conditions and stored at -80°C until analysis. The following investigations were done:

Fasting plasma glucose (FPglucose) was measured by a glucose oxidase method. Triglyceride (TG), total cholesterol, and high density lipoprotein cholesterol (HDL) levels were quantified by using ADVIA 1650 auto analyzer (Siemens Medical Solutions Diagnostic. USA). Glycoselated hemoglobin (Hb A1c) was estimated by ion exchange resin chromatography using Stanbio Glycohemoglobin.

Glomerular filtration rate is estimated from the Modification of Diet in Renal Disease (MDRD) formula [11] as follows: MDRD formula = 186 X [serum creatinine (mg/dl)]$^{-1.154}$ X [age]$^{-0.203}$ X [0.742 if patient is female] X [1.21 if patient is African-American], which is used for statistical evaluation of renal function.

Albumin excretion rate (AER) was assessed and performed in 24-h urinary collections. For collection of the urine sample, a 3-l plastic container was used, and the volume of urine was measured to the nearest 50 ml. Albumin levels were determined by turbidimetry (Siemens Healthcare Diagnostics, Eschborn, Germany). AER was expressed as milligrams per 24 h.

Serum fetuin-A was measured in duplicates by an ELISA (Epitope Diagnostics, Inc., San Diego, USA) The intra- and interassay variations were 5.3 and 7.1%, respectively.

Statistical analyses

Statistical analyses of the results were performed using SPSS software version 15.0 (statistical package for social science, SPSS inc. Chicago, USA). Continuous variables were expressed as means± standard deviation (SD). Comparison between two sets of patients was performed by independent t test, but more than two sets of patients were compared by one-way ANOVA. The Kruskal-Wallis (KW) test was applied to compare the values of HbA1c, F P glucose and Albumin in urine (non normal distributed variables) among the three groups of the study. Pearson correlation coefficient r was used to describe the association between serum fetuin-A and the variables of interest. P values <0.05 were considered statistically significant.

3. Results:

Clinical and laboratory characteristics of all patients with diabetes mellitus and healthy control subjects and comparison between all groups are given in Table 1.

There were no differences in age {P=0.6}, sex {P=0.94}, duration of diabetes {P=0.97}, body mass index (BMI) {P=0.2}, systolic blood pressure {P=0.06}, diastolic blood pressure {P=0.54}, and serum albumin {P=0.75} among all groups of the study. There was no differences in the percentage of diabetic patients on treatment by ACE or insulin therapy between the two groups of diabetes mellitus {P=0.77 and 0.67 respectively}.

Table 1: Demographic, Ciinical and laboratory characteristics of the studied groups.

Parameter	Control group n=25	Controlled diabetic group n=25	Uncontrolled diabetic group n=25	F /X^2 / t	P
Age (y)	53.6 ± 6.1	53.76 ± 6.0	55 ± 6.2	0.4	0.6
Gender (M/F)	12(48%)/13(52%)	13(52%)/12(48%)	13(52%)/12(48%)	0.11	0.94
BMI (kg/m^2)	25.1 ± 4.1	26.8 ± 2.4	26.2 ± 3.2	1.6	0.2
Duration (y)		10.6± 4.9	10.56±4.9	0.02	0.97
Systolic B P (mmHg)	118.5±5.1	122.5±8.2	123.8±10.5	2.8	0.06
Diastolic B P(mmHg)	77.7±4.0	78.4±5.0	76.9±5.1	0.61	0.54
ACE therapy (n,%)		12 (48%)	13 (52%)	0.08	0.77
Insulin therapy (n,%)		14 (56%)	12 (48%)	0.32	0.67
HbA1c (%) X±SD Range Median	5.4 ± 0.5 4.4 – 6.1 5.4	6.2 ± 0.7 [+] 5.9 - 6.7 6.4	11.0 ± 2.1 * 7.5 – 15.0 11	KW 49.6	<0.001**
F P glucose (mg/dl) X ± SD Range Median	82.3 ±7.8 70 – 97 83	92.2± 12.82 [+] 70 – 120 94	127.3 ± 20.2 * 89 – 170 125	KW 47.69	<0.001**
Serum creatinine (mg/dl)	0.55 ± 0.12*	0.9 ± 0.18	0.95 ± 0.19	41.1	<0.001**
GFR (ml/min/1.73m^2)	126.4±14.6*	103.1±14.6	95.5±17.7	26.1	<0.001**
Serum albumin (gm/dl)	4.5± 0.3	4.4±0.3	4.4±0.35	0.27	0.75
Triglycerides (mg/dl)	119.2± 23.3*	160.2± 43.7	157.2± 49.4	7.99	<0.001**
Total cholesterol (mg/dl)	160.2±23.3 *	194.5±42.3	205 ±47.1	9.5	<0.001**
HDL (mg/dl)	52.5±9.7 *	45.9±7.0	42.7±8.1	8.94	<0.001**
Albumin excretion (mg/24h) X ± SD Range Median	6.7± 3.1 2 – 13 6	188.4± 114[+] 40 – 450 160	243± 140.5 * 56 – 560 247	KW 50.13	<0.001**
Serum fetuin-A (mg/L)	478.6±74.4	314± 66.8 [+]	252.4± 55.6*	78.3	<0.001**

**P is significant.   KW, The Kruskal-Wallis test.

* Significance is present between this group and the other two groups.

[+] Significance is present between controlled diabetics and control group.

BMI: Body mass index. HbA1c: Glycoselated hemoglobin. F P glucose: Fasting plasma glucose.

GFR: Glomerular filtration rate. HDL: high density lipoprotein.

Fasting plasma glucose levels were significantly higher in the uncontrolled diabetic group (127.3 ± 20.2) than in the controlled diabetic group (92.2± 12.82) and healthy control group (82.3 ±7.8) {p<0.001}, and also there was a significant increase in FP glucose in the controlled diabetic group as compared to healthy control group {p<0.001}.

Hemoglobin A1c (HbA1c) was significantly higher in the uncontrolled diabetic group (11.0 ± 2.1) than in the controlled diabetic group (6.2 ± 0.7) and healthy control group (5.4 ± 0.5) {p<0.001}, and also there was a significant increase in HbA1c in the controlled diabetic group as compared to healthy control group {p<0.001}.

Serum creatinine levels were significantly higher in both the uncontrolled diabetic group (0.95 ± 0.19) and controlled diabetic group (0.9 ± 0.18) than in the healthy control group (0.55 ± 0.12) {p<0.001},

there was no significant difference in Serum creatinine between the uncontrolled and controlled diabetic groups.

GFR levels were significantly lower in both the uncontrolled diabetic group (95.5±17.7) and controlled diabetic group (103.1±14.6) than in the healthy control group (126.4±14.6) {p<0.001}, there was no significant difference in GFR between the uncontrolled and controlled diabetic groups.

Albumin excretion in urine was significantly higher in the uncontrolled diabetic group (243±140.5) than in the controlled diabetic group (188.4±114) and healthy control group (6.7±3.1) {p<0.001}, and also there was a significant increase in urinary Albumin excretion in the controlled diabetic group as compared to healthy control group {p<0.001}.

Triglyceride and cholesterol levels were significantly higher in both the uncontrolled diabetic

group (157.2±49.4 and 205±47.1, respectively) and controlled diabetic group (160.2±43.7 and 194.5±42.3, respectively) than in the healthy control group (119.2±23.3 and 160.2±23.3, respectively) {p<0.001}, there were no significant difference in triglyceride or cholesterol levels between the uncontrolled and controlled diabetic groups.

HDL levels were significantly lower in both the uncontrolled diabetic group (42.7±8.1) and controlled diabetic group (45.9±7.0) than healthy control group

(52.5±9.7) {p<0.001}, there was no significant difference in HDL between the uncontrolled diabetic and controlled diabetic groups.

Serum fetuin-A levels were significantly lower in the uncontrolled diabetic group (252.4±55.6) and the controlled diabetic group (314±66.8) than in the healthy control group (478.6±74.4) {p<0.001}, and also there was a significant reduction in serum fetuin-A in uncontrolled diabetic group as compared to controlled diabetic group (p<0.001).

Table 2: Correlation between Serum fetuin and other Parameters of the study.

Parameter	Serum fetuin	
	r	P
Age	-0.09	> 0.05
Body mass index	0.001	> 0.05
Systolic blood pressure	-0.19	>0.05
Diastolic blood pressure	-0.03	>0.05
Duration of diabetes	0.02	>0.05
Glycoselated HbA1c	-0.55	<0.001*
Fasting plasma glucose	-0.52	<0.001*
Serum creatinine	-0.61	<0.001*
Serum albumin	0.06	>0.05
Triglycerides	-0.15	>0.05
Total cholesterol	-0.21	>0.05
high density lipoprotein	0.2	>0.05
Glomerular filtration rate	0.53	<0.001*
Albumin excretion in urine	-0.56	<0.001*

* Correlation is highly significant.

The overall mean serum level of fetuin-A was 348.36 ± 116.1 mg/L with a range of 170 to 620 mg/L. Correlation study revealed that each of HbA1c, FP glucose, serum creatinine and Albumin excretion were significantly and inversely associated with serum fetuin-A levels (r = -0.55, -0.52, -0.61, and -0.56 respectively; P < 0.001 for each), whereas; GFR was significantly positively associated with serum fetuin-A levels (r = 0.53, P<0.001). No other clinical or metabolic variable (as BMI, blood pressure, total cholesterol,HDL and triglyceride) was significantly correlated in these groups of diabetic patients with serum fetuin-A (P>0.05 in all, see table 2). The overall mean serum level of fetuin-A in male individuals was 347.5±126.5 mg/L, with no significant difference from that of female individuals (346.5 ± 107.6 mg/L, p = 0.97).

4. Discussion

The gene encoding fetuin-A is located on chromosome 3q27, the chromosomal region that was previously mapped as a type 2 diabetes and metabolic syndrome susceptibility locus (12). The aforementioned findings and the animal studies showing that fetuin-A induces insulin resistance (13-

16) resulted in the view that fetuin-A is an interesting candidate involved in the pathophysiology of type 2 diabetes. Genetic analyses revealing that single nucleotide polymorphisms in the fetuin-A gene were associated with type 2 diabetes in cross-sectional studies (17) further corroborated this hypothesis. However, the role of fetuin-A in the natural history of type 2 diabetes still remained obscure. Fetuin-A, besides the placenta, is exclusively secreted from the liver (18). Expression of fetuin-A and plasma levels of the protein were found to be increased when there is fat accumulation in the liver (19,20) and circulating fetuin-A is increased in the metabolic syndrome (21), the condition that strongly associates with fatty liver (22). Moreover, fetuin-A complexes with calcium and phosphorus in the circulation and prevents the precipitation of these minerals in serum [23,24]. Fetuin-A is regarded as marker for vascular inflammation and as one of the most potent negative regulators of vascular ossification - calcification [25,26]. In animals lacking the fetuin-A gene, the aorta was found to be spared of calcification and fibrosis, whereas peripheral vessels in the skin and kidney showed evidence of extensive calcification,

and the small artery involvement preceded the impairment of renal function [24,27].

In this study, we evaluated the associations of parameters of microvascular disease in patients with T2DM and early diabetic nephropathy as the degree of albumin excretion and renal function (GFR and serum creatinine) with fetuin-A.

This study demonstrates that lower fetuin-A levels seem to be associated with microvascular complications in patients with early diabetic nephropathy disease in type 2 diabetes as evidenced by the significant inverse association between fetuin-A concentrations and the degree of 24 h urinary albumin excretion and also, the significant positive association between fetuin-A concentrations and GFR.

Furthermore, we could show that there is a link between fetuin-A serum levels and state of diabetes control which was determined by inverse association between fetuin-A concentrations and HbA1c.

In addition, fetuin-A levels do not correlate with some clinical and metabolic parameters as BMI, blood pressure, total cholesterol, HDL and triglyceride in our type 2 diabetic patients with early diabetic nephropathy with or without hyperglycemia.

The data presented herein allows to speculate, that fetuin-A could play a role in the development of early microvascular disease (especially nephropathy) in type 2 diabetes, yet possible mechanisms remain unclear. In line with this hypothesis, Eraso et al. showed that circulating fetuin-A was lower in 38 subjects with type 2 diabetes and an ankle/brachial index (ABI)<0.9, compared with 700 diabetes controls [28]. Also Roos et al assessed ABI as a paramerter of microvascular disease and demonstrated that type 2 diabetic patients with an ABI<0.9 had lower fetuin-A levels than patients with an ABI 0.9-1.3 or >1.3 and that fetuin-A was significantly associated with ABI. Moreover, Roos et al. found that lower fetuin-A levels seem to be associated with prevalent macrovascular disease (as coronary artery disease, stroke and peripheral artery disease) in type 2 diabetes. But in contrast to our results, they showed also that fetuin-A serum levels are not associated with microvascular complications (24 h urinary albumin excretion) in patients with early diabetic nephropathy. In addition, they agree with us to some extent in that fetuin-A levels do not correlate with metabolic parameters in their type 2 diabetes patients with prevalent late complications [29].

Again, a recently published study in patients without diabetes and renal impairment demonstrated decreased fetuin-A serum levels in patients suffering from advanced three-vessel disease compared with those without stenosis [30]. These finding go in line with our assumption of reduced fetuin-A serum levels in patients with diabetic nephropathy.

Reviewing the existing data as well as the results obtained in this study, it may be assumed that fetuin-A levels are lower in type 2 diabetes patients with early diabetic nephropathy especially those with uncontrolled diabetes.

Our results are in contrast to findings in several cross-sectional studies which showed an association of high fetuin-A levels with impaired glucose tolerance, metabolic syndrome and an atherogenic lipid profile (high low-density lipoprotein, high triglyceride concentrations and low HDL concentrations) [31,32] and the positive association of Plasma fetuin-A levels with the risk of type 2 diabetes [33].

We recognize the limitations of the present study. Our approach is limited by the small samples size. Therefore, especially the data for associations with microvascular disease and renal function in type 2 diabetes will have to be reproduced in larger groups.

5. Conclusions

In this study, low plasma fetuin-A levels predict microvascular complications in type 2 diabetes with early diabetic nephropathy and also there are associations of fetuin-A with hyperglycemia in these patients.

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Parameter Estimation and Dynamic Simulation Of Gas Turbine Model In Combined Cycle Power Plants Based On Actual Operational Data

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Abstract: Gas turbines are very important nowadays for electric power generation specially that used in the **Combined Cycle Power Plants (CCPPs)**. For this electric power generation, the dynamics of the gas turbine and parameters estimation are very essential. In this article, a simple procedure is used for estimating the parameters of Rowen's model for HDGTs in dynamic studies for analysis purposes. The parameters of Rowen's model for a 265-MW HDGT are derived and several simulated tests using Matlab/Simulink are presented. The way of obtaining the parameters are based on simple physical laws. It explains briefly how to extract the parameters of the model using the operational and performance data. The obtained results via simulations using Matlab/Simulink are highly matched with the involved scientific articles that published in different literature. Furthermore, the obtained results verifies the operational results of the considered HDGT. However, the procedure here is applied on a practical HDGT. The same procedure could be applied for any scale (size) of gas turbines.
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Keywords: Combined Cycle Power Plant (CCPP), Dynamic Simulation, Gas Turbine, Mathematical Modeling, Thermodynamic Process.

1. Introduction:

Gas turbines are one of the most important sources for electric power generation in countries with natural gas resources and are installed in several places in the world due to their special distinctiveness. The needs for a mathematical representation of gas turbines in dynamic studies guide to several publications in this area [1]-[6]. One of the most frequently used simplified models was presented early by Rowen [1] taking into account the load-frequency and temperature control as well as the turbine's thermodynamic responses as a linear function and inlet guide vane effects in a following separate work [2]. Several models with different degrees of simplification for the representation of gas turbines in dynamic studies were introduced. Among these models : the Detailed model (which is based on IEEE model) for **Combined Cycle Power Plants (CCPPs)** which has deeper sight into internal processes [5]. A recent review of these models is given in [8, 9]. Among those articles dealing with dynamic studies and gas turbine performance only some works have been done on the model and its parameter extraction for deeper analysis purposes [3, 4]. However, many of electrical engineers are keen in performing dynamic studies. Rowen [1] does not include parameter estimation and details of each block's physical behavior. Therefore, similar to a previous work [4], the objective in this article is to produce a broad approach for power engineers and students to describe how the parameters of the turbine model can be derived from simple operational and performance data which is available in general. It is also useful to know at least which quantities are required to derive the parameters of the model and which features affect the parameters. As a case study, Rowen's model parameters are approximated here for a 265 MW single shaft Heavy Duty Gas Turbine (HDGT) by using operational and performance data of the gas turbine. In general, the gas turbine model is more complicated than the steam turbine model and thus needs more features to be studied. In this article, a simple procedure which is adopted recently by [4] is used for estimating the parameters of Rowen's model for HDGTs in dynamic studies. *It should be noted that the study in [1] was applied on a gas turbine of rated 60 MW, while the procedure that adopted by [4] was applied on a gas turbine of rated 172 MW. However, the same procedure is applied in this article, but on a practical gas turbine of 265 MW.*

2. Case Study of 265 MW HDGT

A 265 MW simple cycle, single shaft Heavy Duty Gas Turbine (HDGT) and its available operational and performance data are presented and studied for deriving the parameters of the model. These parameters are used

in a further simulation studies. Table (1) shows nominal data of the selected HDGT for modeling. For land based engines, performance data are frequently quoted at the single point standard conditions. These standard conditions used by the gas turbine industry are:

- Ambient temperature (T_A) 15 °C / 59 °F.
- Ambient pressure (P_A) 1.013 bar / 14.7 psi.
- Relative humidity (Φ) 60%.

These conditions are established by the International Standards Organization (ISO) and frequently referred to as ISO conditions [1, 3, 4, 10]. For modeling purposes, a typical operating point is selected and illustrated in Figure (1). In advance, it is assumed that the considered model should be designated to represent the HDGT at rated load. It should be taking into account that in the following computations, the pressure loss in the entrance air filters and at the combustor is neglected. Also, IGVs are not modelled based on Rowen [1].
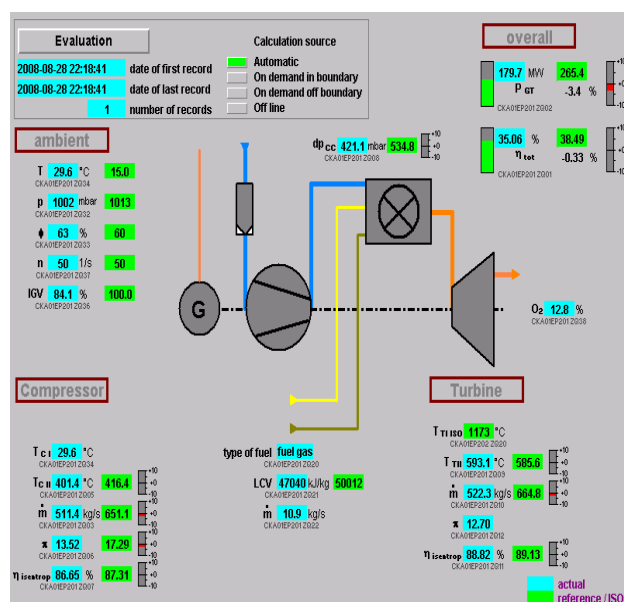
Figure (1): Plant Display Graphic of 265 MW HDGT[10]

2.1 Compressor and Turbine Efficiencies:

Using Table (1) and Figure (1), compressor and turbine efficiencies (η_C, η_T) parameters can be finally computed based on [3, 4] as follows:

$T_{2is(oc)}$ = 635.46 K = 362.46 °C
η_C = 0.895
$T_{3(oc)}$ = 1241.5 °C;
$T_{4is(oc)}$ = 792.9 K = 519.9 °C
η_T = 0.889

Where
(oc) Index stands for operating conditions of Figure (1).
(nc) Index stands for nominal conditions of Table (1).

Due to space limitations, only the final results are mentioned in this article, but for the detailed equations, one could refer to [3, 4]. It is inherently assumed constant compressor and turbine efficiencies in power output near nominal. It should be noted that the estimated efficiencies for the compressor and turbine are close to the actual results as illustrated in Figure (1).

2.2 Turbine Output Mechanical Power:

From now on, the turbine parameters are computed for nominal operation conditions (*nc*) according to Table (1). To extract the parameters of turbine output mechanical power block in [1], Figure (2) is depicted.

Table (1): Design Specifications of an Actual HDGT [10]

Parameter	Symbol	Unit	Value
Electrical power	P_{GT}	MW	265.4
Nominal frequency	F	Hz	50
Turbine speed	N	rpm	3000
Cycle efficiency (simple cycle)	η	%	38.49
Cycle efficiency (combined cycle)	$\eta_{combined}$	%	~ 58
Compressor type		17-stages axial	
Compressor pressure ratio	CPR	bar	17.29
Compressor inlet air mass flow	W_A	kg/sec	651.1
Combustor type		Annular	
Primary operating fuel		Natural gas	
Fuel mass flow	W_F	kg/sec	13.9
Lower heating value of fuel	LHV	kJ/kg	50012
Turbine type		4-stages axial	
Turbine diffuser exhaust mass flow	W_X	kg/sec	664.8
Turbine diffuser exhaust temperature	TET	°C	585.6
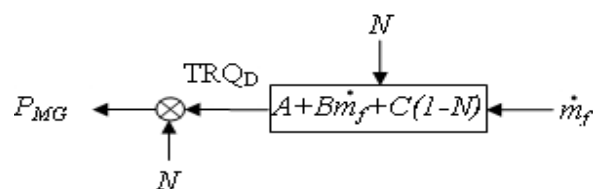
Figure (2): GT Output Mechanical Power Block of Rowen

Assume that, the considered HDGT is at nominal speed. In this point, the per unit (pu) output torque (***TRQ_D***) and mechanical power (***P_MG***) would be the same. Based on simple mathematical calculations in [4], *A* and *B* could

be obtained via applying the actual data from Table (1) and finally calculated as follows:

$$A = -0.117 \; ; \; B = 1.11699 \; ; \; m_{f(nc)} = 14.157 \, kg/sec$$

Where

A, B   Coefficients of developed (output) torque in Figure (2).

It should be noted that the estimated nominal fuel flow ($\dot{m}_{f(nc)}$) is very close to the actual one given in Table (1). The value of the speed sensitivity coefficient **C** in Figure (2) varies between 0.5 and 0.67 [4]. Here, **C** value assumed to be 0.5 (i.e., **C = 0.5**).

2.3 Turbine Exhaust Temperature:

Figure (3) represents the exhaust temperature (T_X) block in [1]. It should be noted that, nominal flows are needed to determine the parameters of this block (i.e., **D** and **E**). At nominal speed, the exhaust temperature parameter **D** could be finally computed as [3]: **D= 492.6 ˚C**
Based on discussion in [4] regarding temperature changes versus speed (**N**), the speed sensitivity coefficient **E** will vary in the range of 0.55 to 0.65 of rated exhaust temperature. Therefore, **E** is chosen to be **0.6T_R**. Hence:
E = 0.6T_R=351.36 ˚C
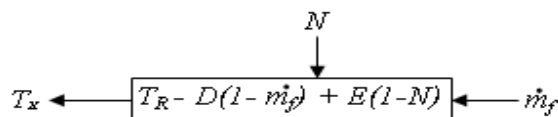
Figure (3): GT Exhaust Temperature Block of Rowen

However, temperature control in HDGTs requires measurement of the exhaust temperatures which may be composed of thermocouple and radiation shield [1]. Here, this study is only interested in the exhaust gas temperature out of the turbine (a convective source) to control the temperature and avoid excessive heating. Nevertheless, the radiation source, i.e., the turbine itself, will cause errors in the temperature measurement. The radiation shield is therefore used to overcome this problem, as illustrated in [3]. Temperature measurement device is the thermocouple which has a typical lag with a time constant based on its type and design. Time constant of thermocouple can be easily extracted from its time response documents. Figure (4) represents the exhaust temperature measurement block of Rowen [1]. To extract the parameters of the exhaust temperature measurement equipments, the same procedure and results of [4] have been adopted. The pertaining results are summarized in Table (2). More details are presented in [3, 4].

2.4 Fuel System:

Gas turbine fuel system is designed to provide energy input to the gas turbine in proportional to the product of command signal (V_{CE}) times the unit speed (**N**) as shown in Figure (5). Assuming linear response actuators and valves, the fuel flow will change directly with the output signal of the valve positioner. However, there is a lag associated with gas/oil flow in the pipes and fuel system manifold (T_{FS}). According to [11], this lag can be simply approximated.
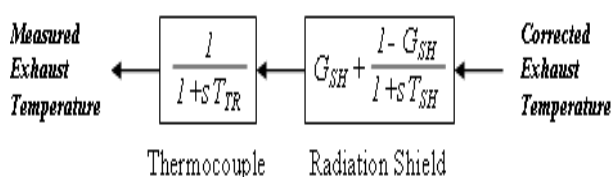
Figure (4): GT Exhaust Temperature Measurement Block of Rowen [4]

Table (2): Exhaust Temperature Measurement Parameters of 265 MW HDGT

Parameter	Symbol	Unit	Value
Radiation shield parameter	G_{SH}	--	0.85
Radiation shield time	T_{SH}	sec	12.2
Thermocouple time	T_{TR}	sec	1.7

Using Tables (1) and (3), the fuel system time constant (T_{FS}) could be easily computed to be as [3]: **T_{FS}= 0.31 sec.** It should be noted that the approximation is inevitable when using Tables and graphs of thermodynamic properties [12], because not all the operating points are provided there.
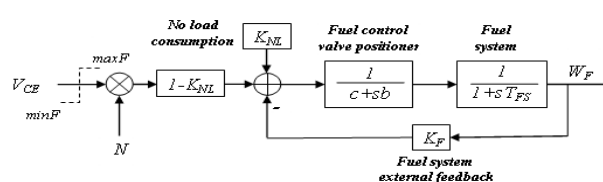
Figure (5): Fuel System of Rowen's Model [1]

Table (3): Operational Data for NG System [10]

Parameter	Unit	Value
Fuel		Natural Gas
Fuel pressure	atm	26
Average temperature	K	293
NG piping approximate volume from the NG skid to the GT nozzles	m³	0.25 ~ (equivalent cylinder of length about 8 m and radius of 10 cm)

There is also a fuel demand signal limiter in the HDGT model. *maxF* is not reached in normal operation and may act as a backup to temperature control where any increase in turbine exhaust temperature will lead to activation of temperature control and decreasing fuel flow. *minF* is a negative value which shows the gas turbine ability of transient power absorption. Its value depends on minimum fuel flow required to maintain the flame in the combustor. A value of 1.5 pu is commonly used for *maxF* while *minF* value can be determined by operational data for the fuel system. From a dynamic standpoint, gas turbines have many differences from steam turbines. One of the more obvious differences is the need for a significant fraction of rated fuel support self-sustaining at no-load conditions. This fact that HDGTs need relatively high fuel consumption to operate even in no load conditions as reflected in Rowen's model. It is reflected by dividing the fuel demand signal into a constant part (K_{NL}) and the reducing gain multiplied by the demand signal (*1-K_{NL}*). For this reason, one of the economic driving forces to minimize operating time at full speed, no-load conditions. Data for no-load operation and minimum fuel flow rate to maintain combustor flame are given in Table (4) as well as Figure (6).

2.5 Time Delays and Compressor Discharge Lag:

The gas turbine behavior forces its dynamic model to have small delays and lag time constants, as shown in [3]. Actually, there is a small time delay between the fuel injection and heat release in the combustor which is called combustion reaction delay (E_{CR}).
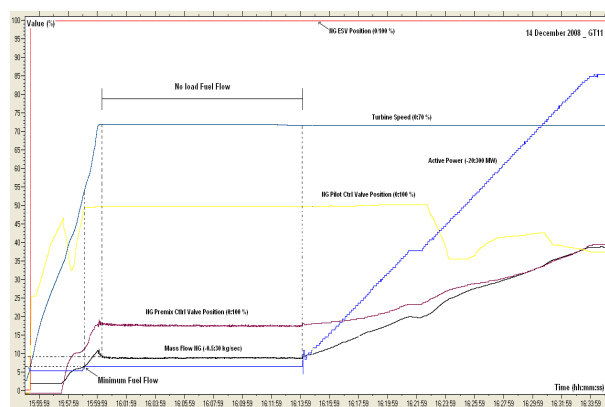
Figure (6): Trend for Minimum Fuel Flow and No-Load Consumption [10]

In modern systems, it is on the order of some milliseconds. Hence, it is assumed that, there is a time of 5 msec between the fuel injection until burning in the combustor (i.e., E_{CR} = 5 msec). There is also a time delay between the fuel combustion and exhaust

temperature measuring system (E_{TD}). This delay is caused by exhaust system and turbine to transport the fluid to the measuring point. E_{TD} is in the order of milliseconds and depending mainly on the size of the HDGT and the average fluid speed. A relatively conservative value of 40 msec delay for air and combustion products transfer to the temperature measuring point is assumed (i.e., E_{TD} = 40 m sec). A relatively higher time lag exists in the compressor discharge path to the turbine inlet (T_{CD}). Considering the average temperature = 1100 K for Natural Gas, and using Table (1), and [3] as well as the thermodynamic properties of air [12], T_{CD} is approximated and could be calculated finally as: T_{CD} = 0.142 sec

Table (4): Operational Data for Minimum Fuel Flow and No-Load Consumption [10]

Parameter	Unit	Value
No load fuel flow	Kg/sec	~2.2
Minimum fuel flow to maintain combustor flame	Kg/sec	~1.4

2.6 Controllers Loops Parameters:

As shown in Figure (7), the values of the frequency-load and temperature control blocks are based on [1], for simulation purposes. All obtained values of the controllers parameters are in the range of the typical values which are usually used for HDGT dynamic models. It should be noted that some modifications are added from GT models in [5, 6] to the model in [4] to obtain the model that shown in Figure (7).

3. Model Simulation and Results of 265 MW Gas Turbine:

The derived and assumed parameters in previous section are used to simulate the behavior of 265MW HDGT. All parameters of the model presented in Figure (7) are reviewed, compared to [1, 4], and listed again in Table (5). The considered model has been simulated and tested under certain conditions as stated below.

3.1 Model performance at rated load:

The considered GT model is simulated under operating in nominal conditions (rated load) against three scenarios as follows:
- 0.1% speed step decrease.
- 0.3% speed step decrease.
- 20% load step increase.

The speed governor droop of 4% is assumed for the simulation, as illustrated in speed-load control block of Figure (7) and Table (5).The first scenario is presented

where the turbine speed downs by step of -0.1% during normal operation under nominal conditions. The behavior of the mechanical output power against -0.1% speed deviation is shown in Figure (8).
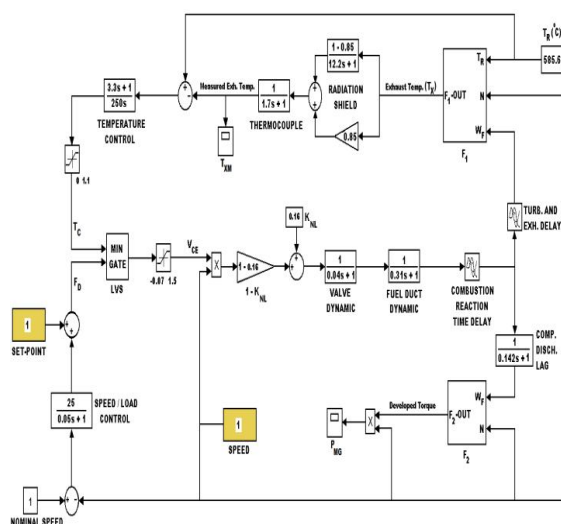
Figure (7): 265MW HDGT Model for Dynamic Studies

In steady state case, for 4% droop, the value of ~ 1.02 pu is observed for the output mechanical power. Figure (9) shows the exhaust temperature of the gas turbine which is measured by the thermocouple. Also, a final steady state value of near 596 $^{\circ}$C is observed for the measured exhaust temperature, where the temperature control is not activated yet. Figure (10) ensures this meaning where the output of the frequency-load controller (F_D) is all time lower than the output of the temperature controller (T_C). Therefore, the frequency-load controller output passes through the minimum gate and controls the fuel flow to the combustion chamber. However, in the second scenario, -0.3% step in turbine speed would cause the temperature control to be activated, as shown in Figure (13). Figure (11) shows the behavior of the mechanical output power against -0.3% turbine speed step, where a final value close to 1.066 pu is noted. Also, in Figure (11), the power output remains constant until temperature control activation in 60 sec roughly. The measured exhaust temperature increases in this period (~60 sec) until it reaches the value of around 616 $^{\circ}$C. At this time, temperature control activation have been occurred and forces the exhaust temperature to down to its rated value of 585.6 $^{\circ}$C and decreases the output power, as illustrated in Figure (12). The third scenario is presented where the turbine power set point increases by step of 20% during normal operation under nominal conditions.The behaviour of the turbine parameters is illustrated in Figures (14), (15), and (16).

Table (5): Extracted Parameters of HDGT

Parameter	Symbol	Unit	265 MW HDGT values [3]	Rowen Values [1]	172 MW GT Values [4]
Speed governor gain=1/droop	W	MW$_{pu}$ / N$_{pu}$	25	25	25
Speed governor lag time constant	Y	sec	0.05	0.05	0.05
Fuel demand signal upper limit	$maxF$	pu	1.5	1.5	1.5
Fuel demand signal lower limit	$minF$	pu	-0.07	-0.1	-0.13
No load fuel consumption	K_{NL}	pu	0.16	0.23	0.24
Fuel system external feedback loop gain	K_F	pu	0	0	0
Valve positioner time constant	b	sec	0.04	0.05	0.04
Fuel system transfer function coefficient	c	--	1	1	1
Fuel system time constant	T_{FS}	sec	0.31	0.4	0.26
Combustion reaction time delay	E_{CR}	sec	0.05	0.01	0.05
Turbine and exhaust delay	E_{TD}	sec	0.04	0.04	0.04
Compressor discharge volume time constant	T_{CD}	sec	0.142	0.2	0.16
Turbine rated exhaust temperature	T_R	$^{\circ}$C	585.6	510	522
Gas turbine torque block parameter	A	--	-0.117	-0.299	-0.158
Gas turbine torque block parameter	B	--	1.1169	1.3	1.158
Gas turbine torque block parameter	C	--	0.5	0.5	0.5
Gas turbine exhaust block parameter	D	$^{\circ}$C	492.6	390	413
Gas turbine exhaust block parameter	E	$^{\circ}$C	351.36	306	313
Radiation shield parameter	G_{SH}	--	0.85	0.8	0.85
Radiation shield time constant	T_{SH}	sec	12.2	15	12.2
Thermocouple time constant	T_{TR}	sec	1.7	2.5	1.7
Temperature controller parameter	G_{TC}	--	3.3	3.3	3.3
Temperature controller integration rate	T_T	$^{\circ}$C	250	250	250
Compressor efficiency	η_C	pu	0.895	--	0.86
Turbine efficiency	η_T	pu	0.899	--	0.89

The behaviour of the turbine parameters is illustrated in Figures (14), (15), and (16). These figures show that, the temperature control plays a vital role. Since it is override the speed/load control in case of overload. This is to protect the turbine against overheat. In other words, despite the set point is adjusted to a higher value than the permitted value, the temperature control takes over the responsibility to fix the positions of fuel valves and the turbine power accordingly to the permitted values.
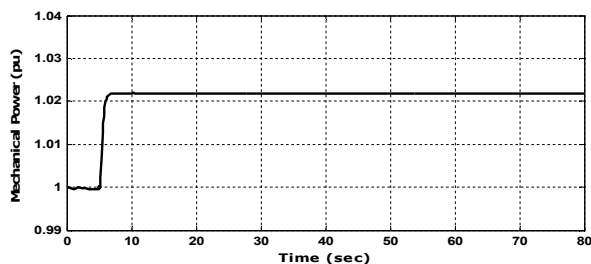
Figure (8): GT Mechanical Output Power after Speed Drop by -0.1%
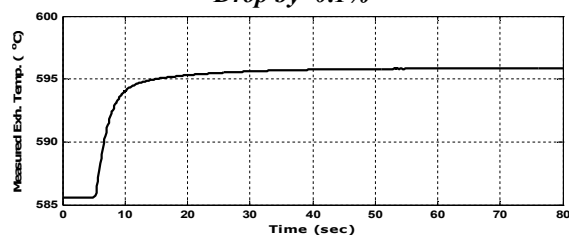
Figure (9): T_{XM} Measurement after Turbine Speed Step of -0.1%
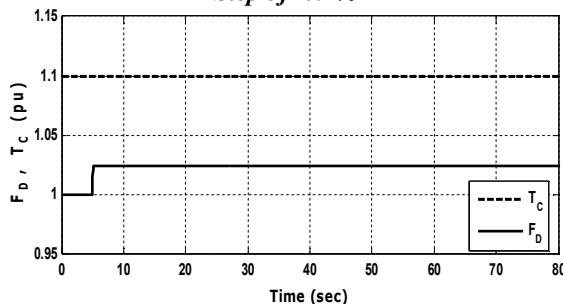
Figure (10): F_D and T_C against -0.1% Turbine Speed Deviation
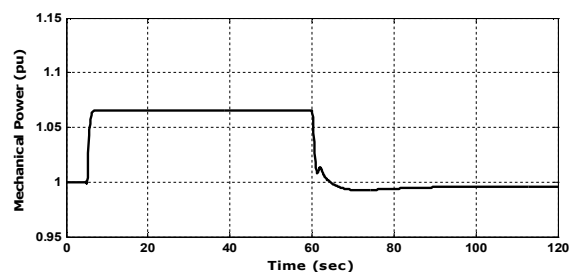
Figure (11): GT Mechanical Output Power after Speed Drop by -0.3%
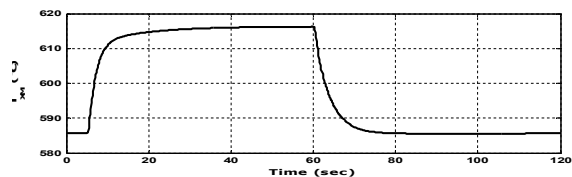
Figure (12): T_{XM} Measurement after Turbine Speed Step of -0.3%
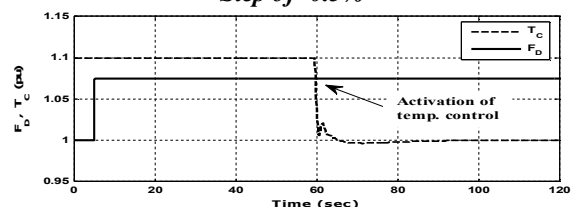
Figure (13): F_D and T_C against -0.3% Turbine Speed
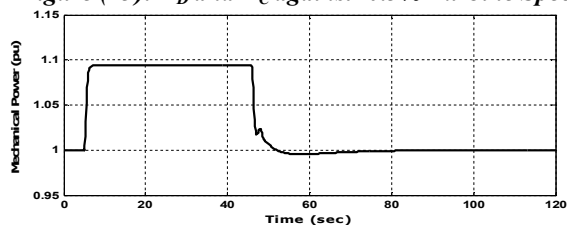
Figure (14): P_{MG} against +20% Load Increase
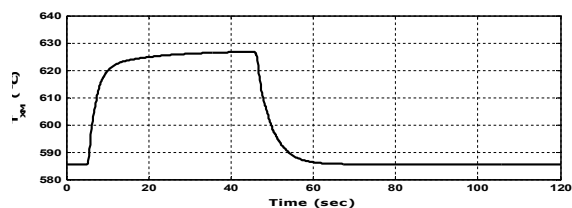
Figure (15): T_{XM} against +20% Load Increase
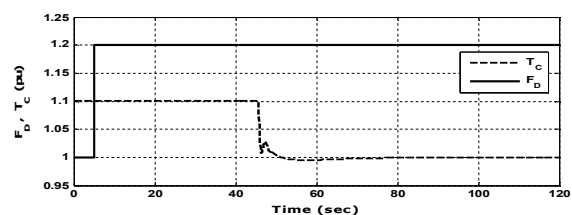
Figure (16): Inputs of LVS against +20% Load Increase

3.2　Model Performance at Partial Load:

Since the considered model is designated to represent the HDGT at nominal point, the load set point is significantly more accurate at base (rated) load (i.e. set point = 1 pu), but less accurate at partial load. However, adjustments for the parameters *A*, and *B* of mechanical power block that shown in Figure (2) can enhance the accuracy of the set point at partial load. Values of *A* = -0.3 and *B* = 1.3 can be selected for this purpose. Behavior of the turbine output power (*P_{MG}*) has been

examined against -0.3% turbine speed deviation, when operating at the selected operating point (i.e. the turbine initially load by 0.67 pu roughly). After that, the temperature control loop is disabled and the simulations are repeated again. The results are represented in Figures (17) and (18). It can be seen that there is no difference between the curves with and without temperature control loop. This is expected, as the operating point is far away from the rated exhaust temperature limit as shown in Figure (18), due to the low power output of the gas turbine as shown in Figure (17). These results are highly matched with those given in [13]. Hence, the temperature control loop is not active and makes the presence of the temperature control superfluous. Under such conditions therefore, the temperature control loop can be neglected without any loss in model accuracy, because the output of the gas turbine is effectively determined by the governor only.
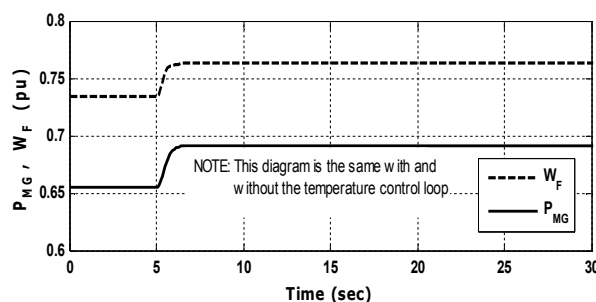
Figure (17): Partial Load of P_{MG} against -0.3% Turbine Speed Deviation
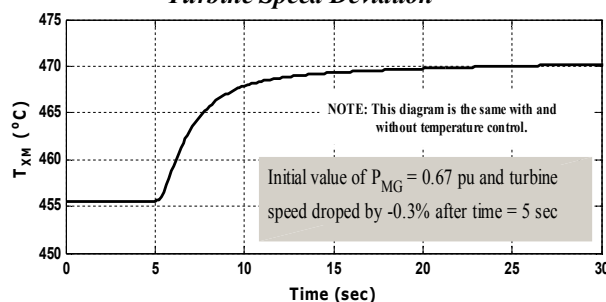
Figure (18): T_{XM} (^oC) against -0.3% Turbine Speed Deviation at Partial Load

This consequence had been proven in [13] as well. Now, it more obvious that, the temperature control loop is implemented in gas turbines to avoid a severe damage in the turbine due to overheat.

4.   Impact of Speed Droop on Gas Turbine Performance:
To illustrate the impact of the Governor with a speed droop characteristic on the gas turbine performance and hence the power system performance, the following

example is provided: Suppose two gas turbine units, as shown in Figure (19). Both units are rated at 265 MW (1 pu) and are initially loaded around the selected operating point 179.7 MW ($I_o \approx 0.66$ pu), as illustrated in Figure (1). Both units have governors with speed regulation; however, Unit 1 is set for 8% speed regulation and Unit 2 is adjusted for 3% speed regulation. It should be known that, the droop setting is adjustable from 2 to 10 percent [1]. To examine units response, -0.4% ($\Delta F = -0.004$ pu) frequency deviation is applied. Unbalance between generation and load will occur as a result of frequency deviation.
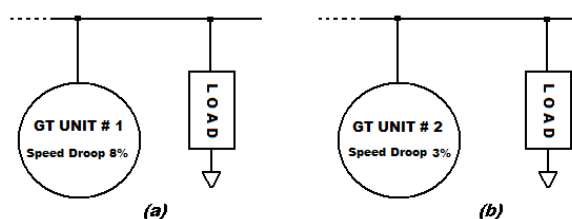
Figure (19): Two GTs with Different Speed Droop
(a) Unit 1 with Droop Setting 8%   (b) Unit 2 with Droop Setting 3%

To rebalance generation and load again, an additional power must be produced by the each unit. Depending on the governor droop setting, the unit governor will increase the output power to rematch generation and load. The steady-state frequency can be determined by considering the speed-load characteristic curves for the two units as shown in Figure (20). To calculate the additional power that has to be increased by each unit according to its governor speed droop setting, the following equation can be used [14]:

$$Percent\ droop\ (R\%)$$
$$= \frac{Percent\ speed\ or\ frequency\ change\ (\Delta F\%)}{Percent\ power\ output\ change\ (\Delta P\%)} * 100$$

In case of unit 1 with 8% droop setting, the governor will increase the output power from around 179 MW ($I_o \sim 0.66$ pu) to around 188 MW ($I_1 \sim 0.71$ pu). That is to say, unit 1 produces ~ 13 MW (ΔP_1) roughly as an additional output power due -0.4% (-0.2 Hz) frequency deviation. In case of unit 2 with 3% droop setting, the governor will increase the output power from around 179 MW ($I_o \sim 0.66$ pu) to around 209 MW ($I_2 \sim 0.79$ pu). That is to say, unit 2 produces ~ 35 MW (ΔP_2) as an additional output power due -0.4% (-0.2 Hz) frequency deviation. An important result could be obtained from these calculations; *a unit with a lower speed droop or regulation setting is more responsive to a change in system frequency.* This result is highly matching the results that are given in [15]. More details about the droop governor characteristics are given in [14].
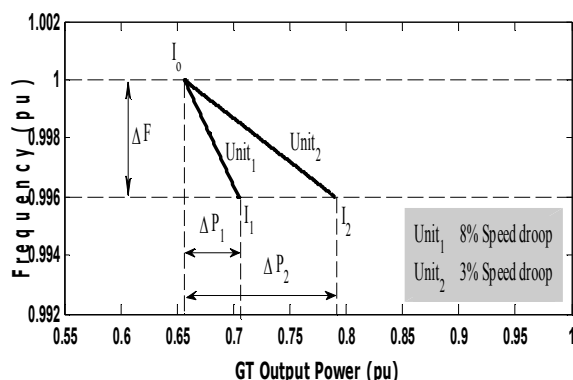
Figure (20): Impact of Speed Droop on Gas Turbine Performance

5.   Conclusions:

 In this article, a simple procedure is used for estimating the parameters of Rowen's model for practical HDGTs. These parameters could be used in dynamic studies for many purposes. The parameters of Rowen model for a 265-MW HDGT is derived and several tests using simulation are presented. The way of obtaining the parameters are based on simple physical laws and explained to some extents to make it useful for who are involved in dynamic studies of HDGT. All the obtained results via simulations using Matlab/Simulink are highly matched with the involved scientific articles that published in different literatures. The same procedure could be applied for any scale (size) of gas turbines. However, it is noticeable that the obtained results are significantly depends on the selected operating conditions.

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Risk Factors and Impacts of Pre-Eclampsia: An Epidemiological Study among Pregnant Mothers in Cairo, Egypt

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Abstract: Introduction: Pre-eclampsia (PE) represents a major cause of morbidity and mortality in mother, fetus and infant in many parts of the world. Objectives: The aim of this study was to investigate the role of behavioral, socio-demographic and clinical conditions as risk factors of PE among pregnant mothers and to define the impact of PE on health of the fetuses and neonates. Subjects and methods: A case-control, hospital based study design was used. All the cases and controls were interviewed and examined; clinically and laboratory. Results: Multiple gestations, rural residence, mothers married more than once, inter pregnancies' interval <3 years, primi-gravida, low social level and maternal age group 26-30 years were significant socio-demographic and personal risk factors (OR=9.79, 4.16, 4.0, 2.73, 2.16, 2.16 and 1.98, respectively). Further, much salty diet intake, no adequate fresh fruits/vegetables and much fat were significant dietary risk factors (OR=1.99, 1.85 and 1.83, respectively). Also; urinary tract infection, vaginal infection/ vaginosis, asymptomatic bacteriuria, polyhydraminos, diabetes and stress were significant medical and obstetric/gynecologic risk factors (OR=5.59, 4.41, 3.62, 3.59, 3.35 and 2.98, respectively). Fetal growth restriction, preterm labor, neonate birth weight <2.5 kg and neonate intensive care admission were more common in pre-eclamptic mothers compared to controls with statistically significant differences (P=0.00, 0.04, 0.03 and 0.02, respectively). The mean of 1- and 5-minute Apgar scores were significantly lower in newborns of pre-eclamptic mothers compared to controls (P=0.00 for each of them). Also, the mean Hb level was significantly lower in newborns of PE cases compared to controls (P=0.00). Recommendations: Improving ante-natal care for pregnant mothers in Egypt. Population based studies are needed in different areas in Egypt and on large numbers of mothers to understand the full epidemiology of pre-eclampsia.
[Essam A. El-Moselhy; Hamed O. Khalifa; Soliman M. Amer; Khadra I. Mohammad and Hani M. Abd El-Aal, Risk Factors and Impacts of Pre-Eclampsia: An Epidemiological Study among Pregnant Mothers in Cairo, Egypt. Journal of American Science 2011;7 (5):311-323]. (ISSN: 1545-1003). http://www.americanscience.org.

1. Introduction

Pre-eclampsia (PE) is a major complication of pregnancy. It is pregnancy-specific condition, which usually occurs after 20 weeks of gestation and resolves with delivery (Roberts, 1998). It is determined clinically by identification of pregnancy induced hypertension, proteinuria or generalized edema or both. PE may be mild or severe (Cunningham et al., 2010). The prevalence of PE has not changed during the last century (Hauth and Cunningham, 1999). The prevalence is varying according to the difference in classifications, definitions and the fact that many estimates are hospital basis. However, the prevalence is commonly cited to be about 7.0 % of first pregnancies (Roberts, 1998). The prevalence of hypertension observed at deliveries is approximately 10.0% that diagnosed with pregnancy- induced or aggravated hypertension (Brown et al., 2000). In Egypt, the prevalence of PE is 10.7% in a community based study (Gadalla et al., 1986). While, in hospital based studies it ranged from 9.1% (Mahaba et al., 2001b) to 12.5% (El-Houseinie et al., 1994) of all deliveries.

Pre-eclampsia is a disease with worldwide significance to mothers and infants; it may have health hazards that increase maternal, fetal and infant morbidity and mortality **(**Roberts, 1998 and Roberts et al., 2003a)**.** Its greatest impact is in developing countries, where it accounts for 20.0-80.0% of the strikingly increased maternal mortality. While, in developed countries PE has a major effect on the fetus and neonate. Application of proper ante-natal care (ANC) and management has largely eliminated maternal mortality, frequently at the cost of preterm delivery. About 10.0% of PE cases occur at a stage of gestation where delivery exchanges a sick fetus in uterus for a sick premature infant in the nursery (Goldenberg and Rouse, 1998). Also, PE has associated with a higher risk for intra uterine growth restriction (IUGR), cerebral palsy (Report the Task Force ACOG/AAP, 2003) and persistent pulmonary hypertension of the newborn (Hernández-Díaz et al., 2007). Further, PE is a leading cause of perinatal mortality, 7.6% (Gaym, 2000). In developed countries perinatal mortality of infants of pre-eclamptic mothers is 5-fold greater than non pre-eclamptics. Further, about 15.0% of preterm births are indicated premature deliveries of PE (Goldenberg and Rouse, 1998). Moreover, PE can progress rapidly, putting both mother

and fetus at severe risk if no action is taken (Basso et al., 2006).

PE has been described as a "disease of theories" as the cause is not known. Some theories include rejection phenomenon (insufficient production of blocking antibodies), compromised placental perfusion, altered vascular reactivity, uterine muscle stretch (ischemia), dietary factors and genetic factors. None of these theories has been conclusively proved (Roberts & Cooper, 2001; Roberts & Lain, 2002 and Solmon & Seely, 2004).

Pregnancy induces increased venous capacitance, reduced systemic arterial resistance, and vasodilatation associated with a 50.0% increase in circulating blood volume (Marshall and Carpenter, 2007). PE is hypothesized to be a two-stage disorder with maternal-fetal interactions necessary to link the two stages (Roberts and Cooper, 2001). Reduced placental perfusion, secondary to abnormal implantation and subsequent reduced placental vascularization, is thought of as the first stage. The second stage; the maternal syndrome, develops in a subgroup of women with certain genetic, environmental, and/or behavioral risk factors (Roberts and Cooper, 2001) as a response to agents produced by the poorly perfused placenta (Roberts and Hubel, 1999). In a suitable maternal environment, endothelial dysfunction results (Roberts and Hubel, 1999) and initiates the coagulation cascade and ensuing multi-system sequelae (Surratt, 1993), stage 2 of PE (Bodnar et al., 2006).

Age, parity (Funai et al., 2005), low social status (MacGillivary, 1983), race, environmental factors (Cunningham et al., 2010), and genetic and familial predisposition influence the incidence of PE (Skjaerven et al., 2005). Also, increase inter-pregnancies space (Lie et al., 1998), multiple gestation (Sibai et al., 2000), nutrition deficiencies (Roberts et al., 2003b), obesity (Ros et al., 1998 and Roberts & Cooper, 2001), diabetes (Wolf et al., 2002 and Funai et al., 2005), infection and inflammatory processes (López-Jaramillo et al., 2001) and paternal factors (Li and Wi, 2000) are susceptible risk factors of pre-eclampsia.

Study Objectives
A- Ultimate objective:
Improve quality of the health of mother, fetus and infant in Egypt.
B- Immediate objectives:
1- To investigate the role of socio-demographic, behavioral and clinical conditions as risk factors of PE among pregnant mothers in Cairo, Egypt.
2- To determine the impact of PE on the health of the fetuses and neonates of the pregnant mothers in Cairo, Egypt.

2. Subjects and Methods
I- Study Questions:
Is there PE socio-demographic, behavioral and clinical risk factors? Is there PE health hazards on the fetuses and neonates?
II- Study Design:
A case-control, hospital based study design was used to investigate the current research problem.
III- Study Setting:
This study was conducted in the Obstetrics and Gynecology Department in Al-Hussein Hospital, Al-Azhar University.
IV- Study Sample:
According to sample size equation the sample was 86 cases, and to guard against sample size bias we increased the sample to be 100 PE cases. So, all the cases of PE attending the Obstetrics and Gynecology Department in Al-Hussein Hospital, Al-Azhar University were included in the study till sample reached the required number; 100. For each pre-eclamptic patient a healthy pregnant woman was chosen randomly. So, a control group of 100 healthy pregnant women was recruited.

All patients must be fulfilling the following inclusion criteria: 1) Age of patients up to 30 years, 2) Gestational age ≥33 weeks, 3) Have a definite specific diagnosis of PE. Also, all patients recruited in this study have fulfilled the following specific exclusion criteria: 1) Essential hypertension, 2) Pregnancy induced hypertension without proteinuria, 3) Intake of vitamins/antioxidants during the current pregnancy, 4) Blood diseases, 5) Kidney disease, 6) Liver disease, 7) Intrauterine fetal death, and 8) Ante-partum hemorrhage.

The controls enrolled in the study have fulfilled the following inclusion criteria: 1) Age up to 30 years, 2) Have no history of PE in the current or previous pregnancy, and 3) Gestational age ≥33 weeks. Also, the controls have fulfilled the same specific exclusion criteria used for the patients group.

V- Ethical Considerations:
The purpose of the study and procedures to be performed were explained to the cases and controls, an oral consent to participate in the study was taken accordingly. All patients were managed properly to control PE. All the cases and controls were delivered spontaneously in the normal vertex position or by Caesarian section according to the condition of each case.

VI- Study Tools and Methods:
1- Interview questionnaire:
It was used to collect data relevant to topic of the study. The patients and controls were submitted to an interview.

2- Diagnosis of PE: All patients must be fulfilling the following inclusion criteria: 1) Hypertension: Blood pressure (BP) ≥140/90 mmHg (Cunningham et al., 2010), 2) Proteinuria: Trace or more by dipstick method. Two random midstream urine specimens, collected ≥4 hours apart taken from each woman to avoid error due to false positive test, were used. The two results must be positive, so the diagnosis of proteinuria was significant (MacGillivary, 1983), and 3) Bilateral, pathological (≥+1) and not just dependant, lower limb edema. Edema is a common feature of pregnancy. But, edema of PE usually involves the face and hands, and persists (Cunningham et al., 2010).

3- Clinical examinations: Both general and local physical examinations were done for the cases and controls. Also, pelvi-abdominal ultra-sonography examination was done for both groups to estimate gestational age, to determine multiple fetuses, polyhydramnios and to detect fetal IUGR. Anthropometric measurements of mothers; height and weight were done. Weight (kg) was measured while women wear light outer garment and without shoes. Height (cm) was measured in standing position. Body mass index (BMI) was calculated as weight divided by height squared (kg/m²). BMI classifications considered obese subject to be ≥30 kg/m² (WHO, 2000).

All the neonates were evaluated clinically and their Apgar scores at 1- and 5-minutes were defined immediately after birth, low 5-minutes Apgar (activity, pulse, grimace, appearance and respiration) score was considered <4 (Casey et al., 2001). Also, weight (kg) by a special pediatric scale was done immediately at birth.

4- Laboratory investigations: Laboratory examinations were done for all cases and controls. Midstream urine samples were taken at time of interviewing the cases and controls for microscopic examination to detect cases of urinary tract infections that may be symptomatic or not. Also, umbilical vein blood samples were taken from all neonates of the cases and controls at birth to determine their hemoglobin (Hb) concentration level (g/dl) by using Drabkin's photometric method.

VII- Statistical Analysis:
Odds ratio (OR) with 95% confidence interval (CI) or exact confidence limits (ECL), t-student test, Yates corrected Chi-square (χ^2) and 2-tailed Fisher exact (FE) were used as tests of significance. The significance level for t, χ^2 and FE was accepted if the P-value <0.05.

3. Results
As regard socio-demographic risk factors of the PE cases and controls (table 1), low educational level (illiterates, and read and write) of the cases was significant risk factor (OR=1.51, 95% CI: 0.83-2.75). The house wives occupation and the unskilled workers are insignificant risk factors (OR=1.44, 95% CI: 0.79-2.60 and OR=1.16, 0.60-2.22). Collectively, 59.0% of the patients were belonged to lower social level and represented a significant risk factor (OR=2.16, 95% CI: 1.18-3.95). Further, rural residence represents a significant risk factor for PE (OR=4.16, 95% ECL: 1.52-13.16). On the other hand, middle social level and urban residence are significant protective factors.

With respect to personal risk factors of the PE cases and controls (table 2), the young (18-21 year) and old (26-30 year) age groups are significant risk factors (OR=2.01, 95.0% CI: 1.00-4.06 and OR=1.98, 95.0% CI: 1.04-3.76, respectively). Also, less than one year marriage-pregnancy interval is significant risk factor (OR=1.84, 95% CI: 1.01-3.35). At the same time, primigravida is significant risk factor (OR=2.16, 95% CI: 1.18-3.96). Regarding inter-pregnancy space, more than 3 years is significant risk factor (OR=2.73, 95% CI: 1.08-7.01). Also, multiple gestations represented a significant risk factor (OR=9.79, 95% ECL: 1.30-433.39). Further, history of prior PE/eclampsia and abortion in first trimester are insignificant risk factors (OR=2.85, 95% ECL: 0.66-14.12 and OR=1.25, 955 CI: 0.45-3.47, respectively). Also, positive maternal family history of PE is insignificant risk factor (OR=4.85, 95% ECL: 0.96-46.94). Regarding change in husbands, marriage more than once is significant risk factor (OR=4.0, 95% ECL: 1.01-22.88).

Regarding life-style and behavioral risk factors of the PE cases and controls (table 3), absence of ante-natal care is insignificant risk factor (OR=1.36, 95% CI: 0.73-2.53). Also, physical activity is insignificant risk factor (OR=1.34, 95% CI: 0.73-2.47). Further, smoking during pregnancy is insignificant protective factor (OR= 0.49, 95% ECL: 0.01-9.68). Regarding diet intake, no adequate intake of fresh fruits and vegetables (OR=1.85, 95% CI: 1.01-3.39), much intake of fats (OR=1.83, 95% CI: 1.01-3.34) and much intake of salty diet (OR=1.99, 95% CI: 1.02-3.91) are significant risk factors. On the other hand, much intake of sugar (OR=1.51, 95% CI: 0.80-2.86) and no adequate intake of proteins (OR=1.35, 95% CI: 0.73-2.50) are insignificant risk factors.

With respect to medical, gynecological and obstetric risk factors among the PE cases and controls (table 4), obesity (OR=2.02, 95% CI: 1.05-3.90), stress (OR=2.98, 95% ECL: 1.04-9.70), diabetes (OR=3.35, 95% ECL: 1.09-12.23), urinary tract infection (OR=3.59, 95.0% ECL: 1.05-15.58), polyhydraminos (OR=3.59, 95% ECL: 1.05-15.58), asymptomatic bacteriuria (OR=3.62, 95% ECL: 1.19-13.10) and vaginal infection/ bacterial vaginosis (OR=4.41, 95% ECL: 1.13-24.97) are significant risk factors.

As regard impacts of PE (table 5), 29.4% of the fetuses of pre-eclamptic women had IUGR compared to 5.9% of the controls (P=0.0002). At the same time, 8.0% of the cases had preterm labor compared to 1.0% of the controls (P=0.04). Moreover, 11.9% of the neonates were <2.5 kg at birth compared to 3.0% of the neonatal controls (P=0.03). Also, 12.8% of the neonates were admitted to neonatal intensive care units compared to 3.0% of the neonatal controls (P=0.02). Further, one (0.9%) of

the neonates died during the first week of life compared to none of the neonatal controls (P=1.00). Also, 1- and 5-minutes Apgar scores of the neonates of patients and controls were 4.62±1.37, 6.16±1.09 and 6.41±1.88, 8.89±1.32, respectively with a statistically significant difference (P=0.00 for each of them). Lastly, levels of hemoglobin of the neonates of patients and controls were 14.12±5.23 and 18.22±5.74 g/dl, respectively with a statistically significant difference (P=0.00).

Table (1): Distribution of pre-eclampsia (PE) cases and control group according to socio-demographic risk factors.

Socio-demographic risk factors	PE cases (n=100)		Control group (n=100)		OR (95% CI) OR (95% ECL)*
	No.	%	No.	%	
Educational status:					
Illiterate, read and write	48	48.0	38	38.0	1.51 (0.83-2.75)
Elementary	39	39.0	47	47.0	0.72 (0.40-1.31)
Secondary and university	13	13.0	15	15.0	0.85 (0.35-2.02)
Occupational status:					
House wife	56	56.0	47	47.0	1.44 (0.79-2.60)
Unskilled	31	31.0	28	28.0	1.16 (0.60-2.22)
Semi-skilled & skilled	9	9.0	19	19.0	0.42 (0.17-1.05)
Professional	4	4.0	6	6.0	0.65 (0.13-2.86)*
Social level:					
Low	59	59.0	40	40.0	2.16 (1.18-3.95)
Middle	33	33.0	49	49.0	0.51 (0.28-0.94)
High	8	8.0	11	11.0	0.70 (0.24-2.00)
Residence:					
Rural	21	21.0	6	6.0	4.16 (1.52-13.16)*
Urban	79	79.0	94	94.0	0.24 (0.08-0.66)*

Table (2): Distribution of pre-eclampsia (PE) cases and control group according to personal risk factors.

Personal and clinical risk factors	PE cases (n=100)		Control group (n=100)		OR (95% CI) OR (95% ECL)*
	No.	%	No.	%	
Mother's age:					
18-21	32	32.0	19	19.0	2.01 (1.00-4.06)
22-25	27	27.0	55	55.0	0.30 (0.16-0.57)
26-30	41	41.0	26	26.0	1.98 (1.04-3.76)
Marriage-pregnancy interval:					
<12 months	54	54.0	39	39.0	1.84 (1.01-3.35)
≥12 months	46	46.0	61	61.0	0.54 (0.30-0.99)
Parity:					
Primi	58	58.0	39	39.0	2.16 (1.18-3.96)
Multi	42	42.0	61	61.0	0.46 (0.25-0.85)
Inter pregnancies' interval:	(n=42)		(n=61)		
≤3 Years	11	26.2	30	49.2	0.37 (0.14-0.93)
>3 Years	31	73.8	31	50.8	2.73 (1.08-7.01)
Multiple gestations:					
Yes	9	9.0	1	1.0	9.79 (1.30-433.39)*
No	91	91.0	99	99.0	0.10 (0.00-0.77)*
History of prior PE/eclampsia:	(n=42)		(n=61)		
Yes	7	16.7	4	3.3	2.85 (0.66-14.12)*
No	35	83.3	57	96.7	0.35 (0.07-1.51)*
History of prior abortion:					
Yes:	17	17.0	21	21.0	0.77 (0.36-1.66)
1st trimester	11	11.0	9	9.0	1.25 (0.45-3.47)
2nd trimester	6	6.0	12	12.0	0.47 (0.14-1.42)*
Maternal family history of PE/E:					
Yes:	9	9.0	2	2.0	4.85 (0.96-46.94)*
Mother (any pregnancy)	7	7.0	1	1.0	7.45 (0.92-339.15)*
Mother (in her own pregnancy)	5	5.0	0	0.0	Undefined
Sisters	2	2.0	1	1.0	2.02 (0.10-120.38)*
Married more than once:					
Yes	11	11	3	3.0	4.0 (1.01-22.88)*
No	89	89.0	97	97.0	0.25 (0.04-0.99)*

Table (3): Distribution of pre-eclampsia (PE) cases and control group according to life-style and behavioral risk factors.

Life-style and behavioral risk factors	PE cases (n=100)		Control group (n=100)		OR (95% CI) OR (95% ECL)*
	No.	%	No.	%	
Ante-natal care (ANC):					
No:	68	68.0	61	61.0	1.36 (0.73-2.53)
Yes:	32	32.0	39	39.0	0.74 (0.39-1.37)
Regular ANC:					
Yes	14	14.0	19	19.0	0.82 (0.29-2.32)
No	18	18.0	20	20.0	1.22 (0.43-3.48)
Time of ANC:					
Early (<20 weeks of gestation)	13	13.0	21	21.0	0.59 (0.20-1.67)
Late (>20 weeks of gestation)	19	19.0	18	18.0	1.71 (0.60-4.91)
Physical activity:					
Yes	64	64.0	57	57.0	1.34 (0.73-2.47)
No	36	36.0	43	43.0	0.75 (0.41-1.37)
Smoking:					
No	99	99.0	98	98.0	2.02 (0.10-120.38)*
Yes	1	1.0	2	2.0	0.49 (0.01-9.68)*
Diet intake:					
No adequate fresh fruits/vegetables	64	64.0	49	49.0	1.85 (1.01-3.39)
Much fat intake	57	57.0	42	42.0	1.83 (1.01-3.34)
Much sugar intake	72	72.0	63	63.0	1.51 (0.80-2.86)
No adequate protein	66	66.0	59	59.0	1.35 (0.73-2.50)
Much salty diet intake	78	78.0	64	64.0	1.99 (1.02-3.91)

Table (4): Distribution of pre-eclampsia (PE) cases and control group according to medical, gynecological and obstetric risk factors.

Medical, gynecological and obstetric risk factors	PE cases (n=100)		Control group (n=100)		OR (95% CI) OR (95% ECL)*
	No.	%	No.	%	
Medical :					
Obesity (BMI≥30 kg/m²)	76	76.0	61	61.0	2.02 (1.05-3.90)
Diabetes mellitus	15	15.0	5	5.0	3.35 (1.09-12.23)*
Asymptomatic bacteriuria	16	16.0	5	5.0	3.62 (1.19-13.10)*
Urinary tract infection	13	13.0	4	4.0	3.59 (1.05-15.58)*
Stress	16	16.0	6	6.0	2.98 (1.04-9.70)*
Obstetric/gynecologic:					
Polyhydramnios	13	13.0	4	4.0	3.59 (1.05-15.58)*
Vaginal infection/vaginosis	12	12.0	3	3.0	4.41 (1.13-24.97)*

Table (5): Distribution of neonates of the pre-eclampsia (PE) cases and control group according to disease impacts.

Fetal and neonatal impacts of PE	PE cases (n=109)		Control group (n=101)		Yates χ² t- value*	P-value
	No.	%	No.	%		
Fetal growth restriction:						
Yes	32	29.4	6	5.9	17.85	0.0002
Preterm labor (n=100):						
Yes	8	8.0	1	1.0	FE: P-value= 0.04	
Birth weight						
<2.5 kg	13	11.9	3	3.0		
≥2.5 kg	96	88.1	98	97.0	4.77	0.03
Neonatal intensive care admission:						
Yes	14	12.8	3	3.0	5.61	0.02
Perinatal deaths:						
Yes	1	0.9	0	0.0	FE: P-value= 1.00	
1-minute Apgar score	4.62±1.37		6.16±1.09		-9.046*	0.000
5-minute Apgar score	6.41±1.88		8.89±1.32		- 11.127*	0.000
Hb (g/dl)	14.12±5.23		18.22±5.74		- 5.397*	0.000

4. Discussion

PE results from the interaction between economic, psycho-social, nutritional, environmental and genetic factors (López-Jaramillo et al., 2001).

PE being more common in poor women long ago, numerous conflicting hypotheses were advanced (Roberts et al., 2003a). Further, there is a high rate of PE in developing countries (Caughey et al., 2005). Lower education level attainment reduces access to medical care for screening and is often associated with greater exposure to poor nutrition, physical inactivity, being overweight and other risk factors (Howard et al., 1992). In Egypt, 32.0% of the PE cases were illiterates compared to 26.0% of the controls, and 28.0% of the cases had up to secondary education compared to 34.0% of the controls, but the differences were insignificant (Mahaba et al., 2001a). Further, PE incidence was higher among manual workers (Baired, 1969). On the other hand, there was no significant difference between PE cases and controls regarding housewives and employees (P=1.0) (Ziaei et al., 2008). Also, In Egypt PE was found among 16.0% and 5.0% of rural and urban pregnant residents, respectively (Gadalla et al., 1986). Collectively, lower socioeconomic class is reported to have a higher incidence of PE. Poor ante-natal care, improper nutrition and increased incidence of concealed pregnancies are confounding factors. Also, the increased in the incidence of severe PE in very young girls may reflect the greater tendency to social neglect among this group. Further, reports on PE during war, famine and drought refer to the effects of war on the incidence of PE during the two major World Wars; higher incidence of PE/eclampsia was reported in Germany. Also, there is probably a difference in the incidence of PE among racial groups; its incidence in white races is 6.2%, while it is 8.5% in black race. This variation is mostly due to genetic factor that relates underlying chronic hypertension (MacGillivary, 1983). The differences between races may reflect the differences in genetic, nutritional, environmental and socioeconomic state.

There is a J-shaped curve for relationship between maternal age and the incidence of PE with a slightly increased pattern among young pregnant and a markedly increased incidence among the older ones, more than 35 years (MacGillivary, 1983 and Rosalia et al., 1998). So, advanced age is common risk factor for PE (Duckitt and Harrington, 2005). Also, the incidence of severe PE is more in pregnant teen aged girls. However, it remains uncertain whether this truly an increased in the incidence of severe PE in very young girls, or whether it is a reflection of the greater tendency to social neglect among them (MacGillivary, 1983). In young primigravida the increase incidence of PE may be due

to poor immune capacity at young age, while increased incidence with increasing age may probably reflect the increasing incidence of essential or latent essential hypertension (Davey, 1995). Further, women over 40 had a three-fold increased incidence of hypertension compared to control women aged 20-30 years (MacGillivary, 1983). On the other hand, some studies didn't found significant age difference between PE cases and controls (Caughey et al., 2005; Lou et al., 2008; Kolusari et al., 2008, and Ziaei et al., 2008).

At the same time, the length of sexual relation is inversely related to the incidence of PE, a sexual relationship of less than 4 months comparing to a sexual relationship of at least 12 months is associated with a 7-fold increased risk of development of PE (Wang, 2003). Also, PE is more common in women implanted with an oocyte fertilized with surgically obtained sperm rather than their partner's ejaculated sperm (Wang et al., 2002). These data suggest that the protective effect of semen exposure on the later development of PE is associated with exposure to sperm cells, or a factor closely linked with sperm in the ejaculate (Wang et al., 2002 and Wang, 2003). PE has been regarded as a disease of primigravidae, and it is suggested that a previous pregnancy is protective against the development of PE (Campbell and MacGillivary, 1985). Studies observed that the combination of primigravidity and age over 35 years leads to a much higher risk of developing PE (Campell et al., 1985). Also, our result is consistent with Mahaba et al. (2001a); they reported that 70.0% of their pre-eclamptic cases were primigravidae. Further, the risk of PE in a second pregnancy increases with maternal age, 1.3/5 years of increased age (Lie et al., 1998).

The risk of PE is increased in circumstances where formation of blocking antibodies to antigenic sites on the placenta might be impaired. This may arise where immunization by previous pregnancy is lacking as in first pregnancies (Cunningham et al., 2010). Major support for this hypothesis comes from studies that show the protective effect of sperm exposure (Dekker et al., 1998). Also, the risk of PE in a second pregnancy increases with interval between pregnancies, 1.5/5 years interval between first and second pregnancies (Lie et al., 1998 and Skjaerven et al., 2002). Also, PE is more frequent in multiple pregnancies (Sibai et al., 2000). Induced and spontaneous abortions are reported to be associated with decreased risks of PE (Eras et al., 2002). In details, prior abortion in the second trimester was found to be protective against PE, but prior first trimester abortion was risk factor (Campbell and MacGillivary, 1985). Also, about 1/3 of women who have had eclampsia in their first pregnancy developed PE in a later pregnancy; the prevalence of chronic

hypertension in these women with recurrent PE is high (Sibai et al., 1987).

Susceptibility to PE is highly heritable. Population based studies have shown a strong familial tendency to PE (Cooper et al., 1993). The single gene hypothesis fits with PE, but multi-factorial inheritance can't be excluded (Chesley and Cooper, 1986). Also, maternal predisposition to PE has been reported (Esplin et al., 2001; Nilsson et al., 2004 and Skjaerven et al., 2005). It seems reasonable to attribute patterns of familial predisposition to genetic inheritance. Daughters born after a pre-eclamptic pregnancy may carry their mothers' susceptibility genes, as well as genes from either parent that operate through the fetus (Lie et al., 1998 and Esplin et al., 2001). The proportion of preterm PE was 10.0% in the parents and 22.0% in the offspring. Women who were born after a pre-eclamptic pregnancy had more than twice the risk of having PE in their first pregnancy (OR=2.2, 95% CI: 2.0-2.4), and still had the same risk (OR=2.3, 95% CI: 1.8-2.9) of PE in their second birth compared to other women. Further, sisters who were not themselves born after a pregnancy complicated by PE were at increased risk of PE compared to women with no family history of PE (OR=2.0, 95% CI: 1.7-2.3). Also, women born after pre-eclamptic pregnancies were more likely to trigger severe PE in their own pregnancy (OR=3.0, 95% CI: 2.4-3.7) (Skjaerven et al., 2005). However, we cannot exclude potential confounding by other risk factors. But, a stronger familial association for clinically severe PE than for mild was found (Vatten et al., 2004). Further, maternal genes and fetal genes from either the mother or father may trigger PE. The maternal association is stronger than the fetal association. The familial association predicts more severe PE (Skjaerven et al., 2005). Also, change of partner between births has been associated with the risk of PE (Cnattingius et al., 1997 and Skjaerven et al., 2002). Major support for this hypothesis comes from epidemiological studies that show the impact of a change in partners, and the increased frequency of PE after donor insemination and oocyte donation (Dekker et al., 1998). Men who fathered a pre-eclamptic pregnancy were nearly twice as likely to father a pre-eclamptic pregnancy in a different woman, regardless of whether she had already had a pre-eclamptic pregnancy or not (Lie et al., 1998). Also, among women with two consecutive births; women without PE/eclampsia in the first birth, changing partners resulted in a 30.0% increase in the risk of PE/eclampsia in the subsequent pregnancy compared to those who didn't change partners. While, among women with PE/eclampsia in the first birth, changing partners resulted in a 30.0% reduction in the risk of PE/eclampsia in the subsequent pregnancy. The difference of changing paternity effect on PE/eclampsia risk between women with and without a history of PE/eclampsia was significant. These findings support the hypothesis that parental human leukocyte antigen sharing may play a role in the etiology of PE/eclampsia (Li and Wi, 2000).

Poor ante-natal care is risk factor for PE (MacGillivary, 1983). But, in this work poor ante-natal care is insignificant risk factor. PE is not a common cultural concept among most of the mothers in Egypt, more than half of our cases were belong to low social level. Also, physical inactivity might be risk factor for PE (Howard et al., 1992). Evidence suggests that physically active women are less likely to develop PE. Regular exercise resulted intracellular and extracellular conditions that should counteract the enhancement of oxidative stress, thus interfering with the process leading to endothelial dysfunction (Yeo and Davidge, 2001). On the other hand, bed-rest has been successfully used as effective method of treating hypertensive disorders of pregnancy. Also, there have been many reports that the incidence of PE is lower among smokers than among nonsmokers (Cnattingius et al., 1997 and Conde-Agudelo et al., 1999). So, smoking during pregnancy is protective (Conde-Agudelo et al., 1999). The incidence of PE in cigarette smokers is about 50.0% that in non-smokers. This is due to the presence of hypotensive agents as thiocyanate in tobacco (Darby and Wilson, 2002). However, this benefit is cancelled out by the substantial negative effect of smoking on fetal growth, risk for placental abruption, general health hazards and increases the incidence of fetal mortality (WHO, 1987 and Cnattingius et al., 1997). Marriage may serve as partial proxies for mothers' smoking, as married had a higher risk of PE (possibly reflecting a lower prevalence of smoking) than non married was negatively associated with PE (Basso et al., 2006).

Nutrition has long been hypothesized to have a role in the etiology of PE. The hypotheses have been diverse and often mutually exclusive (MacGillivary, 1983). There are several reports showing that metabolic- and mineral level changes are associated with abnormalities of pregnancy (Adam et al., 2001). The incidence of PE is more common in poor women. This suggested that nutrients might be involved in the disorder. But, in many studies PE is poorly defined and nutritional data are obtained on women with PE (Roberts et al., 2003a). It is now well understood that, while PE is clinically evident late in pregnancy, the causal exposure(s) and many of the pathophysiologic changes are present months earlier. Periconceptional exposures may be particularly relevant, as they may affect implantation and/or decidual vascular remodeling (stage 1 of PE) (Bodnar et al., 2006). It is

indicated that women with PE had a lower intake of energy, protein and fats than did controls. However, further interrogation indicated that these differences occurred after the woman became ill and were considered to be secondary to the disease rather than causal (Davies et al., 1976). Excess intake of protein, calories, sugar and sodium is associated with onset of PE (Lauro et al., 1997). High intake of polyunsaturated fatty acids, energy and sucrose is associated with increased risk of PE (Clausen et al., 2001). Diet in the past year was assessed at delivery in women with and without PE. It was found that intakes of vitamin C, fruits and vegetables below recommended values were associated with increased risk of PE (Zhang et al., 2002). However, periconceptional and prenatal intakes were not assessed separately in this study, so it is difficult to discern during which time period low vitamin C, fruit and vegetable intakes were most relevant for the development of PE (Bodnar et al., 2006). Also, certain nutrients found in multivitamins, such as vitamin C and vitamin E, have been given in form of supplement, starting in mid pregnancy and have been reported to reduce the risk of PE (Chappell et al., 2002; Roberts et al., 2003a and Bodnar et al., 2006). Energy intake was higher in women with PE and highest in early onset PE. The main difference between cases and controls was an increased intake of sucrose-containing soft drinks (Clausen et al., 2001). Other study found no difference in the energy intake between cases and controls (Morris et al., 2001). Although the belief that low protein intake is associated with an increased risk of PE (Brewer, 1976), none of the studies indicated reduced protein intake in women with or destined to develop PE. This is supported by trials of protein supplementation that did not reduce the incidence of PE (Herrera et al., 1998 and Crowther et al., 1999). Collectively, women with well-defined PE were examined with a crude food frequency questionnaire and no gross nutritional differences were found (Atkinson et al., 1998).

In the present study several medical disorders such as obesity, diabetes, urinary tract infections…etc were found to be risk factors for PE. There is general agreement that the incidence of PE is higher in obese women (Sibai et al., 1997; Ros et al., 1998; Roberts & Cooper, 2001 and Skjaerven et al., 2005). So, elevated BMI is risk factor for PE (Duckitt and Harrington, 2005). Women with a greater BMI in pregnancy are more likely to become hypertensive than those with a lower BMI (Pipkin, 2001). The increase in PE over time may reflect increases in BMI in recent years (Midthjell et al., 1999). Weight of the PE patients and controls was 81.0±13.9 and 69.0±14.0 kg, respectively with a statistically

significant difference (Mahaba et al., 2001a). Evidence suggests that the association with obesity may be limited to the relatively mild type of PE with term delivery (Odegard et al., 2000). Education may serve as partial proxies for obesity, because higher education, which may correlate with lower BMI, was negatively associated with PE (Basso et al., 2006). On the other hand, Lou et al. (2008) and Ziaei et al. (2008) didn't found significant BMI difference between PE cases and controls.

Diabetes is an important risk factor for PE (Ros et al., 1998; Roberts & Cooper, 2001 and Funai et al., 2005). In the present study we found that DM is risk factor for PE. PE has been frequently reported as a complication of gestational diabetes. But, the relationship between these two conditions is not well understood (Vambergue et al., 2002). Common risk factors, such as elevated BMI and advanced age have been noted for each of the two conditions (Duckitt and Harrington, 2005). Also, there might be underlying common pathophysiology; insulin resistance (Ostlund et al., 2004 and Scioscia et al., 2009), chronic inflammation (Borzychowski et al., 2006 and Scioscia et al., 2009) and endothelial dysfunction (Roberts and Gammill, 2006). Early insulin resistance is associated with late pregnancy PE (Wolf et al., 2002). There is a 5.0% increase in the incidence of PE in pregnant diabetics. Also, the increased incidence of PE could be partially explained by the poor control of the diabetes; and in some of the cases, there may have been underlying renal disease, rather than true PE (White, 1965).

A growing body of evidences link infections with PE (Sacks et al., 1998 and López-Jaramillo et al., 2001). Generalized inflammatory state is feature of PE. Maternal leukocytes and maternal endothelium are contributors (Raijmakers et al., 2004). The incidence of asymptomatic bacteriuria was higher in pregnant women with PE (19.0%) than in normal gravidas (3.0%-6.0%) (Hill et al., 1986). Also, the incidence of urinary tract infection in pre-eclamptic women was higher than in normal pregnant women (Hsu and Witter, 1995). Further, urinary tract infection was shown to be a strong risk factor for PE (OR=4.23, 95% CI: 1.05-5.09) (Abi-Said et al., 1995). During pregnancy, urinary tract infection was associated with nearly a 2-fold increased risk for PE. Further, primiparas who had a urinary tract infection were five times more likely to develop PE than those who did not have urinary tract infection during pregnancy (OR=5.3, 95% CI: 2.9-9.7) (Mittendorf et al., 1996). The role of infection in the pathogenesis of PE is particularly relevant in developing countries, where the high incidence of chronic sub-clinical infection may contribute to the high incidence of PE (López-Jaramillo et al., 2001). Further, pregnant women with

asymptomatic bacteriuria, and vaginal infections and bacterial vaginosis who were identified and treated had a 64.0% reduction in incidence of PE. This dramatic reduction was due to the early identification and principally treatment of asymptomatic infections. But, it is not possible to make a definitive statement that infection is the major risk factor for PE. It is proposed that chronic sub-clinical infections may increase maternal cytokines to levels high enough to affect vascular endothelial function in women with a predisposition to develop PE (Herrera et al., 2001).

Depression and anxiety in early pregnancy are associated with the risk for PE (Kurki et al., 2000). In the present study maternal strain might be a cause of PE. This was in accordance with MacGillivary (1983). PE is a state of sympathetic over activity, which reverts to normal after delivery. The increase in peripheral vascular resistance blood pressure (BP) in PE is mediated, partially, by a substantial increase in sympathetic vasoconstrictor activity (Roberts, 1998). High levels of stress can lead to a temporary but dramatic increase in BP (Tobe et al., 2005 and Mohammed, 2009). Further, if the subject try to relax by eating more or drinking alcohol, you may only fuel, problems with high BP (Tobe et al., 2005). If stress itself is a risk factor, it could be because chronic stress exposes to unhealthy, persistently elevated levels of stress hormones like adrenaline and cortisol (Murray and Pizzorno, 2006).

There might be an increased incidence of PE in polyhydramnios cases that may be due to the associated hyper-placentosis (Roberts, 1998 and Ros et al., 1998). There is a stimulation of nerve endings along smooth muscles of the wall of the uterus causing spasm of the renal artery. The subsequent renal ischemia led to proteinuria and activation of the rennin-angiotensin system thus leading to hypertension. Both hypertension and proteinuria result in edema of the different tissues (Hays and Smetter, 1986; Roberts, 1998 and Ros et al., 1998).

There are reports showing that metabolic- and mineral level changes associated with abnormalities of fetal growth (Adam et al., 2001). But, the major cause of fetal compromise in PE is reduced uteroplacental perfusion (Lindheimer et al., 1999). The intervention that effectively reverses PE is delivery (Meis et al., 1998). PE is associated with a significant risk for pregnancy unfavorable outcome including preterm birth, low birth weight and perinatal deaths (Nosseir et al., 1990 and El-Houseinie et al., 1994). Preterm delivery substantially increases the risk of neonatal death (Kramer et al., 2000). Collectively, the pregnancy unfavorable outcome may lead to the observed lower 1- and 5-minutes Apgar scores and level of Hb in the neonates of PE cases compared to controls' neonates. The

association of PE with fetal IUGR is well known especially in pregnancies with early onset disease (El-Houseinie et al., 1994 and Xiong et al., 2000). Abnormal placenta is clearly involved in the genesis of both PE and fetal IUGR (Cross, 1996). It has been proposed that product(s) of the fetal-placental unit enter circulation and then initiate the maternal pathophysiologic changes of PE (Roberts et al., 1990). However, there is evidence that both feto-placental and maternal factors interact in manifesting endothelial cell dysfunction and its clinical manifestations (Taylor and Roberts, 1999). Preterm labor may occur spontaneously in cases of PE and eclampsia. However, it is more likely to be due to artificial induction (Ferris, 1990). Hypertensive pregnant patients have 3-4 times more preterm deliveries than did the normotensive women (Lin et al., 1982 and El-Houseinie et al., 1994). PE is a primary and important indication for preterm delivery in, especially, developed (Goldenberg and Rouse, 1998) and in developing (El-Houseinie et al., 1994; Kolusari et al., 2008 and Ziaei et al., 2008) countries, a trend encouraged in part by the increasing ability to manage extremely preterm infant in highly equipped neonatal intensive care units (Friedman et al., 1999). As expected infants of PE women were delivered earlier and, therefore, there was significant difference in birth weight of the neonates of PE patients compared to controls (2.26±0.91 vs. 3.22±0.41 Kg, P<0.001) (Kolusari et al., 2008). So, there is a significant increase in number of neonatal admission to intensive care units among the neonates of the PE group as a result of more preterm deliveries and a more prevalence of low birth weight babies (Ananth et al., 2005). Delivery exchanges a sick fetus for a sick premature infant (Goldenberg and Rouse, 1998). However, medically indicated preterm delivery may help prevent stillbirth (Ananth et al., 2005). But, the infant might then pay a high compensatory price in postnatal increased risk. Such risk could persist well beyond the neonatal period but be difficult to detect on a population level because of the overall declining trend in infant mortality (Basso et al., 2006). Also, PE is associated with 5-fold increase in perinatal mortality (Hauth and Cunningham, 1999). A large proportion of the perinatal mortality is consequently due to iatrogenic prematurity. Up to 15.0% of preterm births are a result of PE (Meis et al., 1998). Among pre-eclamptic pregnancies, inductions before 37 weeks increased from 8.0% in 1967-1978 to 20.0% in 1991-2003. During this 35 year, the risk of stillbirth decreased from 4.2 to 1.3 in PE compared to normal pregnancies. Also, the risk of neonatal death after pre-eclamptic pregnancy remained relatively stable, 1.7 vs. 2.0. Later infant and childhood mortality also showed little change. Fetal survival in pre-eclamptic

pregnancies has vastly improved over the past 35 years, presumably because of more aggressive management. However, the relative risk of neonatal death following a pre-eclamptic pregnancy has not changed over time. So, PE still carries a 2-fold increased risk of neonatal death (Basso et al., 2006). A review of clinical trials of delayed versus immediate delivery in fact suggested better outcomes with delayed delivery in well-selected patients (Friedman et al., 1999). So, when PE occurs early in pregnancy, even a few more days in uterus may be a key to a new born survival (Friedman et al., 1999 and Sibai, 2003). Also, as there is a paradoxical effect of smoking in pre-eclamptic women; smoking increases the rates of perinatal mortality, abruptio placentae and IUGR (Cnattingius et al., 1997). Further, PE is associated with a higher risk for cerebral palsy of the newborn (Report the Task Force ACOG/AAP, 2003), and it is associated with a higher risk for persistent pulmonary hypertension of the newborn (Hernández-Díaz et al., 2007). Also, 1- and 5-minutes Apgar scores of the neonates of PE patients were significantly lower than controls (Kolusari et al., 2008 and Ziaei et al., 2008).

Conclusions and Recommendations

PE risk factors can be manipulated, so primary preventive strategies are important. Good ante-natal care, screening, early detection and interventions for PE should be strengthened by all health team members. Also, limited information of health team members about maternal dietary intake as well as trace elements content of food consumed by this vulnerable group of population limited their ability to assess diet intake of the micro- and macro-nutrients and risk of PE. Further, early detection demands careful ante-natal care at appropriate intervals, especially in women predisposed to PE. Major risk factors are primipara, family history of PE, multiple fetuses, diabetes, urinary tract infection, low social level and obesity. Also, fetal IUGR, preterm labor, low birth weight and neonate intensive care admission were more common in PE. A program of bio-psycho-social risk assessment must be developed and added to standard ante-natal care. This allows identifying pregnant women at risk for PE, helps to define nutritional supplementation interventions to prevent PE, and to screen and treat asymptomatic urinary tract and cervical infections, thus reducing maternal and perinatal morbidity and mortality. We recommend improving ante-natal care, health education and conducting more population based studies on large number of pregnant women to understand the epidemiology of PE and its impacts on mother and her fetus and infant in Egypt.

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Amniotic Fluid Selenium And Maternal Biochemical Findings Among Pre-Eclamptic Women In Cairo, Egypt

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ABSTRACT: Introduction: Pre-eclampsia (PE) is a multi-factorial and a multi-system disease. Selenium (Se) may be one of the disease causes. **Objectives**: The aim of this study was to find out the mean level of amniotic fluid selenium and the biochemical profile among the pre-eclamptic mothers and controls in Cairo, Egypt. **Subjects and methods**: A case-control, hospital based study design was used. All the cases and controls were examined laboratory. **Results**: The mean amniotic fluid Se level was lower among pre-eclamptic cases; total, mild and severe compared to controls with a statistically significant differences (P=0.00, 0.00 and 0.00, respectively). Further, the difference was statistically significant between mild and severe cases (P=0.00). Also, the mean hemoglobin level, mean hematocrit percent and mean platelet count were lower among pre-eclamptic cases compared to controls with statistically significant differences (P=0.00 for each of them). While; the mean lipid profile (except SHDL-cholesterol), mean liver enzymes levels, mean blood urea level, mean fasting blood glucose level and indicators of infections and/or inflammatory processes, mean total leucocytic count and mean C-reactive protein level were higher among pre-eclamptic mothers compared to controls with statistically significant differences (P=0.00 for each of them). On the other hand, the mean serum createnine level was higher among pre-eclamptic cases compared to controls with a statistically insignificant difference. Further, these differences were also present between the mild and severe PE cases. Lastly, the most important significantly correlated factors of severe PE were low amniotic fluid Se, high total leukocytic count, high fasting blood glucose and C-reactive protein levels (P=0.01, 0.02, 0.02, 0.03, respectively). **Recommendations**: Early ante-natal care, including health education, and treatment of pre-eclamptic women are recommended. Se supplementation may be a way to prevent PE. Population based studies are needed in different areas in Egypt on large number of pregnant women to determine their biochemical profile and to find out other possible trace element deficiencies that might be risk factors for PE.
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Keywords: Amniotic Fluid Selenium; Maternal Eclamptic Women; Cairo; Egypt

INTRODUCTION

Pre-eclampsia (PE) is an inflammatory state characterized by maternal endothelial dysfunction and leukocyte activation (**Raijmakers et al., 2004a**). It is pregnancy-specific condition and it is major complication of pregnancy (**Roberts, 1998a**). PE has a multi-systemic nature (**Roberts, 2000** and **Roberts et al., 2003**). Also, PE can progress rapidly; putting mother at severe risk if there is no good management (**Basso et al., 2006**).

In spite of importance of PE, its etiology is unknown (**López-Jaramillo, 2000**). The proposed "2-stage model" (**Roberts and Cooper, 2001)** in which reduced placental perfusion leads to release of vasoactive factors and occurrence of the maternal syndrome; is likely to provide a simplified, yet largely accurate, description of the origin of severe early-onset disease, but may be less relevant for later-onset milder disease (**Redman and Sargent, 2000**). The proposed role of the placenta in the pathology of PE is also strongly supported by the rapid resolution of symptoms after delivery. Although there is clearly a focal role for placental dysfunction in PE, a number of theories are proposed to explain how this may be associated with the maternal syndrome (**Hubel, 1999** and **Levine et al., 2004)**.

PE is much more than hypertension and proteinuria. Increased attention to the multi-systemic nature of PE, activation of coagulation and increased sensitivity to pressor agents has expanded understanding of it (**Roberts, 2000** and **Roberts et al., 2003**). A basic feature of PE pathophysiology is reduced perfusion of virtually all organs, which is due to vasoconstriction, microthrombi formation and reduced circulating plasma volume. The vasoconstriction is secondary to an increased sensitivity of the vasculature to pressor agent. Activation of the coagulation cascade produces microthrombi. The reduced plasma volume, reflecting an endothelial leak with fluid loss from the intravascular compartment, further compromises perfusion. These abnormalities precede clinically evident disease by weeks to months and have led to the suggestion that a primary target in PE is the vascular endothelium (**Roberts et al., 1990** and **Roberts, 1998b)**.

PE is a complex disorder caused by a series of genetic, nutritional and environmental factors that lead to the creation of an imbalance between the free radicals; nitric oxide (NO), superoxide (O_2^-) and peroxynitrate in the vascular endothelium (**López-Jaramillo, 2000**). The placenta appears to be the principal source of free radical synthesis. Deleterious effects of free radicals include initiation of lipid peroxidation, oxidative damage of biomolecules, and cellular dysfunction. It is proposed that these may initiate maternal vascular endothelial dysfunction and leukocyte activation, recognized features of PE (**Raijmakers et al., 2004a**).

A pivotal role of enhanced placental superoxide generation leading to oxidative stress (OS) is increasingly recognized (**Hubel, 1999** and **Raijmakers et al., 2004b**). Placental OS has been shown to be a key feature in the pathogenesis of PE. OS is an imbalance between the cellular generation of reactive oxygen species and the capacity of antioxidants to prevent oxidative damage. The expression and activity of important antioxidant proteins are decreased in placental tissues from pre-eclamptic women, resulting in an imbalance between prooxidants and antioxidants leading to OS. Two of these antioxidant proteins are glutathione peroxidase (GSH-Px) and thioredoxin reductase enzymes that have selenocysteine within their active site and are selenium (Se)-dependent for activity (**Walsh, 1998; Hubel, 1999** and **Redman & Sargent, 2000**). In a suitable maternal environment, OS and subsequent endothelial activation and injury result (**Roberts and Hubel, 1999**). This endothelial dysfunction initiates the coagulation cascade and ensuing multi-system sequelae (**Surratt, 1993**).

The trace element Se level lowers during pregnancy. Further, lower Se concentration and GSH-Px activity have been noticed in pregnant women compared to pre-pregnancy status (**Sibai et al., 2000**) and non pregnant women (**Ferrer et al., 1999**). Se is capable of limiting adverse endothelial effects. Se removes the products of attack by reactive oxygen species (hydro-peroxides and oxidized lipoproteins), which can break down to further reactive free radicals and cytotoxic agents (**Rayman, 2000**).

Considered risk factors of PE are nutrition deficiencies (**Roberts et al., 2003**), obesity (**Roberts and Cooper, 2001**), diabetes (**Funai et al., 2005**) and genitourinary infection and inflammatory processes (**López-Jaramillo et al., 2001**).

STUDY OBJECTIVES

1- To find out the mean levels of amniotic fluid selenium among the pre-eclamptic mothers in Cairo, Egypt.

2- To determine the biochemical profile of the pre-eclamptic mothers in Cairo, Egypt.

SUBJECTS AND METHODS

I- Study Questions: Is there amniotic fluid selenium deficiency in the pre-eclamptic women? Is there a biochemical profile disturbance in the pre-eclamptic women? Is there correlation between amniotic fluid Se and biochemical markers, and severity of PE?

II- Study Design: A case-control, hospital based design was used to investigate the current research problem.

III- Study Setting: This study was conducted in the Obstetric and Gynecology Department, Al-Hussein Hospital, Al-Azhar University.

IV- Study Sample: According to sample size equation the sample was 86 cases, and to guard against sample size bias we increased the sample to be 100 PE cases. So, all the cases of PE attending the Obstetric and Gynecology Department, Al-Hussein Hospital, Al-Azhar University were included in the study tell sample reached the required number; 100. For each pre-eclamptic patient a healthy pregnant woman was chosen randomly. So, a control group of 100 healthy pregnant women was recruited.

All the PE patients must be fulfilling the following inclusion criteria: 1) Age of patients up to 30 years, 2) Gestational age 33 weeks, 3) Have a definite specific diagnosis of PE. Also, all patients recruited in this study have fulfilled the following specific exclusion criteria: 1) Essential hypertension, 2) Pregnancy induced hypertension without proteinuria, 3) Intake of vitamins/antioxidants during the current pregnancy, 4) Blood diseases, 5) Kidney disease, 6) Liver disease, 7) Intrauterine fetal death, and 8) Ante-partum hemorrhage.

The controls enrolled in the study have fulfilled the following inclusion criteria: 1) Age up to 30 years, 2) Have no history of PE in the current or previous pregnancy, and 3) Gestational age 33 weeks. Also, the controls have fulfilled the same specific exclusion criteria used for the patients group.

V- Ethical Consideration: The purpose of the study and procedures to be performed were explained to the cases and controls, an oral consent to participate in the study was taken accordingly. All patients were managed properly to control PE. All the cases and controls were delivered spontaneously in the normal vertex position or by Caesarian section according to the condition of each case.

VI- Study Tools and Methods:

1- Diagnosis of PE: All patients must be fulfilling the following inclusion criteria: 1) Hypertension: Blood pressure (BP) 140/90 mmHg, 2) Proteinuria: Trace or more by dipstick method, and 3) Bilateral lower limb edema: +1.

Pregnancy-induced hypertension is defined as BP 140/90 mmHg (mild PE) and BP 160/110 mmHg (severe PE) (**National Education program Working Group on High Blood Pressure, 2000**). Proteinuria, trace to +1 (mild PE) and +2 (severe PE). Two random midstream urine specimens, collected 4 hours apart taken from each woman to avoid error due to false positive tests, were used for detection of proteinuria. The two results must be positive, so the diagnosis of proteinuria was significant (**MacGillivary, 1983**). Edema is a common feature of pregnancy, but edema of PE is pathological (+1) and not just dependant; it usually involves the face, hands and persists even after arising (**Cunningham et al., 2010**).

2- Laboratory investigations: Laboratory examinations were done in all cases and controls. Fasting venous blood samples, 10 ml, were taken for lab examinations. These examinations were complete blood count (CBC), renal function tests; serum (S) urea and S. creatinine, total S. cholesterol, S. triglycerides (TG), S. high and low-density lipoprotein cholesterol (SHDL-& SLDL-cholesterol), and liver enzymes; alanine amino-transferase (ALT) and aspartate amino-transferase (AST).

CBC was estimated by ABX MICROS, MEDONIC MING 60 cell counter. C-reactive protein (CRP, mg/L) was determined quantitatively using slide agglutination test. Total S. cholesterol (mg/dl) was determined by an enzymatic technique according to **Richmond (1973)**. While, S. TG (mg/dl) was determined according to **Esders and Michrina (1979)**. SLDL-cholesterol (mg/dl) was precipitated by the addition of phosphotungestic acid in presence of magnesium ions. The supernatant obtained contains HDL, from which cholesterol was determined enzymatically according to **Steele et al. (1976)**. LDL-cholesterol was calculated according to the Friedwald's equation (**Friedwald et al., 1972**). Transaminases activity was measured by continuous monitoring method (**Bergmeyer et al., 1978**). Creatinine was measured by Jaffe method (**Spencer, 1986**), while, urea was measured by enzymatic method (**Titez, 2004**). Fasting blood glucose was measured by glucose oxidase method (**Gochman and Schmitz, 1972**).

A sample of 2 cc amniotic fluid was taken from each woman at time of the delivery to determine Se level (μg/L) by flameless atomic absorption spectro-photometer model 460-graphete 2000 according to **Thompson and Allen (1988)**. We decided to determine Se level in maternal amniotic fluid not in serum or plasma as the levels of Se in maternal serum and plasma might be decreased, partly, because increase blood volume and therefore increase hemodilution during pregnancy (**Rayman, 2002**). On the other hand, level of Se in amniotic fluid suggests a real level of maternal Se during pregnancy. This might

be because Se deposition in placenta and fetal tissues (**Mistry et al., 2008**).

VII- Statistical Analysis: Unpaired t student test and correlation co-efficient were used as tests of significance. The significance level was accepted if the P-value <0.05.

RESULTS

As regard the results of amniotic fluid examinations among the PE cases and control group (**table 1**), mean value levels of amniotic fluid Se in total PE cases and controls were 9.11±0.93 and 11.71±1.63 μg/L, respectively with a statistically significant difference (P=0.000). Also, mean value levels of amniotic fluid Se in mild PE cases and controls were 10.64±1.45 and 11.71±1.63 μg/L, respectively with a statistically significant difference (P=0.000). Lastly, mean value levels of amniotic fluid Se in severe PE cases and controls were 6.98±0.79 and 11.71±1.63 μg/L, respectively with a statistically significant difference (P= 0.000).

Regarding the results of amniotic fluid examinations among the PE cases according to severity (**table 2**), mean value levels of amniotic fluid Se in mild and severe PE cases were 10.64±1.45 and 6.98±0.79 μg/L, respectively with a statistically significant difference (P=0.000).

As respect the results of laboratory examinations among the PE cases and control group (**table 3**), mean and standard deviation values of hemoglobin and percent of hematocrit values of the patients and controls were 9.72±0.64, 11.05±0.59 g/dl and 29.11±2.41, 34.25±1.43%, respectively with statistically significant differences (P=0.000 for each of them). Also, mean and standard deviation value level of fasting blood glucose of the patients and controls were 137.31±46.18 and 92.27±26.15 mg/dl, respectively with a statistically significant difference (P= 0.000). Regarding mean platelet count of the patients and controls, they were 172.22±29.98 and 231.91±31.22 thousand/cmm, respectively with a statistically significant difference (P=0.000). As respect lab results indicating infection, mean and standard deviation leucocytic count and C-reactive protein values of the patients and controls were 12.80±3.47, 8.72±2.36 thousand/cmm and 9.53±2.82, 6.01±1.29 mg/L; respectively with statistically significant differences (P=0.000 for each of them). Regarding lab results of lipid profile, mean and standard deviation values of total serum triglyceride, cholesterol and HDL-& LDL-cholesterol of the patients and controls were 258.82±86.11, 182.17±62.37 mg/dl; 246.57±56.92, 189.58±53.29 mg/dl; 41.27±9.16, 49.86±7.65 mg/dl and 167.96±49.38, 129.29±34.13 mg/dl, respectively, with statistically significant differences (P=0.000 for each of them). As respect lab

results of renal function tests, mean and standard deviation values of S. urea of the patients and controls were 32.52±2.85 and 23.41±3.88 mg/dl, respectively with a statistically significant difference (P=0.000). While, mean and standard deviation values of S. creatinine was 0.85±0.27 mg/dl for patients and 0.81±0.16 mg/dl for controls with a statistically insignificant difference (P=0.2). Regarding lab results of liver enzymes, mean and standard deviation value levels of ALT and AST of the patients and controls were 38.20±11.32, 27.90±6.12 and 33.75±8.53, 24.87±4.81 U/L, respectively with statistically significant differences (P=0.000 for each of them).

As regard the biochemical results of laboratory examinations among the mild and severe PE cases **(table 4)**, mean and standard deviation value levels of hemoglobin and mean percent of hematocrit values of the mild and severe PE patients were 10.18±0.68, 9.29±0.56 g/dl and 32.01±1.11, 27.19±2.01%, respectively with statistically significant differences (P=0.000 for each of them). Also, mean and standard deviation value level of fasting blood glucose of the mild and severe PE patients were 131.21±19.05 and 161.11±26.71 mg/dl, respectively with a statistically significant difference (P=0.000). As regard platelet count values of the mild and severe PE patients, they were 191.23±31.22 and 156.21±21.18 thousand/cmm, respectively with a statistically significant difference (P=0.000). As respect lab results indicating infection, mean and standard deviation leucocytic count and C-reactive protein mean values of the mild and severe PE patients were 8.12±2.03, 13.96±3.52 thousand/cmm and 8.21±1.02, 11.24±2.12 mg/L; respectively with statistically significant differences (P=0.000 for each of them). As regard lab results of lipid profile, mean and standard deviation values of total serum triglyceride, cholesterol and HDL-& LDL-cholesterol of the mild and severe PE patients were 214.37±42.11, 288.52±97.81 mg/dl; 218.81±31.91, 266.82±67.24 mg/dl; 45.86±9.50, 36.65±6.86 mg/dl and 149.25±46.32, 192.87±53.80 mg/dl, respectively, with statistically significant differences (P=0.000 for each of them). Respecting lab results of renal function tests, mean and standard deviation values of S. urea of the mild and severe PE patients were 27.81±2.24 and 36.82±3.15 mg/dl, respectively with a statistically significant difference (P=0.000). While, mean and standard deviation values of S. creatinine was 0.83±0.26 mg/dl for mild PE patients and 0.89±0.29 mg/dl for severe PE with a statistically insignificant difference (P=0.3). Regarding lab results of liver enzymes, mean and standard deviation value levels of ALT and AST of the mild and severe PE patients were 35.50±8.21, 41.90±10.12 and 29.74±5.14, 38.54±8.93 U/L, respectively with

statistically significant differences (P=0.002 and P=000, respectively).

Respecting the correlation co-efficient of severe PE cases according to significant findings of the laboratory examinations of maternal serum and amniotic fluid **(table 5)**, mean low levels of amniotic fluid Se and mean high levels of leukocytic count, fasting blood glucose, C-reactive protein, SLDL-cholesterol, total S. TG, total S. cholesterol and ALT were significantly correlated with severe PE.

DISCUSSION

PE syndrome is recognized to be a multi-system disease of the pregnant mother **(Roberts et al., 2003)**. It results from the interaction between economic, psychosocial, nutritional, environmental and genetic factors **(López-Jaramillo, 2000)**. Further, PE is associated with an imbalance of increased lipid peroxides and decreased antioxidants **(Ziaei et al., 2006)**.

The trace element Se has a biological role as catalysts for endogenous antioxidant enzymes. Also, Se for glutathione peroxide enzymes is component of numerous metalloenzymes and cofactors for super dismutase enzyme **(Mahomed et al., 2000)**. An increased incidence of pregnancy-induced hypertension in selenium-deficient regions was reported **(Lu, 1990)**. Selenium depletion leads to loss of glutathione peroxidase (GSH-Px) and thioredoxin reductase activity, although no one has examined the placental expression of these proteins during PE and related this to Se status **(Vanderlelie et al., 2004)**. The suggested importance of the deficiencies of trace elements in PE relates to the fact that they are present in superoxide dismisses (copper, Selenium and zinc) and GSH-Px (Se). Also, messenger RNA expression for copper-zinc-superoxide dismisses and glutathione peroxidase is lower in pre-eclamptic placenta **(Rayman et al., 1996; Wang & Walsh, 1996; Mahomed et al., 2000** and **Rayman, 2000)**. Biomarker information on Se is conflicting. Whole blood and plasma levels of selenium are lower in pregnant compared to non-pregnant women **(Ferrer et al., 1999; Mihailovic et al., 2000** and **Atmar et al., 2005)** and decrease more as gestation proceeds **(Zachara et al., 1993** and **Sibai et al., 2000)**. Further, erythrocyte **(Zachara et al., 199**3); hair **(Guvenc et al., 1995)** and amniotic fluid **(Mihailovic et al., 2000** and **Rayman, 2000)** levels of Se are lower in pregnant compared to non-pregnant women. The decreased levels of Se in maternal serum and plasma might be, partly, because increase blood volume and therefore increase hemodilution during pregnancy **(Rayman, 2002)**. However, the decreased levels of Se in erythrocyte and amniotic fluid suggest a real decrease in maternal Se during pregnancy and this might be because Se deposition in placenta and fetal

tissues. Also, there was significant reductions in serum selenium concentrations and plasma GSH-Px activity in pregnancy per se compared to non pregnant controls. Moreover, these levels were further decreased in the pre-eclamptic mothers and babies compared to normal pregnancies. OS associated with PE may be a consequence of reduced antioxidant defense pathways specifically involving GSH-Pxs, perhaps linked to reduce Se availability. Reduced GSH-Pxs could be associated with increased generation of toxic lipid peroxides contributing to the endothelial dysfunction and hypertension of PE **(Mistry et al., 2008)**. In a study on 32 pre-eclamptic women and 28 healthy pregnant women, serum level of Se was measured by atomic absorption spectrometry. The study found the mean serum Se concentration in PE is 60.68±6.42 mg/dl and in healthy pregnant is 87.50±10.96 mg/dl. The difference between both groups was statistically significant (P<0.01) **(Atmar et al., 2005)**. Se concentrations in maternal and umbilical cord blood, and amniotic fluid were determined in normotensive and hypertensive women in relation to their smoking status. In the group of normotensive and hypertensive women, significantly lower Se concentrations in blood of smokers were observed than in nonsmokers. Umbilical cord blood Se concentrations in both normotensive and hypertensive smokers were significantly lower than in nonsmokers as well. In the group of normotensive women, significant differences in Se concentrations in amniotic fluid were observed between smokers and nonsmokers **(Kosanovic et al., 2010)**. Further, toe nail Se concentrations in pre-eclamptic women were significantly lower than in their matched normal controls **(Rayman et al., 2003)**. Measuring Se status by using the toe nail clippings was decided to overcome the difficulty experienced in previous studies of the PE process influencing tissue concentration of Se concerning increased plasma volume in normal pregnancy and smaller or non existent in blood volume in pre-eclamptic patients. In Egypt, decreased levels of Se have been observed in patients with PE **(Mekkay et al., 2007)**. Also, third trimester amniotic fluid Se level associated with PE was lower compared to normal pregnancy **(Dawson et al., 1999)**. So, Se supplementation could be used to lower the high incidence of PE **(Lu, 1990)**. Further, as 15.0% of these studied pre-eclamptic group are diabetics and we reported that diabetes is risk factor for PE **(El-Moselhy et al., 2011)**, so Se blood level is lower in gestational diabetic women **(Tan et al., 2001)**. On the other hand, increased levels of plasma Se have been observed in patients with PE compared to controls **(Mahomed et al., 1998)**. Also, median maternal leucocytic Se was 15.0% higher among pre-eclamptic women compared to normal pregnant **(Mahomed et al., 2000)**. Further, the increased levels of Se were

15.0% **(Ratman et al., 1996)** and 18.0% **(Gromadzinska et al., 1998)** among PE cases compared to their normal pregnant controls. At the same time, there was no observed significant difference as regard Se levels between pre-eclamptic women and normal pregnant controls **(Rayman et al., 1996)**. The differences in tissues and analytical techniques used to measure maternal Se status are possible explanation for why available studies concerning maternal Se status and the risk of PE are not combatable. Moreover, differences in population characteristics such as age, race, ethnicity, as well as country and region of residence may account for some of the variation in results across studies. Also, the potential limitation of some studies (as our study) must be considered as the retrospective design of the study that was unable to determine whether the observed alterations in Se concentration preceded PE or whether the alteration attributed to PE **(Mahomed et al., 1998** and **Mahomed et al., 2000)**.

The increase prevalence of anemia among the pre-eclamptic women might be attributing to their disease and low intake of nutrients **(Davies et al., 1976)**. Also, hemoglobin serves to transport nitric oxide, as S-nitrose cysteine, from the lungs to the peripheral circulation, where it can be released. Glutathione peroxidase (GSH-Px), besides being an important antioxidant, is known to catalyze the release of nitric oxide (NO) from smaller carrier molecules, and may play a role in the distribution of NO throughout the body **(Funai et al., 2002)**. So, an imbalance between the free radicals NO, superoxide (O_2^-) and peroxynitrate in the vascular endothelium occurs **(López-Jarmillo, 2000)**. Also, selenium (Se) depletion leads to loss of GSH-Px activity, although no one has examined the placental expression of this protein during PE and related this to Se status **(Vanderlelie et al., 2004)**.

PE has been frequently reported as a complication of gestational diabetes **(Vambergue et al., 2002)**. Also, diabetes is an important risk factor for PE **(Roberts & Cooper, 2001; Funai et al., 2005** and **El-Moselhy et al., 2011)**. Diabetes mellitus among PE cases and control group was 15.0% and 5.0%, respectively (OR=3.35, 95% ECL: 1.09-12.23) **(El-Moselhy et al., 2011)**. But, the relationship between these two conditions is not well understood **(Vambergue et al., 2002)**. In PE, there is exacerbation of physiological changes associated with pregnancy such as insulin resistance, altered immune responses and inflammatory pathway activation. These exaggerated responses seen in PE are reminiscent of metabolic syndrome, and also are evident in gestational diabetes **(Scioscia et al., 2009)**. So, studies suggest that insulin resistance **(Ostlund et al., 2004)**, chronic inflammation **(Borzychowski et al., 2006)** and

endothelial dysfunction (**Solomon & Seely, 2001** and **Roberts & Gammill, 2006)** are underlying pathophysiology. Also, common risk factors, such as elevated body mass index and advanced age have been noted for each of the two conditions (**Duckitt and Harrington, 2005)**. Increased insulin resistance, a characteristic of gestational diabetes, has also been associated with the development of PE (**Kaaja & Greer, 2005** and **Parretti et al., 2006)**. Inositol phosphoglycan P-type (P-IPG) in PE has been extensively investigated and increased production has been demonstrated. This molecule acts as a second messenger of insulin, enhances the metabolic effects of insulin and is associated with insulin resistance (**Scioscia et al., 2009)**. Also, abnormal endothelial function with impaired flow mediated dilatation (**Dadelszen et al., 2007)** and inflammatory cytokine release as C-reactive protein and E-selectin are reported in PE and diabetes (**Aydin et al., 2004)**. Further; the post 50 gm challenge glucose value at 24-28 weeks of gestation, in a case-control study of pregnant women with new-onset hypertension in late pregnancy and normotensive controls, was significantly higher among those developed hypertension (**Solomon et al., 1994)**. Further, hyper-insulinemia may play a role in over activity of the sympathetic nervous system associated with obesity. In rats, insulin, like leptin, causes sympatho-activation to different tissues including the kidney (**Rahmouni et al., 2004)**. So, our results as regard high levels of fasting blood glucose of the patients compared to controls were expected and accepted.

In PE there is marked increase in platelet aggregation and decrease of platelet count that may occur early in pregnancy. The cause of this coagulation problem in PE is either due to disturbance of the balance between the platelet aggregation effects of the thromboxane A2 and the inhibitory effect of prostacyclin (**lewis et al,, 1981)**, or formation of soluble immune complexes that become deposited in the walls of blood vessels, thus enhancing platelet aggregation and intravascular thrombosis (**Burrows et al., 1987)**. Also, the risk factors for PE include thrombophilias (**Roberts and Cooper, 2001)**.

A growing body of evidence links infection and inflammatory processes with PE were reported (**López-Jaramillo et al., 2001)**. PE is an inflammatory state characterized by leukocyte activation (**Raijmakers et al., 2004a)**. It is associated with a greater inflammatory response than observed in normal pregnancy (**Sacks et al., 1998)**. Pre-eclamptic women had higher leukocytic count and increased total number of neutrophils compared to normal pregnant group. Also, pregnant women, who have a high risk for PE and chronic sub-clinical infection, have increased levels of CRP during the third trimester (**Teran et al.,**

2001). These results provide further evidence of enhanced inflammation in PE. Endothelial cell dysfunction is part of more widespread intravascular inflammatory response causing clinical PE (**Sacks et al., 1998)**. Also, placental lipid peroxidation product, tumor necrosis factor (TNF) and syncytiotrophoblast membrane fragments are blood borne agents causing endothelial cell dysfunction (**Redman et al., 1999)**. Further, malondialdehyde and 4-hydroxynonenal are stable production products that enter maternal circulation causing widespread endothelial dysfunction (**Esterbauer, 1993)**. Lipid peroxidation predisposes to shedding of syncytiotrophoblast membrane into maternal circulation and leads to decrease fluidity of syncytiotrophoblast membrane (**Morris et al., 1996)** and may have a profound adverse effect on vascular endothelium (**Smarson et al., 1993** and **Cockell et al., 1997)**. Also, shedding apoptotic debris from syncytial surface is more intense in PE than in normal pregnancy and acts as inflammatory stimulus for PE (**Redman and Sargent, 2003)**. Further, increased circulating TGs, free fatty acids, small dense LDL act as proinflammatory stimulus for PE (**Redman et al., 1999)**. Mean plasma TGs and free fatty acids concentrations undergo near doubling in pre-eclamptic women relative to normal pregnant (**Lorentzen et al., 1995** and **Hubel et al., 1996)**. Fasting serum TGs correlates with serum malondialdehyde in pre-eclamptic women (**Hubel et al., 1996)**. Amplification of injurious effects of placental TNF by increased maternal free fatty acids is then possible. Free fatty acids are highly inflammatory (**Toborek et al., 1996)**. Further, activation of maternal neutrophils during their transit through the placenta could provide a pathway for transfer of oxidative disturbances into the maternal circulation in PE (**Butterworth et al., 1991)**. Also, pre-eclamptic women had higher incidence of asymptomatic bacteriuria than in normal pregnant women, 19.0% vs. 3.0-6.0% (**Hill et al., 1986)**. Further, the incidence of urinary tract infections in pre-eclamptic women was higher than in normotensive pregnant women (**López-Jaramillo et al., 2001)**. In Egypt, there was significant risk of asymptomatic bacteruria, urinary tract infection, and vaginal infection and bacterial vaginosis among pre-eclamptic cases (ORs=3.62, 95% ECL: 1.19-13.10; 3.59, 95.0% ECL: 1.05-15.58 and 4.41, 95% ECL: 1.13-24.97, respectively) (**El-Moselhy et al., 2011)**. On the other hand, in women with PE, it cannot be determined whether the increase in CRP and proinflammatory cytokines was a cause or a consequence of PE (**Teran et al., 2001)**. Also, it is not possible to make a definitive statement that infection is a major risk factor for PE. However, it is proposed that chronic sub-clinical infections may increase maternal cytokines to levels high enough to affect vascular endothelial

function in individuals with a predisposition to subsequent development of PE (**Herrera et al., 2001**). So, the role that infection and inflammation may play in the imbalance of free radicals that leads to PE needs to be studied as it may involve a fundamental change in the prevention and treatment of PE (**López-Jaramillo et al., 2001**).

High intake of polyunsaturated fatty acids is associated with increased risk of PE (**Clausen et al., 2001**). Pregnancy induced hypertension is characterized by high TG and low HDL2-cholesterol levels. Alterations in HDL profiles may contribute to endothelial dysfunction in PE (**Von Versen-Hoeynck and Powers, 2007**). About one-third of pre-eclamptic women develop plasma TG values above 400 mg/dl (**Hubel et al., 1996**) greater than normal pregnancy (**Knopp et al., 1992**). Further, the risk factors for PE include obesity and diabetes (**Roberts & Cooper, 2001** and **El-Moselhy et al., 2011**). These factors are also risk factors for atherosclerosis. Also, other similarities exist between PE and atherosclerosis. In both of them, endothelial cells are important targets and the dyslipidemia predisposing to atherosclerosis occurs in pre-eclamptic pregnancies (**Hubel and Roberts, 1999**). Hyper triglyceridemia shifts the spectrum of LDL subclasses toward proportional increases in smaller, denser, more atherogenic LDL particles (**Krauss, 1997**). Small dense LDL particles more readily infiltrate into arterial tissue (the presumed site of LDL oxidation) and exhibit enhanced adhesiveness to artery internal proteoglycans (**Anber et al., 1996**). Further, smaller denser LDL particles are intrinsically more susceptible to oxidation (**Chait et al., 1993**). Small dense LDLs show greater capacity to provoke changes

in vascular cells in culture consistent with vasoconstrective effects in vivo (**Weisser et al., 1993**). Acute atherosis of decidual arterioles is characterized by fibrinoid necrosis of the vessel wall, disruption of the endothelium, aggregates of platelets and accumulation of lipid-laden macrophages, a true atherosclerosis-like change (**Sheppard and Bonnar, 1981**). Women with PE have reversible increases of serum TGs and LDL-cholesterol and reduced HDL-cholesterol. Importantly, small dense serum LDLs are, also, increased in women with PE compared to controls having normal pregnancies (**Hubel et al., 1989** and **Hubel et al., 1998**).

PE syndrome is now recognized to be a multi-system disease (**Roberts, 2000** and **Roberts et al., 2003**). PE variably may affect the brain, lungs, kidney and liver (**Raijmakers et al., 2004a**). So, the lab results of high liver enzymes and renal function tests are expected and accepted. The difference in lab results of ALT in mild (28.6 ± 7.6 U/L) and severe (55.5 ± 10.4 U/L) PE was statistically significant ($P < 0.001$). Also, the difference in lab results of AST in mild (26.5 ± 6.9 U/L) and severe (57.2 ± 11.8 U/L) PE was statistically significant ($P < 0.001$) (**Ziaei et al., 2008**). Further, when patient have liver dysfunction, thrombocytopenia and hemolysis, they are classified as having HELLP syndrome (i.e., hemolysis, elevated liver enzymes, low platelets) (**Curtin and Weinstein, 1999**).

The potential limitations of this study, which must be considered is the retrospective design of the study that was unable to determine whether the observed alteration in amniotic fluid trace element selenium concentration preceded PE or whether alteration attributed to PE.

Table (1): Means and standard deviations of pre-eclampsia (PE) cases and control group according to the laboratory results of amniotic fluid selenium.

Amniotic fluid selenium	Laboratory results of maternal amniotic fluid selenium M±SD		t-value	P-value
	PE cases (n=100)	Controls (n=100)		
Selenium (µg/L):				
Total cases (n=100)	9.11 ± 0.93	11.71 ± 1.63	-13.855	0.000
Mild PE cases (n=67)	10.64 ± 1.45	11.71 ± 1.63	-4.905	0.000
Severe PE cases (n=33)	6.98 ± 0.79	11.71 ± 1.63	-26.113	0.000

Table (2): Means and standard deviations of the laboratory results of amniotic fluid selenium in pre-eclampsia (PE) cases according to severity.

Amniotic fluid selenium	Laboratory results of maternal amniotic fluid selenium M±SD		t-value	P-value
	Mild cases (n=67)	Severe cases (n=33)		
Selenium (µg/L):	10.64 ± 1.45	6.98 ± 0.79	16.32	0.000

Table (3): Means and standard deviations of pre-eclampsia (PE) cases and control group according to results of the biochemical laboratory examinations.

Items of biochemical laboratory examinations	Laboratory results M±SD		t-value	P-value
	PE cases (n=100)	Controls (n=100)		
Hb (g/dl)	9.72±0.64	11.05±0.59	- 15.279	0.000
Hematocrit (%)	29.11±2.41	34.25±1.43	- 18.342	0.000
Total leukocytic count (thousand)	12.80±3.47	8.72±2.36	9.722	0.000
Platelet count (thousand)	172.22±29.98	231.91±31.22	- 13.79	0.000
Fasting blood glucose (mg/dl)	137.31±46.18	94.27±26.15	8.11	0.000
C-reactive protein (mg/L)	9.53±2.82	6.01±1.29	11.351	0.000
Tot. S. triglycerides (mg/dl)	258.82±86.11	182.17±62.37	7.209	0.000
Tot. S. cholesterol (mg/dl)	246.57±56.92	189.58±53.29	7.309	0.000
SHDL- cholesterol (mg/dl)	41.27±9.16	49.86±7.65	- 7.198	0.000
SLDL- cholesterol (mg/dl)	167.96±49.38	129.29±34.13	6.442	0.000
Urea (mg/dl)	32.52±2.85	23.41±3.88	18.923	0.000
S. creatinine (mg/dl)	0.85±0.27	0.81±0.16	1.275	0.204
ALT (U/L)	38.20±11.32	27.90±6.12	8.004	0.000
AST (U/L)	33.75±8.53	24.87±4.81	9.068	0.000

Table (4): Means and standard deviations of the biochemical laboratory results in pre-eclampsia (PE) cases according to severity.

Items of biochemical laboratory examinations	Laboratory results M±SD		t-value	P-value
	Mild cases (n=67)	Severe cases (n=33)		
Hb (g/dl)	10.18±0.68	9.29±0.56	6.949	0.000
Hematocrit (%)	32.05±1.11	27.19±2.01	12.951	0.000
Total leukocytic count (thousand)	8.12±2.03	13.96±3.52	-8.835	0.000
Platelet count (thousand)	191.23±31.22	156.21±21.18	6.602	0.000
Fasting blood glucose (mg/dl)	131.21±19.05	161.11±26.71	-5.75	0.000
C-reactive protein (mg/L)	8.21±1.02	11.24±2.12	-7.779	0.000
Tot. S. triglycerides (mg/dl)	214.37±42.11	288.52±97.81	-4.169	0.0002
Tot. S. cholesterol (mg/dl)	218.81±31.91	266.82±67.24	-3.892	0.0004
SHDL- cholesterol (mg/dl)	45.86±9.50	36.65±6.86	5.531	0.000
SLDL- cholesterol (mg/dl)	149.25±46.32	192.87±53.80	-3.986	0.0002
Urea (mg/dl)	27.81±2.24	36.82±3.15	-14.702	0.000
S. creatinine (mg/dl)	0.83±0.26	0.89±0.29	-1.006	0.318
ALT (U/L)	35.50±8.21	41.90±10.12	-3.157	0.002
AST (U/L)	29.74±5.14	38.54±8.93	-13.57	0.000

Table (5): Correlation co-efficient of severe pre-eclampsia (PE) cases according to significant results of the laboratory examinations of maternal serum and amniotic fluid.

Items of biochemical laboratory examinations	r-value	P-value
Amniotic fluid selenium	9.138	0.01
Total leukocytic count	11.721	0.02
Fasting blood glucose	8.116	0.02
C-reactive protein	13.222	0.03
SLDL- cholesterol	10.025	0.04
Tot. S. triglycerides	7.107	0.04
Tot. S. cholesterol	6.303	0.04
ALT	9.004	0.04

CONCLUSIONS AND RECOMMENDATIONS

In this study pre-eclamptic patients had lower mean amniotic fluid Se, higher mean levels of fasting blood glucose, low platelet mean count**,** higher mean total leukocytic count, increased mean levels of CRP, increased mean serum TGs and LDL-cholesterol and reduced mean HDL-cholesterol, higher mean liver enzymes (ALT and AST)**,** and higher mean renal function tests compared to pregnant controls. Further, these differences were also present between the mild and severe PE cases. Also, the most important significantly correlated factors for severe PE were low amniotic fluid Se, high total leukocytic count, and high fasting blood glucose and CRP levels. The best way to prevent PE in an effective manner is the establishment of an adequate prenatal control system, whose procedures should contain an adequate Se supplementation. In addition, adequate prenatal care would allow physicians to diagnose and promptly treat symptomatic and asymptomatic urinary and vaginal infections. Finally, the role that infection and inflammation may play in the imbalance of free radicals that leads to pre-eclampsia needs to be studied in depth because it may involve a fundamental change in the prevention and treatment of PE. Also, we recommend studying the role of other nutrient trace elements and vitamins in the occurrence of PE in Egypt.

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Effects of Thiopurine S-methyltransferase Genetic Polymorphism on Mercaptopurine Therapy in Pediatric ALL

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Abstract: Background: Mercaptopurine is one of the most important drugs used in cancer treatment. Its elimination depends mainly on the enzyme Thiopurine S-methyl Transferase (TPMT). A number of known genetic polymorphisms can affect the activity of this enzyme. **Aim of the work**: to study the pattern of TPMT polymorphisms in a cohort of Egyptian patients with ALL and its impact on response to therapy and toxicity. **Patients and methods**: the study included 52 low-risk pediatric ALL patients treated by PNCI XIII LR Protocol. TPMT genotype was done for common mutations using polymerase chain reaction-based assays. Clinical follow-up, documentation of events, and 6-MP dose reductions were performed throughout the maintenance phase in a double blinded fashion. **Results:** TPMT genotyping showed that 40 patients (76.9%) have the wild type and 12 (23.1%) have the mutant type, two (3.85 %) of which were homozygous for G238C and ten were heterozygous (19.25%). TPMT mutant patients, especially homozygous, were at greater risk of 6-MP toxic effects and needed more frequent dose reductions. Mean duration of missed therapy was 50.250 weeks for the mutant patients vs. 25.825 weeks for wild-type patients **(P < 0.001)**. **Conclusion:** TPMT heterozygous and homozygous patients require lower doses of 6-MP.These results justify performing TPMT genotyping before initiating 6-MP therapy in all children with ALL to minimize consequent toxicity through dose modifications.
[Sherif A Aboul Naga, Gamal T Ebid, Hisham M Fahmi, Manal F Zamzam, Hafez F Hafez and Azza M Kamel. **Effects of Thiopurine S-methyltransferase Genetic Polymorphism on Mercaptopurine Therapy in Pediatric ALL.** Journal of American Science 2011;7(5):337-346]. (ISSN: 1545-1003). http://www.americanscience.org.

Introduction

Antimetabolites are one of the most chemotherapeutic agents used in cancer therapy. They are structural analogues of important cofactors or intermediates in the DNA and RNA biosynthetics. Antimetabolites inhibit synthesis of nucleic acids and their building units or are incorporated into the DNA or RNA, resulting in impaired synthesis. Antimetabolites like methotrexate, mercaptopurine and fluorouracil are folate, purine and pyrimidine analogues respectively. They are used in the treatment of childhood cancers *(1).*

Mercaptopurine and thioguanine are thiopurines. They are thiol-substituted derivatives of the naturally occurring purine bases hypoxanthine and guanine, respectively. Mercaptopurine has been used in the treatment of ALL for five decades, mainly during maintenance therapy. 6-Mercaptopurine is administered orally at a dose of 75 to 100 mg/m^2 per day with upward or downward dose adjustments based on the degree of myelosuppression during maintenance therapy. One of the most important factors in the outcome of pediatric ALL is to ensure that patients are receiving their maximum tolerated dose of mercaptopurine *(2)*.When the actual dose of mercaptopurine received increased by 22% as a result of more aggressive prescribing guidelines, the relapse-free survival improved by 18% **(3)**. High-dose intravenous infusions of mercaptopurine (1,000 mg/m^2 over 6 to 24 hours) have also been used to overcome the pharmacokinetic limitations of oral dosing **(4)**.

Thiopurines are very useful drugs, but they have a relatively narrow therapeutic index, with life-threatening myelosuppression as a major toxic effect. They are prodrugs that must be converted intracellularly to thioguanine nucleotides to exert a cytotoxic action. These drugs are metabolized, in part, by the cytoplasmic enzyme Thiopurine S-methyltransferase (TPMT) *(6)*.

The level of TPMT activity in human tissues is controlled by a common genetic polymorphism. Individuals who inherit a deficiency in this enzyme exhibit profound intolerance to thiopurine medications, including mercaptopurine and thioguanine *(7)*. TPMT-deficient patients treated with usual doses of these medications, develop profound hematopoietic toxicity

that precludes the administration of other chemotherapy and can be fatal; so reduction of doses by 10-15 folds should be done to prevent the occurrence of such toxicity *(8)*. One in 300 inherit two mutant TPMT alleles and are TPMT deficient, and about 5%-10% are heterozygotes at the TPMT gene locus and have intermediate enzyme activity *(2)*. The rare TPMT-deficient individual probably accounts for most of the thiopurine-intolerant patients who were previously considered to have 'idiosyncratic' toxic effects. TPMT heterozygotes constitute approximately 10% of the patients who receive these medications. If these heterozygotes have intermediate intolerance to thiopurines, due to their intermediate level of TPMT enzyme activity, this would provide a reasonable rationale for routinely assessing TPMT genotype in all patients before starting thiopurine therapy. (7, 9-13). However, another report did not approved these rationale (14)

TPMT exhibits genetic polymorphism in all large ethnic groups studied to date, including Caucasians, Africans, African- Americans, and Asians (15).

Patients and Methods

In this study we studied TPMT polymorphisms in a cohort of 52 newly diagnosed low risk pediatric acute lymphoblastic leukemia (ALL) patients. We aimed to investigate the prevalence of the polymorphic allele and its possible impact on 6-MP tolerability. ALL patients were treated at the NCI, Cairo University, Egypt in the period from June 2005 to October 2008

The study was approved by the IRB of the National Cancer institute, Cairo University. A signed consent from patient's parent had been taken to be enrolled in the study. Diagnosis was performed according to standard clinical, morphological, cytochemical, and immunophenotypic criteria. The recruited patients comprised 36 male and 16 female with an age range of 1-9 years with a median of 5 years.

Inclusion Criteria (Low Risk Criteria)
- Age= 1-9 years (inclusive) at diagnosis
- Total Leukocyte Count (TLC) < 50,000/mm^3 at diagnosis
- B-cell progenitor immunophenotype
- No t(1;19), t(9;22), or MLL gene rearrangement by cytogenetics
- CNS status 1 or 2 (WBC < 5/mm^3 in CSF)
- Day 15 (mid-induction) bone marrow aspirate (BMA) shows 5% blasts.

Exclusion Criteria:
- Patients with impaired liver or kidney function.

Treatment Protocol

Patients were enrolled into the **ALL LR PNCI XIII/2002** Treatment Protocol. In brief, remission induction therapy consisted of prednisone, vincristine,

L-asparaginase, doxorubicin, etoposide, cytarabine, and triple intrathecal injections (methotrexate, hydrocortisone, and cytarabine) given over a 4-week period. Two weeks later, patients started consolidation therapy which was a 14-day phase that consisted of high-dose methotrexate at a dose of 2 g/m^2 over a 2-hour infusion period given weekly for 2 doses with leucovorin rescue, in addition to 6-mercaptopurine at a dose of 75 mg/m^2 given daily by the oral route for the whole duration of the phase (14 days). Maintenance phase was then started and continued for 120 weeks. It consisted of weekly methotrexate at a dose of 40 mg/m^2 given intravenously or intramuscularly, with 6-mercaptopurine at a dose of 75 mg/m^2 given daily by the oral route for the whole duration of the week. Every 4th week, methotrexate and 6-mercaptopurine were substituted by a pulse of vincristine given intravenously at a dose of 1.5 mg/m^2 (with a maximum dose of 2 mg/m^2) and dexamethasone given orally for the whole week at a dose of 8 mg/m^2/day in 3 divided doses. Every 8 weeks during the 1st year only, methotrexate was substituted by high-dose methotrexate like that given in the consolidation phase and a triple intrathecal injection was added. Furthermore, a re-induction window was executed at weeks 16 to 19 and consisted of prednisone, vincristine, L-asparaginase, and doxorubicin. Complete blood counts were obtained weekly. Chemotherapy was given every week, provided that the absolute neutrophil count was 0.3x10^9/L, platelet count was 50x10^9/L, and that the patient did not exhibit other complications, such as severe mucositis, infection, or hepatotoxicity.

Study Structure

This study was conducted on a double-blind basis. Once the diagnosis of low-risk ALL was established, blood samples for TPMT genotyping were withdrawn and processed (using serial numbers) without knowing the specific genotype of each patient. Clinical follow-up, documentation of events, and 6-MP dose reductions were performed throughout the maintenance phase, and the resultant data were correlated with the specific TPMT genotypes after ending treatment.

I. **Genotyping**

Genotyping for TPMT G460A and A719G mutations was performed by PCR-RFLP method (9). TPMT G238C mutation was performed by ARMS (9), in which we used a common primer plus one primer for wild type and another for mutant type in a separate PCR reaction. Absence of these alleles was considered as TMPT wild type.

1. **Detection of G238C**

Genomic DNA, 400 ng, was amplified under the conditions previously described (9). The final volume for all PCR assays was 25 micro

L. Through use of 1 µg genomic DNA (Qiagen)) as a template, PCR was done with primers (table 1) in buffer D (Invitrogen, San Diego, California). The buffer contained Tris hydrochloride (pH 8.5), 60 mmol/L; ammonium sulfate, 15 mmol/L; and magnesium chloride, 3.5 mmol/L. The concentration of each oligonucleotide was 0.1 OU/mL (about 0.5 µmol/L), and 0.2 µL Taq polymerase (Qiagen) was used. With a Biometra T3 thermocycler (Germany), amplification was done for 30 cycles consisting of denaturation at 94 °C for 1 minute, annealing at 55 °C for 2 minutes, and extension at 72 °C for 1 minute. A final extension step at 72 °C for 7 minutes was done. A DNA fragment was amplified with P2M and P2C primers when C238 (mutant) was present, whereas a DNA fragment was amplified with P2W and P2C primers when G238 (wild-type) was present **(Table 1 and Fig 1)**.

2. **Detection of G460A**
PCR was performed in conditions similar to that of G238C except for buffer J (Invitrogen) which contained Tris hydrochloride [pH 9.5], 60 mmol/L; ammonium sulfate, 15 mmol/L; and magnesium chloride, 2.0 mmol/L) instead of buffer D (9). MwoI digestion of amplified wild-type DNA yields fragments of 267 and 98 base pairs, whereas DNA containing the G460A mutation is not digested and yields an uncleaved fragment of 365 base pairs **(Table 1 and Fig 2)**.

1. **Detection of A719G**
To detect the A719G mutation, a PCR assay using primers P719R and P719F was performed under the same conditions as those used for the G460A mutation (9), except that we used buffer N (Invitrogen) instead of buffer D, The A719G mutation introduces an AccI restriction site in the amplified fragment and yields fragments of 207 and 86 base pairs. Wild-type DNA yields an uncleaved fragment of 293 base pairs **(Table 1 and Fig 3)**.

II-Clinical Follow-up

1. Evaluation of the Toxic Effects of 6-MP
For each weak therapy withheld due to toxicity caused by 6-MP, the main cause was documented (neutropenia or hepatotoxicity) and the week marked as a missed one for treatment. Neutropenia was defined as an ANC (Absolute Neutrophil Count) < 0.3 x 10^9 cells/L. Episodes of fever and neutropenia necessitating antibiotic treatment - on outpatient or inpatient basis - were also considered toxic effects of treatment. Hepatotoxicity was defined as 5-fold serum ALT (Alanine Transaminase) elevation or serum direct (conjugated) Bilirubin 2.0 mg/dL in a previously healthy patient not suffering from any of the known hepatitis virus infections, which dropped back to normal values when treatment was withheld.

2. Dose Modification for 6-MP
Patients missing 25% (30 weeks) of treatment, as documented by missed treatment weeks, had 6-MP dose reduced preliminarily by 30% (75 50 mg/m^2/day). This dose reduction was reviewed every 4 weeks by means of evaluation of the main toxic effects of treatment.

Statistical Analysis

SPSS (Statistical Package for Social Sciences) software version 12.0 was used for data analysis. Mean and standard deviation were estimates of quantitative data. Non-parametric t test compared means of 2 independent groups and ANOVA was used for comparing more than 2 groups with Scheffe Test for post-hoc pairwise comparisons. Chi-Square/Fischer Exact were tests of proportion independence. ROC (Receiver Operator Characteristic) curve analysis was used to set up different levels of neutropenia, hepatotoxicity, and missed treatment durations to categorize 6-MP phenotypes into first, 'Wild' (normal) and 'Mutant' (heterozygous and homozygous) and then, 'Heterozygous Mutant' and 'Homozygous Mutant'. Accordingly, sensitivity and specificity were used to assess the validity of previous measures as diagnostic elements of abnormalities. Significant P value was set at 0.05.

Results

Toxic Effects of 6-MP

The toxic effects of 6-MP among the study group including neutropenia, hepatotoxicity and missed treatment weeks are demonstrated in (table 2).

Dose Reduction for 6-MP

Of the 52 studied patients, 12 (23.1%) required 6-MP dose reduction by 30% (70% of the original dose was given), due to missing 25% (30 weeks) of the duration of maintenance treatment. The other 40 patients (76.9%) required no dose reduction.

TPMT Genotype

The results of TPMT genotyping showed that 40 patients (76.9%) have the wild type (normal, no enzyme defect) and 12 patients (23.1%) have the mutant type. Out of the 12 mutant patients, three (5.77%) showed genotype TPMT *1/TPMT *2 (heterozygous mutant G238C), two (3.85%) showed genotype TPMT *2/TPMT *2 (homozygous mutant G238C), two (3.85%) showed genotype TPMT

*1/TPMT *3A (heterozygous mutant G460A and A719G), four (7.69%) showed genotype TPMT *1/TPMT *3B (heterozygous mutant G460A), and one patient (1.92%) showed genotype TPMT *3B/TPMT *3B (homozygous mutant G460A) (**Fig. 4**).

Clinical impact of TPMT Polymorphisms

1. **Neutropenia**

   Wild TPMT group (40) showed duration of 13.075 ± 4.0344 weeks vs. duration of 24.5 ± 7.5257 weeks for the mutant group (12) (**p value < 0.001**). Neutropenia duration of 14.5 weeks was a cut-off point between wild and mutant genotypes (**Fig. 5**).

   Comparing heterozygous group versus Homozygous group, the heterozygous group (9) showed duration of 21.667 ± 5.4314 weeks vs. duration of 33.0 ± 7.0 weeks for the homozygous group (3) (**p value = 0.002**). Neutropenia duration of 27.5 weeks was a cut-off point between heterozygous and homozygous genotypes (**Fig. 7**).

2. **Hepatotoxicity**

   Wild TPMT group (40) showed duration of 8.925 ± 3.5184 weeks vs. duration of 21.250 ± 6.5661 weeks for the mutant group (12) (**p value < 0.001**). Hepatotoxicity duration of 13.0 weeks was a cut-off point between wild and mutant genotypes (**Fig. 5**).

   Comparing heterozygous group versus homozygous group, the heterozygous group (9) showed duration of 18.222 ± 3.0732 weeks vs. duration of 30.333 ± 5.8595 weeks for the homozygous group (3) (**p value < 0.001**). Hepatotoxicity duration of 24.5 weeks was a cut-off point between heterozygous and homozygous genotypes (**Fig. 7**).

3. **Missed Treatment Weeks**

   Wild TPMT group (40) showed duration of 25.825 ± 6.1306 weeks vs. duration of 50.250 ± 14.5797 weeks for the mutant group (12) (**p value < 0.001**). Missed treatment duration of 31.5 weeks was a cut-off point between wild and mutant genotypes (**Fig. 5**). Comparing heterozygous group versus Homozygous group, the heterozygous group (9) showed duration of 44.222 ± 8.7433 weeks vs. duration of 68.333 ± 14.4684 weeks for the homozygous group (3) (**p value < 0.001**). Missed treatment duration of 56.0 weeks was a cut-off point between heterozygous and homozygous genotypes (**Fig. 7**).

On constructing a ROC curve for the toxicities among wild group versus mutant group, area under the curve (AUC) for neutropenia was 0.930 at a cut-off point of 14.5 weeks. For hepatotoxicity, AUC was 0.970 at a cut-off point of 13.0 weeks. AUC for missed treatment was 0.973 at a cut-off point of 31.5 weeks (**Fig. 6**). However the ROC curve for the toxicities among heterozygous group versus homozygous group area under the curve (AUC) for neutropenia was 0.926 at a cut-off point of 27.5 weeks. For hepatotoxicity, AUC was 1.000 at a cut-off point of 24.5 weeks. AUC for missed treatment was 0.963 at a cut-off point of 56.0 weeks (**Fig. 8**)

Discussion

The antimetabolite 6-MP has been used in the treatment of ALL for five decades, primarily for the maintenance of remission. *TPMT* genetic polymorphism has been investigated intensively over the past decade.

The drug is metabolized by *TPMT* enzyme; its activity is affected by *TPMT* gene polymorphisms. Individuals who inherit a deficiency in this enzyme exhibit profound intolerance to 6-MP. There are currently 11 variant alleles associated with low TPMT activity in humans (**10**). Out of these, TPMT *2, *3A, *3B, and *3C mutations account for more than 95% of the deficiency (11).

Of the 52 patients included in this study, 12 (23.1%) required 6-MP dose reduction by 30% (70% of the original dose was given) due to major toxicities. The other 40 patients (76.9%) required no dose reduction. This correlated perfectly with *TPMT* genotyping, when it turned out that those 12 patients requiring dose reduction were all TPMT mutants.

In this study *TPMT*2 and *3B allele were each encountered in 5 (9.6%) patients. This is much higher than that reported by other studies (table 5). On the contrary *TPMT*3C allele was not detected in any of our patients; this is in agreement with some previous studies (9,12,13,14), while most of the other studies reported a higher incidence of *TPMT*3C allele (table 3) .These differences in overall and specific frequencies could be attributed to ethnic variation or simply to statistical errors resulting from the relatively small sample size used in this study. In this study *TPMT*3A was encountered in 2 patients (3.8%) which is comparable to previous reports (9, 12, 14-16).

Clinical Impact of Wild vs. Mutant TPMT

The study proved a very strong clinical impact of *TPMT* genotype on 6-MP tolerance. The duration of neutropenia, hepatotoxicity and missed treatment weeks were significantly higher in patients harboring the mutant alleles (p <0.001). Duration of 14.5, 13 and 13 weeks was the discriminating cut off for the 3 parameters respectively.

A dose reduction of 30% (70% of the original dose given) was performed on 12 patients due to missing > 25% of the duration of maintenance treatment. Those 12 patients, as we mentioned before, turned out to be all *TPMT* mutants by genotyping.

In agreement with our results, the cumulative incidence of 6-mercaptopurine dose reductions for myelosuppression was highest among patients homozygous for TPMT deficiency (100% of patients), intermediate among heterozygous patients (35%), and lowest among wild-type patients (7%) (*P* < .001) indicating that *TPMT* polymorphism does have an impact on the optimal dose of 6MP. However hepatotoxicity was more not frequent in those with *TPMT* polymorphisms; in fact, hepatotoxicity even tended to be more frequent among those with higher TPMT activity (P. value .035)(17,18). In agreement with our results Mary et al., (19) reported a significant association between *TMPT* mutant type and the increased missed treatment weeks (P. value= 0.007). Also Pinkel (20) reported that hepatotoxicity was more frequent in TPMT deficient patients**.** On the contrary, Stanulla et al., (21) reported that hematopoietic toxicity did not differ between heterozygous, homozygous patients or those with wild type for *TPMT*.

In concordance with our results many other studies reported a significant association of 6-MP toxicity with ALL Patients having *TPMT* mutant alleles (2, 10, 22, and 23).

In contrast to our results Desire and his colleagues (24) reported that the presence of *TPMT* polymorphisms did not seem to completely explain the variation in 6-MP toxicity in 66 pediatric patients. They found that three of the 5 patients (60%) heterozygous for *TPMT**2 or *TPMT**3C polymorphisms and 12/61 patients (20%) with wild type *TPMT* genotype had more than 10% of reduction of 6-MP dose (P = 0.07).

Our study showed a clear difference in 6-MP tolerance between heterozygous and homozygous mutant patients with respect to duration of neutropenia, hepatotoxicity and missed treatment duration (P value= 0.002, < 0.001 and < 0.001) respectively.

These results underline the need for marked 6-MP dose reductions (5-10% of the original) in homozygous mutant TPMT patients. These patients have very low levels of TPMT and hence suffer severe toxicities complicating 6-MP administration.

Detection of the four most prevalent *TPMT* mutations (*2, *3A, *3B, and *3C) yielded greater than 95% concordance between *TPMT* genotype and phenotype in Caucasian population (26)*,* and one can anticipate that the molecular diagnosis of TPMT deficiency and heterozygosity will continue to improve as additional mutations are discovered and incorporated into automated high throughput methods (e.g., DNA arrays).

It is important to recognize that when full doses of 6-MP are prescribed to patients with undiagnosed *TPMT* homozygous or heterozygous mutations, this can compromise the ability to deliver all forms of acute lymphoblastic leukemia chemotherapy and thereby jeopardize the chance for cure. However, with the appropriate dose adjustment, these patients can be successfully treated with all components of acute lymphoblastic leukemia therapy including 6-MP (27).

In conclusion this study further emphasized that *TPMT* mutations are significant determinants of tolerance to acute lymphoblastic leukemia chemotherapy that contains 6-MP. Because this genetic polymorphism places at least 10% of the patients at risk for excessive toxicity and failed treatment results, we suggest that *TPMT* genotyping should be performed prior to therapy for all ALL patients to optimize their 6-MP therapy.

Table 1: Detection primer sequence, restriction enzyme, and amplification/digestion product size for each of the TPMT genetic polymorphisms

Genetic Polymorphism	Method of Detection	Primer Sequence	Restriction Enzyme	Size of Product
G238C	PCR-ARMS	**P2W** (5'-GTATGATTTTATGCAGGTTTG-3') **P2M** (5'-GTATGATTTTATGCAGGTTTC-3') **P2C** (5'-TAAATAGGAACCATCGGACAC-3')		
G460A	PCR-RFLP	**P460F** (5'-ATAACAGAGTGGGGAGGCTGC-3') **P460R** (5'-CTAGAACCCAGAAAAAGTATAG-3')	MwoI	**Mutant:** 267 bp + 98 bp **Wild:** 365 bp
A719G	PCR-RFLP	**P719R** (5'-TGTTGGGATTACAGGTGTGAGCCAC-3') **P719F** (5'-CAGGCTTTAGCATAATTTTCAATTCCTC-3')	AccI	**Mutant:** 207 bp + 86 bp **Wild:** 293 bp

Table 2: Durations (weeks) of the major toxic effects of 6-MP in the studied 52 low-risk Pediatric ALL cases.

Effect	Neutropenia	Hepatotoxicity	Missed Treatment
TPMT wild	13.075 ± 4.0344	8.925 ± 3.5184	25.825 ± 6.1306
TPMT mutant	24.5 ± 7.5257	21.250 ± 6.5661	50.250 ± 14.5797
Whole group	15.712 ± 6.9489	11.769 ± 6.8014	31.462 ± 13.5117
Range	7-41	3-37	15-85

Table 3: TPMT allele frequency in different countries and populations.

Country	N	Allele Frequency (%)					Reference
		*1	*2	*3A	*3C	Other	
Great Britain	199	94.7	0.5	4.5	0.3	-	(15)
Serbian	100	96	-	3 (3%)	-	1 (1%) *3B	(12)
Germany	1214	91.9	0.25	4.5	0.37	0.2	(16)
Norway							
Saami	194	96.6	-	-	3.1	0.3	(30)
Whites	66	91.7	-	7.6	0.8	-	
Poland	358	96.8	0.4	2.7	0.1	-	(13)
Japan	522	98.4	-	-	1.6	-	(28)
Singapore							
Chinese	271	97	-	0.2	2.8	-	(31)
Malays	217	97.5	-	-	2.3	0.2	
Ghana	217	92.4	-	-	7.6	-	(15)
USA							
Whites	282	94.5	0.5	4.6	0.4	-	(9,30)
Blacks	248	95.4	0.4	0.8	2.4	1	
Russia	995	97.2	0.1	2.3	0.4	-	(14)
Egypt	52	40 (76.9)	5 (9.6%)	2 (3.8%)	0	*3B=5 (9.6%)	Current study
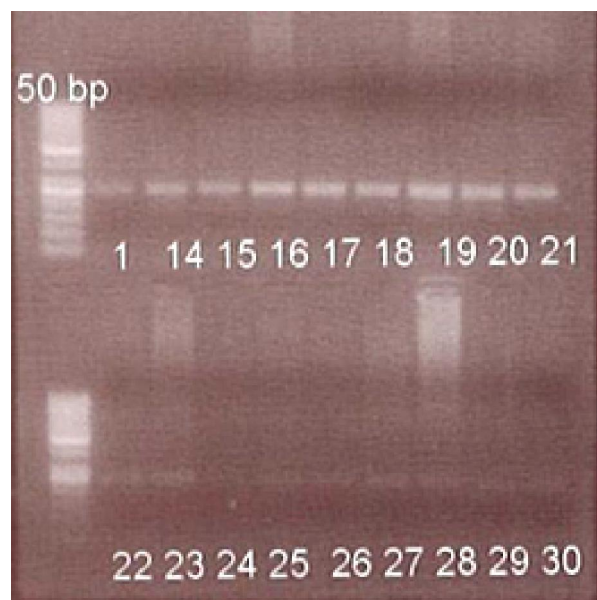
Figure 1 . TPMT G238C Wild Type Amplification
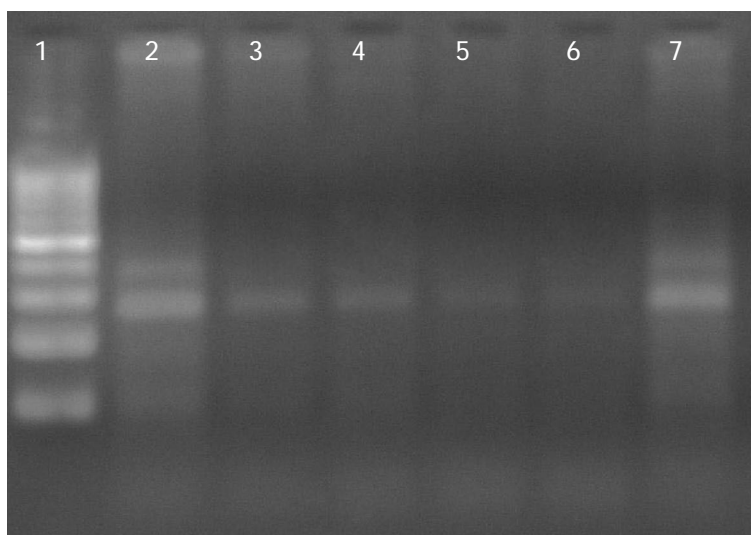
Figure 2. TPMT G460A Genetic Polymorphism.

  Lane 1: 50 base pair ladder,
  Lane 2: Heterozygous genotype,
  Lanes 3-6: Wild type,
  Lane 7: Heterozygous

Figure 3. TPMT A719G Genetic Polymorphism.

Lane1: 100 base pair ladder,
Lanes 2 & 3: Wild type,
Lane 4: Heterozygous genotype,
Lanes 5-9: Wild Type
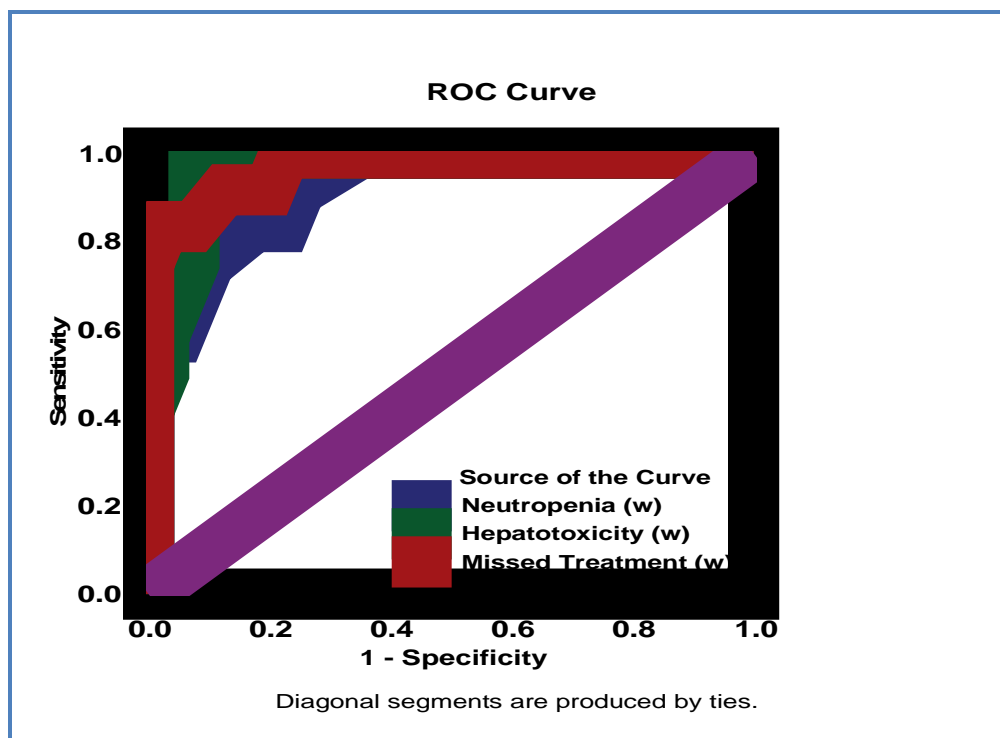
Figure 6. ROC curve discriminating wild from mutant TPMT genotype for neutropenia, hepatotoxicity, and missed treatment durations (weeks) in 52 low-risk Pediatric ALL cases treated with 6-MP.
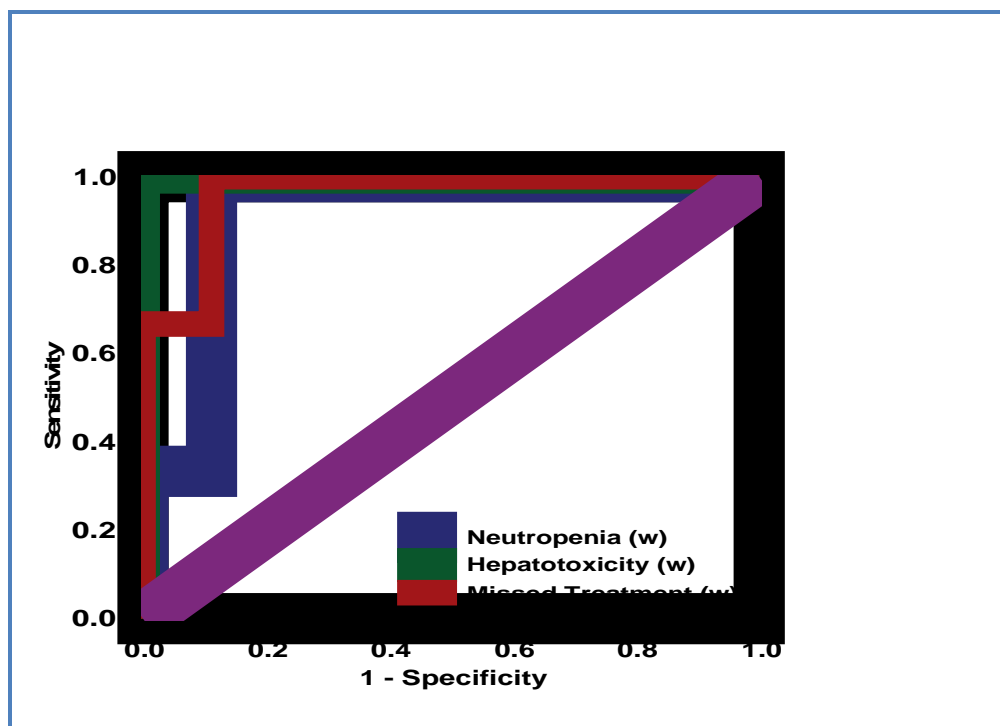
Figure 8. ROC curve discriminating heterozygous from homozygous mutant TPMT genotype for neutropenia, hepatotoxicity, and missed treatment durations (weeks) in 52 low-risk Pediatric ALL cases treated with 6-MP.

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Assessing of Adult Learning Principles

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Abstract: Transfer of learning is the result of training and is simply the ability to use the information taught in your program but in new settings and contexts. As with reinforcement, both types of transfer: positive and negative should be used in the program approach. Positive transference, like positive reinforcement, occurs when the learner uses the skill learnt in your program. It is very important for any learner's orientation to the new skills they develop that they can practice in their own situations. Using knowledge from financial literacy training to work out the best way to use (or not use) credit in their lives is an important tool that many participants could use immediately. Participants can check how much credit debt they have, what interest they are paying and what alternatives there may be. Negative transference, again like negative reinforcement, occurs when the learners applying the skill do not do what they are told not to do. This also results in a positive (desired) outcome. This means it's important to find out what the participants in your program have been using their new skills for. Check to see if they are applying the techniques properly or whether they have misunderstood a key aspect of the program. Once wrong information is absorbed and used again and again it simply becomes another bad habit that could make financial decision-making worse instead of better.

Introduction:

Adult illiteracy feeds the state's unemployment, its welfare rolls, and the correctional institutions. Adult illiteracy severely hinders the life chances of young children, undermines school reform, and limits the opportunities for postsecondary education.

Much like strategies to curb epidemic, strategies to reduce illiteracy and raise the educational attainment of Kentucky's population must include both short-term efforts to face the immediate crises as well as long-term strategies to get at the underlying causes. Short-term crises include the imperative to keep helping welfare clients make the transition from welfare to work within the constraints of federal and state mandates and the need to train workers for immediate employer demands. Long-term prevention must address the underlying, persistent problems of the state's economic structure as well as the low awareness--if not appreciation--among segments of the population of the vital connection among education, employment, and improved standards of living.

The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population)

with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills

necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients. Examples include workplace literacy (combining both basic academic skills and workplace skills), and family literacy (combining basic academic skills and other skills essential for successful parenting).

2. "Education attainment" usually refers to the numbers of years of schooling completed or the level of credential (e.g., high school diploma or associate degree) an individual has obtained. Despite concerns about the meaning of credentials, there is a strong correlation between educational attainment and literacy.

3. "Literacy initiatives" often are defined in terms of the needs of a particular target group. These may be parents of young children, youth who have dropped out of high school without earning a high school diploma, welfare recipients, persons with limited English-speaking ability, incarcerated adults, or adults in the workforce.

4. Other literacy initiatives are defined in terms of a particular educational service, strategy, or means

Characteristics of adult education:
flexibility in time:
In the past, usually one of the obstacles in the way of learning and development of adult education was being inflexible and time courses were programs. But now most countries have to consider that the speed limit of time and learning ability and facilities must be adults. Flexibility in time means that not only should the time classes and programs for adults is appropriate, but necessary facilities should be provided for independent study.

Flexibility in the location:
One of the aspects of flexible space is that individuals can, regardless of their residence to the study and advancing their knowledge and skills pay. For example, adults in remote villages should like people who live in the city use of educational programs. After flexibility in other places is that the issue of specificity of location is not considered primarily educational.

Flexibility in age:
Educational opportunities for certain age should not use it for all regardless of their age, is possible. In fact, educational programs must use people of different ages to prepare.

Flexibility in admission:
No adult should not only be deprived of education because of the necessary conditions for admission in the class does. Of course this is not such a person without academic records to participate in university classes is accepted, Adoption order is that the adults in educational programs at different levels, according to the possibility of using the opportunity that is provided must be based on the experience and knowledge and their knowledge is.

To combine education and job responsibilities:
Adults should be able to work during that time engaged in training classes take them. In other words, their presence in the class should be considered part of their work. This means that low-literate or illiterate working people who are allowed to work an hour of your daily spending surpassed participation in educational programs.

Principles of Adult Learning:

1) PURPOSE
The Financial Literacy Foundation has prepared this document to provide education materials developers with information on the key principles of adult learning. It is a short summary of a very broad area of research and advice, prepared with the input of Adult Leaning Australia, the national peak body representing organisations and individuals in the adult learning field.

2) NEEDS, WANTS, CONCERNS AND ABILITIES OF YOUR LEARNERS
Assess the needs, wants, concerns and current abilities of the target learners. Each target group will have their own special needs and probably expect different outcomes from undertaking your training program. Common themes you can prepare for are:

Why are you here? - no-one readily admits to not knowing something fundamental that may impact on their life chances. Therefore program material, particularly that designed for adult learners should always treat aspects of why learners are in the training sensitively. Describe the outcomes expected from the training in positive, enhancing terms and not as redressing a weakness or failure on the part of the learner. For example, "Undertaking this program will improve (rather than redress a failing) the way you manage your money".

Tell me more - learners may well enter programs like this with poor past experiences of money matters or at least some trepidation about handling personal finances in the future. Recognise this in the program introduction but individual learners should never be required to expose any of their negative experiences in a group. It might seem a good 'ice-breaker' to ask a new group of learners to share what they expect from the program but resist going too far when asking learners to talk about past problems they may have had with finances. Firstly, they may be uncomfortable doing this in a group and secondly you could start the program in a sea of negative views about financial matters generally. A successful program introduction will focus on where the learners will go rather than dwell too much on where they may have been.

What do you know? - Gauge the likely capabilities of your target groups. Overestimating their current skills in dealing with money could mean the program misses fundamental principles and understandings. Underestimating existing knowledge is also not good as plodding through basic material most already are familiar with will bore participants and the full program content will not be assimilated.

What will I be able to do? – above all these target groups will want to be hands on and demonstrate to themselves and their peers that that can do something they could not before the training; and do it well. Let them know right at the beginning that they will be able to do things that will be of great benefit to them, not just know more.

Build on small successes – if a target group of learners has had limited positives in their life or work experiences its important to provide small and regular 'success' points in the program. Simply exposing the content and assuming everyone is assimilating it, putting it all together holistically and building up their skills is not enough. The beginning of the program should be designed so that a discrete piece of learning that the learners can use right away builds their confidence to move on. The program should be a series of steps where the learners confirm their progress and reinforce one new skill by relating it to another they can already confidently apply.

Testing! – many adults and people not regularly engaged in learning fear testing. Many may have had bad experiences of assessment in school and view the practice among peers as stressful. Make sure they understand that what they are in is a life skills program and no-one can 'fail' as such. In fact each can support others in things they do well that fellow learners may need help with so it's a cooperative not competitive environment that they are learning in. Build in some teamed exercises and assessments to avoid people feeling isolated in their learning and fearful of failure in front of the group.

Special needs. You need to consider learners with special needs and those who have English as their second language. Reasonable adjustment should be made depending on each individual learner's particular needs and abilities. Your program material should include advice to the trainer on how to determine the need to make adjustments which, depending on a learner's abilities may include:

- providing interpreters for people who are deaf;
- ensuring access, for example by conducting training and assessment in facilities which have ramps for people using wheelchairs and adjustable desks for people with physical disabilities;
- allowing for access of personal assistants or note takers;
- allowing additional time for assessments;
- allowing oral instead of written responses to questions;

- adaptive technology such as screen readers, speech synthesisers, computer software or hardware; and,
- assistance with managing stress and anxiety.

3) HOW DO ADULTS LEARN?
Your program needs to account for:
- Motivation of the learner;
- Reinforcement of the skills and knowledge being developed;
- Retention of key learning; and,
- Transference of what is learnt to new situations.

Motivation - Adults learn most effectively when they have an inner motivation to develop a new skill or gain new knowledge. They resist learning material if it is forced on them, or if the only reason given is that the material will, in some vague way, be "good for them to know." Adults need to know why they are being asked to learn something; and they definitely will want to know what the benefits will be before they begin learning. This means the best motivators for adult learners are explicit interest and self benefit. If they can be shown that the program will benefit them pragmatically and practically, they will learn better, and the benefits will be much longer lasting. Typical motivations include a desire for better handling of personal money matters, say in retirement, wanting a new or first job, promotion, job enrichment, a need to reinforce old skills in say, handling credit or learn new ones, a need to adapt to community changes such as on-line banking and so on. Remember the tone of the program should be motivating. Your program should employ methodologies so that your trainers establish a friendly, open atmosphere that shows the participants they will help them learn rather than present as 'experts' imparting knowledge. No-one engages well with a trainer/teacher who is just 'showing off' what they know. Financial services have a plethora of jargon and complicated ideas that can put many lay people off. Exposing this sort of terminology and explaining it in simple terms – or deciding whether some of it needs exposure at all – is paramount to keeping your learner's trust and interest.

Appropriate level of difficulty. The degree of difficulty of your financial literacy program should be set high enough to expose all the essential elements of the topic and challenge learners to succeed, but not so high that they become frustrated by information overload. Too much financial industry terminology strung together can be a complete turn off for people who may already struggle with the

fundamentals – is it really a necessary part of the skills they need?

So start with financial information and techniques that relate directly to the learner's own personal needs and wants. Personal budgeting is always useful and less complicated than say, comparing mortgage options. Don't make what could be a lesser used skill so important in the program it de-motivates the learners and loses their interest.

Motivational reward does not necessarily have to be in the monetary sphere; it can be simply a demonstration of social or workplace benefits to be realised from new financial management skills. Older participants could perhaps learn how to help their children with financial decisions. People could be shown how to utilise better financial planning in a club or society they belong to. Its about improving whole of life experiences not just direct monetary reward. The overall thrust of the program should be motivating and, like all good teaching and learning programs, course material should ensure other key adult learning elements are covered.

Reinforcement. As we know reinforcement is a very necessary part of any teaching/learning process. Through it, trainers encourage correct modes of behaviour and performance and discourage bad habits. Your program should use both reinforcement techniques throughout. Positive reinforcement is normally used when participants learn new skills. As implied, positive reinforcement is "good" and reinforces "good" (or positive) behaviour. Negative reinforcement is useful in trying to change bad habits or inappropriate modes of behaviour. The intention is extinction -- that is, the trainer uses negative reinforcement until the "bad" behaviour disappears or the learner understands why past practice is not beneficial to them. Examples could be ensuring participants always compare different rates of interest available to them before signing up for any new debt (a positive reinforcement) and not considering credit purchases that leave them with no income safety net for unforeseen circumstances (negative reinforcement).

Retention. Learners must retain what the program delivers to them in order to benefit from the learning. In order for participants to retain the information taught, they must see a meaning or purpose for that information. They must also understand and be able to interpret and apply the information in their own real life contexts. Understanding includes their ability to assign the correct degree of importance to the material and its application in the future. The amount of retention is always directly affected by the degree of original learning. In other words if the learners did

not learn the material well initially, they will not retain it well either. Retention by the participants is directly affected by their amount of practice during the learning. After the students demonstrate they can apply new financial skills, they should be urged to practice in their own time and for their own personal needs to retain and maintain the desired performance.

Transference. Transfer of learning is the result of training and is simply the ability to use the information taught in your program but in new settings and contexts. As with reinforcement, both types of transfer: positive and negative should be used in the program approach. Positive transference, like positive reinforcement, occurs when the learner uses the skill learnt in your program. It is very important for any learner's orientation to the new skills they develop that they can practice in their own situations. Using knowledge from financial literacy training to work out the best way to use (or not use) credit in their lives is an important tool that many participants could use immediately. Participants can check how much credit debt they have, what interest they are paying and what alternatives there may be. Negative transference, again like negative reinforcement, occurs when the learners applying the skill do not do what they are told not to do. This also results in a positive (desired) outcome. This means it's important to find out what the participants in your program have been using their new skills for. Check to see if they are applying the techniques properly or whether they have misunderstood a key aspect of the program. Once wrong information is absorbed and used again and again it simply becomes another bad habit that could make financial decision-making worse instead of better.

Transference is most likely to occur in the following situations:

• **Association**: participants can associate the new information with something that they already know. What skills have the learners already mastered that they can bring to bear on better financial planning for example? Perhaps they have a hobby where it is necessary to access information from written materials or the Internet and the same skills could be used to obtain and analyse better financial data to use in their budgeting.

• **Similarity**: the information is similar to material that participants already know; that is, it revisits a logical framework or pattern. Using calendars or electronic planners to plan future holidays, work shifts etc can be transferred to setting up a long-term budget planner for financial payments and income.

• **Critical attribute element**: the information learned contains elements that are extremely beneficial (critical) in personal life or in the workplace. Try to

reinforce the importance of aspects of the financial literacy program to the learner's own goals, whether these are in their home life, getting a job or improving their prospects in work they already have. People can even start their own small business ventures if they have the financial skills to work out the costs and benefits first.

4) DELIVERY STRATEGIES

Finally in developing your program consider that adults have different personal and social lives than young people in formal schooling or college. Unlike children and teenagers, adults have many responsibilities that they must balance against the demands of learning. Because of these responsibilities, adults may have barriers against participating in learning. These barriers could include lack of time, money, confidence, or interest, lack of information about opportunities to learn, scheduling problems, "red tape," and problems with child care and transportation. Try to consider these factors when scheduling the program. If it is to be delivered to people in a workplace it should fit around their work times and not require them to come back hours later well after they have completed a hard day's work. Week-ends might seem like good free time to learn but many adult learners are conditioned to week-ends being for family pursuits and are likely to be reluctant to give up hours away from this for financial training. Try to identify groups of learners for each program that can support each other in transport to where the program is delivered, assistance in minding young children and common interests outside of the formal learning. Groups seeking employment or those soon to retire are obvious examples of participants who will have similar interests and motivations and can help each other to access the training and learn collaboratively to use the new skills.

5) ENGAGEMENT OF THE LEARNER

Good program strategies encourage real learning, where the learner increasingly:
• takes responsibility and ownership of their learning;
• engages in experiential learning;
• partakes in cooperative learning; and,
• engages in reflective learning.
By requiring or encouraging your learners to take a more directive and active role in the program as it is delivered you are encouraging them to engage in the critical processes of:
• making meaning out of the new financial management knowledge they have;

• distilling principles from the program, which will aid their transference of financial skills to new contexts; and,
• practising their financial planning skills and mastering processes to improve their money management.
In your financial literacy program learner directed activities can also encourage greater levels of motivation. The learning is more purposeful, because they have a sense of ownership over what they achieve and identify themselves as the key beneficiaries of the outcomes. An abstract exercise in developing a savings plan for an imaginary person or family may appear to introduce the right principles but it may not resonate with the individuals you are training. Think of your target group. What are their savings goals?
What aspects of their income are available to saving and how can they work this out?
What form of saving is best for them in terms of achievable targets, regular contributions and limited risk?
Teachers and trainers often develop example exercises based on imaginary situations because, frankly, they appear to put everyone on the same testing level and it is easier to assess because there are a common set of 'right' answers. This is not the way to make financial literacy learning work for the target groups. They should be encouraged to work on individual situations entirely relevant to them. This may mean more effort on the part of the trainer in assisting with the work each person is doing and assessing outcomes but the result will be practical exercises that keep the learners involved and motivated.

6) ASSESSING PROGRESS AND OUTCOMES

Good assessment is a collaborative process involving the assessor, learners and others, where appropriate. Your assessment process should be transparent and allow for ongoing feedback from and to the learners. Remember these adult learners want to improve their skills in managing money and are not necessarily interested in formal recognition or being ranked against their peers in the group. Where possible, presenters should emphasise from the start that no-one is going to 'fail' the program. Even where students are seeking formal certification of their achievement, presenters can advise that there is no competition between the learners in the group or between an individual and the topic material – it's all achievable and everyone can make it work for them. Make sure they understand that they will all leave with better financial skills than they have at the beginning. If someone in the group is somehow

'better' or 'faster' at understanding superannuation than others that is their good fortune but makes no difference to the benefits everyone in the group gains from knowledge and skills in handling this important financial tool. Everyone will improve their life chances through participating in the program and outside of training for formal certification, assessment is to demonstrate this to them and no-one else.

If you want further Information on collaboration in the design of assessment materials and the role of learners in the assessment process this can be found in:

• Guide One – Training Package Assessment Materials Kit and Guide Five – Candidate's Kit in the Training Package Assessment Guides; and,

• Learning Circles Resource Manual for Facilitators and Learners (developed by Adult Learning Australia).

Conclusion:

Incentives aimed at providing content that audiences are produced primarily to attract different groups of adults interested in design, so that their participation in learning programs are encouraged. Motivational training materials for learners and have great importance even in support of successful applications over learners, planners and executors for educational programs is important.

Material often set different types of materials and educational content in books and pamphlets, books, training guides, trainers, equipment auxiliary audio, visual and material are included such that during actual teaching sessions, are used in the transmission and content but also to achieve the goals of making education programs are important.

Additional material for the next stage of learning often means to be expected when developing your learning skills Learners to increase awareness and enjoyment of reading and studying to operate.

To improve the quality of life, learning materials should reinforce the skills they acquired previous. This material should have access to information and provide new technology. should also have to make learning more fun. Additional materials should provide opportunities for literacy skills to read and to strengthen their cognitive awareness.

Track materials (continued) which increased literacy skills and knowledge gained is also effective in enriching learning environment for learners are important. Participatory materials to ensure the participation of learners in the learning process and codification are included out of class activities, dialogue, role playing, etc.

In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.

Learning activities such as activities outside the classroom, dialogue, role playing and ... Another type of content is presented. Duties are placed on the learner, a resource for developing knowledge, skills and insights he considered.

Curriculum content only from the training provided to learners or not, but put together their learning through activities that can inform or does, skills and attitude to achieve. In this case, apart from learning that the assays taught learners directly to sustainable and effective learning occurs in his.

Another way of providing content that is educational activities outside the learning environment possible for learning more and better enables adult learners. For example, hits, field trip experiences for learners or transfer is provided, develop knowledge, insight and skills they will.

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning

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Principles of Adult Learning in agricultural education

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Abstract: As we know reinforcement is a very necessary part of any teaching/learning process. Through it, trainers encourage correct modes of behaviour and performance and discourage bad habits. Your program should use both reinforcement techniques throughout. Positive reinforcement is normally used when participants learn new skills. As implied, positive reinforcement is "good" and reinforces "good" (or positive) behaviour. Negative reinforcement is useful in trying to change bad habits or inappropriate modes of behaviour. The intention is extinction -- that is, the trainer uses negative reinforcement until the "bad" behaviour disappears or the learner understands why past practice is not beneficial to them. Examples could be ensuring participants always compare different rates of interest available to them before signing up for any new debt (a positive reinforcement) and not considering credit purchases that leave them with no income safety net for unforeseen circumstances (negative reinforcement).
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Introduction:

adult education in the local agricultural education program is an essential component of the "total" program. Offering adult education programs helps to keep farmers and agribusiness employees better informed of current trends and provides them with opportunities to learn new skills and improve existing ones.

Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture.

Adults in agriculture use a number of sources to gain new information that can be used to help them solve problems. Persons employed in agriculture utilize newspapers, magazines, newsletters, radio, television, government publications, internet, and meetings to gather information which can be directly utilized in their business activities. In many communities, the agriculture teacher is the primary source of agricultural information.

Successful adult education programs develop and utilize an Agricultural Education Program Advisory Committee to assess the informational needs of adults in the community. Agriculture teachers should utilize the expertise and communications link, which an effective advisory committee provides. Specifically, the advisory committee should be asked to provide advice regarding planning, conducting, and evaluating the adult education program in agriculture.

Adult education programs in agriculture should emphasize practical application of the information presented. Topics and information included in adult programs should be provided which fulfills needs of the local community. Providing information which cannot be applied to solve a local problem or address a local issue will generally be viewed as frivolous and over time will result in decreased interest (i.e. participation) in the adult education program.

The role of the agriculture teacher should be as a facilitator of the learning process. Most adults reject the traditional teacher-student relationship, which is necessary to maintain in secondary programs. Teachers should be encouraged to view themselves as partners with adult participants in the learning process. The democratic philosophy of shared responsibility for planning, conducting, and evaluating adult education programs distinguishes adult education from secondary education.

A local plan for adult education in agriculture should consist of two major components. Namely, a broad statement of philosophy, goals, and objectives of the local adult education program, and an annual calendar of program activities.

Adult education in agriculture is important for continued community prosperity, growth, and improvement.

The local Agricultural Education program has a responsibility to provide up-to-date information, training, and retraining for all adults interested in agriculture.

The goals of the Adult Education Program are:

1. To assist adults in establishing personal and business goals.

2. To enhance the self-confidence and decision making skills of adults in agriculture.

3. To develop agricultural leaders.

4. To maintain the local agricultural knowledge and technology base.

5. To improve the home, living, and business conditions of persons employed in agriculture.

6. To encourage adults to participate in cooperative efforts.

The objectives for the local Adult Education program are:

1. To increase the net farm income of local agricultural producers.

2. To improve the safety practices of adults employed in agriculture in the local community.

3. To educate the public about the significant role in agriculture in the local economy.

4. To encourage the use of practices that protect and conserve natural resources to maintain a good environment for everyone.

5. To assist local producers in the development of marketing plans that are tailored to their individual needs.

6. To assist local producers in developing strategies to make optimum use of agricultural support agencies (e.g. FSA, MO Department of Agriculture).

A comprehensive program of adult education in agriculture includes three major components: (a) organized instructional classes for adults, (b) a Young Farmers/Young Farm Wives Chapter, and (c) Farm Business Management Analysis (FBMA). State Agricultural Education Program standards implemented in 1992 indicate that a minimum of 20 clock hours of organized adult education classes be provided. Many local agriculture programs will far exceed this minimum standard. Salary reimbursement Procedures for "Full Time" and Short Term adult programs are.

Comparison of adult education in various countries:

in developed countries, adult education is a form of informal education for people above 24 years is presented. In fact, a means of expanding knowledge, skills and abilities of adults. In these countries, adult education helps adults to variable conditions of political, social, economic and cultural adjustment, and pay to fix their shortcomings.

In developing countries and backward because the problems in primary education, lack of resources and facilities, poverty, social existence, economic and cultural concept of adult education is different. In such countries the concept of adult education, literacy education is.

Concept of adult education in revolutionary countries, is a combination of these two concepts.

Changes in these countries due to social, political and cultural revolution, resulting from, literacy and continuing education necessary to find because of the revolution, there is cultural poverty on the other hand the implementation of development plans and the need for skilled personnel are expert. General adult education system based on economic conditions - social and cultural community is different and each specific goals will follow. General objectives of adult education and literacy in two categories is divided into professional education.

Literacy goals include:
- Providing primary education in childhood that adults were deprived
- raising awareness for adults;
- knowledge bases and adults about their cultural heritage;
- increase confidence in adults.

Professional education goals include:
- Equipped with the necessary skills to adults living;
- providing the necessary manpower for the country's goals;
- achieving social equality and equity and eliminate the existing differences between different classes.

Principles of Adult Learning

1) PURPOSE

The Financial Literacy Foundation has prepared this document to provide education materials developers with information on the key principles of adult learning. It is a short summary of a very broad area of research and advice, prepared with the input of Adult Leaning Australia, the national peak body representing organisations and individuals in the adult learning field.

2) NEEDS, WANTS, CONCERNS AND ABILITIES OF YOUR LEARNERS

Assess the needs, wants, concerns and current abilities of the target learners. Each target group will have their own special needs and probably expect different outcomes from undertaking your training program. Common themes you can prepare for are:

Why are you here? - no-one readily admits to not knowing something fundamental that may impact on their life chances. Therefore program material, particularly that designed for adult learners should always treat aspects of why learners are in the

training sensitively. Describe the outcomes expected from the training in positive, enhancing terms and not as redressing a weakness or failure on the part of the learner. For example, "Undertaking this program will improve (rather than redress a failing) the way you manage your money".

Tell me more - learners may well enter programs like this with poor past experiences of money matters or at least some trepidation about handling personal finances in the future. Recognise this in the program introduction but individual learners should never be required to expose any of their negative experiences in a group. It might seem a good 'ice-breaker' to ask a new group of learners to share what they expect from the program but resist going too far when asking learners to talk about past problems they may have had with finances. Firstly, they may be uncomfortable doing this in a group and secondly you could start the program in a sea of negative views about financial matters generally. A successful program introduction will focus on where the learners will go rather than dwell too much on where they may have been.

What do you know? - Gauge the likely capabilities of your target groups. Overestimating their current skills in dealing with money could mean the program misses fundamental principles and understandings. Underestimating existing knowledge is also not good as plodding through basic material most already are familiar with will bore participants and the full program content will not be assimilated.

What will I be able to do? – above all these target groups will want to be hands on and demonstrate to themselves and their peers that that can do something they could not before the training; and do it well. Let them know right at the beginning that they will be able to do things that will be of great benefit to them, not just know more.

Build on small successes – if a target group of learners has had limited positives in their life or work experiences its important to provide small and regular 'success' points in the program. Simply exposing the content and assuming everyone is assimilating it, putting it all together holistically and building up their skills is not enough. The beginning of the program should be designed so that a discrete piece of learning that the learners can use right away builds their confidence to move on. The program should be a series of steps where the learners confirm their progress and reinforce one new skill by relating it to another they can already confidently apply.

Testing! – many adults and people not regularly engaged in learning fear testing. Many may have had bad experiences of assessment in school and view the practice among peers as stressful. Make sure they understand that what they are in is a life skills

program and no-one can 'fail' as such. In fact each can support others in things they do well that fellow learners may need help with so it's a cooperative not competitive environment that they are learning in. Build in some teamed exercises and assessments to avoid people feeling isolated in their learning and fearful of failure in front of the group.

Special needs. You need to consider learners with special needs and those who have English as their second language. Reasonable adjustment should be made depending on each individual learner's particular needs and abilities. Your program material should include advice to the trainer on how to determine the need to make adjustments which, depending on a learner's abilities may include:

- providing interpreters for people who are deaf;
- ensuring access, for example by conducting training and assessment in facilities which have ramps for people using wheelchairs and adjustable desks for people with physical disabilities;
- allowing for access of personal assistants or note takers;
- allowing additional time for assessments;
- allowing oral instead of written responses to questions;
- adaptive technology such as screen readers, speech synthesisers, computer software or hardware; and,
- assistance with managing stress and anxiety.

3) HOW DO ADULTS LEARN?
Your program needs to account for:
• Motivation of the learner;
• Reinforcement of the skills and knowledge being developed;
• Retention of key learning; and,
• Transference of what is learnt to new situations.

Motivation - Adults learn most effectively when they have an inner motivation to develop a new skill or gain new knowledge. They resist learning material if it is forced on them, or if the only reason given is that the material will, in some vague way, be "good for them to know." Adults need to know why they are being asked to learn something; and they definitely will want to know what the benefits will be before they begin learning. This means the best motivators for adult learners are explicit interest and self benefit. If they can be shown that the program will benefit

them pragmatically and practically, they will learn better, and the benefits will be much longer lasting. Typical motivations include a desire for better handling of personal money matters, say in retirement, wanting a new or first job, promotion, job enrichment, a need to reinforce old skills in say, handling credit or learn new ones, a need to adapt to community changes such as on-line banking and so on. Remember the tone of the program should be motivating. Your program should employ methodologies so that your trainers establish a friendly, open atmosphere that shows the participants they will help them learn rather than present as 'experts' imparting knowledge. No-one engages well with a trainer/teacher who is just 'showing off' what they know. Financial services have a plethora of jargon and complicated ideas that can put many lay people off. Exposing this sort of terminology and explaining it in simple terms – or deciding whether some of it needs exposure at all – is paramount to keeping your learner's trust and interest.

Appropriate level of difficulty. The degree of difficulty of your financial literacy program should be set high enough to expose all the essential elements of the topic and challenge learners to succeed, but not so high that they become frustrated by information overload. Too much financial industry terminology strung together can be a complete turn off for people who may already struggle with the fundamentals – is it really a necessary part of the skills they need?

So start with financial information and techniques that relate directly to the learner's own personal needs and wants. Personal budgeting is always useful and less complicated than say, comparing mortgage options. Don't make what could be a lesser used skill so important in the program it de-motivates the learners and loses their interest.

Motivational reward does not necessarily have to be in the monetary sphere; it can be simply a demonstration of social or workplace benefits to be realised from new financial management skills. Older participants could perhaps learn how to help their children with financial decisions. People could be shown how to utilise better financial planning in a club or society they belong to. Its about improving whole of life experiences not just direct monetary reward. The overall thrust of the program should be motivating and, like all good teaching and learning programs, course material should ensure other key adult learning elements are covered.

Reinforcement. As we know reinforcement is a very necessary part of any teaching/learning process. Through it, trainers encourage correct modes of

behaviour and performance and discourage bad habits. Your program should use both reinforcement techniques throughout. Positive reinforcement is normally used when participants learn new skills. As implied, positive reinforcement is "good" and reinforces "good" (or positive) behaviour. Negative reinforcement is useful in trying to change bad habits or inappropriate modes of behaviour. The intention is extinction -- that is, the trainer uses negative reinforcement until the "bad" behaviour disappears or the learner understands why past practice is not beneficial to them. Examples could be ensuring participants always compare different rates of interest available to them before signing up for any new debt (a positive reinforcement) and not considering credit purchases that leave them with no income safety net for unforeseen circumstances (negative reinforcement).

Retention. Learners must retain what the program delivers to them in order to benefit from the learning. In order for participants to retain the information taught, they must see a meaning or purpose for that information. They must also understand and be able to interpret and apply the information in their own real life contexts. Understanding includes their ability to assign the correct degree of importance to the material and its application in the future. The amount of retention is always directly affected by the degree of original learning. In other words if the learners did not learn the material well initially, they will not retain it well either. Retention by the participants is directly affected by their amount of practice during the learning. After the students demonstrate they can apply new financial skills, they should be urged to practice in their own time and for their own personal needs to retain and maintain the desired performance.

Transference. Transfer of learning is the result of training and is simply the ability to use the information taught in your program but in new settings and contexts. As with reinforcement, both types of transfer: positive and negative should be used in the program approach. Positive transference, like positive reinforcement, occurs when the learner uses the skill learnt in your program. It is very important for any learner's orientation to the new skills they develop that they can practice in their own situations. Using knowledge from financial literacy training to work out the best way to use (or not use) credit in their lives is an important tool that many participants could use immediately. Participants can check how much credit debt they have, what interest they are paying and what alternatives there may be. Negative transference, again like negative reinforcement, occurs when the learners applying the

skill do not do what they are told not to do. This also results in a positive (desired) outcome. This means it's important to find out what the participants in your program have been using their new skills for. Check to see if they are applying the techniques properly or whether they have misunderstood a key aspect of the program. Once wrong information is absorbed and used again and again it simply becomes another bad habit that could make financial decision-making worse instead of better.

Transference is most likely to occur in the following situations:

• **Association**: participants can associate the new information with something that they already know. What skills have the learners already mastered that they can bring to bear on better financial planning for example? Perhaps they have a hobby where it is necessary to access information from written materials or the Internet and the same skills could be used to obtain and analyse better financial data to use in their budgeting.

• **Similarity**: the information is similar to material that participants already know; that is, it revisits a logical framework or pattern. Using calendars or electronic planners to plan future holidays, work shifts etc can be transferred to setting up a long-term budget planner for financial payments and income.

• **Critical attribute element**: the information learned contains elements that are extremely beneficial (critical) in personal life or in the workplace. Try to reinforce the importance of aspects of the financial literacy program to the learner's own goals, whether these are in their home life, getting a job or improving their prospects in work they already have. People can even start their own small business ventures if they have the financial skills to work out the costs and benefits first.

4) DELIVERY STRATEGIES

Finally in developing your program consider that adults have different personal and social lives than young people in formal schooling or college. Unlike children and teenagers, adults have many responsibilities that they must balance against the demands of learning. Because of these responsibilities, adults may have barriers against participating in learning. These barriers could include lack of time, money, confidence, or interest, lack of information about opportunities to learn, scheduling problems, "red tape," and problems with child care and transportation. Try to consider these factors when scheduling the program. If it is to be delivered to people in a workplace it should fit around their work times and not require them to come back hours later well after they have completed a hard day's work.

Week-ends might seem like good free time to learn but many adult learners are conditioned to week-ends being for family pursuits and are likely to be reluctant to give up hours away from this for financial training. Try to identify groups of learners for each program that can support each other in transport to where the program is delivered, assistance in minding young children and common interests outside of the formal learning. Groups seeking employment or those soon to retire are obvious examples of participants who will have similar interests and motivations and can help each other to access the training and learn collaboratively to use the new skills.

5) ENGAGEMENT OF THE LEARNER

Good program strategies encourage real learning, where the learner increasingly:

• takes responsibility and ownership of their learning;
• engages in experiential learning;
• partakes in cooperative learning; and,
• engages in reflective learning.

By requiring or encouraging your learners to take a more directive and active role in the program as it is delivered you are encouraging them to engage in the critical processes of:

• making meaning out of the new financial management knowledge they have;
• distilling principles from the program, which will aid their transference of financial skills to new contexts; and,
• practising their financial planning skills and mastering processes to improve their money management.

In your financial literacy program learner directed activities can also encourage greater levels of motivation. The learning is more purposeful, because they have a sense of ownership over what they achieve and identify themselves as the key beneficiaries of the outcomes. An abstract exercise in developing a savings plan for an imaginary person or family may appear to introduce the right principles but it may not resonate with the individuals you are training. Think of your target group. What are their savings goals?

What aspects of their income are available to saving and how can they work this out?

What form of saving is best for them in terms of achievable targets, regular contributions and limited risk?

Teachers and trainers often develop example exercises based on imaginary situations because, frankly, they appear to put everyone on the same testing level and it is easier to assess because there are a common set of 'right' answers. This is not the way to make financial literacy learning work for the

target groups. They should be encouraged to work on individual situations entirely relevant to them. This may mean more effort on the part of the trainer in assisting with the work each person is doing and assessing outcomes but the result will be practical exercises that keep the learners involved and motivated.

6) ASSESSING PROGRESS AND OUTCOMES

Good assessment is a collaborative process involving the assessor, learners and others, where appropriate. Your assessment process should be transparent and allow for ongoing feedback from and to the learners. Remember these adult learners want to improve their skills in managing money and are not necessarily interested in formal recognition or being ranked against their peers in the group. Where possible, presenters should emphasise from the start that no-one is going to 'fail' the program. Even where students are seeking formal certification of their achievement, presenters can advise that there is no competition between the learners in the group or between an individual and the topic material – it's all achievable and everyone can make it work for them. Make sure they understand that they will all leave with better financial skills than they have at the beginning. If someone in the group is somehow 'better' or 'faster' at understanding superannuation than others that is their good fortune but makes no difference to the benefits everyone in the group gains from knowledge and skills in handling this important financial tool. Everyone will improve their life chances through participating in the program and outside of training for formal certification, assessment is to demonstrate this to them and no-one else.

If you want further Information on collaboration in the design of assessment materials and the role of learners in the assessment process this can be found in:
• Guide One – Training Package Assessment Materials Kit and Guide Five – Candidate's Kit in the Training Package Assessment Guides; and,
• Learning Circles Resource Manual for Facilitators and Learners (developed by Adult Learning Australia).

Conclusion:

To improve the quality of life, learning materials should reinforce the skills they acquired previous. This material should have access to information and provide new technology. should also have to make learning more fun. Additional materials should provide opportunities for literacy skills to read and to strengthen their cognitive awareness.

Track materials (continued) which increased literacy skills and knowledge gained is also effective in enriching learning environment for learners are important. Participatory materials to ensure the participation of learners in the learning process and codification are included out of class activities, dialogue, role playing, etc.

In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.

Learning activities such as activities outside the classroom, dialogue, role playing and ... Another type of content is presented. Duties are placed on the learner, a resource for developing knowledge, skills and insights he considered.

Some research findings that can be a learning process for the Guidelines for training operations are applied, is given below:

1- - Preparation for adults to learn how much he depends on previous learning. Knowledge that has accumulated because of an ability to absorb new information more person is. Past educational experience features a diverse group of adult learners, the starting point of any activity on the diversity training is emphasized.

2- intrinsic motivation, learning a deeper and make them sustainable. When the need is met directly by the learning itself, what is learned, but is complementary learning. Creating a training activity in adult learning needs, learning ensures stable

3- Positive reinforcement (reward) learning to reinforce the negative (punishment) is more effective. Many adults because of negative experiences at the beginning of schooling, are weak and afraid. Feeling of success in adult learning for continuous learning and adult participation is essential.

4- To maximize learning, information must be provided an organized manner. Entries can be simple or complex can be arranged around related concepts are organized. Starting point for organizing content knowledge for adults and adults is linked to past experiences

5- Learning, especially regarding skills development, will be added frequently.

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Development Partnership in Practice: The Sawah Technology

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Abstract: This paper examines the process of technology development and dissemination with respect to sawah rice production. The term sawah refers to man-made environment for rice production that includes levelling and bunding of rice fields with inlet and outlet connecting irrigation and drainage. It has been hypothesized that sawah rice production technology holds the ace to the expected green revolution in West Africa as a yields of 5t/ha have been obtained. The process of sawah rice technology development and dissemination is exploring strategic synergy and partnership among Japanese institutions, research institutes, Ministry of agriculture, extension agencies, farmers groups, Millennium Village and Universities in Nigeria and Ghana which can be described as an emerging innovation system for rice production in West Africa. The partnership was empirically ascertained in terms of involvement, kind of involvement and intensity of involvement of the various stakeholders in the areas of joint problem identification (JPI), joint priority setting and planning (JPSP), collaborative professional activities (CPA), joint On- farm Adaptive Research (OFAR), dissemination of knowledge (DK), joint demonstration trials (JDTR), joint field days (JFD), joint seminar and workshop (JSW), evaluation survey (ES), and evaluation meeting (EM). A structure questionnaire was used to elicit information from a list activities identified among the stakeholders. Data collected were subjected to percentage distribution and one way analysis of variance to determine differences in the involvement of each of the actors. The results show varying degrees of involvement, types of involvement and different levels of intensity. While Japanese institutes are very prominent in funding and training, scientists and farmers are prominent in problem identification and joint demonstration trials. The implications of the results are discussed and pragmatic suggestions made for a proactive revamping of the process of technology development and dissemination for rice production in West Africa.
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1.   Introduction

Over decades, rice has occupied a prominent position as a strategic crop for food security and economic development of nations of the world. FAO (2006) classified the crop as the most important food depended upon by over 50 percent of the world population for about 80% of their food need. Due to the growing importance of the crop and the increasing challenges of attainment of food security, it has been estimated that annual rice production needs to increase from 586 million metric tons in 2001 to meet the projected global demand of about 756 million metric tonnes by 2030 (Kueneman 2006). Recent global trend in the rice industry however shows that there is a growing import demand for the commodity in Africa, as evidenced from pressure on world supply and the steady increase in the world price of the commodity in the last five years (FAO, 2006). In the West Africa sub region, Nigeria has witnessed a well established growing demand for rice as propelled by rising per caput consumption and consequently the insufficient domestic production had to be complemented with enormous import both in quantity and value at various

times (Erenstein et al., 2004; Daramola, 2005). The enormous importation has however been considered by various regimes as an avoidable drain on the country's foreign exchange earnings in view of the abundant natural endowments for expanded production in Nigeria.

In the past, the growth recorded in domestic rice production was due to area expansion. However, recent strategies through research system sought to increase production through increased productivity through intensification based on the development and dissemination of improved rice varieties and other modern inputs as a composite package to rice farmers. Oyekanmi et al., (2008) and Nwite et al., (2008) reported that from research stations (based on their on-station and on-farm trials showed that the adoption of the technologies and improved management practices lead to substantial yield increases in rice production. This invariably underscores the significant role that technology stands to play in attaining the much needed growth in the rice sub sector.

1.1 Development partnerships

'Partnerships' are of central importance to development practice in the 21st Century. The concept has become generally accepted as being fundamental for the success of poverty 'elimination'. It is used to refer to a wide range of different kinds of relationship, often with insufficiently rigorous assessment being applied either to its meaning or to its substance. Beneficial development practice should involve different groups of people and institutions is (Mercer et al, 2003; Slater and Bell, 2002). Two main ways in which the term 'partnership' is used in development practice are: the relationship between donors and recipient governments (usually global partnerships); and tri-sector initiatives combining the private sector with government and civil society (often partnerships at a national or regional scale). In addition, the term partnership is sometimes used to refer to activity focused projects that draw on the expertise of various stakeholders, invariably at a local or national scale. In some instances, all three usages coalesce, but failing satisfactorily to distinguish between the interests behind each of these approaches to partnership can lead to confusion and can also have damaging effects on the ability of poor people to enhance their lives (UNESCO, 2005).

1.2 Agricultural Technology System

Agricultural technology system (ATS) is defined by Kaimowitz et al (1991) as consisting of all the individuals, groups, organisations and institutions engaged in developing and delivering new or existing technology Ellis, (1992) described ATS as a national agricultural research system (NARS) - this includes many organisations, public and private, that are involved in generating various forms of agricultural technology. Swanson et al (1988) described the following indicators in analysing ATS.

Public policy: This guides the direction of agricultural development by establishing a course of action and goals at national level. Priorities are set; a resource allocated and rules are elaborated which create the environment for technological progress. Under this are the following indicators: - Government financial commitment to agriculture - Investment in research and extension - Availability and utilization of agricultural credit - Pricing policy - Farmers participation in technology system.

Technology development: The indicators under this section measure factors that affect the performance of the research subsystem, these are: - Access to external knowledge and technology - Human resources for agricultural research Resource allocation to research salaries and programme - Resource allocation to commodity focussed research

Technology transfer: This provides information on various resources and activities with knowledge transfer from researchers to farmers through extensionists. This considers the following: - Access to and availability of internal technology - Personnel administration and supervision - Time allotted to technology transfer - Resource allocation between extension salaries and programmes - Technology dissemination - Personnel resources for extension.

Technology utilization: This is concerned with the primary objectives towards which the entire technology system has been aimed. It focuses on: - Availability of technology - Access to technology - Technology adoption Kaimowitz and Merril-Sands (1989), explaining the institutional agricultural technology system posited that links between research and technology transfer have both functional and institutional meaning. Thus, the links between them may be discussed from two points of view, they may be seen as functional links, which relates to the institution and personnel were identified to be influencing research technology transfer namely:

Political factors: consider the historical legacy, current political and social structure and external pressure in terms of national policy, foreign donor and private sectors.

Technical factors: measure the farmer input and targeting; environmental diversity, communication channels and infrastructure, level of pre-existing knowledge about the environment, the dispersion and accessibility of the farming population.

Organisational factors: examine the interdependence between components and compatibility of management style, size consideration, different staff orientation and functional or market based organisations.

1.3 Agricultural Knowledge Information System (AKIS)

Rolings (1991) analyzed Agricultural Knowledge Information System (AKIS) and identified four basic processes in which all participants in an AKIS are engaged. These basic processes are:

Generation - This is often attributed only to research, yet public agricultural research is not more than 100 years old in most countries. Farmers have, however,

managed to develop their agriculture for thousands of years. Knowledge generation appears to be more effective when carried out in-groups than when attempted individually.

Transformation - This is perhaps the most crucial process-taking place in the AKIS. The essence of an AKIS is that knowledge generated in one part of the system is turned into information for use in another part of the system. The following transformations take place: i)   From information on local farming systems to research problem; ii)   From research findings   to   tentative   solutions   to   problems technologies;   From research problems to research findings; From technologies to prototype recommendations for testing in farmers field. v) From recommendation to observation of farmers' behaviour; From technical recommendation to information affecting service;   behaviour;   From adapted recommendations to information disseminating by extension; and viii)   From extension information to farmer knowledge.

Integration - This is carried out by all participants in an AKIS. The review articles produced by scientific disciplines to pull together research results are obvious examples.   Leaders of multi-disciplinary research teams are engaged in a continuous effort to integrate research results produced by different disciplines.

Storage and retrieval - These processes would seem to be typically the taste of specialized libraries but most researchers, extension workers and farmers store and retrieve information.

Rolings (1991), therefore stated that the analysis of AKIS must be examined against the back drop of: 1. Policy environment which formulates the laws, incentives that influence agricultural performance; Structural conditions, such as markets inputs the resource base,   infrastructure and the structure of farming; Political and bureaucratic structure through which interest groups   influence the system; and 4.

External sector comprising of the donor agencies, international agricultural research centers (IARCs) and/or commercial farms. The analysis could cover the comparison of major components, linkage mechanisms, management decisions, and actual and formal systems. Also identifying institutional and functional gap and investigating how actors see them as playing complementary roles.

1.4 Cycle of Partnership Formation

Various authors studying partnerships in development scenarios have made clear that partnership building occurs in several phases. Partnerships begin when a common interest arises and end when the proposed results are achieved or when the partners decide to terminate the partnership. Nevertheless, the process is iterative: some phases overlap, new problems and ways of operating the partnership arise, and processes that were already completed must be begun again (Hartwich et al 2007).

Phase 1: Identifying the Common Interest: The point of departure is usually a technical problem or a technological or market opportunity that can be resolved or addressed by research. The problem or opportunity may have already been identified by the public and private actors based on previous relationships or through a formal process of identifying a common interest. The common interest changes each time a new member enters the partnership or an old one departs. Therefore, it is often useful to develop a strategic vision that will allow the partnership to orient itself when it must adapt to changes in the socioeconomic context (Bovaird, 2004).

Phase 2: Negotiating the Partnership Contract
In this phase, the potential partners begin to develop the partnership's activities and discuss the expected costs versus the possible benefits. The goals of the partnership are reviewed, as are the interests and capacities of the potential partners. The main subjects of negotiation at this phase are: financing, distribution of benefits and intellectual property, structure or organizational design of the partnership and specific partnership activities (Crawford, 2003)
.

Phase 3: Operation
In this phase, the proposed activities of the partnership are put into practice. Some strategies that can improve the operation of partnerships include: confidence building,   transparency,   understanding   different cultures and strategic vision (Hartwich et al 2007).

Phase 4: Monitoring and Evaluation
The evaluation of a partnership can have different purposes, such as justifying the use of funds, understanding whether the expected results have been or are being generated and how efficiently they are being realized, and identifying the strengths and

weaknesses of the partnership in areas related to administration, management, leadership, and the synergetic effect produced (Bovaird, 2004).

Phase 5: Termination or Continuation
After evaluating the partnership and examining whether the expected results have been achieved, the partners must choose whether to continue or terminate the partnership (Hartwich et al 2007).

2.   Materials and Methods

A qualitative approach was used in this study and the participant observation and in-depth interviews were conducted to collect data for the study. The study population involves the participating researchers and farmers in Nigeria and Ghana. A purposive sampling

technique was used due to the fact that the number of participating scientist is limited and that of farmers has been increasing very season. The checklist for the interviews was based on the list of 21 activities that were developed from literature on partnership and linkages in agricultural technology development. The ranking of the partnership activities were collated and presented in table formats

3.   Results

Table 1 presents the results of the ranking of the comparative analysis of partnership activities used among major stakeholders in sawah technology development process, while Table 2 presents the analysis of variance comparing involvement in partnership activities by major stakeholders in sawah technology development

Table 1: Partnership activities among major stakeholders in Sawah rice technology development

Partnership activities	Japanese Institutions and researchers	Scientists in Ghana and Nigeria Institutions	Farmers in Ghana and Nigeria
Joint problem identification	X X X	X X	X
Joint priority setting and planning	X X	X	X
Joint programming	X X X	X X	
Joint technology publication	X X X	X X X	
Collaborative professional activities	X X X	X X	X
Joint research contracts	X X X	X X	
Joint research activities	X X X	X X X	
Exchange of resources	X X X	X	X
Joint facilities	X	X X	X X
Joint financial resources	X X X	X	X
Staff rotation		X X X	X X
Dissemination of knowledge	X X X	X X X	X X X
Joint publication	X X X	X X X	
Joint reports	X X X	X X X	
Joint demonstration trials	X X X	X X X	X X X
Joint field days	X	X X X	X X X
Joint audio-visual materials	X	X X X	X
Joint seminar and workshop	X X X	X X	
Cross training	X X X	X X	X X
Evaluation survey	X X X	X X	X
Evaluation meeting	X X X	X X	X
Evaluation field visits	X X X	X X	
Evaluation reports	X X X	X X	

Table 2: Analysis of variance comparing involvement in partnership activities by major stakeholders in sawah technology development

Partnership activities	Sum of Squares	df	Mean Square	F[*]	p	Kruskal Wallis Test[**]	df	p
Between Groups	18.087	2	9.043	16.87	.000	22.846	2	0.00
Within Groups	35.391	66	.536					
Total	53.478	68						

[*] when scores were at interval level of measurement, [**] when scores were ranked

4.   Discussion

Table 1 covers linkage activities between these three components. Japanese Institutions and researchers were very prominent in 18 out of the 21 listed activities. These are joint problem identification, joint programming, joint technology publication, collaborative professional activities, joint research contracts, joint research activities, exchange of resources, joint financial resources, dissemination of knowledge, joint publication, joint reports, joint demonstration trials, joint seminar and workshop, cross training, evaluation survey, evaluation meeting, evaluation field visits and evaluation reports. This may be because of the high involvement of the Japanese Institutions and researchers in all the stages of the technology development process. It is also noteworthy that the funds for the technology development process were granted by Japanese Institutions and researchers.

Scientists in Ghana and Nigeria Institutions were only prominent in 9 out of the 21 listed activities. These activities are joint technology publication, joint research activities, staff rotation, and dissemination of knowledge, joint publication, joint reports, joint demonstration trials, joint field days and joint audio-visual materials. The institutional mandate of the participating research scientists from in Ghana and Nigeria may be responsible for this trend of involvement in the partnership development activities. The high participation of Scientists in Ghana and Nigeria Institutions in partnership activities implies that when development is the focus and mandate related, resources are likely to be utilized effectively in carrying out these functions.

Farmers in Ghana and Nigeria were only prominent in 3 out of the 21 development activities. These are dissemination of knowledge, joint demonstration trials and joint field days. The acquisition of knowledge associated with these activities could be responsible for their prominence. Their non-involvement in the other activities underscores the lack of complete or partial linkage existing between researchers, extension agents and farmers. While it is a known fact that majority of farmers are illiterate, It has been established that they are sources of vital information (local) that will enhance the development, acceptability and utilization of technologies.

In Table 2, the result showed that there is a significant difference in the involvement of Japanese Institutions and researchers, Scientists in Ghana and Nigeria Institutions and Farmers in Ghana and Nigeria in the partnership activities in the sawah technology development process (F = 16.87, p < 0.05). The pattern of involvement as revealed by the mean involvement score shows that Japanese Institutions and researchers were more involved than Scientists in Ghana and Nigeria Institutions which also participated more in the partnership activities in the sawah technology development process than Farmers in Ghana and Nigeria. However the degree of involvement has enhanced the successful development and dissemination of sawah technology and there is need for the sustainability of the partnership activities.

The paper has shown clearly that partnership activities were critical in the development and dissemination of the sawah technology in West Africa. It has also highlighted the varying degrees of involvement in partnership activities by the three major stakeholders in the technology development process. The varying degree of involvement in the partnership activities enhanced the successful development and dissemination of sawah technology and there is need for the sustainability of the partnership activities.

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Electrodeposition and characterization of Nickel from Gluconate baths in presence of Some Additives

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Abstract: Electrodepsion of nickel from solutions containing nickel sulfate, boric acid, ammonium sulfate and sodium gluconate on copper substrate has been investigated. The study dealt with the influence of bath composition, current density, pH and temperature on cathodic current efficiency as well as the effect of urea, aniline sulfate and chloramine B as additives on the corrosion behavior using Potetiodynamic polarization curve and morphology of the deposited nickel using scanning electron microscopy (SEM). The optimum conditions for producing nickel deposits from the free additives baths were: 0.2 mol/l $NiSO_4.6H_2O$, 0.2 mol/l sodium gluconate, boric acid 0.4 mol/l, ammonium sulfate 0.4 mol/l, pH 8,current density of 2.5 A/dm^2 and at 25 ^{0}C. The same conditions were used in the presence of additives, under these conditions the cathodic current efficiency was 96.5% which decreased sharply with increasing temperature. These coatings have high corrosion resistance in comparison with Cu-substrate. However the surface morphology of the deposits varies from spherical grain to columnar in the absence and presence of additives, respectively.

1. Introduction:

Electrochemical nickel plating is a widely used process. Applications comprise functional coatings, for example, for corrosion protection, increase of wear resistance and decorative coatings such as bright Ni mostly in combination with chromium. Many electrolyte formulations are based on the classical composition proposed by Watts, which yields dull Ni deposits. To obtain decorative deposits with a mirror-like surface finish special additive formulations have been developed, which contain organic substances like surfactants, brighteners and levelers. The current efficiency is nearly 100% over a wide range of current densities [WEHNER et al., 2003].

The majority of metal electrodeposition processes are carried out from baths containing complexing agents such as sulfamates, tartrates, Citrates, glycinates and gluconates have been used. These complexing agents are non-toxic, easily obtained and their degradation products offer easier treatment [Rashwan et al., 2003]. A survey of literature shows that gluconate electrolytes were used to electroplate metals such as nickel [Abd El Meguid. E. A et al., 1999], copper [Abd El Rehim et al., 2000], tin [Abd El Rehim et al., 2000] and zinc [Rashwan et al., 2000]. Organic additives have been found to affect the electrothrowing power of nickel from sulfate, chloride and Watts's bath. High purity nickel was produced by electroplating from sulfate and chloride solutions in the presence of high concentration of boric acid as a buffer [Lupi et al., 2006].The effect of acetone on the current efficiency, morphology and particle size of the deposited nickel from an ammonical sulfate bath have been studied [Borikar et al., 2006].The morphology of the nickel deposited with a high concentration of organic additive TBAC (tri benzyl ammonium chloride) have been reported and the average particle size of the deposited powder decreased with the concentration of acetone. More recently, performed of nickel electrodeposition at a constant current density to determine the optimum concentration of chloride and an organic additive used for industrial nickel electroplating were studied [Malevich et al., 2008]. Selenious oxide and certain dyes have been used in conjunction with naphthalene sulfonic acids in nickel baths for improving the brightness and leveling of the nickel deposits. While saccharin, p-toluene sulfonamide, sodium m-benzene disulfonate, o-sulfo benzaldehyde have been used as stress reducers in Watts or sulfamate bath to obtain the desired hardness without tensile stress [Lowenheim, 1974]. Certain anionic wetting agents are used in nickel baths to

prevent bubbles of hydrogen from adhering to the cathode and causing pits in the deposit. Sulfates of normal primary alcohols containing 8–18 carbon atoms at concentrations of 0.1–0.5 g/l were the first successful wetting agents used commercially in bright electrodeposited nickel baths. However, sodium lauryl sulfate (SLS) free from lauryl alcohol is the most extensively used wetting agent of this class for ductile dull nickel plating. Sodium lauryl sulfate and sodium lauryl ethoxy sulfonates, otherwise called or known as anionic surfactants have been widely used commercially in the electroplating of nickel [Shinochiro et al., 1979].The objective of the present study is to obtain nickel deposits from alkaline-gluconate bath, in order to determine the dependence of coating characteristics on several electroplating variables and the effects of urea, analinium sulfate and chloralamine B in it is structure and corrosion resistance.

2. Materials and Method:

Two solutions baths listed in two tables (1) and (2) used were freshly prepared from analar chemicals and doubly distilled water. Copper sheet cathode and pure nickel sheet anode both of dimensions 2X2 cm^2 were used. The copper sheet cathodes were mechanically polished with different grade emery papers and then immersed in pickling solution (300ml H_2SO_4+100ml HNO_3+5ml HCl+595ml doubly distilled water) for 1min, washed with distilled water, rinsed with acetone, dried and finely weighted. The pH was measured using Microprocessor pH/mV/^{0}C Meter (Model CP 5943-45USA) and adjusted by NaOH 20% addition, the temperature was controlled by using hot plate-magnetic stirrer (Philip Harris Ltd). Direct current was supplied by a d.c power supply unit (GP-4303D). Cathodic current efficiency (CCE) of the deposits were calculated as Q_{Ni}/Q_{tot} X 100,where Q_{Ni} is the real charge estimated from the quantity of deposited nickel and Q_{tot} is the theoretical charge calculated from Faraday's Law. The surface of the as-deposited nickel on copper substrates was morphologically inspected using scanning electron microscopy (SEM). (JEOL-5410 attached to an EDX unit). The electrochemical experiments were performed using A VOLTA LAB 40 (Model PGZ301) with the aid of commercial software (Volta Master 4 version 7.08). A saturated calomel electrode (SCE) and a platinized platinum black were used as the reference and auxiliary electrodes, respectively with different deposited plates as the working electrode and the electrochemical cell was filled by 3.5% NaCl. Volta Master 4 calculates and displays the corrosion rate, Corr. in μm/year: this rate is calculated from the i cor the corrosion current density found, the D density and the M atomic mass

and V valence entered in the Tafel dialogue box. The calculation is performed as follows:

Corrosion μm/year=   (i cor. (A/cm²) x M (g)) / (D (g/cm³) x V) X3270   with: 3270 = 0.01 x [1 year (in seconds) / 96497.8] and 96497.8 = 1 Faraday in Coulombs.

3. Results and Discussion:

3.1. Cathodic Current Efficiency (CCE):

The effect of pH on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at 25 ^{0}C and current density of 2.5 A/dm^2 is illustrated in Figure (1).It's clear from the plot of Figure(1) that the CCE of nickel is very low at low pH values of (3-4) and abruptly increases at pH of 5 attaining steady state in the pH range 5-7 (CCE=70%). At a pH of 8 the CCE is a maxima value of about 97%.The increase in the CCE of nickel deposition with increasing the pH value is due to the increase in hydrogen overpotential. Moreover, the strong hydrogen evolution in acidic solution may inhibit the diffusion of Ni(II) species to cathodic diffusion layer possibly to concurrent hydrogen adsorption and bubbles formation [Ying and Ng, 1988, Abd El Rehim et al., 1997]. In these gluconate solutions, it has been suggested that the gluconate ion is attached to Ni (II) ion by coordination through the carboxyl group and one of the adjacent hydroxyl groups [Joyce and Pickering, 1965]. Therefore, nickel may be obtained by electroreduction of either the complexed or uncomplexed ions with simultaneous hydrogen evolution as aside reaction and nickel may exists as [Ni $C_6H_{11}O_7$]$^+$ complex (K_f =74.43) [Kouba A , 1975]. The influence of temperature on cathodic current during nickel electrodeposition in pH 8 was examined and the results are shown in Figure (2). An increase in temperature from 25 ^{0}C to 50 ^{0}C decreased the cathodic current efficiency and this can be explaining by the enhancement of rate of hydrogen evolution which suppressed the metal deposition [Ying and Ng, 1988]. One of the most important operating conditions in electroplating process is the current density, as shown in Figure (3). Increasing the current density to 2.5 A/dm^2 increased the efficiency and after that decreased sharply and this is also due to hydrogen evolution at high current densities. It is found that the efficiency of nickel plating increases with increasing plating time from 10 to 20 min Figure (4). With further increase in plating time the efficiency decreased and the increasing of the efficiency with plating time may be attributed to the fact that hydrogen evolution takes place simultaneously with nickel deposition. Hydrogen evolution decreases with increasing plating time as a

result of increasing pH in the vicinity of the cathode surface [ABD EL REHIM et al., 2002].

From Figure (5). Cathodic current efficiency of Nickel electrodeposition increased with increasing gluconte concentration up to 0.2 mol/l and then decreased with increasing gluconate content in the bath. These results are expected due to the inhibiting effect of gluconate ions [Abd El Meguid et al., 2003].The data of Figure (6). Show that the cathodic current is increased with increasing Ni(II) ion up to 0.2 mol/l and then slightly decreases which may be due to that increase in nickel content tends to oppose its depletion in the cathodic diffusion layer [Abd El-Halim and Fawzy, 1993]. The effect of urea, analinium sulfate and chloramine B as additives in nickel electroplating from alkaline gluconate was shown in Figure (7). The cathodic current of nickel electrodeposition is decreased as the additive content in the bath is increased and this can be explained by the fact that larger aliphatic or aromatic compounds with positively charged amine groups generally blocked the active side in cathodic substrate at high concentration and it may cause pitting corrosion at higher or lower concentration [Hackerman and Snaveley, 1984].

3.2. Potetiodynamic Polarization Curves:

Linear polarization technique was carried out by subjecting the working electrode to a potential range of 205 mV below and above corrosion potential (Ecorr) at a scan rate of 5 mV/sec, corrosion rate were evaluated from the polarization curves by Tafel extrapolation with the aid of commercial software (Volta Master 4 version 7.08). The results in Figure (8). and table (3) Show the corrosion behavior of the deposited plates with nickel gluconate layer and nickel gluconate plated with addition of urea, aniline sulfate and chloramine B and from the data one could say that nickel gluconate layer alone and with additives was decreased the corrosion rate of cu-substrate in order

Aniline sulfate> urea> Ni-Gluconate> chloramine B> cu-substrate

With protection efficiency of:

96.15%> 95.12%> 91.21%> 83%, respectively

Organic additives protect the entire surface of a corroding metal when present in sufficient concentration both anodic and cathodic reactions are suppressed in the presence of organic additives, the film formed protect the metal surface through a hydrophobic film and the film formed provides a barrier to the dissolution of the metal [Hackerman and Snaveley, 1984] and the reason that aniline sulfate and urea showed greatest protection efficiency can be explain by the fact that larger aliphatic or aromatic compounds with positively charged amine groups generally form active portions in organic cationic

inhibitors [Hackerman and Snaveley, 1984, Pierre R, 1999].

3.3. Surface Morphology of The deposits:

The surface morphology of the as-deposited nickel on Cu-substrate was examined by scanning electron microscopy. Figure (9 a, b, c, d) shows the morphological details of some nickel deposits obtained from the optimum bath conditions for nickel gluconate deposited alone and with aniline sulfate, urea, chloramine B as additives. The deposits are generally adherent, bright and smooth and cover all substrate surface and the obtained deposits from the optimum free additives solutions is essentially differ from those which obtained in the presence of additives; as it is compact fine spherical grain shape which reflect in the presence of additives to compact fine columnar shape as in the presence of aniline sulfate and urea and mixture of spherical grain to predominately columnar shape in the presence of chloramine B, this transition from spherical to columnar reflect the presence of microcrackes in the deposits as result of highly stress. The stress could be due to the blocking sites which found by the action of additives .The result of EDX Figure.10. Indicate that the Ni% is high (97.5-98%) in these baths.

Table (1): Materials and Operating Conditions of Nickel Gluconate Baths

$NiSO_4.6H_2O$	0.025-0.25 mol/l
$C_6H_{11}NaO_7$	0.05-0.4 mol/l
H_3BO_3	0.4 mol/l
$(NH_4)_2SO_4$	0.4 mol/l
Current	1-4 A/dm^2
pH	3-10
Time	10-60 min
Temperature	25-50 ^{0}C
Stirring	150 rpm

Table (2): Materials and Operating Conditions of Nickel Gluconate Additives Baths

$NiSO_4.6H_2O$	0.2 mol/l
$C_6H_{11}NaO_7$	0.2 mol/l
H_3BO_3	0.4 mol/l
$(NH_4)_2SO_4$	0.4 mol/l
Urea	0.5-2 g/l
Aniline Sulfate	0.5-2.5 g/l
Chloramine B	0.5-2.5 g/l
Current	2.5 A/dm^2
pH	8
Time	20 min
Temperature	25 ^{0}C
Stirring	150 rpm
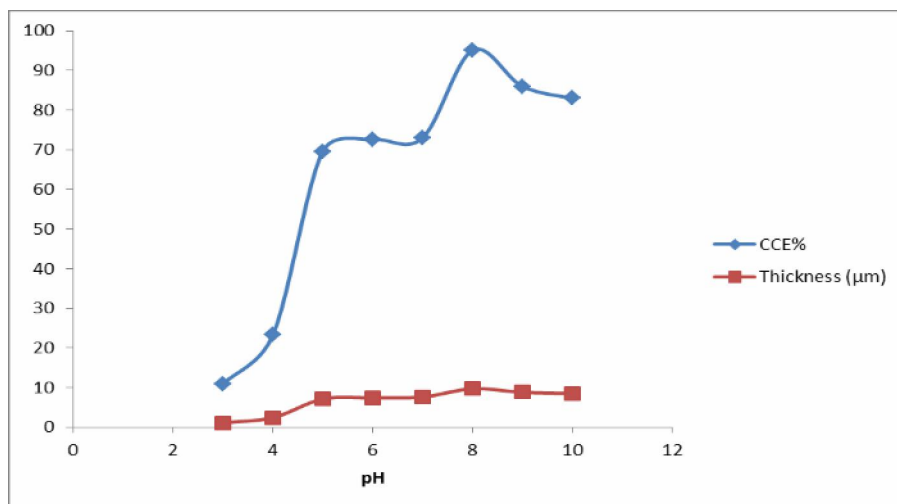
Fig(1) .Effect of pH on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at 25 [0]C, time 20 min and current density 2.5 A/dm^{2}.
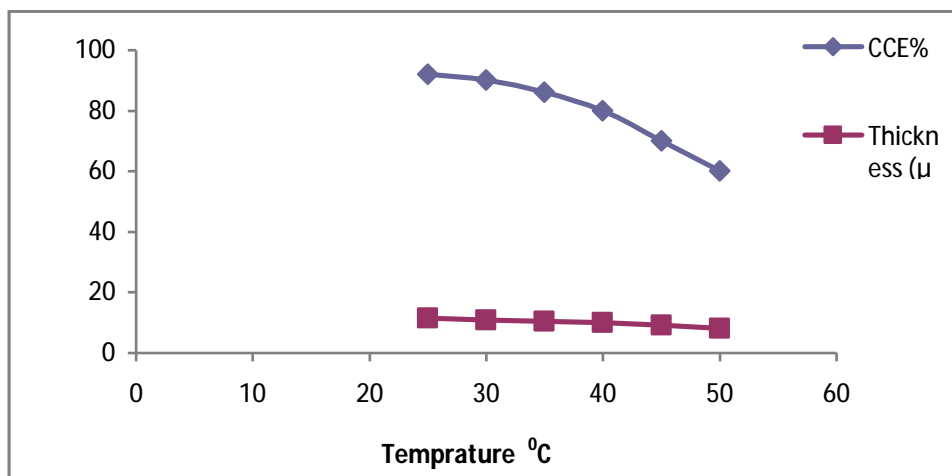
Fig(2) .Effect of temperature on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and current density 2.5 A/dm^{2}.
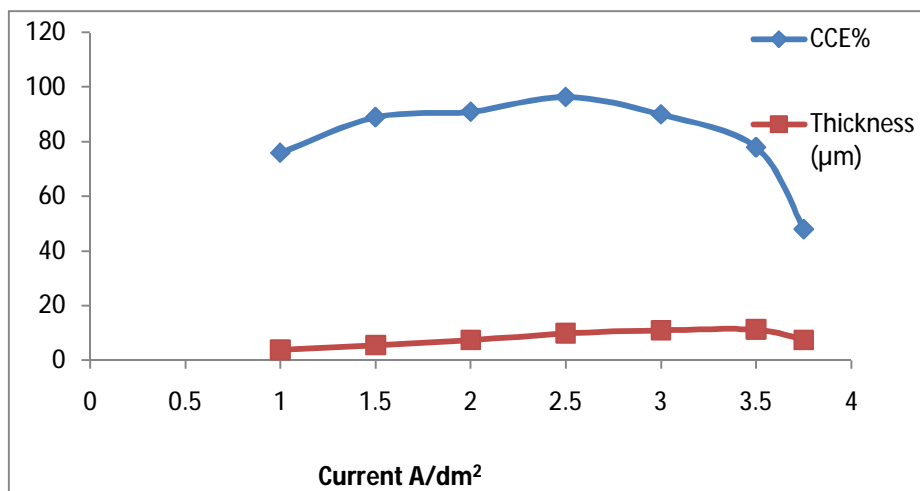
Fig(3) .Effect of current densities A/dm^2 on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l NiSO$_4$.6H$_2$O and 0.2 mol/l C$_6$H$_{11}$NaO$_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature 25^{0}C.
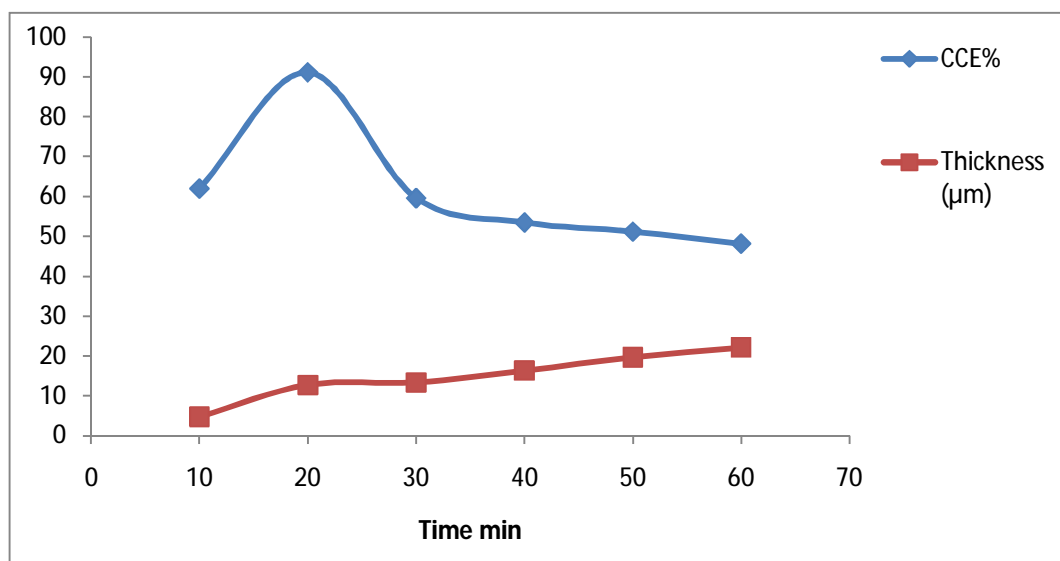
Fig(4) .Effect of plating time/min on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l NiSO$_4$.6H$_2$O and 0.2 mol/l C$_6$H$_{11}$NaO$_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8 and temperature 25^{0}C and current density 2.5 A/dm^2.
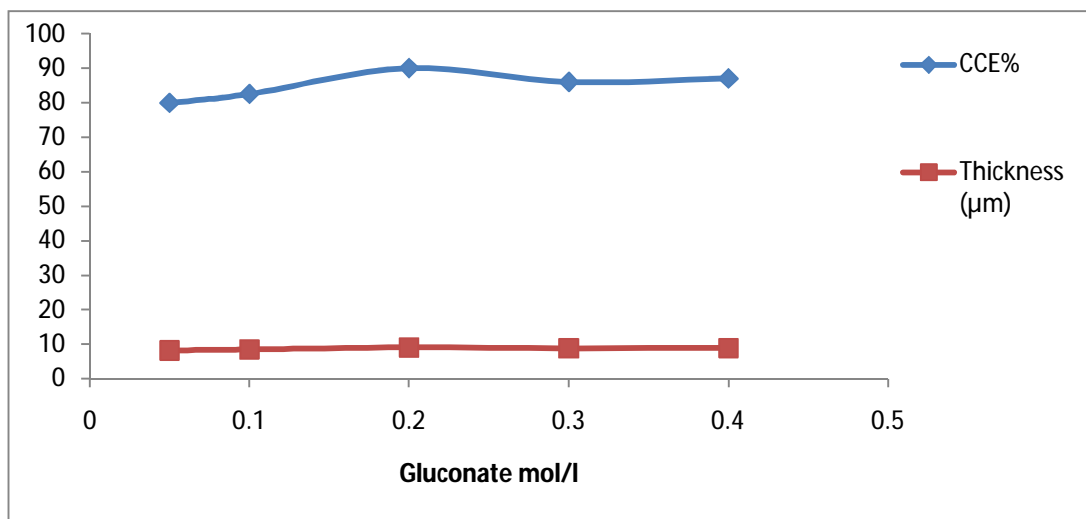
Fig(5) .Effect of gluconate mol/l on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature 25^0C,current density 2.5 A/dm^2.
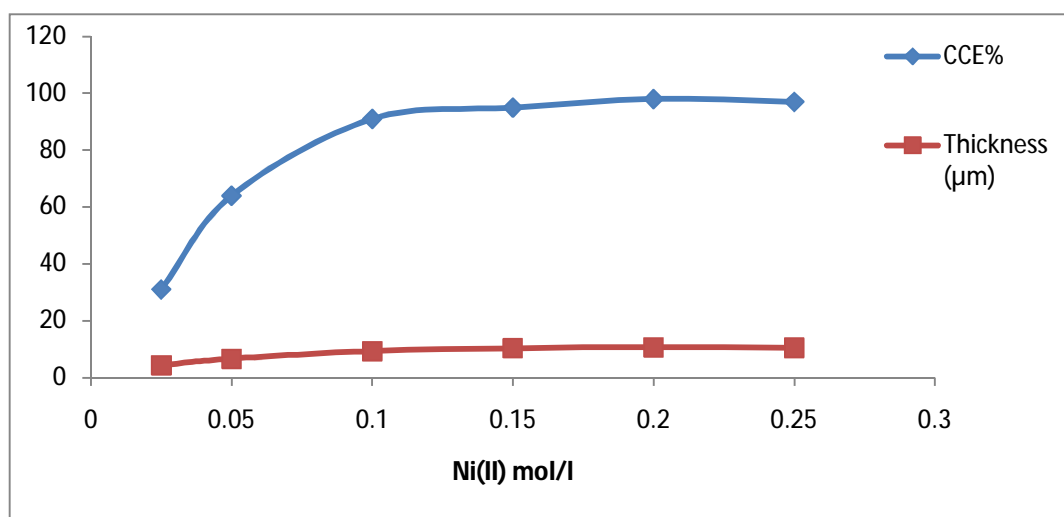
Fig(6) .Effect of Ni(II) mol/l on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l $C_6H_{11}NaO_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature 25^0C,current density 2.5 A/dm^2.
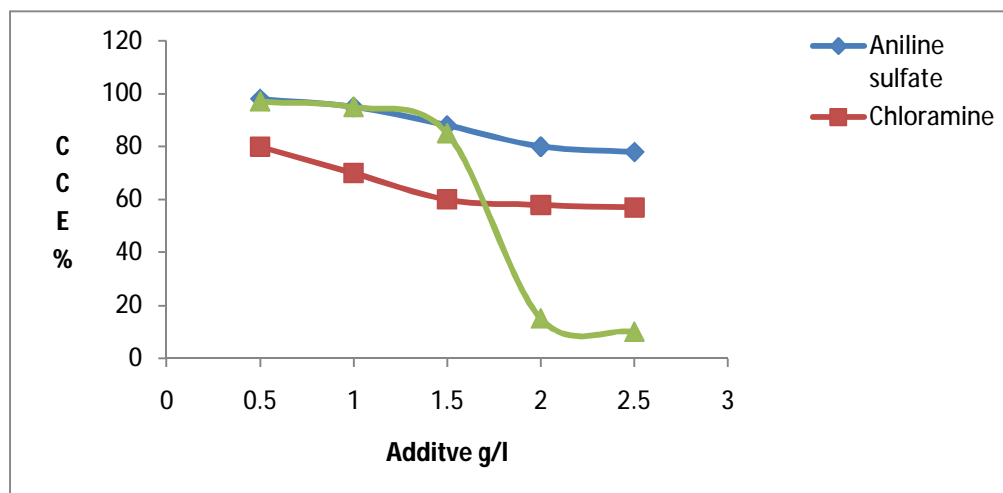
Fig(7) .Effect of urea, aniline sulfate and chloramine B g/l on cathodic current efficiency, CCE, of nickel deposition from baths containing 0.2 mol/l NiSO$_4$.6H$_2$O and 0.2 mol/l C$_6$H$_{11}$NaO$_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature25^{0}C,current density 2.5 A/dm^2.
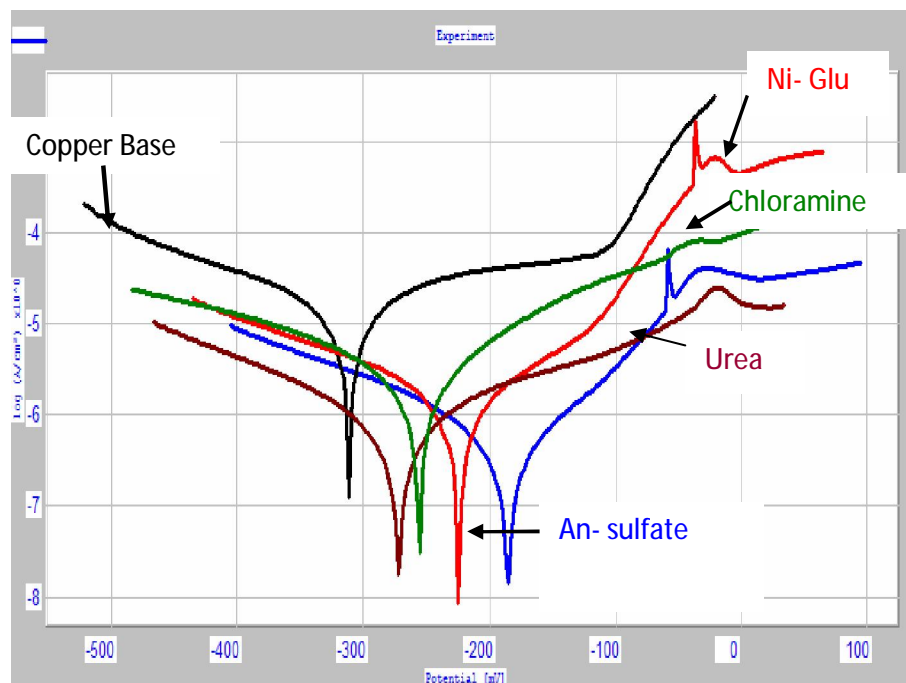
Fig. (8) Corrosion behavior of nickel deposited from gluconate baths alone (Ni-gluc) and with aniline sulfate, urea, chloramine B, the samples was chosen from the optimum plating conditions.

Table (3): Data obtained from the corrosion behavior of nickel deposited from gluconate baths alone (Ni-gluc) and with aniline sulfate, urea, chloramine B, the samples was chosen from the optimum plating conditions.

	E (i=0) corr. mV	i corr. μA/cm²	Rp kohm.cm²	Beta a mV	Beta c mV	Corrosion μm/Y
Cu Base	-315.0	6.2359	1.93	73.4	-82.7	72.40
Urea	-275.4	0.3045	38.09	66.6	-75.5	3.535
Chloramine B	-259.5	1.0579	11.06	57.6	-81.9	12.28
Ni-Glu	-228.7	0.5479	17.83	64.3	-66.2	6.362
An-sulphate	-189.9	0.2404	48.65	61.4	-75.7	2.791

Fig. (9a).SEM of nickel deposited from bath containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature 25^0C, current density 2.5 A/dm^2.
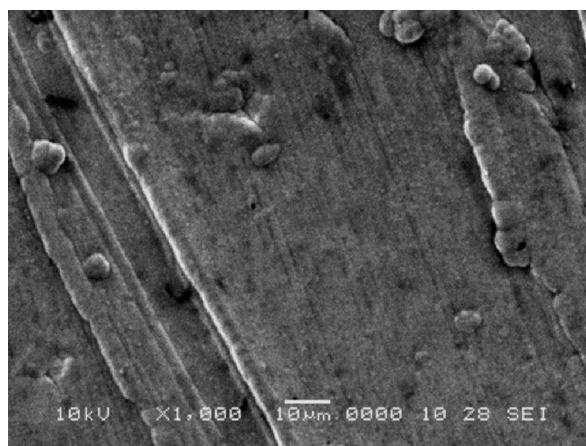
Fig. (9b). SEM of nickel deposited from bath containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$, 0.5 g/l aniline sulfate with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature25^0C, current density 2.5 A/dm^2.
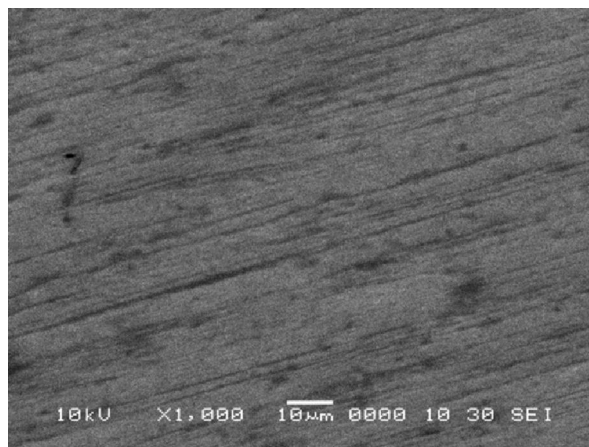
Fig. (9c). SEM of nickel deposited from bath containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$, 0.5 g/l urea with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature25^0C, current density 2.5 A/dm^2.
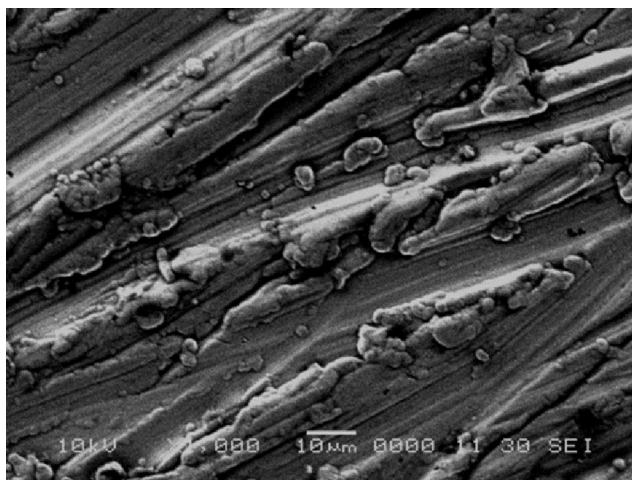
Fig. (9d). SEM of nickel deposited from bath containing 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$,0.5 g/l chloramine B with 0.4 mol/l boric acid and 0.4 mol/L ammonium sulfate at pH 8, time 20 min and temperature25^{0}C, current density 2.5 A/dm^2.
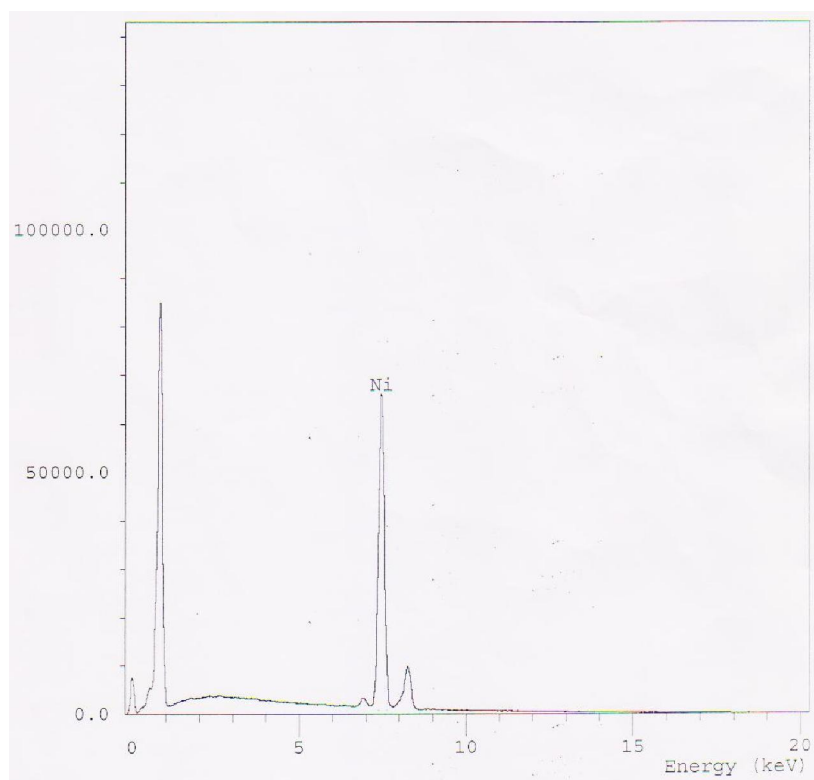
Fig.(10). Energy dispersive X-ray of nickel deposition from baths containing of 0.2 mol/l $NiSO_4.6H_2O$ and 0.2 mol/l $C_6H_{11}NaO_7$ with 0.4 mol/l boric acid and 0.4 mol/l ammonium sulfate at pH 8, time 20 min and temperature25^{0}C and current density 2.5 A/dm^2.

4. Conclusion

This work studied electrodeposition of nickel in alkaline gluconate baths with and without of aniline sulfate, urea and chloramine B as additives and the influence of these additives in the corrosion behavior of cu-substrate. It is found that the optimum operating condition for producing nickel deposits from the free additives bath are: 0.2 mol/l $NiSO_4.6H_2O$, 0.2 mol/l sodium gluconate, pH 8, current density of 2.5 A/dm^2 and at 25^{0}C. And the same condition was used in the

presence of additives, under these conditions the cathodic current efficiency is 96.4% which decreases sharply with increasing temperature. These coatings have high corrosion resistance in comparison with cu-substrate. However the surface morphology of the deposits varies from spherical grain to columnar in the absence and presence of additives, respectively.

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4/20/2011

Empowerment: An Approach for Development in Rural Areas of Iran

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Abstract: The main objective of this study provides a strategy for rural development. Empowerment of rural areas has emerged as an important issue in recent times. The economic empowerment of rural is being regarded these days as a sine-quo-non of progress for a country; hence, the issue of empowerment of rural areas is of paramount importance to community developers, social scientists and social reformers. Empowerment can enable the local people to participate in the economic, political and social sustainable development of the rural communities. The findings of this investigation can assist rural developers in the implementation of rural development strategies based on rural empowerment.
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Keywords: empowerment, rural development, Iran

Introduction

Empowerment means people and communities, especially those frequently marginalized, having the capability to participate effectively in social, economic and political spheres (Helling, Serrano, & Warren, 2005). The term 'empowerment' is a contested concept which connotes different meanings depending on different perspectives of looking at it (Asnarulkhadi & Aref, 2009). The World Bank has suggested that empowerment should be a key aspect of all social programs (World Bank, 2001). The empowerment of rural means for them to have the necessary ability to undertake a number of tasks either individually or in groups, so that they have further access to society resources. Empowerment is recognized as an essential strategy to strengthen the well-being of individuals, and communities, (Aref, 2010). In other word empowerment is an abiding process which takes place with specific intent so enabling them to have further control over community resources (Rezaei, 2007).

Numerous studies emphasized on empowerment as means for community development. (Aref & Ma'rof, 2009; Aref et al., 2009; Gillman, 1996; Gore, 1992; Humphries, 1994; Lennie, 2002; Peters & Marshall, 1991). Empowerment is the expansion of the capabilities of the poor people to: participate in, influence and control the institutions that affect their lives. Elements of empowerment is the rights, resources and support to: Information, participation, and organizational capacity (Hamyaran, 2006). This literature suggests that rural researchers need to adopt a more critical approach to the concept about the processes they claim have facilitated empowerment. This requires the development of useful models of empowerment and effective methods for empowerment (Anderson, 1996).

Rural empowerment

Rural development is closely linked to development of the local economy. Improving local food security, household income, and the quality of livelihood options as well as encouraging growth in the number, scale, and profitability of both formal and informal sector businesses are important aspects of local development (Helling et al., 2005). In addition to its contribution to household welfare, growth in production and commerce provides the base for local resource mobilization to finance the provision of public services. Economic growth also contributes to the capital stock for investment in local development, including human capital from investment in the education and health of farmers, workers, and entrepreneurs and social capital from the strengthening of relationships among financial institutions, suppliers of inputs, producers, and purchasers of goods and services in the marketplace (Helling et al., 2005).

Rural Empowering are a challenge. Empowering in rural area can help to meet these challenges. Empowering not only enhance national productivity, employment but also help to develop economic independence, personal and social capabilities among rural women. Following are some of the social capabilities, which were developed as result of taking up empowerment among rural areas.
• Improved standard of living
• Self confidence and enhance awareness
• Sense of achievement
• Increased social interaction
• Engaged in political activities
• Improvement in leadership qualities

• Involvement in solving problems

• Decision making capacity (Sathiabama, 2010).

The major types of empowerment can be summarized into four groups (Lennie, 2002).

*Social empowerment***:** Access to new knowledge, Developing new skills, abilities, confidence and competence, obtaining the friendship and support of other women, participating in various activities with other women.

*Organizational empowermen**t:*** New knowledge and awareness about new benefits of technology for rural development through rural tourism development or development of agriculture cooperatives.

Political empowerment: Influencing other government policies and decisions that affect on rural communities, changing town-based people's beliefs, networking with people in government and industry and other women to discuss issues affecting rural women and rural communities.

Psychological empowerment: An increase in self-confidence and self-esteem, Greater motivation, inspiration, to develop new skills and knowledge, to keep pushing for better services for rural people

The local development paradigm is comprised of three main activities:

-Empowerment through capacity building

-Provision of Services to the community

-Local Governance (Hamyaran, 2006).

Three alternative approaches to local development; decentralized sectoral, local government, and community support approaches (Figure 1), emphasize many of the same principles: empowerment of the poor and other marginalized groups, responsiveness to beneficiary demand, autonomy of local institutions associated with greater downward accountability, and enhancement of local capacities.
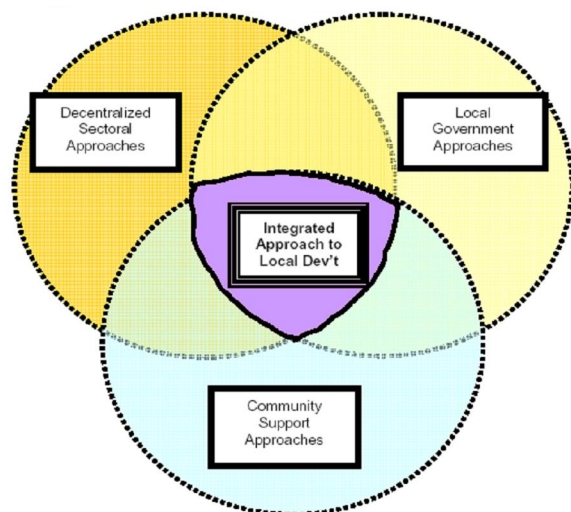
Figure 1: Integrating Approaches for rural development. Source (Helling et al., 2005)

A sustainable local human, social and economic development can be achieved through community empowerment and local governance reform that will in turn enhance the efficiency of public service provision and encourage private sector growth (Figure1). A favorable national policy and institutional environment, an enhanced capacity of all local protagonists and institutions, along with adequate transfer of resources are the exterior catalysts necessary for local development to fall on track and to take its course as smoothly as possible (Hamyaran, 2006; Helling et al., 2005).
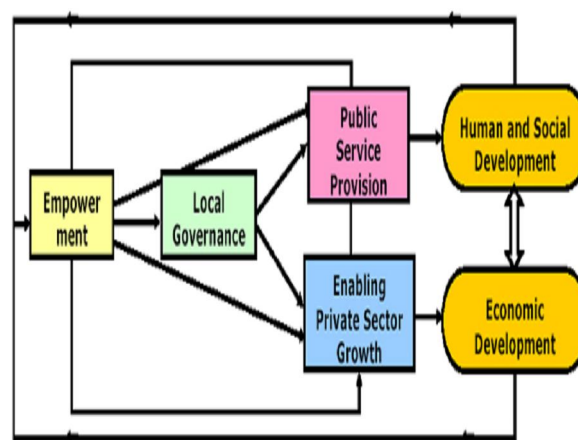
Figure 2: A Conceptual Framework for Rural Development. Source: (Helling et al., 2005)

Empowerment in Rural Areas of Iran

Empowerment is the starting point for local development. Empowerment is the process of enhancing the real possibility that an individual or a group can make and express choices, and transform their choices into desired actions and outcomes (World Bank, 2004). Individuals, households, and communities need both opportunity and capability in order to be truly empowered (Helling et al., 2005). The empowerment in rural area of Iran, as in many other countries, may be divided into two categories. First, there are those which arise in the context of daily human interactions within the societal arena for the fulfillment of common needs, fending of natural disasters, or responding to traditions and religious beliefs. The second is the result of conscience personal decision making and the desire to partake in activities outside one's immediate circle, specifically those which have communal ramifications. Institutionalization of communal participatory activities in the form of unions, forums, councils, societies, and voluntary groups fall within this category. Poverty and societal necessities have been

factors contributing to people rallying around and organizing themselves into groups in Iran, in order to better confront such maladies and inefficiencies. Historically, Iran has repeatedly fallen victim to devastating invasions by foreign armies. Internal tribal and regional conflicts have also been the cause of persistent instabilities, jeopardizing lives and livelihood. Maintaining security for one's immediate and extended family has thus been another driving factor towards people conglomerating into groups. The most basic form of group activity has been coordination for irrigation, cultivation, and production. Lack of mechanized means of production, particularly within the agricultural sector, which required focused manual labor within certain periods of time in the course of the year, necessitated cooperation and partnership. The thought of establishing community organizations in Iran dates back to the Constitutional Revolution (1906) where it found expression as part of an addendum to the first constitution of the country with regards to the right of establishment of provincial councils. Even though due to the overall declining state of events at that juncture in time such councils did not achieve permanence, they nevertheless became a forum for the voicing of people's opinions with regards to matters of their concern and an official venue for their political and social cooperation. The topic of people's empowerment is addressed and elaborated in the constitution of Iran:

-With specific reference to guidelines stated within the Quran, the Rural Islamic Councils have been described as "pillars of decision making and administration in the affairs of the country".

-For efficient planning and implementation of programs in production, industrial and agricultural establishments, councils should be elected which include representatives from workers, farmers, other employees and managers; and in educational, administrative, service establishments similar councils should be formed.

-Strengthening of people's participation had been the professed qualitative goal of the first two development plans that were promulgated and implemented by the Islamic Republic of Iran (1983-1987 and 1995-1999). The following were among its salient guidelines:

-Increased legal support for people's participation with emphasis on attracting private investment.

-Encouraging increased participation of women in social, cultural, educational and economic affairs while safeguarding family values.

-Establishment of Islamic provincial, township, municipal, and village councils with the supervisory power over every cultural, reconstructive, executive and economic affairs within their area of their jurisdiction (Hamyaran, 2006; Helling et al., 2005).

Conclusion

Empowerment increases people's capabilities to make and express choices and to transform those choices into desired actions and outcomes. People's capabilities to participate effectively in local development are determined not only by individual resource endowments, but also by social capital that provides the basis for collective action (Helling et al., 2005). The result of this study is suitable for the rural development for take control of the management of rural areas Because with the empowerment of rural areas, the elimination of gender discrimination and the creation of a balance of power between men and women, will not only be beneficial to women, but society as a whole shall benefit politically, economically and culturally. The results of this review suggested a range of strategies that could enhance rural empowerment.

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1/4/2011

Noise Level of Two Types of Tractor and Health Effect on Drivers

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Abstract: "Noise" or "unwanted sound" is one of the major sources of discomfort to the workers which affects human both psychologically and physically. The present investigation was conducted in Iran during the period from September to November 2010. The noise pollution caused by tractor and load were measured in open field with no obstruction and at the driver ear and by stander in accordance with NIOSHA standards. A ITM 399 (without cab) and Valtra T170 (with cab closed and open) and mold board plow and disk plow were used. Unloaded tractor noise was also measured. The data analyzed for different engine speed and gears. Results showed that the Sound Pressure Level (SPL) in the driver ear for the tractor without cab in all cases were more than NIOSH allowable 85 dB(A) criteria for eight hour of operation. The SPL of the tractor with open windows cab was also higher than the standards but lower than the tractor without cab. It was concluded that the driver should either stay on driving for less than 2 hours with tractors without cabin or open window cabin or the only best way, tractors should be equipped with factory made cabins. Even with the latter type of tractors, drivers should avoid opening the window very often for say checking the operation of the machinery behind the tractor or in case the air conditioner malfunctions.
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Keyword: sound level, noise measurements, tractors, cabin, driver's ear

1. Introduction

Noise or unwanted sound is one of the major sources of discomfort to the workers which affects human both psychologically and physically. It has caused hearing problems to many drivers in the world. Noise is measured in two ways for OECD tests (Anonymous, 2010): at the operator's ear and from a bystander position, and is measured in decibels [db(A)]. But to the human ear, a noise that sounds twice (or half) as loud is actually measured at 10 dB(A). So when comparing noise figures, remember that it takes a reduction of 10 dB(A) before the human ear will perceive the noise as being half as loud. Sound measurement is made on the test track in two locations- at the driver's ear and in a location representing "bystander noise." The tests at the driver's ear are performed in several gears and under a number of conditions; but only the maximum level is reported. The "bystander sound" test is performed with the microphone located at 7.5 m from the centerline of the tractor which is accelerating from a lower speed to full speed in its top gear. The OECD procedure differs. The SAE/ASABE procedure measures sound in only one gear under different load conditions, whereas the OECD procedure measures sound in different gears

between High Idle and Rated Engine speed (Larsen, 2002). Sound levels are recorded using the "A" scale in the sound-level meter and are expressed in terms of decibels (A) or dB(A). The A scale is a filter that responds like a human ear. A 3-dB(A) increase in sound level doubles the sound-pressure level. Therefore, for every 5-dB(A) increase in sound level, the permissible exposure time is cut in half. In other words, at 95 dB(A), the allowable exposure time is only four hours. It is not uncommon to have tractor sound-level reaching 95 dB(A) (Grisso et al., 2007). Tractor driver farmer had more often high frequency hearing loss when compared to non tractor driver farmer. The noise levels observed on tractors in different operations were in the range of 90–110 dB (A) (Kumar et al., 2005). Sound levels that cause hearing loss begin at about 85 dB(A). Hearing loss occurs more quickly with louder noise. OSHA standards consider sound measured at 85 decibels or higher as damaging to the eardrum and therefore a risk to hearing (Anonymous, 2004). It is stated (Anonymous, 2010) that 30 percent of Sweden's farmers suffer from hearing loss. Similar results to those from Sweden were found in a study conducted by University of Iowa in the United States, indicating that

American farm workers are faced with the same noise problems in their daily work. An investigation by Dewangan et al (2005) for determination of SPL on 18.7 and 26.1 kW tractors and 4.6 and 6.7 kW hand tractors during field operations with various implements, revealed that both tractors produced the noise of 92 dB(A) in the working zone of operator. The SPL of the hand tractor was about 2 dB(A) higher than that of the tractor. The SPL during field operations at operator ear level increased with increase in engine speed and forward speed. Celen and Arm (2003) found that the maximum SLP of 97.1 dB(A) was in exhaust pipe and the minimum of 79.7 dB(A) at the bystander ear. An increase of 3 dBA was measured for engine speed changes from 1000 to 2000 rpm. Durgut and Celen (2004) measured an 96.6 db(A) at the drivers ear but a minimum of 67.7 dB(A) for the surrounding. They also found a 6 dB(A) difference when engine speed changed from 1000 to 2000 rpm. According to Aybek et al (2010), statistical analysis showed that type of operation, type of cabins, and operation x cabin interactions were statistically significant at (P < 0.01). The use of original cabins had a greater effect in decreasing average sound pressures and resulted in more efficient noise insulation, especially at higher center frequencies compared to field installed cabins. Sound pressure levels at 4000 Hz center frequency was reduced 2-13 dB and 4-18 dB by using a field-installed cabin and an original cabin, respectively. It was concluded that depending on the cabin types used, the operators could usually work from 4 to 6 h a day without suffering from noise induced inconveniences while 2–3 h is permissible for plowing and forage harvesting on tractors without cabins. In reference Anonymous (2009) it is stated that No Member State may refuse to grant EC (European Council) type-approval or national type-approval of any type of tractor on grounds relating to the driver-perceived noise level if that level is within the following limits: 90 dB(A) in accordance with Annex I, or 86 dB(A) in accordance with Annex II. Individual tasks which exceeded 85 dB(A) TWA-8 (NIOSH) identified by researchers were Tilling/plowing, Planting, or other farm activities (Milz, 2006). Equation (1) is given for

safe exposure time to noise, $t = \dfrac{8}{2^{\frac{SPL-85}{3}}}$ (1)

(Anonymous, 1996) where t= hours of exposure per day.

An experiment in Croatia by Goglia et al (2005) showed that by ISO 4872, 6393 and 362 standards, the noise level did not exceed the limit values. However, the noise level at the operator's position at full load and at nominal load exceeded the limits. Noise levels of 155 tractors on 36 farms were studied (Holt et al., 2006). The range of noise levels at the driver's ear level with radios off and windows closed (if so equipped) was from 78 to 103 dB. Seventy-five percent of tractors without cabs had noise levels in excess of 90 dB, compared to only 18% of tractors with cabs. The use of a radio adds an average of 3.1 dB of noise. When some cab windows are open and the radio is on, an average of 4.2 dB is added to the cab noise. A specially selected group of 45 farm tractor drivers were examined in order to estimate the degree of occupational hearing loss (Solecki, 2010). The drivers, aged 21-50 years, were employed on multi production farms. The study showed that the operators under study had statistically worse hearing within the range of high frequencies (3-6 kHz), especially those aged over 30 years. A study was carried out when a fabricated cab was added to an agricultural tractor (Abd-el-Tawwab et al., 2000). The fabricated cab was selected after a comprehensive series of experimental tests carried out on a variety of cab constructions. The results were discussed from the view point of obtaining the influence of the tractor driving parameters (road speed, gear-shift, engine speed and tractive effort) on the noise measured inside the tractor cab and over the frequency range up to 2000 Hz. In April, however, the occurrence of high total exposure values was due to intensive field activities (plowing, harrowing, sowing), and prolonged exposure to this factor (Aybek et al., 2010). In the seasons of the year analyzed, high equivalent exposure values were observed within the range: 5.53-6.61 Pa^2 h (some Polished standards). Mean value for this parameter for the whole year reached the value of 4.27 Pa^2 h (standard exceeded 4.3 times). This value is equivalent to a mean exposure level equal to 91.3 dB.

3. Material and Methods

Two types of tractor a 2-wheel drive MF399 with 62 kW PTO power without cabin and a Valtra T170, 184 kW power with closed window and open window cabin were tested. No load and loaded with moldboard plow and disk were tested for noise level at different gears and engine speed. The gears were 1 low, 2 low and 3 low and the speeds were set at 1500, 1750, 2000 and 2200 rpm. The measurements were taken at the driver ear and at a distance 7.5m from centre axis of tractor. A sound meter of type Lutron SL4013 equipped with capacitance microphone was used. The OECD testing standards were observed. The test course was a plot of 100 m long by 40m wide in open field. Each experiment data was recorded with 9 replicates. Data was analyzed based on factorial experiment with MSTAT-C software.

4. Results

Data was collected between the high idle and the rated speed according to OECD standards (Kumar et al., 2010) and in two ways as recommended by OECD (Abd-el-Tawwab et al., 2000). Statistical analysis of the results are show in tables 1-4 and the corresponding graphs in figures 1-6. A summary of results for the range of noise level is given in table 5. The maximum SPL reached 94.5 dB(A) in accordance with Grisso et al (2007) but less than the 96.6 dB(A) in Durgut and Celen (2004) and much lower than the maximum 110 dB(A) as measured in (Kumar et al., 2010). The SPL as shown in the figures does increase with engine and forward speed as mentioned in Dwangan et al (2005) with the exceptions in figures 2 and 4 for the second low gear. Holt et al (2006) gives a range of 78-103 dB(A) for closed window cabin while the experimental results showed a much smaller range of 74.3-77.9 dB(A). Durgut and Celen (2004) indicates a range of 76.5-91.9 at 2000 rpm engine speed without mentioning the type of tractor (with or without cab), the driving gear or loading in comparison with experimental 75.5-93.4 dB(A) for the same engine speed. The 93.4 dB(A) is for loaded and without cabin

tractor. Goglia et al (2007) also indicates that the sound level exceeded the limits at full load but without mentioning the gear, engine speed, cabin and weather loaded or not. Neither it mentions how much the exceeded value was. In this experiment the maximum loaded SPL was 93.5 dB(A) for disking at gear 3 low. The graphs of Fig. 2, 4 and 6 show an ascending trend of noise level with increasing engine speed. Noise level for closed window cabin is way much below the 85 dB(A) permissible level for 8 hours of work. For tractors without cabin and the open window cabin both; the level surpassed the 85 dB(A) but in all cases the noise level on tractor without cabin is higher than the one with open window cabin. Loaded tractors had higher noise level than unloaded one. The disk loaded tractors at all cases had higher noise level than the plough loaded. This could be because of the higher speed of disking. The graphs of Fig. 1, 3 and 5 shows the noise level in 3 low gears. It is apparent that noise level with some exception at gear 2 low, raises with increasing speed. The loaded tractors with one exception have higher noise level.
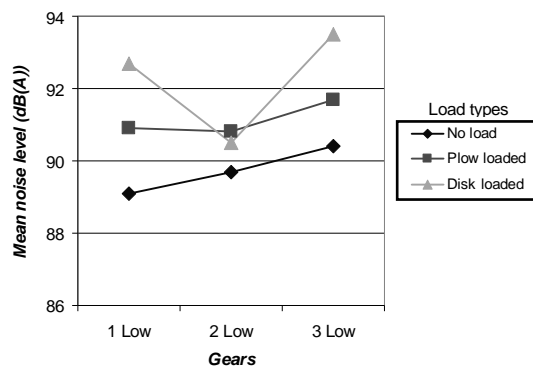
Figure 1. Mean noise level in different gears for tractor without cabin.
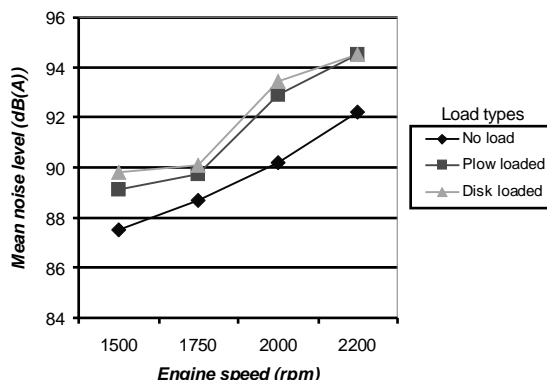
Figure 2. Mean noise level for different engine speeds for tractor without cabin.
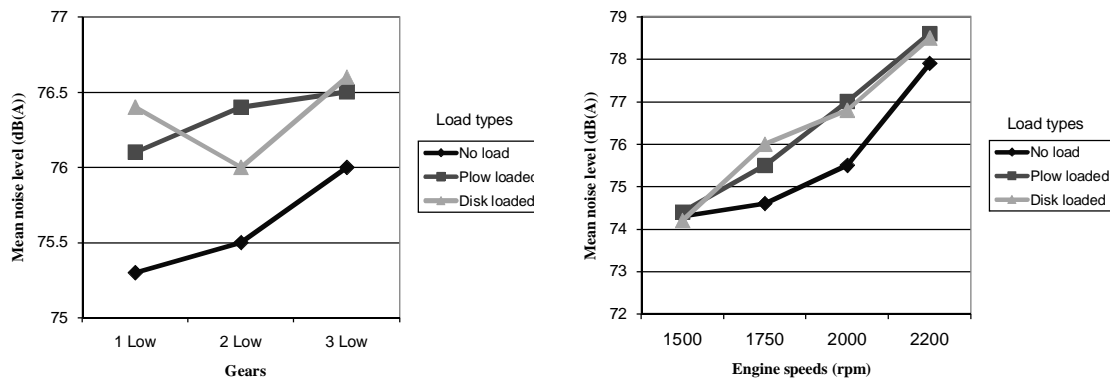
Figure 3. Mean noise level in different gears for tractor with closed window cabin.

for tractor with closed window cabin.
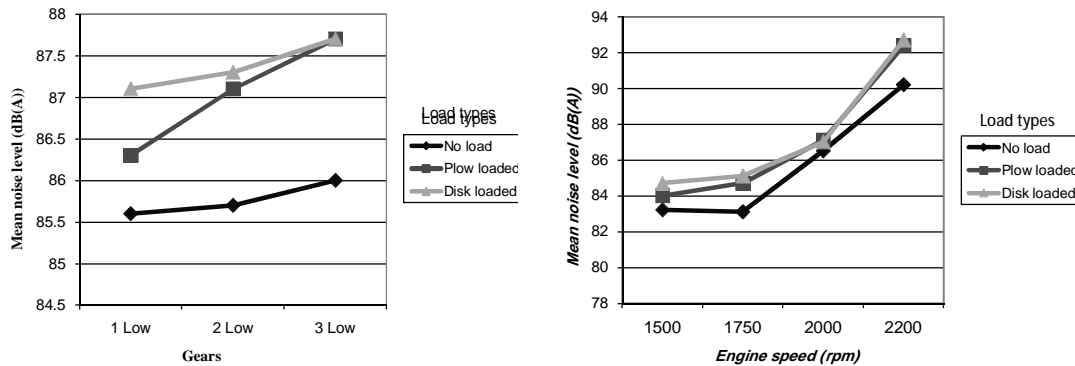
Figure 5. Mean noise level in different gears for tractor with open window cabin.

for tractor with open window cabin.

Table 1. Mean noise level at driver ear in different gears*.

	Without cabin			Closed cabin			Open cabin		
Gears	1 Low	2 Low	3 Low	1 Low	2 Low	3 Low	1 Low	2 Low	3 Low
No load	89.1[b]	89.7[ab]	90.4[a]	75.3[a]	75.5[a]	76.0[a]	85.6[a]	85.7[a]	86.0[b]
Plow loaded	90.9[b]	90.8[b]	91.7[a]	76.1[a]	76.4[a]	76.5[a]	86.3[a]	87.1[a]	87.7[a]
Disk loaded	92.7[b]	90.5[b]	93.5[a]	76.4[a]	76[a]	76.6[a]	87.1[a]	87.3[a]	87.7[a]

* Means with different letter in columns are significant at 1% level.

Table 2. Mean noise level at driver ear in different engine speeds*.

	Without cabin	Closed cabin	Open cabin

Engine rpm	1500	1750	2000	2200	1500	1750	2000	2200	1500	1750	2000	2200
No load	87.5 [b]	88.7 [a]	90.2[b]	92.2[b]	74.3[a]	74.6[a]	75.5[a]	77.9[a]	83.2[a]	83.1[a]	86.5[a]	90.2[b]
Plow loaded	89.1 [a]	89.7[a]	92.9[a]	94.5[a]	74.4[a]	75.5[a]	77.0[a]	78.6[a]	84.0[a]	84.7[a]	87.1[a]	92.4[a]
Disk loaded	89.8 [a]	90.1[a]	93.4[a]	94.5[a]	74.2[a]	76.0[a]	76.8[a]	78.5[a]	84.7[a]	85.1[a]	87.0[a]	92.7[a]

* Means with different letter in columns are significant at 1% level.

Table 3. Mean noise level at driver ear in different gears*.

	Without cabin			Closed cabin			Open cabin		
Gears	1 Low	2 Low	3 Low	1 Low	2 Low	3 Low	1 Low	2 Low	3 Low
No load	89.1 [c]	89.7 [a]	90.4 [b]	75.3[a]	75.5[a]	76.0[a]	85.6[a]	85.7[a]	86.0[a]
Plow loaded	90.9 [b]	90.8 [a]	91.7 [b]	76.1[a]	76.4[a]	76.5[a]	86.3[a]	87.1[a]	87.7[a]
Disk loaded	92.7 [a]	90.5 [a]	93.5 [a]	76.4[a]	76.0[a]	76.6[a]	87.1[a]	87.3[a]	87.7[a]

* Means with different letters in rows, are significant at 1% level.

Table 4. Mean noise level at driver ear in different engine speeds*.

	Without cabin				Closed cabin				Open cabin			
Engine rpm	1500	1750	2000	2200	1500	1750	2000	2200	1500	1750	2000	2200
No load	87.5 [c]	88.7 [bc]	90.2[b]	92.2[a]	74.3[b]	74.6[b]	75.5[b]	77.9[a]	83.2[c]	83.1[c]	86.5[bc]	90.2[a]
Plow loaded	89.1 [c]	89.7[c]	92.9[b]	94.5[a]	74.4[c]	75.5[bc]	77.0[b]	78.6[a]	84.0[c]	84.7[c]	87.1[b]	92.4[a]
Disk loaded	89.8 [b]	90.1[b]	93.4[a]	94.5[a]	74.2[c]	76.0[b]	76.8[b]	78.5[a]	84.7[c]	85.1[c]	87.0[b]	92.7[a]

* Means with different letters in rows, are significant at 1% level.

Table 5. Summary of experimental results for range of noise level, dB(A).

		No cabin	Closed window	Open window
Gears:1-3 Low	No load	89.1-90.4	75.3-76.0	85.6-86.0
	Permissible Exposure time (h)	3-2	73.5-64	7-6
	loaded	90.7-92.5	76.0-76.6	86.3-87.7
	Permissible Exposure time (h)	2-1.4	64-56	6-4.3
Engine speed 1500-2200(rpm)	No load	87.5-92.2	74.3-77.9	83.1-90.2
	Permissible Exposure time (h)	4.5-1.5	97-41	12.4-3.2
	loaded	89.1-94.5	74.2-78.6	84-92.7
	Permissible Exposure time (h)	3-0.9	97-35	10-1.4

4. Discussion

It may be concluded that drivers should always work with lowest engine speed and the lowest gear but; this is contradictory because tractors in this case, would not produce enough power to do the job. The alternatives are either stay on driving for less than 2 hours with tractors without cabin or open window cabin, the driver wears some kind of ear protection or the only best, is that tractors should be equipped with factory made cabins. Even with the latter type of tractors, drivers should avoid opening the window very often for say checking the operation of the machinery behind the tractor or in case the air conditioner malfunctions. Calculated permissible time in hours using equation (1) is also shown in table 5.

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Review definitions and principles relating to Andragogy

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Abstract: Learners must retain what the program delivers to them in order to benefit from the learning. In order for participants to retain the information taught, they must see a meaning or purpose for that information. They must also understand and be able to interpret and apply the information in their own real life contexts. Understanding includes their ability to assign the correct degree of importance to the material and its application in the future. The amount of retention is always directly affected by the degree of original learning. In other words if the learners did not learn the material well initially, they will not retain it well either. Retention by the participants is directly affected by their amount of practice during the learning. After the students demonstrate they can apply new financial skills, they should be urged to practice in their own time and for their own personal needs to retain and maintain the desired performance.

Introduction:

The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients. Examples include workplace literacy (combining both basic academic skills and workplace skills), and family literacy (combining basic academic skills and other skills essential for successful parenting).

2. "Education attainment" usually refers to the numbers of years of schooling completed or the level of credential (e.g., high school diploma or associate degree) an individual has obtained. Despite concerns about the meaning of credentials, there is a strong correlation between educational attainment and literacy.

3. "Literacy initiatives" often are defined in terms of the needs of a particular target group. These may be parents of young children, youth who have dropped out of high school without earning a high school diploma, welfare recipients, persons with limited English-speaking ability, incarcerated adults, or adults in the workforce.

4. Other literacy initiatives are defined in terms of a particular educational service, strategy, or means to address a target population's literacy problems. "Adult basic education" and "family literacy" are examples. These initiatives are often defined in terms of a particular configuration of services for the target population (e.g., assessment and information and counseling services).

5. The term "lifelong learning" is often associated with "literacy." Lifelong learning is a means to the goal of maintaining necessary levels of literacy throughout one's lifetime. The goal of lifelong learning has implications for both individual adult's learning behavior as well as education policy and the design of the education system.

Goal six of the National Education Goals illustrates a broadly stated goal that incorporates expectations about both adult literacy and the kinds of policies and

services that should be in place to improve literacy. Goal six, "Adult Literacy and Lifelong Learning," states that, "By the year 2000, every adult will be literate and possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship."

Definition of Andragogy

term andragogy (the teaching of adults as opposed to pedagogy, the teaching of children) and questions whether it should relate more to a type of learner rather than the age of the learner. The blogger is Gwen. She describes her blog as "a reflection on the educational process by teachers working to transform their work into a more learner-centered, evidence-based, andragogical affair. Gwen suggests that the transition in a student from needing to be spoon-fed learning to a more independent state of seeking sometimes happens as early as middle school, while some adults in graduate school are still asking, "Is this on the test?" The question is an excellent one and Gwen does a great job of putting it forth. In her examination of the word and its meaning, she puts responsibility on both the student and the teacher. The word andragogy then becomes a fluid term referring to that developmental point at which an individual student becomes able and interested in accepting responsibility for his or her own learning. The teacher's responsibility is to recognize when that has happened and respond accordingly, getting out of the student's way and providing the support needed for their individual pursuit.

Andragogy: an emerging technology for adult learning:
Most of what we know about learning from the studies of learning in children and animals obtained more things about the training we know through experience educating children under conditions of compulsion (compulsive) obtained in relation to theories and more With Teaching - learning process obtained based on a definition of education as a process of transition culture.
Pedagogy from the Greek word "paid" means child and "agogos" meaning derived so conducting pedagogy means specifically include art and science of educating children. A problem that exists in the history of this phrase that the "children" omitted from the definition. In the minds of many people and even the dictionary "pedagogy" as the art and science training is defined even in the books written about adult education, you can specifically related to "Adult Education in pedagogy" without any explanation

clearly defined audience and can see the words. In addition, the main reason why adult education does not impact significantly on our civilization Since only the adult teachers know that how to teach adults if they were children.
Another problem is that with a pedagogy based on the old concept of an objective education that knowledge transfer is considered if the head Alfred White explains that the past generation as the training process of transferring what was known and the process was defined Because the transmission of culture change and culture, much larger main longer-term life and long-term process, individuals were. Under these conditions, something that a young person learns all the time in his life for him will remain valid. But the emphasis is on white head that "the specified period (the major cultural change) shorter than human life, and this basis should be training for people faced with new conditions to prepare."
In the early twentieth century the specified period, cultural changes (such as inputs or passive mass of new knowledge, technological innovation, alternative building professionals, social mobility and change in politics and economy, and required several generations to .....) found. with regard to the Cultural Revolution that occurred several. Under these new conditions in the knowledge that a person twenty years has earned or acquired in forty years when he will be old and obsolete and skills in his twenties had acquired during his thirty years, and discarding the useless was.
So what defines education as the transfer of other known right now but it should not be defined as a process of life at all to figure out what is not known. Skilled or professional adult educators know that they can not for a long time, like children teach adults. Most adult learners are volunteers who simply update their educational experiences do not. Therefore, adult education gradually separated from the traditional pedagogy and the separation along with the fear which was hosted by the standards violations occur. Adult educators to judge a logical theory about adult behavior as "adults" are still there and the lack of and no way to treat it. Theoreticians of Adult Education in Europe (Especially Germany and Yugoslavia) and the U.S. for a specific theory of adult education, and quickly developed a theory of this new technology for adult education was Conclusion. This new technology was a new name "Aandragogy" based on the Greek word "aner" means (human). So Andragogy art and science of learning to help adults. But more than semantic Andragogy to help adult learning. It means helping individuals to learn, so it is a concept for teaching children and young people and is also a process for the mature adult is getting.

Some Andragogy assumptions and its technological concepts:

Includes four main Andragogy assume that it has a different pedagogy. The assumptions are:

1)self concept: movement one of its personality by personality dependent guidance

2) reservoir of experience as a source for learning which he used

3)individual readiness for learning, which increases individual autonomy to develop activities and social roles

4) when he saw the changes based on learning of the subject matter central to the core of each of the above assumptions can be described briefly

Self - concept:

Children in conditions of complete dependence on the world are entering their every need (except biological functions) should be provided by someone else.'s First baby picture of himself as a separate personality dependent personality towards her when actually takes his life by itself be managed. At home, at play, at church, school and society expects of her adolescence and adulthood goes to impose his will. This concept to encourage the adult environment is dependent**.** In fact, the definition of community as an individual child is learning his job all the time and this is a passive role, one receives the inforHere, the child self is formed and he sees himself that the necessary capacity for decision making for own decisions in his first test takes a small and does not exceed the adult world, but gradually increased and the range of decisions than he is the concept of children in their own way of guidance is movingmation and shall save and teachers that children decide what information should be**.** Here, the child self is formed and he sees himself that the necessary capacity for decision making for own decisions in his first test takes a small and does not exceed the adult world, but gradually increased and the range of decisions than he is the concept of children in their own way of guidance is moving And during youth needs to take responsibility for important and meaningful to maintain living increases. But trends of his life until the last possible moment concept of their child who is dependent on the personality keeps. The culture of backwardness in the education of children in kindergarten and elementary school years, been considered so teachers, students in the planning process and are involved in learning activities and as a child but he goes up the educational ladder and more and more responsibility their education assumes And this with the help of parents, teachers and curriculum planners occur. But when his person was defined as adults for certain

things as emotional self-concept occurs naturally his own role in society and sees itself as a mature person as a producer or acts subject sees, Now his duty as a server, a couple (husband or wife), a parent (father or mother), and a citizen ...... Will look. After an adult look at his new position and look at other than his educational responsibilities and the concept acquires its own character driven And he will be able to take his own decisions and outcomes to manage them. In fact, the point is that when he himself fully understands his guidance a deep need for understanding and respect for others by your character to feel his guidance And that's why the adult needs to be treated with respect and be seen as a unique individual. Therefore, situations that they feel they can be treated like children, or avoid, avoid, resist, and said they hate. Adult learning and the conditions under which incompatible and incongruous with the concept of their own (as autonomous individuals) is take away (saying what to do and what not to do**.** In the case of adults to recall some of the classroom as a place that is wrong with their behavior and this spirit is so strong that a major obstacle for adult education activities is placed. So if adults were able to learn systemic absorption of the educational environment, we should be teaching awards and is worthy of adult.

On the other hand, when adults first exposed to a learning environment where they are treated with respect and in a two-way interaction with the teachers are responsible for the learning of them is given at the beginning and usually some kind of shock no organization comes into existence as adults for self-guidance they are not prepared to a familiar process for learning need. If you could adapt this knowledge and learning environment we provide for her sense of exhilaration and freedom she is experiencing and then enters into a deep learning and to reach results that the starting point is the time for him and for her teacher**.**

Technological concepts:

Several concepts for Andragogy technology and differences in their concept of children and adults are given.

1)learning environment: a basic concept as a social space that the adult learns that there are recommendations in relation to that physical environment should be such that

- adults can feel comfortable in it.
- Training equipment should be comfortable in adult sizes.
- Meeting rooms should be arranged without the formalities.

- Sounds and audio devices must be light - the visual is limited.

Most important is mental atmosphere and should be a convention that any adult sense of acceptance, respect and supports. When that kind of interaction between teacher and adult atmosphere is produced and the person in a friendly and informal atmosphere that is placed and when the name is known and the value is put to him as a unique personality considered felt to be "adult" shows more tendency So in traditional schools, formal atmosphere for adult learners is somewhat annoying. Therefore, the signs of child Andragogy for adult learners and they are considering are removed.

Service companies, churches, businesses and places of living environments are probably more for the education of adults are in contact and where they are most comfortable Rooms after row of chairs are arranged with the grouping of children for adult chairs were not suitable and should be such that convention participants sit in groups of small circular or round tables that should be appropriate for adults. Some adults say that Blackboard is a trace of their childhood are therefore to increase the popularity of adult education use of paper based newspapers on Tuesday is good. Teacher behavior probably more than any other factor on learning is effective teacher different ways of attitude and approach to students affects. Teacher who makes time to recognize individual students with their calls (especially first name) This shows that a teacher really has the students and participating in discussions respects and really listen What gives, he says. Adulthood atmosphere beyond theory classes and can be extended to all situations in addition to the creation of a suitable location for the design of appropriate training such as decor, architecture, methods, and leadership style and human ratios

Needs diagnosis:
the traditional activities that the teacher tells students what they need as well as what he needs to learn to impose his will. Of course, an adult will learn what others want him to learn if their power is strong and remember the penalty for failure to have followed his. More to learn but he sees things that need to be motivated to learn so Andragogy on adult learners to engage in self-diagnostic process for learning needs to be emphasized. Generally this process involves three stages:
1 - Build a model of competence or unique characteristics to achieve ideal performance model. Has a comprehensive quality of a good observer, good public speaker, and deserve a good parent and competencies that need to be good. In the model

phase convention in which the values and expectations of teachers, the school and the community goes with what is pervasive in mind are mixed together.

Conclusion:
Beyond the issues relating directly to DAEL(Department of Adult Education and Literacy), the task force heard a number of concerns about the Commonwealth's overall approach to adult literacy.

- Lack of coherent statewide leadership and coordination among multiple complementary initiatives aimed at the same problem.
- Lack of continuity in state leadership. Cited in particular was the difficulty sustaining a high level commitment to the issue long enough to make a difference because of changes in priorities of the state's political leaders. A high level of turnover in the leadership of the Department of Adult Education and Literacy has also contributed to the instability.
- Tendency to think of adult education as a separate categorical program rather than a strategy that cuts across the mission and responsibility of multiple Commonwealth programs and initiatives (e.g., early childhood education, welfare reform, economic development, and corrections).
- Multiple uncoordinated categorical federal initiatives that tend to drive (and fragment) policy for an overall state effort that is largely funded by Kentucky.
- A tendency to commingle and confuse different functions. The most important distinction is between functions focused on the needs of clients (adult learners, employers, communities, regions, and the Commonwealth as a whole) and functions associated with the operations and performance of providers. It is important that each of these functions receive attention, yet the tendency is for one (e.g., overseeing a network of providers) to drive out attention to overall system strategy.
- Inadequate coordination of services to meet the needs of individual adults, communities, employers, and regions is hindered by:

- Vertical financing and regulatory relationships between separate federal and state programs and local providers and administrative units. These vertical relationships can hinder the horizontal coordination

of services for individual adult learners, communities, and employers.

- Turf wars among providers, local politics, and long-standing conflicts among neighboring counties.

- Inadequate links with and leverage of other public and private initiatives and investments to reach the target population. Major sources of help include employers, postsecondary education, and workforce development.
- Lack of a state financing policy and strategy for provider performance incentives and collaboration, and tax and other employer incentives for leverage of non-state resources.
- Lack of programmatic and administrative flexibility to meet the rapidly changing needs of adult learners, employers, regional economies, and communities.

When the issue is examined from a county-by-county perspective, a significant mismatch is found between the availability of services and the target population. The problem is partially one of resources. Yet an even more serious problem is the lack of local leadership and coordination of available resources—both public and private. A deliberate strategy is needed to focus state priorities on the target population at the lowest literacy levels (Levels I and II) and in the counties with largest percentages of adults at these levels. Unless Kentucky can narrow the disparities within the state, the Commonwealth will be unable to narrow the disparities in per capita income and other critical indicators between Kentucky and its competitor states.

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Lateral Tarsal strip technique for correction of lower eyelid Ectropion.

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Abstract: Purpose: To evaluate lateral tarsal strip technique as a simple procedure that can be used in the presence of lateral canthal tendon laxity or malposition. The technique was used in this study on cases of involutional , paralytic, and cicatricial ectropion .The surgical outcome from different types of ectropion was compared and evaluated. **Patients and methods:** This retrospective study reviewed records of 30 patients (41 lids) who had undergone lateral tarsal strip from January-2008 to June-2010. All records were examined to determine the indications, management, outcome, postoperative complications and success rate. **Results:** A total of 17 males and 13 females made up the study groups. The mean age of the cohort was 59.15 +\- 6.2 yrs (range 4- 65 years).The average follow up period was 24 weeks .The patients were divided into 3 groups:Group A: 10 patients with bilateral involutional ectropion (20 lids). Group B: 10 patients with unilateral paralytic ectropion (10 lids). Group C: 10 patients with cicatricial ectropion 9 unilateral and 1 bilateral (11 lids). Most common presenting feature was persistent tearing, which was seen in all patients, others included lid laxity, lagophthalmos and unacceptable cosmesis. Thirty-five lids obtained satisfactory correction of eyelid ectropion with a simple lateral tarsal strip surgical procedure, while six lids required additional intra operative ancillary procedures to correct the remaining skin laxity, scleral show and residual ectropion. Common ancillary procedures used were excision of skin and muscle strip, lateral tarsorraphy and scar revision in severe cicatricial ectropion. Good aesthetic and functional results were achieved in 85% of cases.**Conclusions**: Lateral tarsal strip is a simple technique, which can be used in different types of eye lid ectropion. The technique is directed at correcting the anatomical defect, preserving the natural anatomy and maintaining the integrity of tear passage and outflow, rendering excellent cosmetic and functional results. The ancillary procedures used in our study are suggestive of a very specific role for lateral tarsal strip as a sole treatment in correcting various types of eyelid ectropion.

1. Introduction

The lateral tarsal (LTS) strip is a simple procedure that can be used in the presence of lateral canthal tendon laxity or malposition. Most cases of laxity and non-cicatricial ectropion are caused by lateral or medial canthal tendon laxity or elongation. The eyelid shortening procedure generally involves removal of the mid tarsal portion of eyelid, which may cause notching, damaging tear passage or tear outflow structures and results in displacement of lacrimal punctum without addressing the cause of the defect. (1)The lateral tarsal strip technique is directed at correction of the anatomical defect, preserving the natural anatomy and maintaining the integrity of tear passage and outflow.

Involutional ectropion is the most common form of lower lid ectropion in which turning out of the lower eyelid causes tearing, conjunctival exposure, redness, and photophobia. Rarely, untreated ectropion may result in a corneal ulcer. The main factor giving rise to involutional ectropion is the progressive degeneration of elastic and fibrous tissues within the lid occurring with increased age.

This causes an imbalance between the usual forces acting on the lower eyelid, and the resulting eyelid laxity, both horizontal (tarsal plate and orbicularis) and vertical (lower eyelid retractors and orbital septum), allows the punctual eversion to occur first, then medial portion of the lid will turn outwards, finally the entire lid will turn causing frank ectropion.

Medical treatment with lubricants offer only temporary relief of symptoms (2,3,4); surgery remains the mainstay for permanent treatment. (5-11) Different operations have been described that address the pathophysiologic factors with apparently acceptable surgical outcomes. (11-27) So many operations have been described that it raises the question of whether surgical correction is ever 100% curative. It is generally accepted that, for the best results, surgery should address both horizontal and vertical laxity. (9,10,17,18,19,20,21,24,26,28-33)

Follow-up is particularly difficult in the group of elderly patients because they may be too unwell to report for follow-up, they may move, or

they may die. Often, the clinical follow-up is too short to establish the long-term results. (11)

There is a need for involutional malposition to be corrected with minimal surgical intervention and morbidity, producing an effective, sustained result. (34,35,36)

Patients with keratitis from paralytic ectropion pose a functional and aesthetic oculoplastic challenge. There is dysfunction with upper and lower eyelid retraction as well as horizontal laxity resulting in lower eyelid ectropion or sag, lagophthalmos, and a significant risk of exposure keratopathy. (37,38,39,40) This is greatest when there is coexistent corneal anesthesia and a greatly reduced vertical palpebral aperture that is needed to reduce the lagophthalmos.

The aims of rehabilitative eyelid surgery are multiple: to reduce the vertical palpebral aperture and not to shorten the horizontal palpebral aperture unduly and to improve eyelid closure, ocular surface lubrication, and the aesthetic appearance of the patient.

This technique is also useful in mild to moderate cicatricial lid ectropion as a single-step surgical procedure or even in severe cicatricial ectropion with ancillary procedures to remove the traction, being very important for reconstructing the normal position, anatomical structure and lid function. (41)

The approaches for accessing the inferior orbital rim and orbital floor are transconjunctival, subciliary, subtarsal, and subpalpebral to manage orbital trauma and lower lid blepharoplasty, all these methods have advantages and disadvantages, and the choice is usually a matter of personal preference. Regardless of the approach, malposition of the lower eyelid is a common long term complication. (42, 43, 44, 45) The malposition may include retraction of the lower eyelid to show the sclera inferiorly, or frank ectropion. (42, 43) The result is cosmetically unacceptable and may be associated with tearing, irritation, and other symptoms of exposure keratitis. Factors that contribute to such malposition include horizontal laxity of the lower eyelid, and scarring of the skin and middle lamella (orbital septum). To correct this malposition, we disinsert the lower eyelid, and use a lateral tarsal strip to tighten and replace the lateral canthus. This provides horizontal and vertical support to the lower eyelid. The tarsal strip technique is relatively simple, and can correct the malposition after operations for trauma. (46,47,48)

The aim of this study is to evaluate the surgical outcome of LTS technique in different types of lower eyelid ectropion .

2. Patients and Methods

This retrospective study reviewed records of 30 patients, 17 males and 13 females, with lower eyelid ectropion , 11 bilateral and 19 unilateral cases, with a total of 41 lids, who had undergone lateral tarsal strip from January-2008 to June-2010. All records were examined to determine the indication, management, outcome, postoperative complications and success rate. They all received an informed consent for the procedure. Thirty-five lids were corrected with a simple LTS surgical procedure, while six lids required an additional intra operative ancillary procedures to correct the remaining skin laxity, scleral show and residual ectropion.(Table 1)

Patients were divided into 3 groups :

Group A: 10 patients with bilateral involutional ectropion, 9 were corrected with a simple LTS surgical procedure and 1 required additional skin and muscle excision (20 lids).

Group B: 10 patients with unilateral acquired 7th nerve palsy , 9 were corrected with a simple LTS surgical procedure and 1 required additional lateral tarsorraphy (10 lids). All patients had marked facial palsy present for more than 1 year with lagophthalmos and keratitis.

Group C: 10 patients with cicatricial ectropion ,9 unilateral and 1 bilateral (11 lids).

From these 8 patients with postoperative mild cicatricial ectropion after blepharoplasty, complaining of unacceptable look, tearing, redness and photophobia due to mild lower eyelid ectropion , were managed by simple LTS.While 2 patients (3 lids) with severe traumatic cicatricial ectropion, were managed by total reconstruction of lower eyelid with scar revision in addition to LTS . (Table 1)

Methods

The preoperative assessment of each patient was recorded on a standard Performa. Details of any previous surgery was taken, lateral tarsal strip technique efficacy was assessed by abolition of lower eyelid with thumb which compresses the orbital fat, shortens and elevates the lid laterally giving a good idea about the outcome of the surgical technique. (Fig.1) The following tests and measurements were also included:

1- Lid Distraction Test: The lower eyelid is grasped centrally and pulled away from the globe as far as possible without causing discomfort and the maximum separation of the lower lid margin from the lower limbus is measured in the primary position.

2- Snap-Back Test: The lower eyelid is pulled down away from the globe, and then suddenly released; normally the lid return into normal position due to elasticity a second after release, if any delay

found it is calculated and the test is considered positive indicating horizontal lower eyelid laxity, stop watch was used to calculate the time.

3- Margin-reflex distance: Distance between lower eyelid margin and corneal reflex in the primary position.

4- Capsulopalpepral Fascia Disinsertion signs:

-Higher resting position of lower eyelid.
-Incomplete lower eyelid movement with down gaze.
-Pink horizontal band along lower fornix.
-Deep lower fornix.
-Absent lower eyelid crease

5- Rose Bengal staining Test: Kerato-conjunctival staining due to exposure.

Table 1: Base Line Characteristic

No. of patients	30	
Gender **Male:**	17 Patients	56.6 %
Female:	13 Patients	43.3 %
Age (Years) **Mean** **Range**	59.15+\-6.2 Ys 4 – 65 Ys	
Eyes **Right:**	21 lids	
Left:	20 lids	
Lid Malposition • **Involutional ectropion:** • **Paralytic ectropion (7th N palsy):** • **Post operative Cicatricial Ectropion :** • **Traumatic Cicatricial Ectropion:**	20 Lids (10 Bilateral) 10 Lids (10 Unilateral) 8 Lids (8 Unilateral) 3 Lids (1 Unilateral and 1 Bilateral)	
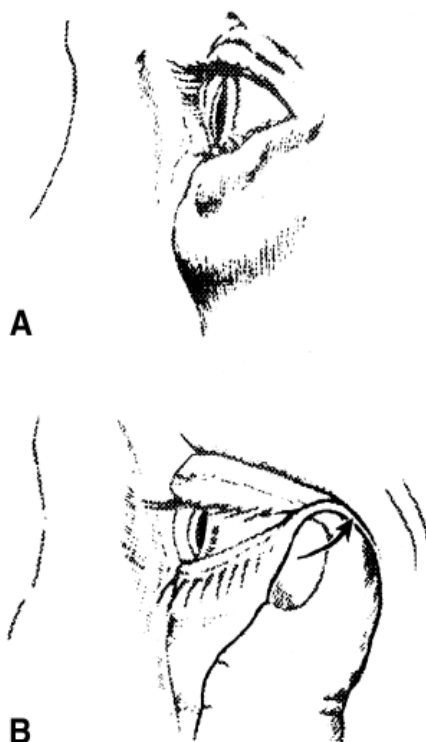
Figure (1):   A. Diagram showing left lower eyelid malposition
B. Abolition by thumb compression shortening and elevating lower lid laterally,
with compressing of the orbital fat. (36)

Table 2: Surgical Procedures.

Clinical Diagnosis	No. Patient.	Surgical procedure
• **Involutional Ectropion:**	9 patients 18lids 1 patients 2 lids	**LTS** **LTS + Skin Muscle Excision**
• **Paralytic Ectropion (7th N palsy):**	9 patients 9 lids 1 patients 1 lid	**LTS** **LTS + LT**
• **Post.oper. Cicatricial Ectropion:**	8 patients 8 lids	**LTS**
• **Traumatic Cicatricial Ectropion:**	2 patients 3 lids	**LTS+ Scar revision**

LTS: Lateral Tarsal Strip   **LT**:Lateral Tarsorraphy.   **Scar Revision**: Scar Excision + Rotational flaps.
Skin Muscle Excision: Removal of a horizontal skin and muscle strip along the whole width of the lower lids 3 – 4 mm from the lower lid margin.

Nine patients with involutional ectropion (18 lids) where operated with lateral tarsal strip as the only procedure to treat the lid pathology, one patients with bilateral involutional ectropion (2 lids) needed removal of a horizontal skin and muscle strip along the whole width of the lower eyelid , 3 – 4 mm from the lower lid margin to prevent over riding of the preseptal part of the orbicularis muscle over the pretarsal part, in this patient the lower lid was taught and puffy, the wound was closed by 6-0 prolene and the residual scar was cosmetically acceptable and augmented the lateral tarsal strip effect. (Fig. 2 a, b)

Ten patients with 7th nerve palsy were operated with LTS, (Fig. 3 a, b) in one case we performed lateral tarsorraphy (LT) to decrease the vertical inter-palpebral distance. (Fig. 4 a, b) The LTS perfectly aligned the lower lid malposition. In two patients with severe traumatic cicatricial ectropion, scar revision and rotational flaps were done, though the main surgical procedure to reattach the lower lid in its normal position was LTS, revision of the scar and flaps were done to eliminate traction and for cosmetic reasons, but still not enough alone to reconstruct lower lid malposition. (Fig. 5, 6)

In eight patients with mild post operative lower lid ectropion, LTS was perfectly the only surgical procedure. (Fig.7). All the operations in this study were performed by one senior surgeon, Marzouk MA. (Table 2)

(Fig. 2a): Patient with involutional lower lid ectropion.

(Fig. 2b): Same patient after lateral tarsal strip with skin and muscle excision.
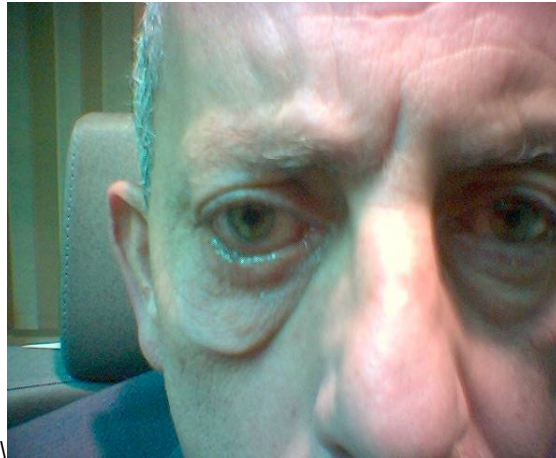
(Fig. 3 a): Patient with lower lid ectropion due to right facial palsy.

(Fig. 3 b): Same patient with lower lid ectropion due to right facial palsy after simple lateral tarsal strip.

(Fig. 4 a): Patient with lower lid ectropion due to right facial palsy.

(Fig. 4 b): Same Patient after lower lid lateral tarsal strip & lateral tarsorraphy.

(Fig. 5 a): Patient with lower lid malposition due to car accident.

(Fig. 5 b): Same patient in operation room after lower lid reconstruction with lateral tarsal strip as a main surgical step for reconstructing LL position.

(Fig. 5 c): Same patient 2nd post operative day after lower lid reconstruction with lateral tarsal strip as a main surgical step for reconstructing LL position.

(Fig. 6 a): Patient with lower lid cicatricial ectropion.

(Fig. 6 b): Same patient with lower lid cicatricial ectropion at the operation room after scar revision and lateral tarsal strip to relocate the lower lid in its normal position.

(Fig. 6 c): Same patient with lower lid cicatricial ectropion 1 week postoperatively.

(Fig. 7 a): Patient with right lower lid ectropion due to lower lid blepharoplasty.

(Fig. 7 b): Same patient after simple lateral tarsal strip.

Surgical Methods

Surgery was performed under local anesthesia in 28 patients and under general anesthesia in 2 patients, one 4 years old kid not fit for local anesthesia and one patient with severe lid deformity which needs extended surgical procedures. Local anesthesia included tetracaine eye drops in the conjunctival sac and subcutaneous infiltration of the lower eyelid with 1:1 volume of lidocaine 2% with 1:200.000 epinephrine and bupivacaine 0.5%. The lateral canthus was also infiltrated down to the periosteum along with the lateral third of the upper eyelid.

A lateral canthotomy and inferior cantholysis were initially performed. A "tarsal strip" is fashioned from the lateral lower eyelid by stripping the superior mucocutaneous junction tissue, debriding conjunctival epithelium posteriorly, excising the anterior lamella, and making a linear incision inferiorly to create a "tendon" of tarsal plate. The length of the fashioned tendon is determined by assessing the desired tension required to tighten the lower eyelid. The tarsal strip is attached to the internal lateral orbital rim with a double-armed 5-0 polyglactin suture by creating a slip knot at the tendon and passing the 2 suture ends through the internal orbital portion of the lateral orbital rim periosteum. (49) The aim is to slightly overcorrect the height of the eyelid by placing the suture slightly more superiorly than the lateral canthal angle while maintaining a posterior vector of tension. Just before tying this suture, lateral canthal reformation is achieved with a single buried 6-0 polyglactin suture. Deep buried 6-0 polyglactin suture is used to close the lateral canthal orbicularis muscle followed by skin closure with interrupted 7-0 polyglactin suture. (50)
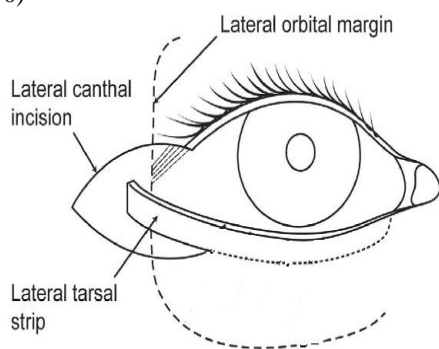
Figure (8): Diagram showing lateral tarsal strip procedure .(51)

Antibiotic ointment was instilled in the inferior conjunctival fornix and suture sites, and a double eye pad was used for a firm dressing for 24 hours. Patients were asked to instill tobramycine eye drops 4 times per day for 3 weeks. Patients were asked to take care not to pull on their lower lid when instilling the drops because it could increase the risk of dehiscence. The first postoperative review in the outpatient clinic was 1 week after surgery. Patients were then reviewed again at 4, 8, 12, and 24 weeks postoperatively.

All patients were followed up for a minimum of 6 months to ensure that the late failures can be detected. Successful surgery was defined as resolution of lid malposition.

3. Results:

A total of 30 patients, 17 males and 13 females, made up the study groups. The mean age of the cohort was 59.15 +\- 6.2 yrs (range 4- 65 years). The average follow up was 24 weeks. The patients were divided into 3 groups :

Group A: 10 patients with bilateral involutional ectropion (20 lids).

Group B: 10 patients with unilateral paralytic ectropion (10 lids).

Group C: 10 patients with cicatricial ectropion 9 unilateral and 1 bilateral (11 lids).

Most common presenting feature was persistent tearing, which was seen in all patients, others included lid laxity, lagophthalmos and unacceptable cosmesis. Thirty-five lids obtained satisfactory correction of eyelid ectropion with a simple LTS surgical procedure, while six lids required an additional intraoperative ancillary procedures to correct the remaining skin laxity, scleral show and residual ectropion. Common ancillary procedures were excision of skin and muscle strip, lateral tarsorraphy and scar revision in severe cicatricial ectropion.

N.B: We excluded the 2 patients with severe cicatricial ectropion (3lids) from the statistical calculations as they gave us abnormal measurements due to fibrosis.

The preoperative tests and measurements were taken and statistically analyzed as follow:

-Lid Distraction test ranged from 14 to 15 mm with a mean of 14.4+\-0.48 mm in group A, and from 14 to 16 mm with a mean of 14.8+\-0.49 mm in group B and from 11 to 13 mm with a mean of 12.2+\-0.39 mm in group C.

-Snap-Back test was positive in all patients as the lids did not snap back except ,after blinking in group A , after forced eye closure in group B, and after multiple blinking in group C.

-Margin reflex distance ranged from 4.0 to 4.5 mm with a mean of 4.25+\-0.25mm in all groups.

-Capsulopalpebral fascia dehiscence signs: A higher resting position of the lower eyelid, inability of the lower lid to follow movement of the globe in down gaze and a deep lower fornix were noticed in all groups.

-Rose Bengal staining test was positive in all groups.

-Six months after surgical correction:

a- Lid Distraction test ranged from 9 to 10 mm with a mean of 9.4 +\- 0.49 mm. The test results were highly significant $p<0.05$ compared to preoperative calculation in all groups.

b- Snap-Back test ranged from 3 to 5 sec. with a mean of 3.8 +\-0.94 sec. The test results were significant compared to preoperative calculation in all groups.

c- Margin reflex distance ranged from 4.5 to 5.5 mm with a mean of 4.95+\-0.36mm. The test results were significant compared to preoperative calculation in all groups.

d- Rose Bengal staining decreased in all groups, indicating good functional results.

Functional and cosmetic success was achieved in 28 patients. No major complications were noted except for pain and tenderness over lateral canthal region, which was short lasting (1week).

4. Discussion

Disorders that alter the delicate anatomy of eyelid margin can have serious effect on comfort and vision. The lower eyelid is analogous to tennis net. The net remains erect and straight because of its horizontal support at the net poles. If the horizontal support slackens, the net sags and is free to flop in to one court or the other depending on the wind. Management of such relaxation aims at restoration of the near-normal horizontal eyelid tone by horizontal lid tightening. Anderson and Gordy originally described the lateral tarsal procedure in 1979. The lateral tarsal strip procedure was found to be particularly useful for lower lid paralytic ectropion, involutional entropion or ectropion, lateral canthal tendon laxity or malposition, iatrogenic phimosis associated with recurrent entropion or ectropion after traditional lid shortening procedures and in elevating the lateral canthus and effectively deepening the fornix while tightening lax eyelids in surgically anophthalmic socket. (1)

In this study we divided 30 patients in to 3 groups according to the etiology of the lower eyelid ectropion, group A: involutional, group B: paralytic and group C: cicatricial.

We used a battery of simple clinical tests to evaluate lower eyelid ectropion in all cases.

The Lid Distraction test changed from 12-14mm before LTS, to 9-10mm, 6 months after LTS, this was highly significant. The Snap-Back test is difficult to quantitate (4). However by using a stop watch we found the test to be reliable and easy to perform. Snap-Back test before LTS in group A was on blinking, and in group B was on forced eye closure, and in group C was on multiple blinking, 6 months after LTS Snap-Back test changed to 3-5 sec. which was significant. Margin reflex distance changed from 4.0-4.5 mm before LTS, to 4.5-5.5 mm, 6 months after LTS, which was also significant. All our cases had extensive Rose-Bengal cojunctival and corneal staining which showed marked improvement in the degree of staining after LTS procedure.

The Snap-Back test reflects the lid elasticity, the Lid Distraction test reflects the overall relaxation and the Rose-Bengal staining reflects the objective ocular surface morbidity. This makes Rose-Bengal testing an important step in the preoperative evaluation of patients with border line lower eyelid laxity which when correlated with subjective complaints could be useful in decision making for surgery and in the evaluation of postoperative results. In our study one patient with involutional ectropion (2 lids) underwent excision of muscle and skin strip along with lateral tarsal strip as an ancillary procedure; one patient with facial palsy (1 lid) needed lateral tarsorraphy. Tarsal strips are an excellent adjunct to skin grafts in cases of cicatricial ectropion. Two patients (3 lids) in our series underwent full thickness rotational skin graft along with lateral tarsal strip.Lateral tarsal strip is relatively simple procedure and complications are rare. The most common complaint of patient is tenderness and mucus discharge at lateral canthal region, which were noted in all our patients during postoperative period. Other rare complications like pyogenic granuloma formation, suture abscess and wound dehiscence were not seen in our series. The patient undergoing lateral tarsal strip should be cautioned not to excessively rub or stretch the tight eyelid in immediate postoperative period and we routinely advise our patients for the same. LTS is a simple technique, which can be used in correcting various eyelid disorders, and renders excellent cosmetic and functional results. The multiple ancillary procedures used in our study are suggestive of a very specific role for lateral tarsal strip as a sole treatment in correcting various types of eyelid ectropion. (1)

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Preferred Educational Strategies and Critical Thinking Dispositions among Nursing Students

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Abstract: Thinking dispositions are characterological in nature, and like many human character traits, they develop in response to immersion in a particular cultural milieu. The cultural milieu that best teaches thinking dispositions is a culture of thinking environment that reinforces good thinking in a variety of explicit ways. The effective program for teaching thinking dispositions, therefore, should create a culture of thinking in the educational system. Critical thinking is a desirable outcome; so to develop and practice critical thinking; educators need to re-consider course content and curricular strategies used to develop critical thinking. The study aimed to determine nursing students' preferences of educational strategies and their critical thinking dispositions. This study was conducted at the Faculty of Nursing, University of Alexandria. The subjects of this study consisted of (50%) of the total number of students of each academic level comprising 630 students. The students' total score of critical thinking dispositions had significant relation with nine preferred educational strategies out of twenty four. They strongly preferred the following educational strategies: role play, demonstration, portfolio computer assisted instruction/e- learning and panel discussion. While they moderately preferred the following educational strategies: interactive lecture, case study, questioning and nursing round. Finally, they never preferred written assignment. Based on the finding of this study annual assessment of students' CTDs using the CCTDI is carried to select educational strategies that reinforce the positive dispositions and change the negative and ambivalent ones towards the positive inclination.
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Key words: Critical thinking dispositions, students' preferences, educational strategies

1. Introduction:

Critical thinking dispositions are the affective components of critical thinking. These dispositions are coupled with cognitive skills as essential components of ideal critical thinker. Critical thinking disposition is consistent willingness, motivation, inclination and drive to be engaged in critical thinking while reflecting on significant issues, making decision and solving problems. The Delphi project concluded that critical thinking (CT) as "Purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference as well as explanation of the evidential conceptual, methodological, and contextual considerations upon which that judgment was based. The Delphi study reports that CT includes the dimensions of skills and dispositions. Accordingly, The ideal critical thinker is, habitually inquisitive, well-informed, honest in facing personal biases, prudent in making judgments, willing to consider, clear about issues, orderly in complex matters diligent in seeking relevant information, reasonable in selection of criteria, focused in inquiry and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit". (Chenoweth,1998; Giancarlo &Facione ,2001)

The concepts of CT and CTDs become a catchphrase among nurse educators today and increasingly important in nursing because it shapes goals in nursing education as well as practice. These concepts are considered as indicators in higher education, the Commission of Collegiate Nursing Education (CCNE) strongly indicated that the development of CT and CTDs should be the top curricular priority in baccalaureate nursing programs. (Rannoevacho ,2000 ; Cauig,2001)

The Joint Commission of Accreditation of Health Care Organizational Standards (JCAHO, 1994) reported that critical thinking is accompanied with quality improvement. Enhancing patient care is a trade mark of the nursing profession and. Surveyors from JCAHO envision that nurses do more than documentary passive observations. Nurses need to take action based on patients' conditions in such a way that management of care involves all facets; exemplify reasoned considerations, constructive thinking and incorporate a particular disposition that leads to favorable outcomes. The process of critical thinking will enhance the ability of nurses to identify clinical indicators, assess their significance and discuss areas for improvement. Both CTDs and continuous quality improvement are seen as never ending processes and outcomes. Hence, a harmonious

relationship exists between the importance of CTDs and how to promote it through a conducive learning environment and the use of educational strategies and the effective quality improvement initiatives. (Bandman & Bandman , 1995; Facione et. al, 1994 ; Alfaro,2004)

There are three sets of factors that may affect students' dispositions toward critical thinking; characteristics of teachers, characteristics of learners and the educational strategies that both teachers and learners apply. Critical thinking is a desirable educational outcome; so to develop and practice CT; educators need to re-consider course content and curricular strategies used to develop CT. (Lee et. al, 2000; Girot, 2000; Seymour et.al 2003; Kawashima & Petrini , 2004)

Gilmartin(2001) ; Banning(2004)stated that critical thinking is a salient feature of the facilitative methods of teaching and learning. Nurse educators who teach nursing need to be familiar with and encourage the use of facilitative methods of teaching and learning, in particular creative educational strategies and the adoption of these teaching and learning approaches can encourage the use of process oriented teaching methods . This will add to the creation of a teaching and learning programme that reduces the dichotomy between professional knowledge and university knowledge.

Caroll (2007) suggested a set of criteria for assessing how well an instructional approach might be expected to teach thinking dispositions. Their view is based on the idea that thinking dispositions are learned through a process of enculturation, rather than direct transmission. Thinking dispositions are characterological in nature, and like many human character traits, they develop in response to immersion in a particular cultural milieu. The cultural milieu that best teaches thinking dispositions is a culture of thinking environment that reinforces good thinking in a variety of explicit ways. The effective program for teaching thinking dispositions, therefore, should create a culture of thinking in the educational system. Such a culture will have the following four elements.

1. It should provide models of good reasoning behavior and providing opportunities for teacher to model reasoning so, students are provided with exemplars of what thinking dispositions look like in practice.
2. The program should provide direct explanations about the purpose, concepts and educational strategies that promote CTDs.
3. A program for teaching CTDs should provide plenty of opportunities for active, reflective and collaborative learning experiences.

4. Lastly, the program should provide plenty of opportunities for formal and informal feedback around thinking dispositions through teacher feedback, peer feedback and self feedback students should learn about the strengths and weakness of their reasoning behavior. Feedback is one of the most powerful ways a culture teaches and expresses its values.

Stewart and Dempsy (2005) identified, benchmarks and guiding principles for best practices that promote CTDs; encourage contact between students and faculty, develop reciprocity and cooperation among students, uses active and reflective learning techniques, give prompt feedback , emphasize time on task, communicate expectations and learning outcomes, respect diverse talents and ways of learning. Moreover, Stewart and Dempsy (2005) identified students' independent learning and self autonomy as the most important guiding principles for promoting CTDs, they identified independent learning as a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes'. They added that educator's role as a facilitator of the learning process is very important.

So, this study aimed to determine the relationship between critical thinking dispositions of the nursing students and preferred educational strategies.

2. Material and Methods
Materials
Research design:
This research is a descriptive correlational design.

Setting:
 This study was conducted at the Faculty of Nursing, University of Alexandria.

Subjects:
The subjects of this study consisted of 50% of the total number of students of each academic level comprising 630 students. First year, n=161; Second year, n=135; Third year; n=144; Forth year, n=190. Subjects were selected using the systematic random sampling method

Tools:
Tool I: California Critical Thinking Disposition Inventory (CCTDI):

The California Critical Thinking Disposition Inventory (CCTDI) (*Facione & Facione, 1992*) was used to determine students' critical thinking dispositions or habits of the mind. The CCTDI is a 75 items likert format tool , each subscale assesses one of the seven dispositions of critical thinking, namely; truth seeking (12 items), open-mindedness (12 items), analyticity (11 items), systematicity (11 items), self confidence (9 items), inquisitiveness (10 items), and cognitive maturity (10 items).

Scoring system:

For each of the seven subscales a student's score on the CCTDI may range from a minimum of 10 points to a maximum of 60 points. Scores are interpreted utilizing the following guidelines. A score of 40 points or higher indicates a positive inclination or affirmation of the characteristic; a score of 30 or less indicates opposition, disinclination toward the same characteristic. A score in the range of 31-39 points indicates ambivalence toward the characteristic.

An overall score on the CCTDI can be computed by summing the seven subscale scores. Overall CCTDI scores may range from a minimum of 70 points to a maximum of 420 points. Similar interpretative guidelines are used when looking at overall CCTDI scores: a total score of 280 points or higher indicates a positive overall disposition toward critical thinking, whereas a total score of 210 or lower indicates the negative disposition towards critical thinking. A score in the range of 211-279 indicates ambivalence toward critical thinking.

Each of the 75 items includes a forced choice six point likert scale ranging from strongly agree (1) to strongly disagree (6). A reversed scoring is allotted to negative statements.

Tool II: Preferred Educational Strategies Questionnaire Schedule (PESQS):

This tool was constructed by the researchers after reviewing the related literature *Gardner (2004) ; Lierman (2004)* to determine the degree of preference of each strategy by every study subject. It constitutes a list of 24 educational strategies in a likert format and a simple description of each strategy. Each of the 24 educational strategies includes a forced choice 4- point likert scale that are categorized and coded as follows; always preferred (4), often preferred (3), sometimes preferred (2) and not preferred (1).

Method

- Permission to conduct the study was obtained from the dean of the Faculty of Nursing; Alexandria University and the head of each

scientific department after explaining the purpose of the study.

- California Critical Thinking Disposition Inventory (tool I) was translated into Arabic and adopted to suit the Egyptian culture by the researcher.

- Preferred Educational Strategies Questionnaire Schedule (PESQS) (tool II) was developed by the researcher after extensive review of related literature. This tool used to determine the degree of preference of each strategy by the nursing students, this part of the tool was developed in the form of structured statements that describe simply each strategy. Students were asked to tick their responses in the likert format to determine the extent of preference of each educational strategy.

- Tool I and II was submitted to a jury composed of 6 experts in the field of nursing from the faculty of nursing staff members. They were asked to judge completeness and accuracy of the content of the tools.

- Reliability of the tool I and II were tested for their internal consistency using Cronbach Alpha reliability test. The coefficient values were 0.869 and 0.726, respectively.

- Subjects were selected using the systematic random sampling method by selecting the fourth name from random lists that were previously prepared by the students' affairs department.

- Pilot study was conducted by the researcher to test the clarity and applicability of the tools on 80 students (20 students from each academic level). Tools were reconstructed and put in its final form.

- The researchers explained the purpose of the study, and then assured them that their responses would be kept confidential. Student's consent to respond to the questionnaire was obtained.

- Data was collected by the researcher, using the questionnaire method over a period of 3 months from the beginning of April to the end of June 2008.

Statistical analysis:

- Data was coded and computerized and statistical analysis was conducted using SPSS version 12.
- Descriptive statistics were done using numbers, percentages, arithmetic means and standard deviations.

- Analytical statistics were done using:
1. ANOVA was used to determine:-

- Significance of differences of nursing students' critical thinking dispositions in relation to their academic level.
- Significance of differences of nursing students' critical thinking dispositions in relation to their last educational experience.
- Significance of differences of the preferred educational strategies among the nursing students of the four academic levels.
- Relationship between critical thinking dispositions and preferred educational strategies among the nursing students.
- The selected level of significance was p 0.05.

2. Cronbach Alpha reliability test; to test the internal consistency of tool I and II.

3. Results

Table (1): illustrates personal and academic characteristics of the nursing students; it can be noticed that nearly one third of the students (30.1%) were in the forth year, about one quarter (25.6%) were in the first year, while less than one quarter (22.9%) and (21.4%) were in the third and second year respectively. The majority of the students (78.1%) were females, while males constituted 21.9%.

Figure (1): shows that nursing students regardless of their academic level showed ambivalent disposition toward the total score of critical thinking dispositions and all critical thinking dispositions subscales (CTDs) except for the inquisitiveness disposition which had the positive level (42.49±6.557).

Moreover, the highest mean score was among students of the four academic levels (N=630) in the inquisitiveness disposition followed by the analycity disposition (42.49±6.557, 39.61±5.379), respectively. Meanwhile, they got the lowest mean scores in the truth seeking and open mindedness dispositions (32.20±5.968, 35.28±5.068), respectively. Also, findings indicated also, that students of the first year got ambivalent level regarding all CTDs except for analycity and inquistiveness dispositions which were in the positive level (40.19±7.25, 40.88±6.55) respectively.

Results indicated the following in relation to the CTDs of the students according to their academic levels; regarding truth seeking and open mindedness subscales; it can be noticed that the highest mean scores were among the first year students (33.34±5.56 and 37.12±5.77) respectively and the differences were statistically significant (F= 6.90 and 15.57) respectively.

Concerning Analyticity, Systematicity, Self confidence, Inquisitiveness, Cognitive maturity subscales and the Total score of critical thinking dispositions; it can be noticed that the highest mean scores were among the forth year students (40.42±5.63, 38.33±5.46, 39.86±5.72, 44.47±6.78, 37.19±6.88, 268.23±25.81) respectively and the differences were statistically significant (F= 8.86, 9.36, 7.91, 15.26, 14.86, 22.90) respectively and P=0.000 for all values.

Figure (2): Presents ranking of the mean percent scores of the total nursing students' preference for each educational strategy as follows: pre clinical conference ($\overline{X}$ %85.5%), nursing round ($\overline{X}$ %= 83.25%), post clinical conference ($\overline{X}$ %= 81.25%), mentoring ($\overline{X}$ %=76.75%), problem based learning ($\overline{X}$ %=76.5%), demonstration ($\overline{X}$ %=74.75%), computer assisted instruction/e-learning($\overline{X}$ %73.5), learning contract($\overline{X}$ %=71.5), questioning($\overline{X}$ %=67.75) case study($\overline{X}$ %67), role play($\overline{X}$ %=67), interactive lecture($\overline{X}$ %=66), seminar($\overline{X}$ %=65.75), debate($\overline{X}$ %=65), panel discussion($\overline{X}$ %=65), portfolio($\overline{X}$ %=63.5), cooperative learning($\overline{X}$ %=62.5), role modeling($\overline{X}$ %=62.5), written assignments ($\overline{X}$ %=61.25), brain storming($\overline{X}$ %=60.75), concept map($\overline{X}$ %=59.75), reflective journal($\overline{X}$ %=59.25), project based learning ($\overline{X}$ %=57.25) and traditional lecture ($\overline{X}$ %=56.25).

Figure (3) illustrates presents mean total scores of CTDS of the nursing students as they significantly relate to the preferred educational strategies. The students' total score of critical thinking dispositions had significant relation with nine preferred educational strategies out of twenty four. They strongly preferred the following educational strategies: role play, demonstration, portfolio computer assisted instruction/e- learning and panel discussion. While they moderately preferred the following educational strategies: interactive lecture, case study, questioning and nursing round. Finally, they never preferred written assignment. F value ranged between 4.36 and 14.55 and p value ranged between 0.00 and 0.01. On the other hand, There was no statistical significant relationship between the students' total score of critical thinking dispositions and their preference to written assignment

Table1: Personal and Academic Characteristics of the Nursing Students

Characteristics of Nursing Students	N N = 630	%
Academic level		
First year	161	25.6
Second year	135	21.4
Third year	144	22.9
Forth year	190	30.1
Last Educational Certificate		
Secondary	432	68.57
Technical Health Institute Nursing Diploma	128	20.32
Technical Nursing Institute Diploma	61	9.68
BSc	9	1.43
Gender		
Male	138	21.9
Female	492	78.1
Age		
17-	165	26.2
19-	292	46.3
21-23	173	27.5

Figure 1: Mean scores of critical thinking dispositions of the nursing students in relation to their academic level

Fig. 2: Ranking of the Mean Percent Scores of the Total Nursing Students' Preference for Each Educational Strategy
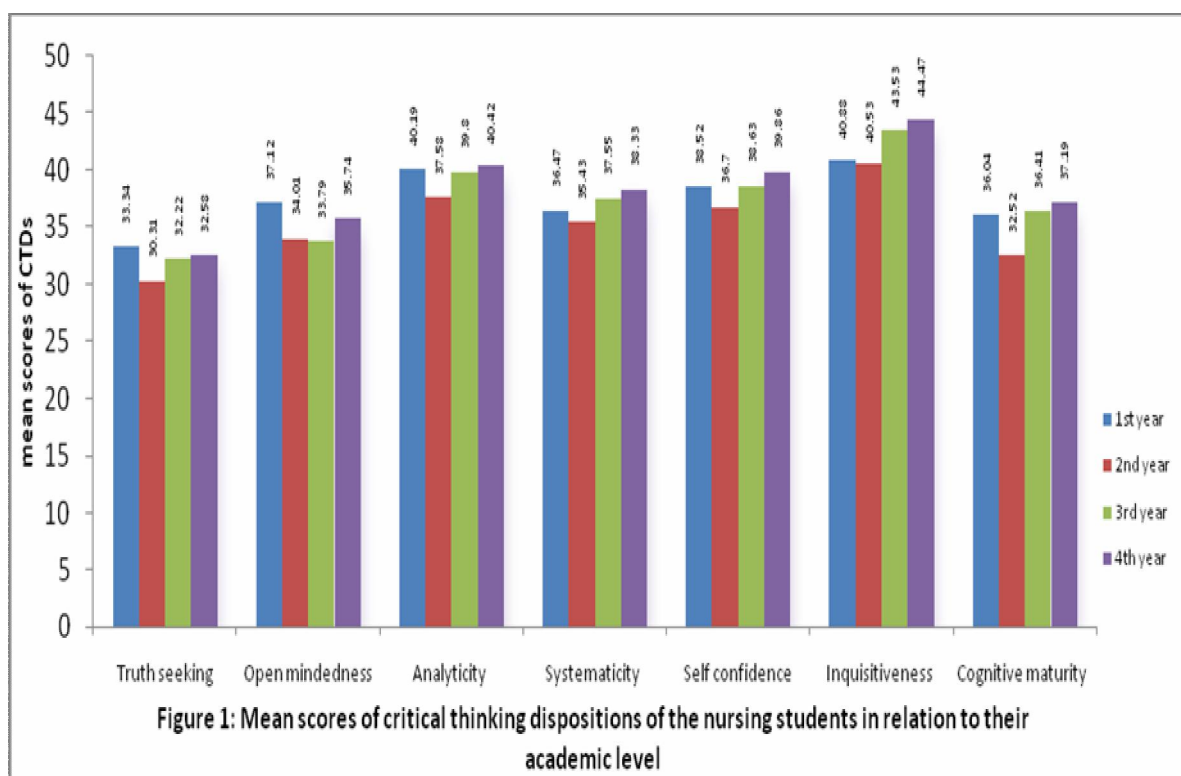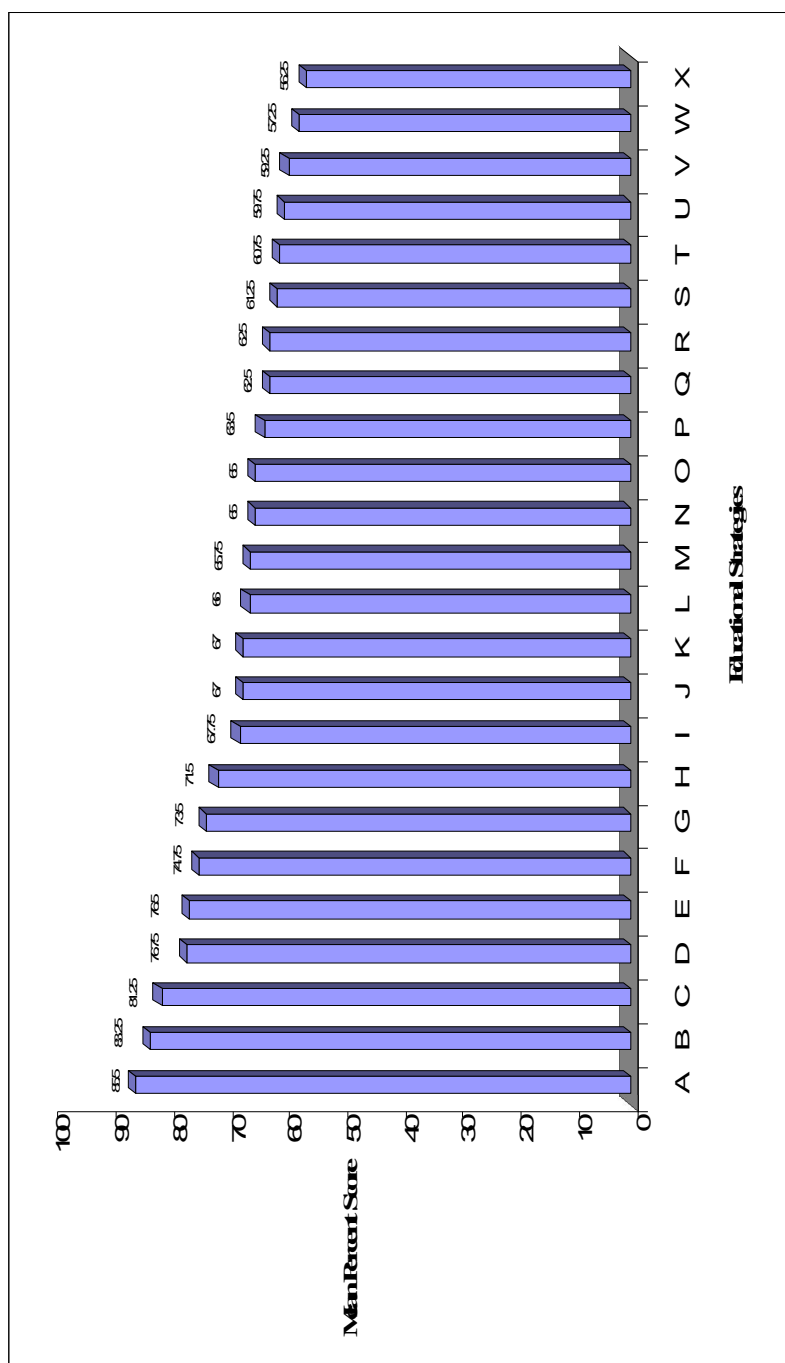
A=Pre Clinical Conference, B=Nursing Round, C=Post Clinical Conference, D= Mentoring, E= Problem Based Learning, F=Demonstration, G=Computer Assisted Instruction/E-Learning, H= Learning Contract, I= Questioning, J=Case study , K=role play, **L**=Interactive Lecture, M=Seminar, N=Debate, O=Panel Discussion, P=Portfolio, Q=Cooperative Learning, R=Role Modeling, S=Written Assignments, T=Brain Storming, U=Concept Map, V=Reflective Journal, W=Project Based Learning And X=Traditional Lecture.
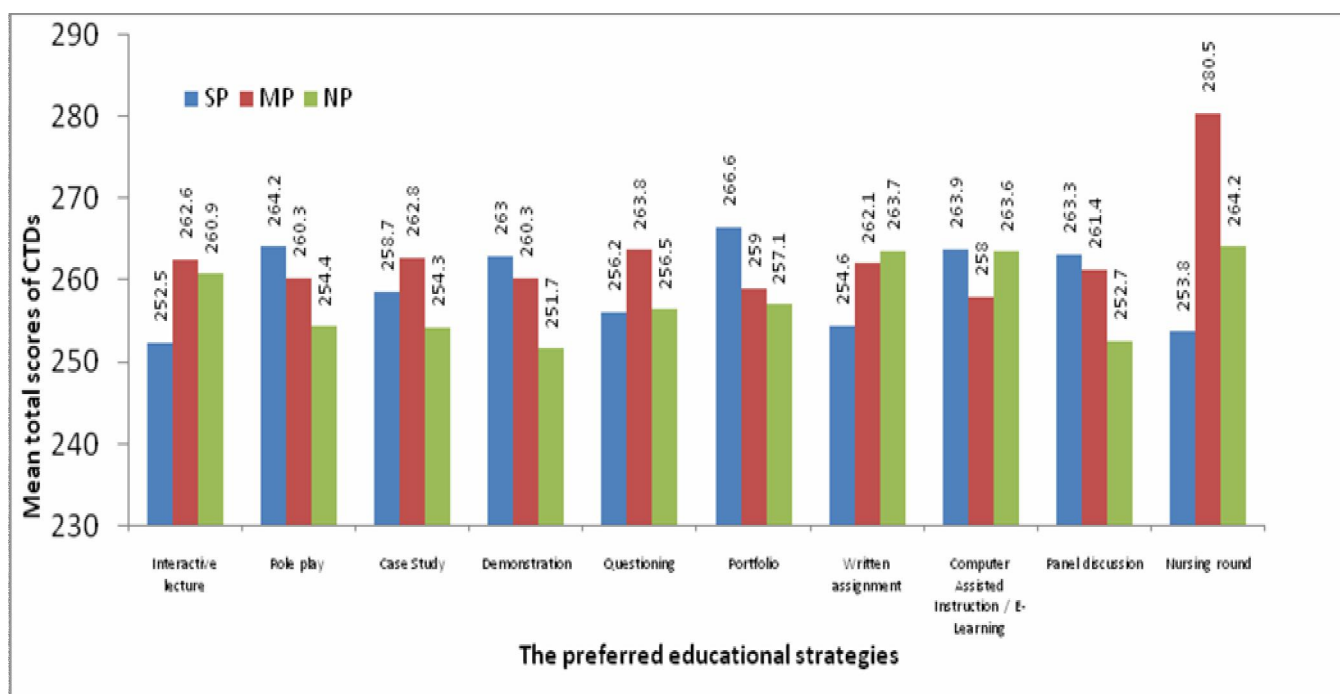
Figure 3: Mean scores of CTDs Of nursing students as they significantly relate to preferred educational strategies

4. Discussion

Nurse educators have the challenge of providing students with an education that prepares them for the future marketplace. Critical thinking is a valued educational outcome. Therefore, nurse educators agree that critical thinking is an integral component and essential competency for the professional nurse in today's ever changing health care environment.

Gardner (2004) identified that the education of good critical thinkers includes the fostering of critical thinking dispositions (CTDs), these dispositions are described as the consistent internal motivation to problem solving and decision making by using thinking.

The results revealed that the nursing students mean scores were high in analyticity and inquisitiveness, compared to truth seeking and open mindedness; these findings are consistent with (Mc Carthy ,2001; El Hessewi,2003). These indicate that the nursing students have the disposition of being alert to potentially problematic situations, anticipating possible results or consequences, prizing the application of reasons and the use of evidence if

the problem in hand turns out to be challenge or difficult.

Interestingly, the results showed also, that the nursing students mean scores were positive in inquisitiveness, which refers to the person's intellectual curiosity and desire for learning. The inquisitive person is eager to learn more, he/she is one who wants to know how things work and values learning even if the immediate pay off are not directly evident. These results were supported by Redding ,1999) who considered up-to-date knowledge as an important component of critical thinking .The nursing students curiosity to broaden their knowledge base become a must when evidence based practice based on standards is applied. Another reason that motivates the nursing students to look for knowledge and to strengthen their scientific base is their intense need to improve their image in the health care field as the knowledge base provides the students with sense of empowerment.

Regarding the CTDs of the nursing students in relation to their academic level; as, regards truth seeking which is the courageous desire for the best

knowledge even if such knowledge fails to support or determine one's preconceptions, beliefs or self interest. The mean score of this dispositional characteristic was the highest among the fourth year students. This finding is consistent with the finding of (Lee et al. ,2006) in their study to examine critical thinking disposition in baccalaureate nursing students.

Findings of this study was supported by those of (McCarthy et al.,1999; Bartlett & Cox ,2000, Tiwari et al. ,2003; Profetts-McGrowth ,2005;Shin et al. ,2006), these findings revealed that seniors got the significantly highest mean of the overall CCTDI. In contrast, findings of (El Hessewi, 2003 ; Brunt. 2005; Ward ,2006), where the senior level students got the lowest mean of total score of CTDs.

In relation to, the relationship between critical thinking dispositions (CTDs) and preferred educational strategies among the nursing students; numerous components of critical thinking (CT) are involved in the development of valued educational strategies. Educational strategies that promote CTDs are never simple and require careful planning. They entail highly complex performances of observation and analysis, reading and interpretation, question and answer, conjecture and refutation, proposal and response, problem and hypothesis, query and evidence, individual retention and deliberation…these educational strategies command student vigilance which in turn causes learners to feel highly visible in the educational environment and students become active, reflective, interactive and independent. Learners also are accountable not only to teachers but also to their peers in their responses, arguments, commentaries and presentation, they are also accountable to themselves through their self reflection. (Shulman, 2005)

As for the interactive lecture; findings revealed that there were significant relationships between the nursing students' total score of CTDs and the nursing students' preference of the interactive lecture. (Oerman ,2000), clarified that the interactive approach during the lecturing method encourages students' CTDs, he explained that, during the interactive lecture a combination of educational methods are used according to the nature of the topic being introduced; discussion, questioning, short case analysis, concept map, story based discussion, and book end approach.

As regards role play, case study and demonstration, as a simulation educational strategies; the results showed that there were significant relationship between the total score of CTDs. (Welthew (2004), identified role play, case study and demonstration as the most important types of simulation used to educate nursing students. (Linden

(2008) in her study of "the effect of clinical simulation and traditional teaching versus traditional teaching alone on critical thinking of nursing students" explained that simulation meets the standards for interactive, student – centered learning that stimulates CTDs. Moreover this strategy has been prescribed in nursing education as part of the education redesign.

Moreover, (Amerson ,2005; Samuel ,2006) explained that during interactive lectures, students are required to actively engage in the learning process, a great opportunity is allowed for students to discuss with each others and to explore alternate perspectives and examine different decisions to arrive at reasoned judgments. So, possessing open mindedness is a command for these interactions and collaborations.

The results revealed that there were significant relationships between the total score of CTDs, and their preference of the questioning strategy. On this track of usefulness of the questioning technique , Webber et al. (2002) stated that, nursing education builds on information from courses with proven methods that espouse learning (such as questioning and other interactive techniques which encourage the adult learner). Memorizing facts is not critical thinking, however, taking information into a global perspective by analyzing and evaluating the data, gives insight as to the nature of the problem/ question that will then evoke a solution / answer.

The results showed that there were significant relationship between the nursing students' total score of CTDs and their preference of portfolio. These results are supported by Grant et al. (2007) who stated that portfolio enable students to gather evidence of learning via a series of tasks and the information documented arises from learner's learning experience, such students follow the reasons and evidences are truth seekers. Furthermore, Driessen & Vermunt (2003) ,clarified that the component tasks of the portfolio should be organized to meet intended learning outcomes. Students tend to use their systematic thinking in order to accomplish their tasks in the required manner. Through portfolio, the future developmental needs can be identified and organized. Tiwari et al. (2003) ; Ghallab (2008) opinions supports the relationship between analyticity and open-mindedness and portfolio. The work controlled in the portfolio provides material for the student to review their learning. It also, provides full picture on how students analyze, produce, and create. In addition, students interact on intellectual emotional and social levels with others, they listen to each other, ask their peers about their opinions in their work. Another benefit for the portfolio is raising students self confidence because it measures students progress in their accumulated work.

As for computer assisted instruction (CAI)/e- learning; the results presented significant relationships between the nursing students' open-mindedness and analyticity and their preference of this strategy. Meyer (2003) ; Ahmed (2008)stated that" as faculty members struggle to determine how to use new technologies in education appropriately; they must grapple with understanding the advantages of online or computer assisted activities. Curtis & Lawson (2001) found evidence from the literature on successful collaborative learning in online discussions. They reported in their study that, students experienced greater cognitive and explanatory learning.

The results presented that there were significant relationships between the nursing students' total score of CTDs and their preference of nursing round. These results are reasonable, Elliot and Waldock (2008) in their study "round: an approach to nursing development" reported that successful round should constitute of three basic constituents; engagement, team building and knowledge appreciation.

Furthermore, Morsy (2004) stated that nursing round demands students to possess analyticity in order to analyze the patient condition and systematicity in order to organize the communication or intervention according to the purpose of the round.

Finally, there was no statistically significant relationship between total score of CTDs and written assignment. That results explained by Fazarro et.al (2009) that the written assignments in enthusiastic design in the clinical nursing experience must considered as nursing students spend prolonged hours in the practical sits practicing psychomotor skills and attending lecture classes and participating in seminars and clinical conferences, so after completing the schools day they becomes very exhausted.

From that context CTDs is a desired educational outcome; so to develop and practice CT, educators need to reconsider educational strategies that had significant relationship with the students CTDs and are in accordance with their preferences. Nurse educators need to be familiar with and encourage the use of facilitative methods of teaching and learning that not only prepare the nursing students with the substantive knowledge necessary for competent practice but also, create an environment in which students learn to think critically, practice reflectively, learn independently, work effectively in groups and access and use new information to support their practice that will in turn decrease the dichotomy between professional knowledge and university knowledge. However, such a shift in what has been traditionally revered in nursing education creates tensions and challenges such as: students' resistance to new methods, classroom straights and role confusion, here the role of faculty arises to overcome these difficulties. In this respect the Faculty of Nursing – Alexandria University considered promoting students CT as one of the most important strategic objectives to be a unique privilege for joining the Faculty.

5. Conclusion and Recommendations

The following are the conclusions derived from findings of the present study:
The CTDs of the nursing students as arranged in descending orders are: inquisitiveness, analyticity, self confidence, systematicity, cognitive maturity, open mindedness and truth seeking.

The nursing students' total score of critical thinking dispositions had significant relation with nine of the preferred educational strategies out of the twenty four; the students strongly preferred the following educational strategies: role play, portfolio, computer assisted instruction/e- learning , panel discussion. While they moderately preferred the following educational strategies: interactive lecture, questioning case study and nursing round. Finally, they never preferred written assignment.

Based on the findings of the present study, it is recommended that; annual assessment of students' CTDs using the CCTDI is carried to select educational strategies that reinforce the positive dispositions and change the negative and ambivalent ones towards the positive inclination. Also, longitudinal study that evaluates students' critical thinking dispositions throughout the four years of the nursing program to determine the developmental process of CTDs.

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Effects of strengthening adult education in agricultural development

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Abstract: adult education in the local agricultural education program is an essential component of the "total" program. Offering adult education programs helps to keep farmers and agribusiness employees better informed of current trends and provides them with opportunities to learn new skills and improve existing ones. Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture. Adults in agriculture use a number of sources to gain new information that can be used to help them solve problems. Persons employed in agriculture utilize newspapers, magazines, newsletters, radio, television, government publications, internet, and meetings to gather information which can be directly utilized in their business activities. In many communities, the agriculture teacher is the primary source of agricultural information.
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Introduction:

Adult illiteracy is like a disease that infects virtually every dimension of Kentucky life. Adult illiteracy saps the energy and capability of Kentucky's people and its economy. Adult illiteracy feeds the state's unemployment, its welfare rolls, and the correctional institutions. Adult illiteracy severely hinders the life chances of young children, undermines school reform, and limits the opportunities for postsecondary education. Kentucky's capacity to raise the state's per capita income, improve the quality of life of its population, and develop a competitive economy, depends fundamentally on the state's ability to increase the population's educational level. Progress is needed across all of Kentucky, not just some of Kentucky. The social, economic, and political costs of growing disparities between the haves and have-nots are unacceptable. To maintain its current standing relative to competitor states, Kentucky must make progress. Extraordinary progress will be necessary for Kentucky to improve its competitive position relative to neighboring states and the most progressive states in the nation. To be successful, the Commonwealth's strategies must energize and gain the commitment of all the state's political, education, business, and civic leaders. No strategy will succeed unless it engages leaders in each community and county to identify needs and develop programs and services appropriate to the community's unique circumstances. The most serious challenge will be to motivate low-skilled, under-educated adults within the working age population to seek further education. Simply expanding the number of providers and programs will not necessarily increase demand from the populations and communities where the needs are greatest. Deepseated social, economic and cultural barriers—many dating back generations—lead people to undervalue education. In addition, in many counties it is difficult for people to see a direct relationship between better education and better-paying jobs. Either there are no jobs available or many existing employers do little to emphasize the connection between better education and the possibilities for getting a job, keeping a job, or earning a higher wage. For many, getting more education and earning a high school diploma or a college degree has little positive meaning. only the negative consequences are obvious: getting more education often means leaving one's family and community for jobs and opportunities for advancement somewhere else. The future of Kentucky depends on uplifting the quality of life and economy of all of Kentucky. The social and economic costs of neglect of large parts of the state will drag down the rest of the state and seriously hinder its capacity to compete in the global economy. Much like strategies to curb epidemic, strategies to reduce illiteracy and raise the educational attainment of Kentucky's population must include both short-

term efforts to face the immediate crises as well as long-term strategies to get at the underlying causes. Short-term crises include the imperative to keep helping welfare clients make the transition from welfare to work within the constraints of federal and state mandates and the need to train workers for immediate employer demands. Long-term prevention must address the underlying, persistent problems of the state's economic structure as well as the low awareness--if not appreciation--among segments of the population of the vital connection among education, employment, and improved standards of living.

Adult characteristics:
to understand the characteristics of adult learners, their mental and physical condition should be considered in the following referred to some of them.
Operating speed:
slow reaction in adults is natural that necessarily means reducing the logic and practice skills, not due to weakness and increased awareness of natural forces and their skills.
Consciousness:
 no stimulus and incentives encouraging, despite inhibiting stimuli, slow transfer rate, mental, and weak inhibitors of natural forces (mostly visual and auditory) are factors that slow reaction affect individual mental and cognitive activities, but never able to understand, understanding and learning ability (which varies with the speed of learning) is not relevant.
Health:
 what is most age, longer duration is necessary to be heard by listening issue. Why is that when elderly people and old could not hear well, their confidence and vulnerable to the possibility that negative beliefs about their find, they are great. Visual abilities can be like other people, usually decreases with age.
Background of knowledge - skills and beliefs of adults:
adults, social experiences, many have already learned different values and beliefs in their pronouns have stabilized, so changes in the new act very cautiously. The idea of such a manner that skill and applying them older and longer life is, Similar resistance to accept new ideas will be more and more severe. Thus, the adult criteria for the built and paid for their ideas and beliefs that are forming. Because of these criteria and the beliefs that they are afraid of failure, Therefore, to prevent it, sometimes against the resistance of new phenomena are only the material taught and its face that make reinforced concrete and tangible interference situation is.

Ways to Strengthen Adult Education

1- Create a culture that supports adult study
1. Communicate that learning is intrinsic to faith development. Lift up ongoing study, including adult education, as an essential function of any Christian community.
2. Reinforce the expectation of study participation from the pulpit and with new members.
3. Make Bible study a part of other church activities such as committee meetings and mission activities.
4. Use scripture meaningfully in worship. Don't assume your worshippers know the context of the passages read. Use sermons as an opportunity to teach the Bible.

2- Offer a variety of formats, schedules, and approaches
5. Experiment with a variety of times -- Sunday morning classes, weeknight groups, retreats, oneday events, and breakfast-hour or noon-time classes – depending on lifestyles in your congregation.
6. Consider scheduling some classes or small groups in homes or other community locations. Christian education doesn't happen only in church buildings.
7. Start new studies and groups often. Despite their best intentions, ongoing groups have a tendency to become cliquish. Newcomers are far more likely to feel comfortable joining something new.
8. Have as your goal a Bible study program that exposes church members to the entire biblical witness over time.
9. Recognize different learning styles among individuals and age groups. Older folks tend to be most comfortable with traditional classroom structures. Boomers are inclined to question authority and enjoy discussion. Younger persons are more accustomed to media and technology and prefer a fast-paced, informal style.
10. Make use of a variety of different approaches, including lectionary-based studies, topical studies, character studies, etc.
11. Incorporate different learning strategies, such as role playing, dramatization, guided meditation, even memorization.
12. Churches too small for a large number of groups can vary their approach by rotating different studies and curricula with groups.
13. Don't teach "about" the Bible in a way that doesn't allow people to encounter the texts for themselves. Encourage individual reading or make it part of the group's time together.
14. Encourage active, discussion-based learning. Break into small conversation groups frequently.
15. Allow for diversity in perspectives.

16. Encourage the use of a variety of different biblical translations. Those less experienced in Bible study may find it helpful to read from a paraphrase.

3- Meet people where they are

17. Acknowledge biblical illiteracy among many adult church-goers – even the well-educated – and strive for methods that straddle this paradox.

18. Recognize that some beginners will be turned off by "homework." Use videos, in-class readings, dramatizations, or audio tapes as alternative ways of getting everyone "on the same page" and ready for discussion, all the while encouraging the habit of daily scripture reading.

19. Provide short-term classes for those who won't commit to a long-term study or ongoing class, but make these short-term learning experiences "stepping stones" toward greater involvement.

20. Conduct "taster" classes for those who want to try out the experience before they commit to it. Select topics that will appeal to those new to Bible study.

21. Break an ongoing class into shorter, defined segments, each with a clearly identified focus. With each new segment, take the opportunity to publicize the topic and invite newcomers.

22. Teach stewardship of time to counteract "busyness." Just as with financial stewardship, persons need to be encouraged to make Christian education a priority. Encourage "first fruits" commitments of time.

23. Be clear about expectations with regard to attendance, participation, and preparation.

4- Promote participation effectively

24. Link group study topics to sermon series and encourage participation from the pulpit.

25. Emphasize study during Lent. Select a topic or curriculum for church-wide study during this period and encourage all to take part. Tie the topic into preaching and worship.

26. Lift up study leaders and participants. Celebrate every time a new group starts or completes a study program. Use the newsletter, a photo board, or a dedication service in worship.

27. Ask class members to write a newsletter article or testify about the significance of their learning experiences.

28. Remember that personal invitations are usually the most effective way of getting someone involved in any activity.

29. Capitalize on the current popularity of book clubs and films by creating opportunities for those who enjoy these activities. Check out "Reel Time" from Cokesbury.

5- Foster strong leadership

30. Recruit leaders as the first step toward forming groups. Groups will often form around a gifted leader.

31. Stress the group leader's role as facilitator, rather than teacher. Setting up one person as "the expert" creates a poor group dynamic and discourages new people from stepping into leadership. Thinking of group leaders as facilitators allows Scripture and the Holy Spirit to do the teaching.

32. Expect your pastor to model the importance of ongoing adult education by leading and participating in study, but don't reinforce the notion that only the ordained can lead study groups.

33. Take advantage of the leader training opportunities provided in conjunction with many popular study curricula.

34. Provide orientation and ongoing support for group leaders.

35. Train leaders in group process so they can keep their groups on track, being sensitive to the need to keep more outspoken participants in check and draw out the more reserved using phrases like, "Let's hear from some of the others," or "You look like you have something to say."

36. Emphasize the importance of leader preparation, especially mapping out discussion questions in advance.

37. Encourage team leadership. Experienced leaders should invite a newer person to pair with them in leading groups to develop the less experienced leader.

38. Rotate the leadership responsibility within a group so that all participants get experience leading sessions.

39. Know that Sunday School classes and small groups are one of the best places to develop lay leaders and lay relationships that strengthen the church.

6- Use resources effectively

40. Stay abreast of new resources, including those available from other denominations or traditions and the secular press.

41. Don't be afraid to introduce ideas and resources from a variety of theological perspectives. Trust the discernment abilities of individuals and the group.

42. Use workbook-style studies creatively. Nothing is more boring than a lesson read straight out of a leader's manual. Find ways to make pre-packaged lesson plans come alive.

43. Use videos to bring expert perspectives to bear and to get everyone "on the same page" for discussion. But avoid class sessions that are no more than viewing a video, or participants will soon

wonder why they shouldn't stay home and watch their own TV.

44. Create a resource center with reference materials, maps, and other items to support your leaders and participants.

45. Don't allow your church library to become a museum. Update the collection. Offer books and resources linked to sermon topics and congregational study themes.

46. Consider a book sales kiosk and stock it with things you'd like your congregants to be reading. Many busy people would rather buy a book than worry about due dates and library fines.

7- Stress spiritual formation

47. Remember, the goal is formation, not information. Every class should be deliberate in helping members accept God's grace, grow in faith, deepen their relationship to the Christian community, and answer Christ's call to discipleship.

48. Include prayer as part of every study session and encourage group members to pray for one another daily.

49. Encourage a covenantal relationship within study groups.

50. Nurture a sense of Christian community and connectedness within groups. A Sunday School class or small group can be a "home" for individuals within a larger church.

Conclusion:

Adult education in the local agricultural education program is an essential component of the "total" program. Offering adult education programs helps to keep farmers and agribusiness employees better informed of current trends and provides them with opportunities to learn new skills and improve existing ones.

Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture.

Adults in agriculture use a number of sources to gain new information that can be used to help them solve problems. Persons employed in agriculture utilize newspapers, magazines, newsletters, radio, television, government publications, internet, and meetings to gather information which can be directly utilized in their business activities. In many communities, the agriculture teacher is the primary source of agricultural information.

Successful adult education programs develop and utilize an Agricultural Education Program Advisory Committee to assess the informational needs of adults in the community. Agriculture teachers should utilize the expertise and communications link, which an effective advisory committee provides. Specifically, the advisory committee should be asked to provide advice regarding planning, conducting, and evaluating the adult education program in agriculture. Adult education programs in agriculture should emphasize practical application of the information presented. Topics and information included in adult programs should be provided which fulfills needs of the local community. Providing information which cannot be applied to solve a local problem or address a local issue will generally be viewed as frivolous and over time will result in decreased interest (i.e. participation) in the adult education program.

The role of the agriculture teacher should be as a facilitator of the learning process. Most adults reject the traditional teacher-student relationship, which is necessary to maintain in secondary programs. Teachers should be encouraged to view themselves as partners with adult participants in the learning process. The democratic philosophy of shared responsibility for planning, conducting, and evaluating adult education programs distinguishes adult education from secondary education.

A local plan for adult education in agriculture should consist of two major components. Namely, a broad statement of philosophy, goals, and objectives of the local adult education program, and an annual calendar of program activities.

Adult education in agriculture is important for continued community prosperity, growth, and improvement.

The local Agricultural Education program has a responsibility to provide up-to-date information, training, and retraining for all adults interested in agriculture.

The goals of the Adult Education Program are:

1. To assist adults in establishing personal and business goals.

2. To enhance the self-confidence and decision making skills of adults in agriculture.

3. To develop agricultural leaders.

4. To maintain the local agricultural knowledge and technology base.

5. To improve the home, living, and business conditions of persons employed in agriculture.

6. To encourage adults to participate in cooperative efforts.

The objectives for the local Adult Education program are:

1. To increase the net farm income of local agricultural producers.

2. To improve the safety practices of adults employed in agriculture in the local community.

3. To educate the public about the significant role in agriculture in the local economy.

4. To encourage the use of practices that protect and conserve natural resources to maintain a good environment for everyone.

5. To assist local producers in the development of marketing plans that are tailored to their individual needs.

6. To assist local producers in developing strategies to make optimum use of agricultural support agencies (e.g. FSA, MO Department of Agriculture).

A comprehensive program of adult education in agriculture includes three major components: (a) organized instructional classes for adults, (b) a Young Farmers/Young Farm Wives Chapter, and (c) Farm Business Management Analysis (FBMA). State Agricultural Education Program standards implemented in 1992 indicate that a minimum of 20 clock hours of organized adult education classes be provided. Many local agriculture programs will far exceed this minimum standard. Salary reimbursement Procedures for "Full Time" and Short Term adult programs are.

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Evaluation of Canopy Cover of Street Trees in Urban Forests Using by Satellite Data

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Abstract: Information on structure of city forest such as species composition and canopy cover density is a prerequisite for planning, design and management of vegetation in cities in local and regional scale. For this purpose in present study, different inventory methods Including 100% inventory by using 20meters transects and aerial images (1:8000 scale) and spot satellite image were compared for evaluating canopy cover surface of street trees with 1 kilometer length is Sep2009 , to develop an optimum and suitable method to evaluate canopy cover of these trees. In 100% inventory considered as the basis for comparing with various methods, canopy surface of these trees was calculated in each 15m transect. Results of paired –T test indicated that results of 100% inventory and aerial photos ($p = 0.52$, $t = 0.809$, $df = 23$) and satellite image ($p = 0.48$, $t = 0.847$, $df = 23$) don't differ significantly. Regression results indicated that using aerial images ($R^2 = 0.92$) and spot images ($R^2 = 0.89$) is relevant to evaluate street trees canopy cover.
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Key words: canopy cover, street trees, inventory, aerial photograph, spot images.

1. Introduction

City forests are considered among important elements and components of civil ecosystems. Since trees are considered as most important index of civil landscape (Gary and Geff,2005) , it's necessary as first step for landscape sustainable development to recognize and record information about civil trees , so that based on collected data analysis , planning needed to maintain and develop landscape being performed. (konijnendijk etal., 2005 , white, 2002).Information on structure and function of civil forests is necessary to increase advantages and decrease costs of management related to civil forests (wood , et al., 1999). Information helping better management of civil forests are including canopy cover surface , tree and shrub coverage percent , percentage of coverage afforested in the city, percent of land various covers , tree and bush species available in the city and required data in single – tree surface including species , mean diameter at breast height , cutting. Surface, tree height, canopy height, canopy width, fresh and dried foliage rate . While it seems that most civil foresters are managing a valuable capital but they aren't aware of their wealth and the number of trees in what area they are managing and they don't know there what species of trees in what extent in the city. In some cases will cause negligence in optimum management of these resources (ward & Johnson, 2007). To take inventory of street trees modern complex methods such as

100% inventory, using aerial photos. Satellite images, computerized techniques or simpler methods like. Evaluation from inside the car and other different sampling can be used. However, using inventory techniques in different conditions is dependent on the goal of inventory method, and the method used must be evaluated in respect of accuracy and spent cost. Several studies have been performed on inventory method from urban forests. Indian Inventory Institute used two stage methods to define coverage of tree outside of the forest.

By using obtained results suggested random classification method for inventory method from trees outside of the forest. studied various techniques to define optimum method to evaluate canopy cover of street trees by using GIS technique (Geographic Information system) and results indicated that 100% inventory method or sampling in GIS medium may be suitable with low time and cost spent to evaluate street trees(wood et al., 1999).

Currently , with development of remote sensing data with high local resolution power most problems of urban planning and management have been solved. Many studies have been performed by using aerial photos and satellite data such as spot in evaluating canopy coverage of urban forests (Coillie et al , 2007 , zhang et al., 2007 , Jensen & Hardin , 2005 , Goetz et al. , 2003 , Freeman & Buck , 2003).

In present study, function of aerial photos and spot images was studied to provide street trees canopy cover map and its results were compared to 100%

inventory method in respect of accuracy and spent cost. This study aims to compare accuracy and costs of evaluating street trees canopy cover on aerial photos and spot satellite images to 100% inventory method and developing a suitable inventory method to evaluate street trees canopy surface. So that it could be possible to develop an optimum and suitable technique for evaluating street trees canopy cover and management of these valuable resources.

2. Material and Methods

The Study area is located in district of Rasht with 49º 36´27" - 49º 36´ 39" E Longitudes and 37º15´ 47" - 37º 15´ 44" N altitude including street trees of both sides of street .It has been studied in Sep 2009.

Trees of this region are planted with 3 ± 1.1 average spaces from each other. These trees are in more unsuitable conditions due to construction and light shortage and most of them are dried or drying. Canopies are in unusual conditions due to their closeness to each other and they become ellipsoid most trees canopy have been inclined toward the street.

Different inventory method techniques used to evaluate canopy area and their methods are including:

Inventory method:

In studies performing to compare various inventory method techniques, firstly studied community is inventory method by 100% inventory and those techniques will be evaluated through comparing obtained results of various sampling methods and their actual rates (100% inventory method). In present study also 100% inventory method technical has been used as a basis to compare various methods to evaluate canopy cover area.

Firstly after square turn, street length divided to 20 m bands. Total number of bands taken in both sides of the street was 25 transects that according to length of transects; it has been measured 500 m totally.

In this method large and small length of tree canopies were measured by tape – measure. Equation 1 was used to evaluate canopy area. To obtain total area of transect canopy, canopy area of transect canopy, canopy of trees located in each transect was summed. Finally, mean, standard deviation and total area of canopy were calculated.

$A = (D_1 /2) \times (D_2 /2) \times 3.1415$ (1)

A = tree canopy area (m^2)

$D_1 =$ Small diameter of tree canopy (m)

$D_2 =$ Large diameter of tree canopy (m)

Aerial photographs:

Aerial photographs taken in last aerial photograph method from Rasht in 2009 with 1:8000 scale by Army forces geographical information organization were used to obtain canopy cover in each transect . Firstly these aerial photographs were geometric corrected using 1 : 2000 maps in software ERDAS IMAGINE 8.4 with 0.4 RMse.

Then limit of studied region was mapped on them and implemented on studied limit by using ArcGIS 9.2 software. Amount of canopy surface was defined in each transect by using ArcGis9.2 through digitalization of tree's canopy cover surface. Mean and standard deviation of total area in aerial photographs were calculated after measurement of total surface of transects and its transformation to 11.5, SPSS medium (Table 1).

Spot image

In this technical, raw photographs of spot satellite purchased by municipality geographic information center were used. Spot detail takes photographs (multi spectrum) with 4 bands (green, red , near infrared and mid infrared) with 10 meters resolution power and panchromatic with 2.5 meter resolution power (Dial et al., 2003) . Spot photograph has been under geometric correction through image by image technique with aerial photograph in ERDAS IMAGEINE software medium with 0.2 RMSe. (Goetz et al., 2003). ArcGIS software was used to define transects and tree canopy surface size in photographs. Then by digitalization of tree's canopy cover surface, canopy cover rate in each transect was calculated in GIS medium (Breisgau , 2003 and Dwyer & Miller , 1999).

Obtained measurements were transformed to 11.5 SPSS medium. Then mean and standard deviation of total area of transects were evaluated. And also paired t – test and regression relations were calculated. It is worth mentioning that when implementing each method, time and cost of each utilized method were recorded.

3 Results:

Results including total area , mean , standard deviation , standard error , standard error percentage and total cost spent in each method are given in table 1.

Data normality was studied using kolmogrov – Smironov test so that data was normal. Paired t – test were used to compare obtained areas from land 100% inventory method, aerial photos and satellite images. Results of paired t-test between 100% inventory method and aerial photos (p = 0.52 , t = 0.809 , df = 23) and satellite image (p = 0.48 , t = 0.847 , df = 23) indicated that obtained data don't differ significantly

from 100% inventory method so that figures represent this fact (Figure 1and 2) . Results of regression analysis indicated that aerial photos and Spot images respectively with 92% and 89 clearing coefficient indicate that it is possible to evaluate canopy cover surface of street trees with high accuracy using dada utilized in present study (Table 2).

Table 1. results obtained through various methods.

Inventory methods	100% inventory method	Aerial photograph	Spot image	Aerial images difference to land reality	satellite image different to land reality
Total area	4145.34	4093.45	3870.16	52.9	275.17
Average area of transect	140.78	142.65	137.1	2.1	3.6
Standard deviation (m^2)	15.3	12.36	11.40	2.94	3.9

Table 2. prediction model , regression coefficient , significance late.

Technique	X Model	R^2	Significance rate
Aerial photo	Y=1.065x-12.02	0.92	0.001
Satellite images	Y=0.788x+19.78	0.89	0.002

y = canopy cover area in 100% inventory method
x = canopy cover area in aerial photos and satellite images.

Results of costing indicated that method of evaluating canopy cover area of street trees from satellite images spends lowest cost rate so that cost spent for 100% inventory method is respectively 6.5 and 34 times higher than costs spent to evaluate canopy cover surface in aerial photos and spot satellite images. While costs spent to evaluate street trees canopy cover in aerial photos is approximately 5 times higher than costs of spot images.
Function in evaluating street trees canopy cover. Thus these two technique were studied in respect of spent cost and time to find suitable method in respect of spent cost.
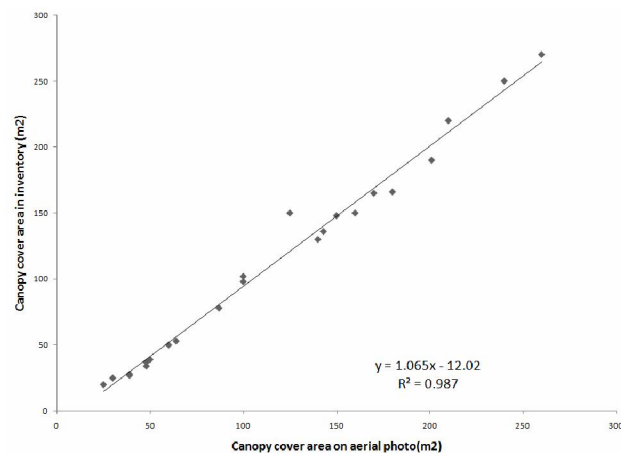
Figure.1 Relationship between canopies covers area estimate in aerial photos and 100% inventory .
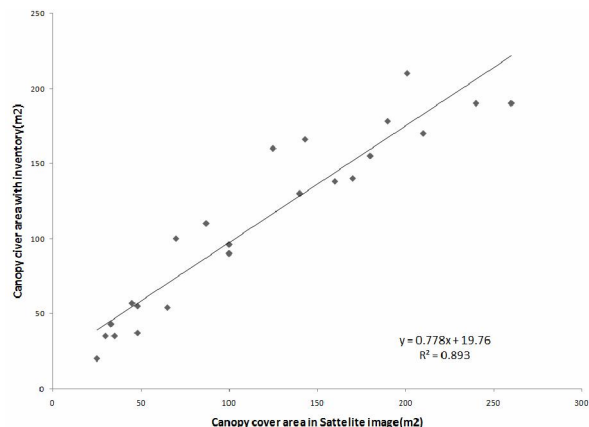
Figure.2 Relationship between canopies covers area estimate in satellite image and 100% inventory

4. Discussions

According to performed calculations , street trees canopy cover evaluate method by using Spot images spent lowest cost rate and had acceptable accuracy. Thus inventory taking from street trees may be used in wide range of big cities. According to this fact, method with lowest spent cost and highest accuracy is optimum technique. Therefore, consistent to results, evaluate of street trees canopy cover evaluation from aerial photos and Ikonos satellite images has highest accuracy (Akbari et al.,2003)
Aerial photos with lower spent cost and time obtain better results compared to 100% inventory technique and can be suitable.
And they may be suitable alternative for territorial inventory technique to calculate canopy cover (Goodwiny , 1996). But it must be noticed that powerful processing systems are required to interpret

aerial photos in wide level in big cities, and corrections required before interpretations in wide level are time – consuming and expensive. Nowadays, according to rapid changes of land uses in urban areas, updated information on street trees canopy cover is needed to be aware on its changes in short – term. Aerial photos with consuming great cost and labor are provided in 10 years periods in Iran. Then according to the fact that satellite images are taken in short – term periods and show changes of land surface , they may be used as suitable tool to supervise changes in street trees canopy surface. While using satellite images with high resolution power such as IKONOS and Quick bird provide us the possibility to utilize them in management of urban forests with lower time and cost consumption compared to aerial photos taken in longer period.

Based on results of present study it could be recommended that it is rational to use aerial images to evaluate tree's canopy cover in small surfaces with high accuracy.

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Anionic Schiff Base Amphiphiles: Synthesis, Surface, Biocidal and Antitumor Activities

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Abstract: A series of anionic surfactants containing schiff base group was synthesized and their chemical structures were confirmed using elemental analyses, FTIR, ^{1}H-NMR, and mass spectroscopy. The surface activities of these amphiphiles were determined based on the data of surface tension. Thermodynamics of adsorption and micellization processes of these surfactants in their solutions were also calculated. It was found that these compounds have tendency towards adsorption at the interface and also micelle formation at lower concentrations.Also, these schiff bases amphiphiles have been evaluated for their biocidal activity against bacterial and fungi species and their antitumor activity against three human tumor cells such as HEPG$_2$ (liver), HCF$_7$ (breast) and HCT116 (colon).
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Keywords: Schiff base amphiphiles; surface activity, biocidal activity; antitumor activity; potent action.

1. Introduction:

Schiff bases are one of the important classes of organic compounds which have many interesting properties and extensive applications in medicinal, agricultural, pharmaceutical fields and material science (Cerchiaro *et al. 2005,* Vancoa *et al.* 2004, Marcell *et al.*2009, Nabel and Mohamed 2008). Schiff bases are characterized by the –N=CH– (imine) group which is important in elucidating the mechanism of transamination and racemisation reactions in biological systems (Lau *et al.* 1999 and Shawal *et al.*1985). Due to the great flexibility and diverse structural aspects, a wide range of Schiff bases have been synthesized. Now days, there is a large number of research on Schiff base amphiphiles have already been published. The most ones were used as corrosion inhibitors and crude oil spill dispersants (Aiad et *al.*2009, Negm *et al.*2008, Hegazy 2009, Negm *et al.*2009, Nabel *et al.* 2008 ,Atta *et al.*2008, Atta *et al.*2008 and El-Saeed *et al.*2008

Schiff bases are considered good bases for synthesis of several antibacterial compounds due to their easily preparing procedures and their ability to attach to several functional groups on their chemical skeleton. The schiff bases were essentially appeared antibacterial influence against most of bacterial strain, and their resistance routes against different types of bacteria is based on using efficient biocides. These biocides are either cationic, ionic compounds or metal complexes. A literature survey showed that Schiff bases and their metal complexes have biological application including antibacterial (Abdallah *et al*.2009, Nabel *et al.*2008, Nabel *et al.* 2010, Nair *et al*.2006, Raman *et a*l.2003 and Mohamed 2006), antifungal and antitumor activities (Karthlkeyan *et al.*2006 , Gaballa *et al.*2007 , Sinha *et al.*2008 , Weber *et al.*1988 and Baihalli *et al.*2008).

Our study aimed to synthesis some Schiff base surfactants from condensation of three amines with 2-alkoxy benzaldehyde having hydrocarbon chain length ranged from C$_{12}$ to C$_{18.}$ .The prepared compounds were tested for being surface, biocidal and antitumor activities.

The synthetic route, chemical structures and abbreviations of these surfactants are shown in scheme 1.

2. Experimental:

All chemicals used in the present study were of Analar or highest purity grade from BDH, Aldrich and Merck companies and used as received without further purification. FTIR spectra were recorded on a Perkin–Elmer 1420 spectrometer and a biorad FT57 (KBr).A brucker model DRX-300 NMR spectrometer with TMS as an internal standard for ^{1}H-NMR spectra was used. Mass spectra were recorded on a Joel JMS-AX 500 (ET and FAB) $^+$. The elemental analyses of the synthesized materials were performed using a vario Elementar instrument for elemental analysis.

2.1. Synthesis of Alkyl Chloride:

Alkyl chlorides were synthesized according to a method reported elsewhere (Weil *et al.*1960).

2.2. Synthesis of 2-Alkoxy Benzaldehyde (AB):

Salicylaldehyde (20 mmol) was dissolved in methanol (30 ml) containing potassium hydroxide (23 mmol) and the reaction mixture was refluxed under nitrogen atmosphere for 2h. A methanol solution containing (30 mmol) of alkyl chloride was added drop wise to this mixture and refluxed for 20 h under nitrogen atmosphere, scheme 1. The solution was concentrated to dryness to give 2-alkoxy benzaldehyde, AB as red brown viscous oil. The crude product was washed by a mixture of light petroleum; ethyl acetate: chloroform (30: 1: 5 v/v/v)

afford AB-12, AB-16 and AB-18 as very viscous liquid (65-80%), Table 1. IR spectrum (AB-12): 721-756 cm^{-1} (Ar-nucleus), 1161 (C–O–C), 1732 (C=O), 2857 and 2923 cm^{-1} (CH$_2$ and CH$_3$ of fatty chain). ^{1}H-NMR (CDCl$_3$, MHz): 0.85 (t, 3H, CH$_3$); 1.04-1.43 (m, 22H, (CH$_2$)$_{11}$); 3.4-3.6 (t, 2H, OCH$_2$); 6.41-7.53 (m, 4H, Ar) and 8.26 (s, 1H, CHO). FAB- MS (m/z): 290 (M$^+$, 57%).
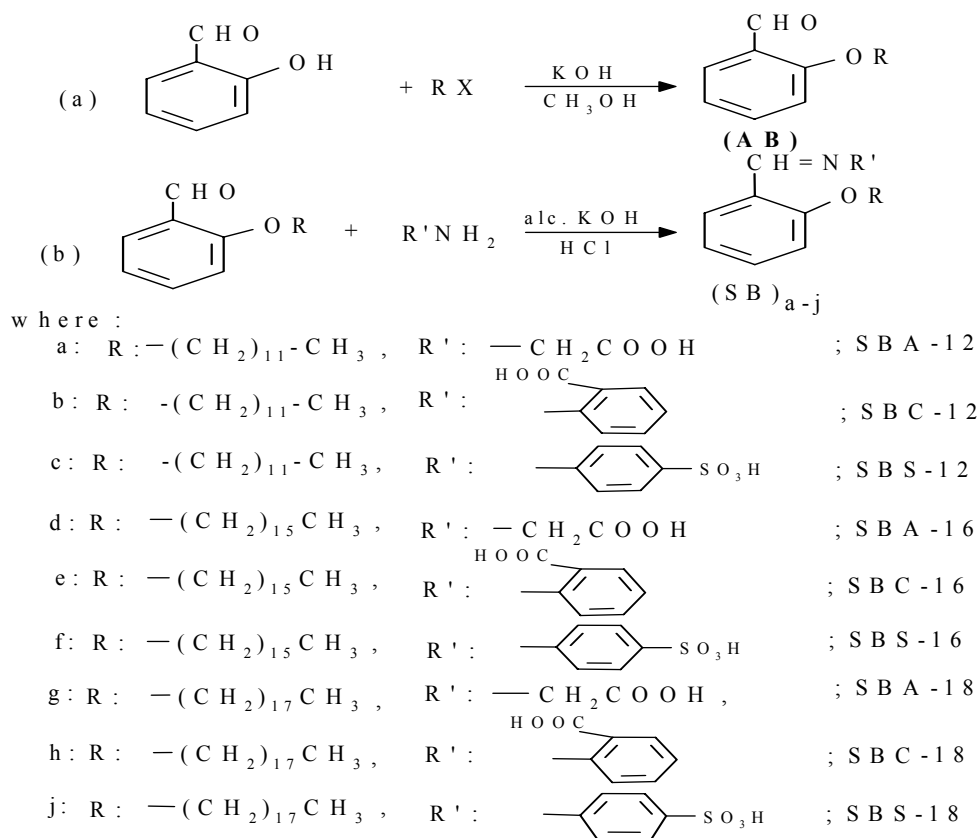
Scheme 1: Synthetic Route of Schiff Base Amphiphiles.

2.3. Synthesis of Schiff Bases Amphiphiles:

Different alkoxy schiff bases were synthesized by the condensation reaction of amines, namely: glycine, anthranilic and sulfanilic acids with 2-alkoxy benzaldehyde. An amine (3.6 mmol) was stirred with an alcoholic potassium hydroxide solution (17 ml, 3.6 mmol). To this solution, 2-alkoxybenzaldehyde (3.6 mmol) was added drop wise and the reaction mixture was refluxed with continuous stirring for 6hr. Then, the reaction mixture was left to overnight and acidified with dilute

hydrochloric acid. The pure schiff base was extracted ethyl acetate and washed several times with water, then dried over anhydrous sodium sulfate to afford the desired Schiff base amphiphiles which were denoted as SBA-12, SBA-16, SBA-18, SBC-12, SBC-16, SBC-18, SBS-12 ,SBS-16 and SBS-18; Scheme 1 and Table 1.

Micro elemental analysis of the synthesized Schiff bases showed their purity (Table 1). IR spectra of SBA-12 showed absorption band at 617-754 cm^{-1} for benzene nucleus and appearance of a strong band

Table 1: Physico-chemical Properties of the Synthesized Compounds:

Compound	Abbreviation	Mol. Formula/Mol. Wt.	Yield%	Microlemental analysis cal./found			
				C	H	N	S
Parent aldehyde; 2-alkoxy benzaldehyde(AB):							
2-dodecyloxybenzaldehyde	**AB-12**	$C_{19}H_{30}O_2$ 292.59	65.2	78.00 77.98	11.09 11.07	- -	- -
2-hexadecyloxy benzaldehyde	**AB-16**	$C_{23}H_{38}O_2$ 349.20	70.6	79.11 79.08	11.77 11.75	- -	- -
2-octadecyloxy benzaldehyde	**AB-18**	$C_{26}H_{42}O_2$ 377.60	80.4	79.53 79.51	12.03 12.01	- -	- -
Schiff base amphiphiles(SB):							
2-dodecyloxy (benzylidene imine) acetic acid	**SBA-12**	$C_{21}H_{33}O_3N$ 347.00	70.1	72.11 72.09	10.20 10.18	4.02 4.00	- -
2-hexadecyloxy (benzylidene imine) acetic acid	**SBA-16**	$C_{25}H_{41}O_3N$ 403.00	82.3	73.88 73.86	11.01 10.89	3.46 3.44	- -
2-octadecyloxy (benzylidene imine) acetic acid	**SBA-18**	$C_{27}H_{45}O_3N$ 427.00	85.6	74.58 74.56	11.19 11.17	3.23 3.21	- -
2-dodecyloxy (benzylidene imine) benzene-1- carboxylic acid	**SBC-12**	$C_{26}H_{35}O_3N$ 412.06	78.6	75.80 75.78	9.18 9.17	3.41 3.39	- -
2-hexadecyloxy (benzylidene imine) benzene-1-carboxylic acid	**SBC-16**	$C_{30}H_{43}O_3N$ 368.47	80.7	76.88 76.86	9.92 9.90	3.00 2.97	- -
2- octadecyloxy (benzylidene imine) benzene-1-carboxylic acid	**SBC-18**	$C_{32}H_{47}O_3N$ 497.08	85.3	77.34 77.32	10.23 10.19	2.84 2.81	- -
2-dodecyloxy (benzylidene imine) benzene-4-sulfonic acid	**SBS-12**	$C_{25}H_{35}O_4NS$ 445.00	75.02	67.03 67.01	8.46 8.44	3.14 3.12	7.16 7.14
2-hexadecyloxy (benzylidene imine) benzene-4-sulfonic acid	**SBS-16**	$C_{29}H_{43}O_4NS$ 501.00	84.3	69.03 69.01	9.23 9.20	2.79 2.77	6.36 6.34
2-octadecyloxy (benzylidene imine) benzene-4-sulfonic acid	**SBS-18**	$C_{31}H_{47}O_4NS$ 529.00	87.8	69.86 69.85	9.54 9.52	2.65 2.63	6.02 6.00

at 1651 cm^{-1}determines the formation of an azomethene (HC=N–). A broad absorption band of C=O appeared at 3425cm^{-1} and at 1701 cm^{-1} for C–O. ^{1}HNMR (CDCl$_3$) for SBA-12: δ 0.88 (t, 3H, CH$_3$); 1.26 (m, 22H, (CH$_2$)$_{11}$); 6.59 (d, 4H, Ar); 4.8 (t, 2H, OCH$_2$); 4.17 (s, 2H, NCH$_2$); 9.8 (s, 1H, CH=N) and δ 10.5 (s, 1H, COOH). EI/FAB$^+$ (m/z):343(M$^+$–4, 69.6%).

IR spectra of SBC-12 showed a complete disappearance of the absorption band at 1732 cm^{-1} corresponding to the carbonyl group and the appearance of a new band at 1635cm^{-1} corresponding to C=N group. Bands at 1716, 2869 and 2925cm^{-1} corresponding to C=O of COOH, CH$_2$ and CH$_3$, respectively. A broad absorption band at 3440 cm^{-1} for COOH and 621-756cm^{-1} corresponding to a benzene nucleus appeared in all of the synthesized compounds indicating the presence of all functional groups expected in the synthesized compounds. ^{1}HNMR (CDCl$_3$) for SBC-18 showed the following signals relative to TMS as an internal standard at 0.85 (t, 3H, CH$_3$); 1.12 (m, 22H, (CH$_2$)$_{11}$); 1.5-1.8 (t, 2H, CH$_2$); 3.1-3.5 (m. 2H, OCH$_2$CH$_2$); 3.6-3.7 (t, 2H, OCH$_2$); 7.0-7.2 (m, 8H, 2Ar nucleus), 8.4 (s, 1H,

CH=N) and δ 10.6 (s, 1H, COOH). The mass spectra showed parent ion peak at m/z (493; M$^+$–4, 20.2%).

IR spectra of SBS-12 showed a stretching vibration at 1600 cm^{-1} for HC=N and appearance of absorption band for SO$_3$H and C–O–C at 1207,1110cm^{-1}, respectively, plus all chaired band appeared either in SBA-12 or SBC-12. The chemical shifts of the different types of protons in ^{1}HNMR spectra of SBS-12 showed δ 0.88 (t, 3H, CH$_3$); 1.24 (m, 22H, (CH$_2$)$_{11}$); 7.1-7.5 (m, 8H, 2Ar); 8.2 (s, 1H, CH=N); 3.6 (t, 2H, OCH$_2$) and δ 4.3 (s, 1H, SO$_3$H). Mass spectra of SBS-12 showed molecular ion peak at 444 (M$^+$–1, 2.04%).

2.4. Surface Tension Measurements:

Surface tension measurements were done at 25°C ± 0.2 using a Due Nouy platinum ring method with Kruss K7 tensiometer. The values which remained constant for a period of 30 min. were taken as the surface tension of the solution. The critical micelle concentration (cmc) and the surface tension at the cmc were determined as the values of the break point of surface tension vs. concentration plots.

2.5. Biocidal Activity:

Biocidal activity of the synthesized schiff base surfactants was measured at the fermentation biotechnology and applied microbiology center (FBAM, Al-Azhar University) using inhibition zone technique in dimethyl formamide as a solvent. The studied microorganisms were identified for each strain as gram negative bacteria: *pseudomonas fluorescen (597), pseudomonas phaseolicola (GSPB 2828)*, gram positive bacteria: *Staphylococcus aurens* (ATCC 25923), *Staphylococcus pyogenes (*ATCC 19615) and fungi: *Fusarium oxysporum* and *Aspergillus fumigatus.*The antibiotic chloramphenicol was used as standard references broad antibiotic, cephalothin and cycloheximide were used as standard gram negative bacteria and antifungal references respectively.

2.6. Antitumor Activity:

The antitumor activity for the compounds under investigation was carried out at pharmacology unit, National Center Institute, Cairo, University.

The choice of Elhrlich ascites carcinoma (EAC) as a model system of mice cell tumor and it is a suitable tool for studying the biological behavior of malignant tumor and drug action within cells (Homburger 1981).

3. Results and Discussion:
3.1. The Surface Properties:

Fig. (1) Represents the variation for the surface tension vs. log. concentration of the synthesized schiff base amphiphiles at 25°C. The profile showed sharp break points corresponding to the critical micelle concentration values of the different surfactants. The critical micelle concentration (cmc) values of the synthesized amphiphiles are gradually decreased by increasing the length of the alkyl chains attached to the synthesized molecules (Table 2) which referred to increase of the hydrophobicity as a result of increasing the methylene groups (Oda *et al.*1997, Nagarajan, and Ruckern 2000). On the other hand, the hydrophilic substituent's have a considerable role in their cmc values. Derivatives which contain sulfonate groups (SBS) have a higher depression in cmc values than those containing carboxylate groups (SBA, SBC).

From surface tension lowering ability γ_{cmc} in Table 2, it can be seen that γ_{cmc} of schiff base amphiphiles increases with increasing hydrophobic chain length. This explained the increases of hydrophobicity of surfactants and compounds with dodecyl group in the alkyl chain for all series that showed the maximum surface tension lowering ability.

Table 2: Surface Properties of the Synthesized Schiff Base Amphiphiles at 25°C:

Compound	cmc x 10^{-3} mol/l	γ_{cmc} mN\m	π_{cmc} mN\m	PC_{20}	cmc/C_{20}	Γ_{max}. Mol/cm^2	A_{min} x 10^2 nm^2	-ΔG_{mic} KJ/mol	-ΔG_{mic}/ CH$_2$	-ΔG_{ads} KJ/mol	-ΔG_{ads}/ CH$_2$
SBA-12	7.88	30.5	41.5	2.91	6.41	1.25	132.8	12.01		12.34	
SBA-16	7.41	34.0	38.0	2.99	6.62	1.42	116.9	12.16	0.19	12.43	0.17
SBA-18	5.62	36.0	36.0	3.32	9.32	1.60	103.8	12.84		13.07	
SBC-12	6.92	27.5	44.5	2.85	4.91	1.13	147.5	12.33		12.73	
SBC-16	5.50	30.0	42.0	2.95	4.92	1.14	143.6	12.89	0.17	13.25	0.16
SBC-18	4.68	31.5	40.5	3.05	5. 25	1.17	141.3	13.29		13.64	
SBS-12	6.61	37.5	34.5	2.83	4.47	1.20	138.3	12.44		12.73	
SBS-16	5.25	39.0	33.0	3.05	5.89	1.38	120.3	13.01	0.15	13.25	0.13
SBS-18	4.65	40.0	32.0	3.15	6.56	1.52	109.2	13.31		13.52	

Effectiveness (π_{cmc}) of the synthesized surfactants is the difference between the surface tension of distilled water and that at the cmc values, while the efficiency (PC_{20}) is the negative logarithm of surfactant concentration, which provides a 20 mN/m reduction in surface tension.

The effectiveness (π_{cmc}) values showed gradual decrease by increasing the hydrophobic chain length indicating the increasing of accumulated surfactant molecules at the interface. The maximum accumulation was indicated by the lowest surface tension depression at the critical micelle

concentration and was recorded for SBC-12 at 44.5 mN/m. The efficiency values (PC_{20}) of the targeted surfactants (Table 2) showed their good tendency to modify the surface activity of their solutions at considerably low concentrations. Increasing the hydrophobic chain length of the studied amphiphiles results a decrease in the surface tension of the surfactant solution indicating the high tendency of the longer hydrophobic molecules to adsorb at the interface. The lowest PC_{20} value was observed to SBS-12.
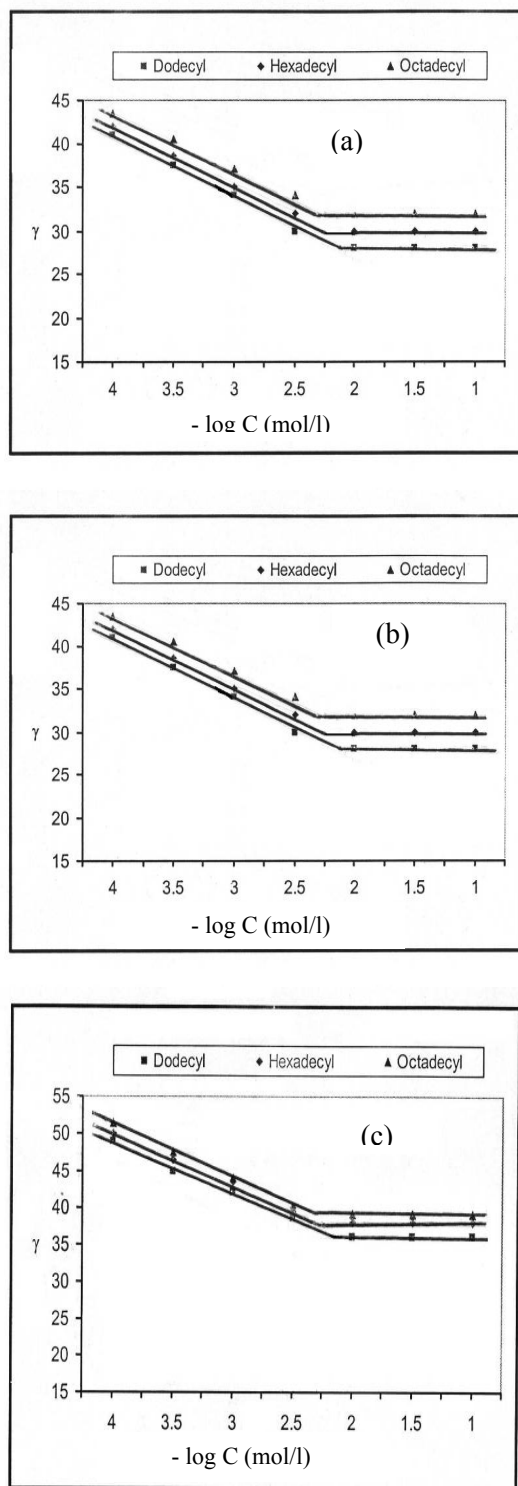
Fig .1 : Variation of Surface Tension (γ) against Concentration of the Synthesized Schiff Base Amphiphiles at 25°C (a) SBA , (b) SBC and (c) SBS

The cmc/C_{20} ratio is an index of adsorption onto the water/air interface relative to micellization in the bulk surfactant concentration. The cmc/C_{20} ratios of schiff base amphiphiles were listed in Table 2. It is obvious that the cmc/C_{20} ratios increase with the increase of hydrophobic alkyl chain length. This result suggests that SB with long hydrocarbon chains adsorb at the air/water interface in preference to forming micelles, whereas SB with short hydrocarbon chains do not adsorb efficiently at the interface.

It can be also found that the cmc/C_{20} values of schiff bases SBA are higher than those of SBC and SBS; the difference of the hydrophobic benzene ring may be the main reason.

Values of the minimum surface areas occupied by schiff base amphiphiles at the interface (A_{min}) were calculated according to the equation:

$$A_{min} = \frac{10^{16}}{N\Gamma_{max}}$$

Where Γ_{max} and N are the maximum surface excess and Avogadro's number respectively.

Increasing the maximum surface excess values indicates the increasing of adsorbed molecules at the interface, hence the area available for each molecule will decrease .That causes the compacting of surfactant molecules at the interface to form denser layer.

From Table 2, it can be seen that A_{min} values of SBC and SBS are larger than those of SBA and A_{min} is greatly influenced by the hydrophobic alkyl chain length. Increasing the hydrophobic alkyl chain length increases A_{min} values at the interface. It is well known that phenyl is a rigid group, so the hydrophobic groups of SBC and SBS pack rather loosely than those of SBA. Also, increasing the maximum surface excess (the accumulation of surfactant molecules at the air/water interface, Γ_{max}) indicates the surfactant/water repulsion in the bulk of the solution which pumps the surfactant to the air/water interface. Longer hydrophobic alkyl chain lengths showed longer Γ_{max} values and derivatives which contain phenyl ring have a lower Γ_{max}; SBC, SBS than those of SBA. That can be referred to the change of the hydrophobicity of the molecules under consideration by the type of substituents.

The thermodynamic characteristics of the synthesized anionic schiff base amphiphiles were studied using the calculated values of adsorption and micellization free energies ΔG_{ads}, ΔG_{mic}. These data were calculated using the thermodynamic equations (Azzam et al.2004) Table 2. The free energy changes of micellization and adsorption showed negative sign indicating the spontaneously of the two processes at

25°C. Also, ΔG_{mic} and ΔG_{ads} decreased slightly by increasing the hydrophobic chain lengths.

The maximum depression in ΔG_{mic} and ΔG_{ads} was observed for SBS-18 derivative at -13.31and -13.52KJ/mole, respectively.

The calculated increment $\Delta G_{mic}/CH_2$ and $\Delta G_{ads}/CH_2$ i.e., the change in ΔG_{mic} and ΔG_{ads} per one methylene group in alkyl substituted R was 0.15 and 0.13 KJ/mol which was lower indicates that the tendency of adsorption of SBS molecules from the bulk to the air/water interface is stronger than those of SBA and SBC molecules.

3.2. Evaluation of the Synthesized Surfactants as Antibacterial and Antifungal Agents:

Frequently, for numerous applications, it is highly desirable to develop the so-called functional surfactants, i.e., surface active compounds which show evidence of additional benefits. In this context the antimicrobial properties of surface active compounds are highly for applications in the cosmetic field, in consumer products, in cleaning liquids for medical instruments, as well as for the stabilization of industrial emulsions against deterioration by bacteria and fungi (Marcelo *et al*.2008 and Viscardi *et al*.2000)

Hence, the above synthesized schiff base surfactants were tested regarding their activities against a series of bacteria (Gram positive: *Staphylococcus aureus* ATTC 25923, *Staphylococcus pyogenes* ATCC 19315; Gram negative: *Pseudomonas fluorescen* S97, *Pseudomonas phaseolicola* GSPB 2828 and fungi: *Fusarium oxysparum, Aspergillus fumigatus.* The data of biological activity of the reported compounds at 1 and 2 mg/ml are given in Table (3 & 4). The results showed that our surfactants are in general capable of inhibiting the growth of bacteria and fungi to a moderate extent. Also, it is clear from Tables 3, 4 that the biological activities of the synthesized surfactants against the tested microorganism increase by increasing their doses. The highest activity was observed at 2 mg/ml. On the other hand, the most effective factor is the carbon chain length; it was found that, as the carbon chain length (hydrophobic part) increases, the compound efficiency also increases. That can be related to their ability of adsorption at the interface. Increasing the absorbability increases their action on the cell membrane. The absorption of schiff base molecules on the cell membrane decreases its permeability which disturbs the biological process in these cells leading to their death. So, C_{16} and C_{18} derivatives showed a higher effective biocidal action upon tested bacteria and fungi. Also, the presence of benzene ring slightly decreases its effect.

Table 3: Antimicrobial Activity of the Synthesized of the Schiff Base Amphiphiles:

Compound	Mean of zone diameter (mm)/different conc.							
	Gram-positive				Gram-negative			
	*Staphylococus aureus*ATCC 25923		*Staphylococus pyogenes* ATCC 19315		*Pseudomonas fluorescen*(597)		*Pseudomonas phascolicala* (GS PB 2828)	
	2	1	2	1	2	1	2	1
SBA-12	-	-	-	-	18	14	17	10
SBA-16	5	3	7	2	22	19	23	18
SBA-18	10	7	12	6	26	22	24	19
SBC-12	-	-	-	-	12	9	12	8
SBC-16	-	-	-	-	13	9	14	8
SBC-18	12	8	10	7	19	10	17	9
SBS-12	-	-	-	-	10	7	8	5
SBS-16	-	-	-	-	12	8	12	8
SBS-18	-	-	-	-	17	13	20	16
Control	42	28	38	30	36	36	25	30

Chloromphenical as broad antibiotic and cephalothin as reference for gram negative.

Table 4: Antifungal Activity of the Synthesized Schiff Base Amphiphiles:

Compound	Mean of zone diameter (mm)/different conc.			
	Fusarium oxysporum		*Aspergillus fumigatus*	
	2	1	2	1
SBA-12	10	8	12	9
SBA-16	16	12	14	10
SBA-18	18	13	16	11
SBC-12	4	2	6	2
SBC-16	10	3	12	10
SBC-18	13	8	12	11
SBS-12	4	2	6	2
SBS-16	6	4	7	4
SBS-18	12	8	12	10
Control	40	28	40	30

Cycloheximide is used as reference for fungi

3.3. Antitumor Activity:

In vitro, anticancer cytotoxin activity of synthesized schiff base amphiphiles was investigated using EAC at different concentrations (25, 50 and 100%); Table 5. The tumouricidal effects of the compounds under investigation were tested on the survival of cultured EAC cells, the antitumor activity of the targeted compounds was expressed as a percentage of non viable cells (% NVC) calculated as follows:

$$NVC\% = \frac{number\ of\ NVC}{Total\ number\ of\ cells}\ X\ 100$$

From Table 5, it is clear that the cytotoxic effects of these compounds were dose dependent, i.e. by increasing the concentration on these compounds in the culture media; the percentage of non-viable cells (EAC) is increased. Also from data of Table 5 one observes that upon testing the schiff base compounds which contains more than one benzene ring, the antitumor activity dramatically increases from 0% of non-viable EAC cells at 25 mg/ml to 95% of these cells at 100 mg/ml and also NVC% increases by increasing the chain length of the hydrophobic radical.

To achieve the maximum therapeutic damage of tumor cells using the minimum concentration of drugs, the tumor cells lines used in this study for SBA-12 which causes the death of 95% of EAC cell are liver carcinoma (HEPG$_2$), breast carcinoma (MCF 7) and colon carcinoma (HCT 116); Table 6 and Fig. 2.The 50% growth inhibitory concentration (IC $_{50}$) values for SBC-12 at different concentration ranged from 1 to 10 mg/ml is recorded. Data showed that SBC-12 was found to exhibit high activity in vitro system on the tumor cell lines

investigated and the highest cytotoxic effect on FEPG2, HCT116 and MCF7, respectively.

Finally, in our research, we found that SBC-12 surfactant affects tumor tissue at very low concentrations at values lower than their cmc values which means that there is a strong relationship between very small values of cmc of this compound and its ability to reach IC$_{50}$ values under very low concentration. This is due to the fact that increasing the concentration of schiff base surfactants causes an increase in the adsorption process on cells membranes till the cmc is reached; after this adsorption slowly decreases and then stops due to the formation of micelles, which prevent mobility and suppresses antitumor activity.
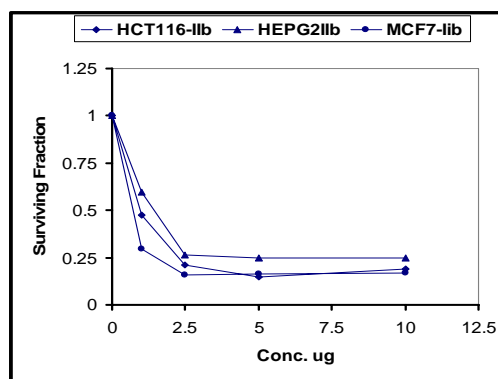
Fig .2 : Surviving Reaction of HCT116 , HEPG 2 and MCF7 against Concentration of 2-Alkoxy (benzylidine imine) Benzene-1-Carboxylic Acid; SBC-12

Table 5: Antitumor Activity of the Synthesized Schiff Base Amphiphiles Using Eltirlich Ascites Carcinoma (EAC).

Compound	Inhibition percent of cell viability (mg/ml)/conc.		
	25%	50%	100%
SBA-12	0	0	0
SBA-16	0	0	10
SBA-18	0	0	20
SBC-12	20	60	95
SBC-16	20	40	80
SBC-18	20	40	80
SBS-12	0	0	20
SBS-16	0	20	40
SBS-18	10	30	70

Table 6: Cytotoxicity Activity of 2 - Dodecyloxy (benzylidine Imine) Benzene Carboxylic acid (SBC-12) Using Colon Carcinoma (HTC 116), Liver Carcinoma (HEPG2) and Breast Carcinoma: (MCF7) as Tumor Cell.

Conc.	HCT116	HEPG-2	MCF7
0.0	1.00000	1.000000	1.000000
1.0	0.47640	0.59383	0.2963272
2.5	0.20971	0.264045	0.156162
5.0	0.14832	0.245392	0.162409
10.6	0.18761	0.245392	0.167718

4. Conclusion:

A series of anionic surfactants containing schiff base group have been synthesized and their chemical structures were confirmed using elemental analyses, FTIR, ^{1}H-NMR, and mass spectroscopy. Their surface activities were determined based on the data of surface tension. It was found that critical micelle concentration (cmc) values of these amphiphiles were gradually decreased by increasing the length of the alkyl chains attached to the synthesized molecules which referred to increase the hydrophobicity as the result of increasing the methylene groups. Thermodynamics of adsorption and micellization processes of these surfactants in their solutions were also calculated. Results were indicated that these compounds have tendency towards adsorption at the interface and also micelle formation at lower concentrations. Biocidal activity of prepared amphiphiles was investigated against bacterial and fungi species which showed that our surfactants are in general capable of inhibiting the growth of bacteria and fungi to a moderate extent. Also, it is clear that the biological activities of the synthesized surfactants against the tested microorganism increase by increasing their doses. Antitumor activity of these surfactants was evaluated against three human tumor cells such as HEPG$_2$ (liver), HCF$_7$ (breast) and HCT116 (colon). The cytotoxic effects of these compounds were dose dependent, i.e. by increasing the concentration on these compounds in the culture media; the percentage of non-viable cells (EAC) was increased. Also, data showed that SBC-12 was found to exhibit high activity in vitro system on the tumor cell lines investigated and the highest cytotoxic effect on FEPG2, HCT116 and MCF7, respectively

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The study of relation between biodiversity indices of woody species and growing stock in natural forest stands

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Abstract: In order to determine the relationship between diversity indices of woody species and growing stock per hectare in natural beech (*Fugus orientalis Lipsky*) Forests, Twenty sites specially at middle elevations were studied including three plots per each site . The dimension of each plot was 50×100 meters. The method of surveying was selective sampling. Results indicated there are positive linear regression between the biodiversity indices and growing stock per hectare. The best equation were obtained from the relationship between Brillouin index and growing stock per hectare(r =0.95).

1. Introduction

Biodiversity has so wide meaning and consists of genetic diversity up to ecosystems diversity. Species diversity is known equal to biodiversity that is limited to diversity in local or regional surface (Krebs, 1998). Diversity of organisms, measurement of diversity and examination of some hypothesis about reasons of diversity are some cases that have been favored by ecologists for a long time (Barnes *et al*., 1998). Researchers have applied different indices in order to measurement of diversity (Krebs, 1998).Understanding of necessity of species diversity that has happened recently has caused to concentrate on the quality of measurement of biodiversity in plants and animals a lot (Ehrlich and Wilson, 1991).

The some research used quantitative models (nonlinear matrix) with ecological criterion of diversity index of Shannon – Winer , minimum number of trees in each age class and section level of trees and some other criteria in order to manage combined forests of oak , pine and spruce(Bazzaz ,1987). In most studies about biodiversity, Alpha and Beta diversities have been considered (Pitkanen, 1998). Alpha diversity has been species diversity in a region (Whittaker, 1972) and Beta diversity mentions to the amount of changes of species in environmental gradient length (Whittaker, 1972; Wilson and Shmida, 1984). The first index of heterogeneity has been applied by Simpson in the year 1949 for the first time (Whittaker, 1972) and many copies of this index have been developed up to now. Another index that has wide application in studies is shannon index (Vujnovic *et al*., 2002).in order to estimate the diversity of vegetative covering of forestry projects of Boreal used the diversity index and by using different variables such as the number of needle – leaf and wide – leaf species , determining fires , the fertility of growing places , topography , average diameter of trees , the number of floors of canopy , the type of soil , drainage and artificial life renewal , presented a classification including 14 classes of biodiversity in forestry projects(Itkanen ,1997).Studied the impact of beneath woody floor and the age of stand on relative diversity and frequency bryophytes , lichens and fungi in trampling pine stands (*Popolus tremuloides*) in combined forests of Boreal in Alberta and showed that the availability of combined stands of aged pine and fallen woods in different steps of demolition are important for preserving the total of bryophytes , lichens , and fungi(Crites,2000) .Some studied the relations of biodiversity and surface in been forests of Denmark in a case study . The diversity of forest species showed negative relation with surface (Harris ,1984). The purpose of this research is that the relation between diversity indices with growing stock in hectare in natural stands would be studied, So that we can estimate ideal growing stock in other areas by studying these indices in each step of stand. In order to this, forests in Guilan province that have considerable natural stands were selected for study. In this research, the aim of biodiversity is the diversity of species and the diversity of species is dependent on the number of species (as richness) and also the ratio of the number of individuals within each species (as frequency or monotonousness) in a specified level or a group of creatures. In each community with two way , the quantity of biodiversities determined that in first method , the calculation of the quantity of diversity , the rare species in a community is very important which is calculate able by dependent methods of Shannon– Winer and Brillouin index. In this study, the relation

between these indices with growing stock of trees in hectare between these indices with growing stock of

2. Materials and Methods

This study has been done in twenty growing places of basin 21 from dividing the auriferous basins of north forests of country in natural beech stands.
In the studied region most rainfall is in autumn. The mean annual rainfall in plainly region in the station of the climatology of Rasht (100 meters ASL) is 1258 mm and mean annual temperature in the station is 15.6º C.

The most soils of study area have been placed on maternal igneous rocks (Alkaline and acidic) and be seen on the maternal Andesitic and Basalt rocks with more spreading. The type of the soils of this region is acidic brown. The acidity of these soils is 4.5 to 5.5.

For studying of the relation between the diversity indices with growing stock in forest stands of beech, first natural stands which not to be interfered as for as possible , were identified and reflected on the map. Then, with primary studies in each identified region, three pieces of 0.5 hectare which were intact and with least interference were measured as selective sampling. Twenty sites especially at middle elevations were studied including 3 plots per each site. The dimension of each plot was 50 ×100 meter. Statistics within each piece as hundred percent was done for measuring the characteristics of the type of species, the diameter equivalent to tree slope. The situation of studied regions was also identified from the slop and altitude from sea level. After obtaining desired characteristics, first diversity indices using related formula were calculated and growing stock using local volume table was estimated. Then the relation between diversity indices with growing stock in hectare by regression calculation, were analyzed.
The amounts of diversity indices are calculated with following formula.
Equal (1) – The index of Simpson:

$$1 - D = 1 - \sum_{i=1}^{s} Pi^2 \qquad (1)$$

In this equal, 1-D is the diversity index of Simpson and P is the proportion of the individuals in each species in the piece of sample.

Equal (2) – the function of Shannon – Wiener

$$H^/ = -\sum_{i=1}^{s} p_i \ln (p_i) \qquad (2)$$

In this formulation, H is Shannon – Wiener's function and its unit is Bits / individual and S is the number of species.

trees in hectare was studied.

Equal (3) – Brillouin index H = 1/N log

$$Ni / n_1 . n_2 . n_3 \qquad (3)$$

In this formulation, H is Brillouin index, N is total number of stands (individuals) in sample, N_1 is the number of related stand and N_2 is the number of stands related to second species.

3. Results

In this research , the amounts of biodiversity (using Simpson's index , Shannon – Wiener's function and Brillouin index) and the estimation of growing stock in hectare in studied growing places were calculated and the relationship between the indices of diversity and growing stock was studied (Table 1)
Amounts of indices of diversity and the amounts of growing stock in hectare to estimate growing stock in hectare, local volume table have been used. The amounts of diversity and growing stock indices in hectare in studied regions have been presented in table 1.In table 1 is seen that in regions where growing stock of trees is high , diversity indices is also higher and in regions with low growing stock , the amounts of diversity indices is less than other regions. Since this subject should be studied from statistical point of view, the relationship between diversity and growing stock indices of trees by regression calculation were studied.

Regression relationship between diversity indices and growing stock in hectare
The relationship between different indices of biodiversities of trees in studied regions (including Simpsons' index, N2 Hill, Shannon – Wiener's function , and Brillouin index) and growing stock in hectare have been presented in figures 1-4.
The figures 1-4 show that:
- There is the relation of Y=495.1X + 298.3 with correlation coefficient of 0.83 (r = 0.83) between Simpson's index and growing stack. In this relation , X is the amount of Simpson's index and Y is growing stock in hectare (Figure1.)
- There is a relationship between N2 Hill and growing stock in hectare with the relation of Y = 176 X +240.2 with correlation coefficient of 0.83 (r = 0.80) . In this relation X is the amount of N2 Hill's index (Figure2.).
- Shannon – Wiener's function and growing stock in hectare have the relation of Y = 540.5X + 270.7 and (r = 0.85) in that X is the amount of Shannon – Wiener's function(Figure 3.).

- It was observed a relation of Y = 560 X + 290.1 and r = 0.95 between Brillouin index with growing stock in hectare (Figure4).

Therefore the hypothesis of Zero is rejected and there is meaningful relationship between diversity and growing stock indices in hectare in the level of 0.05.

Table 1. The amount of biodiversity indices and amount and rate of growing stock in hectare in studied region.

Site	ASL	Growing volume	Simpson	N_2hill	Shanon-Winer	Brillouin
1	1320	521	0.44	1.804	0.451	0.433
2	1340	425	0.31	1.168	0.296	0.283
3	1370	350	0.14	1.211	0.152	0.144
4	1260	419	0.17	1.211	0.187	0.180
5	1260	419	0.17	1.604	0.187	0.180
6	1080	516	0.37	1.954	0.499	0.303
7	840	574	0.48	1.685	0.437	0.419
8	780	478	0.40	1.823	0.400	0.382
9	730	550	0.45	1.527	0.445	0.414
10	1640	401	0.34	1.751	0.280	0.272
11	1610	441	0.42	1.670	0.327	0.322
12	980	440	0.40	1.053	0.405	0.392
13	1400	324	0.50	1.653	0.059	0.056
14	1110	449	0.39	1.418	0.344	0.332
15	1080	430	0.29	1.891	0.260	0.250
16	840	565	0.46	2.812	0.433	0.415
17	840	623	0.64	2.812	0.606	0.582
18	1040	571	0.46	1.878	0.407	0.384
19	1040	564	0.54	2.194	0.502	0.476
20	960	556	0.65	2.858	0.599	0.568

Figure 2 Relation of N_2 Hill's index with growing stock in hectare
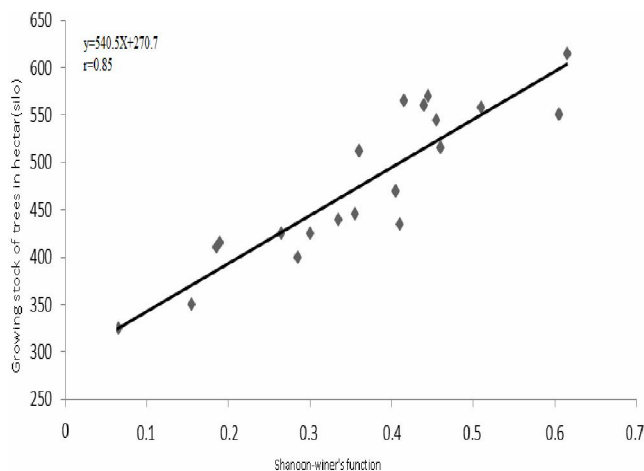
Figure 3 Relation of Shannon-winer's function with growing stock in hectare.

Figure 1. Relation of Simpson's index with growing stock in hectare
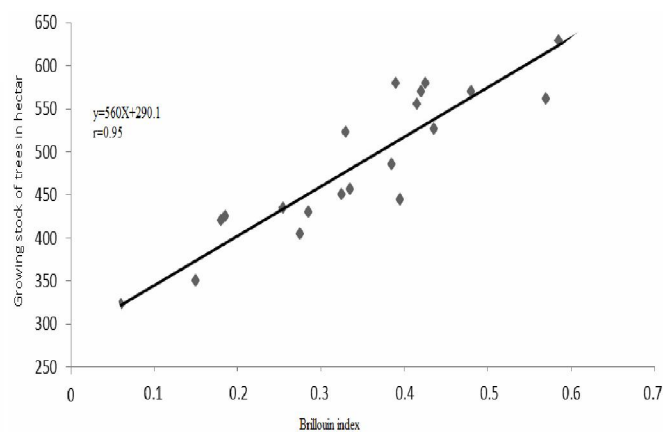
Figure 4 .Relation of Brillouin index with growing stock in hectare

Discussion

The study of obtained results from the relation between biodiversity indices and growing stock in hectare in the studied growing places show that there is meaningful relationship between these biodiversities indices of trees and the factor of growing stock in hectare at the level of 0.05. Beech have more than 70% of the number of trees in this region .According to this study, maximum correlation coefficient is related to the relation of growing stock of trees with Brillouin index (r = 0.95) and minimum of that has been obtained in the relation between obtained in the relation between N2 Hill and the factor of growing stock in hectare (r = 0.80) . As a result Brillouin index function is more suitable for study of the relation of biodiversity with growing stock in forests of studied regions. Obtained relationship shows positive and linear correlation, it means that in regions that biodiversity shows high rates; growing stocks in hectare are also higher. This subject shows that growing places which have higher biodiversity generally have high stability and fertility and from growing stock of trees in hectare perspective also have better condition. According to the result of this study, we can obtain the amount of growing stock of trees in hectare with high accuracy by determining biodiversity criterion (the amount of Shannon – Winer's function) in studied regions.

It seems that we can obtain a relationship in a wider area which according to biodiversity criterion , can estimate growing stock of trees in hectare with acceptable of growing stock in each region or obtaining models that are considered biodiversity factor as one of basic variables of that model.

Also, according to obtained results from this study, it seems that we can obtain a relationship between biodiversity indices with other factors of forest stands in this region with other studies. Also , It seem that we can understand relatively ecological ability and potential of growing places by comparing the factor of biodiversity in different regions , or obtain relations which be a base for ideal planning in forest units. In this study, other factors like slope orientation, altitude, and some characteristic of soil also have been studied.

From the result of the study of these factors can understand that generally by increasing the altitude in studied region , mean growing stock in hectare will be decreased and mean biodiversity indices in hectare also become low(Whittaker. R.H., 1972).

In this study, growing stock in hectare in different growing places with changing slope , depth and the moisture of soil show that growing stock in growing places.

North Slope and deep soil and high moisture compared with other growing places. In these conditions, ideal growth of trees has caused that trees reach stock of trees in hectare. On the other hand , the diversity of trees with high percent combination in these growing places have caused the increase of biodiversity indices.

Sub – diversity of species in a growing place with percentage of low number has little impact on the increase of biodiversity indices.

It's necessary to state that this research has been done in beech community and done researches have shown that in natural beech stands , in addition to altitude and aspect , factors like low depth of soil , being high the sand of the soil and being rocky and stony of growing sites also have negative impact on volume (Hashemi,2010). The result of research in studied regions showed that biodiversity indices of tree species have direct relationship with growing stock.

Of course in studied pure stands, some negative factors in growing beech like low depth of soil, being high in the sand of soil and being stony were observed. Since some growing place factors may intensify or neutralize or weaken the impact of other factors, so if we can compare the similar stand of natural and intact forest from the perspective of growing place conditions but by different biodiversity to each other, therefore judgment about optimum point of diversity will be possible.

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Gene Action Studies of Different Traits in Maize (*Zea mays* L.) Under Heat stress and Normal Conditions

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Abstract: The present study was carried out to determine the type of gene action, genetic parameters of yield and other quantitative traits by crossing eight diverse maize inbred lines in partial diallel fashion. Seeds of F_1 population along with their parents were evaluated in year 2010 in Shoushtar City (Khuzestan province in Iran) using a randomized complete block design with three replications. Genotypes planted at two dates, 6 July (to coincide heat stress with pollination time and grain filling period) and 27 July (as normal planting). Estimation gene effects and some of genetic parameters and graphic plot drawing to Hayman – Jinks method revealed statistics a and b significant for all traits in two conditions. Considering the average dominance degree and Hayman graphical plot, dominant effects for hektolitr weight trait under heat stress condition and for grain yield under normal condition, over dominance as well as partial dominance for other traits, were revealed.
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Key words: Maize; heat stress; genetic parameters; grafic plot

1.Introduction

Under heat stress, maize plant shows stunted growth, wilting top firing, tassel blast, silking delay and desiccation, pollen abortion and poor seed set which eventually can result in yield losses. Heat stress is 2nd major abiotic problem after drought that reduces grain yield more than 15 percent (Akbar et al, 2008). In southern part of Iran, especially in Khuzestan, heat stress is one of the most important abiotic stress in maize growing area. Therefore breeders need to develop such maize genotypes which may sustain period of heat stress stress without lowering their yield potential.

Betran et al. (2003) reported gene action for yield, ear diameter, number of grain in row, grain depth and 1000 grain weight is over dominance but for number of grain rows is partial dominance.

Barati et al. (2003) showed that gene action for yield, number of grain in row and 1000 grain weight is over dominance but for number of grain rows is partial dominance.

Srdic et al. (2007) found that dominant gene effects were more significant in maize grain yield and number of grains per row while additive gene effects were more important for grain row number and 1000 grain weight. The mode of inheritance of grain row number was partial dominance, while over dominance was of greater importance for grain yield, number of grains per row and 1000 grain weight.

Wattoo et al. (2002) revealed that the yield potential like number of days taken to tasselling, number of days taken to silking, plant height, number of ears per plant, number of grain rows per ear, number of grains per row, 100 grain weight and grain yield per plant were controlled by over dominance type of gene action.

Irshad-Ul-Haq et al. (2010) revealed that non-additive genetic effects were more pronounced in the inheritance of plant height, days to 50% tasseling, days to 50% silking, ear height and grain yield per plant. The graphic analysis showed that all the characters were under the genetic control of over dominance type of gene action. Also for grain yield the parents NYP-8 and NCQPM-2 were close to the point of origin and had an excess of dominant genes whereas FR-37 being farthest from the origin was carrying maximum number of recessive alleles.

Hussain et al. (2009) reported that plant height, leaf area, grain yield, per plant and harvest index, under normal and water stress conditions indicated additive gene action with partial dominance. Also over dominance type of gene action was recorded for grains per row and 100 grain weight. Heritability estimates ranged from moderate to high (54-85%) for various traits.

Rezaei *et al*. (2005) reported that high broadsence heritability estimates (0.85 to 0.95) were observed for most traits, the estimates for narrowsence heritability were relatively low, the

lowest values belonging to number of grain row and grain yield (0.23 and 0.38) respectively.

Heritability degrees varied from low to moderate for grain yield (Kalla et al, 2001; Singh et al, 2002).

The study of diallel analysis of the genetic traits would certainly be a valuable aid in selection and breeding for better maize hybrids and synthetics under heat stress condition. The information derived may be helpful to develop selection criterion and selection of most promising inbred lines for further future breeding programs.

2. Materials and methods

The study was conducted at Shoushtar City located in Khuzestan province, Iran (32°2 N and 48°50 E, 150m asl) year 2010. The soil type at this location is clay loam, pH= 7.6 with EC= 0.5 mmhos/cm.

The experimental material comprised of eight inbred lines of maize with different reaction to heat stress encompass 3 lines sensitive (A679, K3651/1 and K3640/5), 2 lines medium (K47/2-2-1-21-2-1-1-1 and K19) and 3 lines tolerance to heat stress (K18, K166A and K166B). The lines were crossed during spring, 2010 in a partial diallel fashion to obtain grains of direct crosses. The F_1 seed along with their parental inbred lines were sown in a triplicated randomized complete block design under two planting dates, 6 July, to coincide heat stress with pollination time and grain filling period and 27 July, (the normal planting date) to avoid heat stress during pollination and grain filling period, in year 2010. Each plot contained 3 rows of 75 cm apart and 9 m in length, consisted 45 hills, each of two seeds were sown, one of which seedlings was removed at 4 leaves stage. The experiment was irrigated every 5 days, fertilizers were applied prior to sowing at a rate of 120 kg N ha^{-1} and 140 kg P ha^{-1}, and additional side dressing of 120 kg N ha^{-1} was applied at the six leaves stage of maize plants. Minimum and maximum air temperatures at pollination time were 30°C and 46°C under heat stress condition (planting date 6 July) and 25°C and 38°C under normal condition (planting date 27 July) (Table 1).

Data pertaining grain row number in ear, grain number in row, grain number in ear, 1000 grain weight, hektolitr weight and grain yield traits were statistically analyzed. Analysis of variance was performed for each individual experiment, using SPSS software. Genetic analysis was done according to the diallel technique as described by Hayman (1954) and Jinks (1954). Genetic components of variation, D (additive effects of genes), H_1 and H_2 (dominance effects of genes) and F were computed from estimates of variances and covariances. These parameters provide estimates of the relative frequency of dominant to recessive allels in the parental lines. The information on gene action and presence of dominant and recessive genes in the parents was also inferred by plotting the covariance (Wr) of each array against its variance (Vr).

3. Results

Significant differences were observed among the parents and F_1 hybrids in both conditions for all studied traits (Table 2) and thus allowed the use of Hayman – Jinks model for genetic analysis of these characters.

Analysis of variance of F_1 data showed significant differences for statistics a and b, suggesting the presence of both additive and dominance genetic effects in the expression of all traits (Table 2). Significance of b1 revealed the presence of directional dominant effects of genes. The b1 statistic for grain yield under both conditions, for grain number in ear, grain row number in ear, grain number in row and hektolitr weight traits under normal condition and 1000 grain weight under heat stress condition was significant. Among inbred lines, asymmetrical gene distribution for grain yield, grain row number and hektolitr weight under both conditions, for grain number in ear, grain number in row under heat stress condition and 1000 grain weight under normal condition were evident due to significant of b2 statistic. Also, among parents, specific gene effects for all traits under both conditions were evident due to significant of b3 statistic. Irshad-Ul-Haq et al. (2010) reported that a, b, b1, b2 and b3 items for all traits were significant.

Genetic component of variation showed (Table 3) significant value of D under both heat stress and normal conditions for grain row number in ear, 1000 grain weight and hektolitr weight traits, for grain yield, grain number in row and grain number in ear traits under heat stress condition, indicating the importance of additive genetic effects. Under both planting conditions significant H components (H_1 and H_2) revealed important dominant variation. Different distribution of dominant genes was displayed by unequal value of H_1 and H_2 under both experimental conditions.

Significant and positive additive and dominance effects covariance (F) as criterion of

dominance and additive alleles frequency for 1000 grain weight trait under both conditions, grain number in ear and hektolitr weight under heat stress condition and grain row number in ear under normal condition, indicated that the positive genes were more frequent.

Importance of the heterozygous loci for plants was indicated by significant value of h^2 that for grain number in ear and hektolitr weight traits under normal condition and 1000 grain weight under heat stress condition.

Under both conditions, environmental variation (E) was significant, that indicating important effects of environments on traits.

Degree of dominance $\sqrt{\dfrac{H1}{D}}$ indicated over dominance gene action for grain yield trait under normal condition, hektolitr weight under stress condition and partial dominance gene action for other traits. Betran et al. (2003) reported over dominance gene action for yield, ear diameter, number of grain in row, grain depth and 1000 grain weight, but partial dominance for number of grain rows. Hussain et al. (2009) reported that plant height, leaf area, grain yield, per plant and harvest index, under normal and water stress conditions indicated additive gene action with partial dominance. Also over dominance type of gene action was recorded for grains per row and 100 grain weight. Over dominance type gene action in maize reported by Prakash and Ganguli (2004) and Ali et al. (2007) for grain yield and for all traits by Wattoo et al. (2002) and Irshad-Ul-Haq et al. (2010).

The proportion of genes with positive and negative effects $\dfrac{H2}{4H1}$ in the parents for all traits except grain number in row and grain number in ear under normal condition was found to be less than 0.25 denoting asymmetry at the loci showing dominance. Irshad-Ul-Haq et al. (2010) reported that the proportion of genes with positive and negative effects for traits plant height, days to 50% tasseling, days to 50% silking and ear height to be less than 0.25 and for grain yield to be 0.25.

Broad sense heritability varied from 0.44 for grain number in ear under normal condition to 0.86 for grain yield under heat stress condition. Narrow sense heritability was of non-additive nature and displayed lower than 50 percent of the genetic variation transferred from the parents. Heritability degrees varied from low to moderate for grain yield (Kalla et al, 2001; Singh et al, 2002).

Rezaei et al. (2005) reported high broadsence heritability estimates (0.85 to 0.95) for most traits, the estimates for narrowsence heritability were relatively low, the lowest values belonging to number of grain row and grain yield (0.23 and 0.38) respectively. Hussain et al. (2009) reported heritability estimates ranged from moderate to high (54-85%) for various traits.

Graphical representation revealed that the regression line intercepted the Wr axis just below the point of origin which indicated the presence of over dominance type of gene action for grain yield under normal condition (Fig 1b) and hektolitr weight under heat stress condition (Fig 6a) traits. But for other traits the regression line intercepted the Wr axis just above the point of origin which indicated the presence of partial dominance type of gene action, that this results in agreement is with results received of degree of dominance $\sqrt{\dfrac{H1}{D}}$.

Inbred line K166B for grain yield trait under both conditions being closer to the origin possessed maximum dominant genes, while inbred line K18 had most recessive alleles. For grain number in ear, inbred lines K47/2-2-1-21-2-1-1-1 and K19 under stress condition and inbred lines K3640/5 and K3651/1 under normal condition, inbred lines K18 and K166B under stress condition and inbred lines A679 and K166A under normal condition for grain number in row, lines K18 and K47/2-2-1-21-2-1-1-1 under stress condition and lines K3651/1 and K47/2-2-1-21-2-1-1-1 under normal condition for grain row number in ear trait, lines K18 and K19 under stress condition and K18 and K166A under normal condition for 1000 grain weight and for hektolitr weight, lines K3640/5 and K19 under heat stress condition and lines K166A and K166B under normal condition showed maximum dominant and recessive genes, respectively. Saleem et al. (2007) indicated that inbred lines B-46 possessed maximum dominant genes for 100 grain weight and line EX-285 for grain yield per plant. For number of days taken to tasseling, number of days taken to silking and number of grain row per ear, inbred line SYP-24 had maximum dominant genes. Irshad-Ul-Haq et al. (2010) indicated that for grain yield the parents NYP-8 and NCQPM-2 were close to the point of origin and had an excess of dominant genes whereas FR-37 being farthest from the origin was carrying maximum number of recessive alleles.
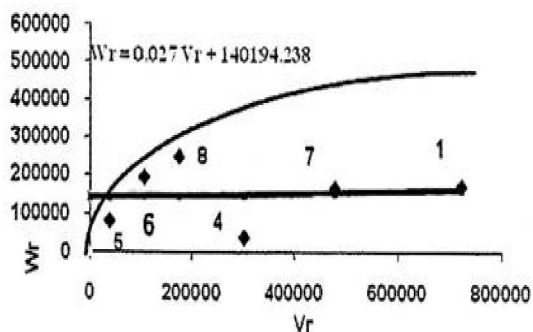
Fig 1a. Vr/Wr graph grain yield (kg/plot) in heat stress condition
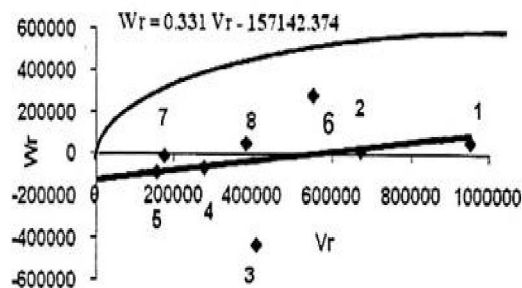
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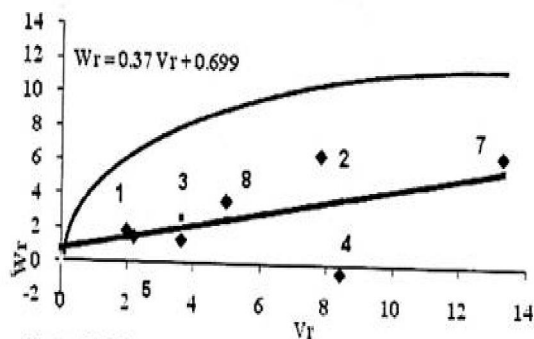
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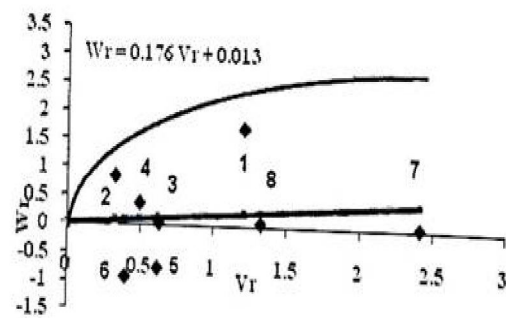
Fig 2b. Vr/Wr graph grain row number in ear in normal condition
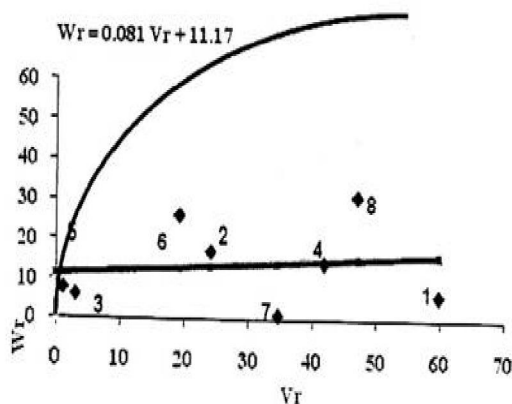
Fig 3a. Vr/Wr graph grain number in row in heat stress condition
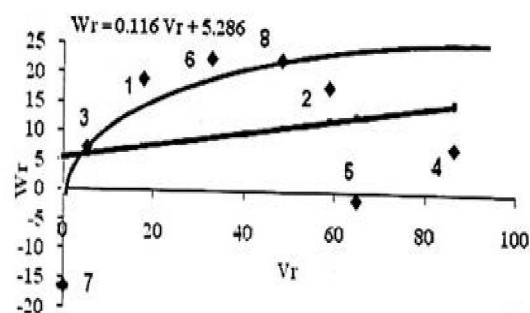
Fig 3b. Vr/Wr graph grain number in row in normal condition

1: K18; 2: K3651/1; 3: A679; 4: K166A; 5: K166B; 6; K3640/5; 7: K47/2-2-1-21-2-1-1-1; 8: K19
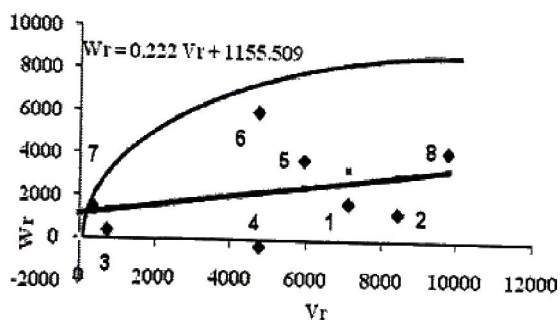
Fig 4a. Vr/Wr graph grain number in ear in heat stress condition
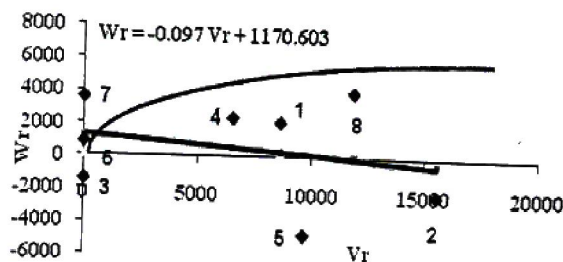
Fig 4b. Vr/Wr graph grain number in ear in normal condition
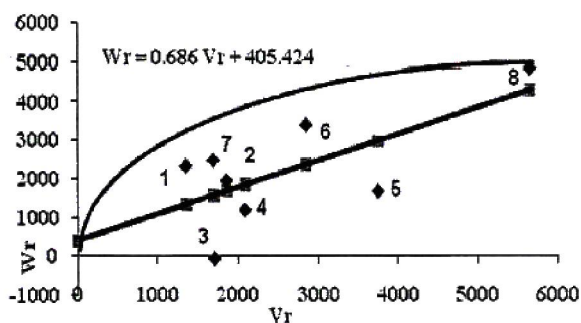
Fig 5a. Vr/Wr graph 1000 grain weight (gr) in heat stress condition
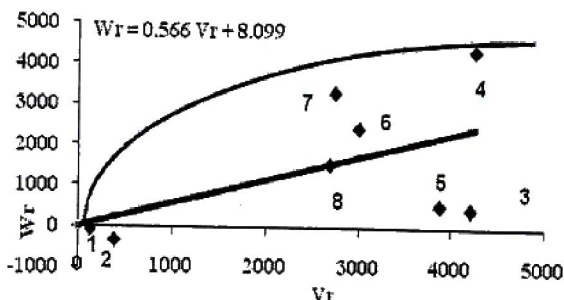
Fig 5b. Vr/Wr graph 1000 grain weight (gr) in normal condition
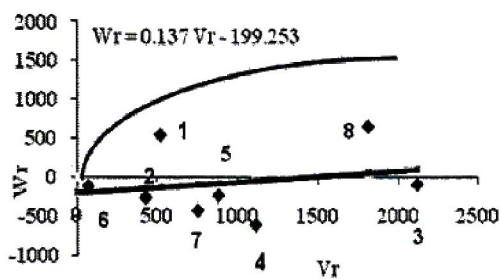
Fig 6a. Vr/Wr graph hektolitr weight (gr/lit) in heat stress condition
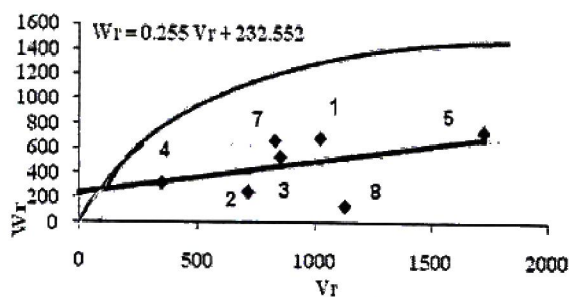
Fig 6b. Vr/Wr graph hektolitr weight (gr/lit) in normal condition

1: K18; 2: K3651/1; 3: A679; 4: K166A; 5: K166B; 6; K3640/5; 7: K47/2-2-1-21-2-1-1-1; 8: K19

Table 1. Average minimum and maximum temperature of research farm in heat stress and normal conditions in 2010 year

Months	Temperature (^{o}C)	
	Minimum	Maximum
July	31 ^{o}C	46 ^{o}C
August	32 ^{o}C	46 ^{o}C
September	30 ^{o}C	46 ^{o}C
October	25 ^{o}C	38 ^{o}C
November	17 ^{o}C	27 ^{o}C
December	11 ^{o}C	21 ^{o}C

Table 2. Analysis of variance mean squares obtained from in 8×8 diallel crosses and analysis of mean of squares of diallel crosses of eight maize inbred lines in heat stress and normal conditions

Source of Variance	df	Grain yield (kg/hac)		Grain number in ear		Grain row number in ear		Grain number in row		1000 grain weight (gr)		Hektolitr weight (gr/lit)	
		Stress	Normal	Stress	Normal	Stress	Normal	Stress	Normal	Stress	Normal	Stress	Normal
Block	2	535426*	2317944*	34218*	244832**	181**	14*	97.90*	1236**	5718ns	4946ns	2052ns	5998ns
Hybrid	35	1092651**	1316319**	66388**	135981**	87**	9.57**	377.30**	651**	10357**	10738**	3395**	5170*
Error	70	145969	584733	1785	120742	20	6	27.33	584	2784	3669	582	2608
a	7	3990058**	1944439**	45742.9**	76050.9*	44.21**	6.53**	277.54**	461.82**	55983.9**	46883**	6006.9**	11128**
b	28	1377319**	2775917**	29670.4**	59029.1**	37.09**	6.11**	158.36**	297.16**	11895**	13836.8**	6261.2**	5208.6**
b1	1	1574644**	10723930**	98.5ns	305419**	0.14ns	5.84*	5.2ns	1685.29**	48205.6**	10108.7ns	2082.4ns	49859.8**
b2	7	854254**	2488819**	14300.13**	26550.7ns	14.56*	13.75**	62.14**	81.87ns	3914ns	13110**	8428**	2430.6*
b3	20	1645986**	2479001**	36528.6**	77580**	49.38**	3.45**	200**	303.11**	12873**	14277.6**	5711.9**	3209.8**
Error	126	192710	535380	3552.4	27638.8	6.20	1.20	15	107.44	2790.2	3320	1096	983

ns, * and **:nonsignificant, significant at 5% and 1% probability levels, respectively.

Table 3. Estimation of statistical indices and genetics parameters for different traits in eight maize inbred lines diallel crosses in heat stress and normal conditions

Traits	Grain yield (kg/hac)		Grain row number in ear		Grain number in row		Grain number in ear		1000 grain weight (gr)		Hektolitr weight (gr/lit)	
Parameter	Stress	Normal	Stress	Normal	Stress	Normal	Stress	Normal	Stress	Normal	Stress	Normal
D	318442*	275424ns	30.12*	7.4**	143.5**	133.4ns	20431.9**	-22034ns	6676*	9876.99*	1154.6*	4274.35*
H1	308959**	1982055**	22.6**	6.42**	104.8**	120.1*	20098.9**	20654.8**	6351.04**	9458.5**	5276.8**	3162.03*
H2	283308**	1499272**	20.7**	3.29**	93.9**	127.6*	17448.9**	21214.8**	6099.2**	7045.6**	3455.3**	2830.8*
F	43524ns	646364ns	8.5ns	6.1**	32.9ns	-32.5ns	7602.9*	-6340.4ns	524.7*	3694.2*	2578.6*	653.02ns
h^2	258888ns	1490713ns	-0.92ns	0.689ns	-1.67ns	231.08ns	-481.3ns	40761.6**	6648.5*	1020.25ns	153.9ns	7991.36**
E	64237**	178460**	2.07**	0.396**	5.93**	35.8**	1184.14**	9212.9**	930.07**	1106.7**	365.23**	327.6**
$\sqrt{\dfrac{H1}{D}}$	0.98	2.68	0.87	0.93	0.85	0.95	0.99	0.97	0.97	0.98	2.14	0.86
$\dfrac{H2}{4H1}$	0.23	0.19	0.23	0.13	0.22	0.27	0.22	0.26	0.24	0.19	0.16	0.22
h^2b	0.86	0.71	0.77	0.72	0.85	0.56	0.84	0.44	0.80	0.76	0.74	0.78
h^2n	0.44	0.09	0.2	0.15	0.27	0.17	0.24	0.11	0.47	0.39	0.14	0.32

ns, * and **:nonsignificant, significant at 5% and 1% probability levels, respectively
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4.Discussions

It may be concluded that overall information obtained in the present study if practiced with care, in general, go a long way in developing promising synthetics and hybrids of maize. All the traits, except grain yield under normal condition and hektolitr weight trait under heat stress condition were under the control of additive type of gene action. The grain yield under normal condition and hektolitr weight trait under heat stress condition were under the control of over dominance type of gene action. Over dominance for traits reveals that selection in later generations may be more effective and the selection in early generations will be more effective for the traits which is additively controlled.

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Genetic Analysis of Yield and Qualitative Traits in Maize (*Zea mays* L.) Under Heat stress and Normal Conditions

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Abstract: The present study was carried out to determine the type of gene action and genetic parameters of yield and qualitative traits by crossing eight diverse maize inbred lines in partial diallel fashion. Seeds of F_1 population along with their parents were evaluated in year 2010 in Shoushtar City (Khuzestan province in Iran) using a RCBD with 3 replications. Inbred lines and hybrids planted in two separate experiment at two dates, 6 July (to coincide heat stress with pollination time and grain filling period) and 27 July (as normal planting). Diallel analysis to Griffing's method 4 and model II were performed. Also estimation gene effects and some of genetic parameters to Hayman – Jinks method revealed. Grain yield in stress condition of the highest ratio GCA/SCA was enjoyed that show additive effect role important. But; other traits of ratio GCA/SCA low were enjoyed. Hybrid K18×K166B of positive and significantly combining in two conditions for grain yield were enjoyed. Analysis of variance of F_1 data showed significant differences for statistics a and b, suggesting the presence of both additive and dominance genetic effects in the expression of all traits. The average dominance degree for grain yield trait under normal condition and grain protein percent in heat stress, over dominance as well as partial dominance for other traits, were revealed.

1.Introduction

Maize (*Zea mays* L.), the sole cultivated member of genus Zea and tribe Maydeae, ranks as one of the three important cereal crops in the world after wheat and rice. Maize being nutritionally an important crop has multiple functions in the traditional farming system, being used as food and fuel for human being and feed for livestock and poultry. It is a source of industrial raw material for the production of oil, starch, syrup, gluten, alcohol, glucose, custard powder, dextrose, flour, flakes, ethanol and many more products (Wattoo et al. 2009).

In southern part of Iran, specially in Khuzestan, high temperature stress is one of the most important abiotic stress in maize growing area. Increasing heat tolerance of hybrids is consequently a challenge for maize breeders. For this, it is necessary for promising inbred lines as well as their combination to be tested under both normal and heat stress conditions.

Combining ability describes the breeding values of parental lines to produce hybrids. Sprague and Tatum (1942) used the term general combining ability (GCA) to designate the average performance of a line in hybrid combinations, and used the term specific combining ability (SCA) to define those cases in which certain combinations do relatively better or worse than would be expected on the basis of the average performance of the lines involved. Diallel cross technique developed by Hayman (1954) and Jinks (1954) provides information on the heritance mechanism in the early generations and helps the breeder to make effective selection.

The optimum temperature for grain development in maize (*Zea mays* L.) has been reported to be between 27 and 32°C (Keeling and Greaves, 1990). Temperature during reproductive development in maize is often higher than optimum for maximum grain yielding (Keeling and Greaves, 1990). Maize ears were heat stressed for 2 and 4 days at continuous 35°C, starting 5 days after pollination and caused a 20% and 48% reduction in grain final dry weight (Monjardino et al. 2005). Heat stress reduced the yield of maize grain up to 80% (Makus et al. 2000).

Akbar et al. (2008) reported that the GCA/SCA variance ratio exhibited that all traits were predominantly under non-additive control. Betran et al. (2003) reported the type of gene

action appeared to be different under drought than under low nitrogen, with additive effects more important under drought and dominance effects more important under low nitrogen. Afarinesh et al. (2008) reported additive and dominance variances role in normal condition and dominance variance in drought stress condition.

Shabbir and Saleem (2002) conducted 6×6 complete diallel cross involving six maize inbred lines and reported that the nature of gene action for protein content of maize grain was additive. Rosulj et al. (2002) indicated that additive type of gene action controlling oil contents in grain. Wattoo et al. (2009) reported that grain yield were controlled by over dominance type of gene action, while quality traits like protein and oil contents were under the control of partial dominance with additive type of gene action. Mebrahtu and Mohamed (2003) conducted a study to find out the mode of inheritance of protein in a 7×7 diallel analysis in beans and indicated that both additive and non additive genetic variance were important for inheritance of protein contents.

The goal of this research was determination of gene action of qualitative (grain protein and starch) traits and grain yield in maize genotypes in heat stress and normal conditions.

2.Materials and Methods

The study was conducted at Shoushtar City located in Khuzestan province, Iran ($32°2$ N and $48°50$ E, 150m asl) during year 2010. Fifteen maize inbred lines and twenty eight hybrids from combination of eight selected inbred lines in year 2010 were evaluated. Inbred lines and hybrids planted in two separate experiment in two planting dates, 6 July to coincide heat stress with pollination time and 27 July as normal planting using a randomized complete block design with three replications, in Shoushtar City in south part of Iran. Each plot contained 3 rows of 75 cm apart and 9 m in length, consisted 45 hills, each of two seeds were sown, one of which seedlings was removed at 6 leaves stage. The experiment was irrigated every 5 days, fertilizers were applied prior to sowing at a rate of 120 kg N ha^{-1}and 140 kg P ha^{-1}, and additional side dressing of 120 kg N ha^{-1} was applied at the six leaves stage of maize plants. Minimum and maximum air temperatures at pollination time were $30°C$ and $46°C$ under heat stress condition (planting date 6 July) and $25°C$ and $38°C$ under normal condition, respectively (planting date 27 July).

Data pertaining grain yield, grain starch percent and grain protein percent traits were statistically analyzed. Analysis of variance was performed for each individual experiment, using SPSS software. Diallel analysis to way Griffing's method 4 and model II using Diall 98 software was performed. Genetic analysis was done according to the diallel technique as described by Hayman (1954) and Jinks (1954).

3.Results

Significant differences were observed among the parents and F_1 hybrids in both conditions for studied traits (data not shown) and thus allowed the use of Griffing's method 4 and model II and also Hayman – Jinks model for genetic analysis of these characters in both conditions.

General combining ability variance for all traits except grain protein percent and grain starch percent in normal condition was significant (Table 1). Grain yield in stress condition and grain protein percent and grain starch percent traits in normal condition showed nonsignificant specific combining ability variance. This traits were observed significant specific combining ability under other condition (Table 1). Akbar et al. (2008) reported that GCA and SCA effects were found as highly significant except nonsignificant to GCA effect for 100 grain weight under high temperature condition.

Except grain yield in stress condition, other traits were low ratio GCA/SCA that observed role important non-additive effect ration to additive genes effect. Addition to Baker's ratio for this traits indicating of genetic control this traits by additive effect and non-additive genes, but with more portion non-additive genes effect (Table 1). Akbar et al. (2008) reported that the GCA/SCA variance ratio exhibited that all traits were predominantly under non-additive control. Betran et al. (2003) reported the type of gene action appeared to be different under drought than under low nitrogen, with additive effects more important under drought and dominance effects more important under low nitrogen. The importance of additive effects increased with intensity of drought stress. Afarinesh et al. (2008) reported additive and dominance variances role in normal condition and dominance variance in drought stress condition.

General combining ability in all traits in two conditions in neither of parents was nonsignificant (Table 2). Therefore in two conditions for breeding this traits can of breeding methods base hybridization used.

Hybrid K18×K166B significant and positive combining in two conditions for grain yield, hybrids K166A×K47/2-2-1-21-2-1-1-1 and K18×K19 in stress condition and hybrid K3651/1×K166B in normal condition significant and positive combining for grain starch percent showed (Table 3). Unay et al. (2004) reported two parents W552 and DNB statistically significant and positive GCA effects. Akbar et al. (2008) reported that the inbred line 935006 was found as the best general combiner with better mean performance for all traits under both temperatures followed by R2304-2 and F165-2-4.

Analysis of variance of F_1 data showed significant differences for statistics a and b, suggesting the presence of both additive and dominance genetic effects in the expression of all traits (Table 4). Significance of b1 revealed the presence of directional dominant effects of genes. The b1 statistic for grain yield under both conditions, for grain protein percent traits under stress condition and grain starch percent under normal condition was significant. Among inbred lines, asymmetrical gene distribution for grain yield under both conditions, for grain protein percent and grain starch percent under heat stress condition were evident due to significant of b2 statistic. Also, among parents, specific gene effects for all traits under both conditions were evident due to significant of b3 statistic (Table 4). Irshad-Ul-Haq et al. (2010) reported that a, b, b1, b2 and b3 items for all traits were significant.

Genetic component of variation showed (Table 5) significant value of D for grain yield, grain protein percent and grain starch percent traits under heat stress condition, indicating the importance of additive genetic effects. Under both planting conditions significant H components (H_1 and H_2) revealed important dominant variation. Different distribution of dominant genes was displayed by unequal value of H_1 and H_2 under both experimental conditions.

Under both conditions, environmental variation (E) was significant (Table 5), that indicating important effects of environments on traits.

Degree of dominance $\sqrt{\dfrac{H1}{D}}$ indicated over dominance gene action for grain yield trait under normal condition and grain protein

percent in heat stress and partial dominance gene action for other traits (Table 5). Betran et al. (2003) reported over dominance gene action for yield, but; partial dominance for number of grain rows. Over dominance type gene action in maize reported by Prakash and Ganguli (2004) and Ali et al. (2007) for grain yield. Shabbir and Saleem (2002) reported that the nature of gene action for protein content of maize grain was additive. Rosulj et al. (2002) indicated that additive type of gene action controlling oil contents in grain. Wattoo et al. (2009) reported that grain yield were controlled by over dominance type of gene action, while quality traits like protein and oil contents were under the control of partial dominance with additive type of gene action. Mebrahtu and Mohamed (2003) conducted a study to find out the mode of inheritance of protein in a 7×7 diallel analysis in beans and indicated that both additive and non additive genetic variance were important for inheritance of protein contents.

The proportion of genes with positive and negative effects $\dfrac{H2}{4H1}$ in the parents for all traits except grain starch percent under normal condition was found to be less than 0.25 denoting asymmetry at the loci showing dominance (Table 5). Irshad-Ul-Haq et al. (2010) reported that the proportion of genes with positive and negative effects for traits plant height, days to 50% tasseling, days to 50% silking and ear height to be less than 0.25 and for grain yield to be 0.25.

Broad sense heritability varied from 0.56 for grain starch percent under normal condition to 0.86 for grain yield under heat stress condition. Narrow sense heritability was of non-additive nature and displayed lower than 50 percent of the genetic variation transferred from the parents (Table 5). Heritability degrees varied from low to moderate for grain yield (Betran et al. 2003; Hussain et al. 2009). Rezaei et al. (2005) reported high broadsence heritability estimates (0.85 to 0.95) for most traits, the estimates for narrowsence heritability were relatively low, the lowest values belonging to number of grain row and grain yield (0.23 and 0.38) respectively. Hussain et al. (2009) reported heritability estimates ranged from moderate to high (54-85%) for various traits.

Table 1. Mean squares obtained from combining abilities different traits hybrids in diallel crosses in heat stress and normal conditions

Source of Variance	Df	Grain yield (kg/hac)		Grain protein percent		Grain starch percent	
		Stress	Normal	Stress	Normal	Stress	Normal
GCA	7	1190980**	1535789*	8.84**	3.05ns	96**	213ns
SCA	20	287450ns	1239505*	4.72**	2.03ns	99.85**	152ns
Error (combining ability)	54	193825	584733	1.51	1.29	16.3	121
GCA/SCA		4.14	0.12	1.87	1.50	0.96	1.4
Baker ratio[1]		0.89	0.71	0.79	0.75	0.66	0.74

1- $2\sigma^2 GCA/(\sigma^2 SCA + 2\sigma^2 GCA)$

ns, * and **:nonsignificant, significant at 5% and 1% probability levels, respectively.

Table 2. Parents general combining to Griffing's method 4 in heat stress and normal conditions

Inbred lines	Grain yield (kg/hac)		Grain protein percent		Grain starch percent	
	Stress	Normal	Stress	Normal	Stress	Normal
K18	259.97ns	64.7ns	-1.08ns	-0.77ns	-0.21ns	4ns
K3651/1	-303.29ns	-9.97ns	0.72ns	0.67ns	-3.6ns	-4ns
A679	-341.98ns	483ns	0.54ns	-0.11ns	-1.58ns	-3ns
K166A	-19.87ns	284ns	0.13ns	-0.17ns	0.59ns	1ns
K166B	419.89ns	53.14ns	-0.57ns	-0.11ns	1.81ns	4ns
K3640/5	-82.43ns	310.08ns	0.65ns	0.24ns	-2.13ns	-2ns
K47/2-2-1-21-2-1-1-1	54.46ns	180.47ns	-0.75ns	0.17ns	3.03ns	-4ns
K19	13.24ns	-39.36ns	0.36ns	0.08ns	2.09ns	2ns
SE (GCA)	257.23	53.14	0.7	0.41	2.31	3.44

ns, * and **:nonsignificant, significant at 5% and 1% probability levels, respectively.

Table 3. Parents specific combining to Griffing's method 4 in heat stress and normal conditions

Name of hybrids	Grain yeild (kg/hac)		Grain protein percent		Grain starch percent	
	Stress	Normal	Stress	Normal	Stress	Normal
K18×K3651/1	-330ns	-243.08ns	-0.71ns	-0.41ns	1.33ns	-8ns
K18×A679	-218ns	362.8ns	-0.82ns	-0.28ns	-0.23ns	-9ns
K18×K166A	-213ns	-281.52ns	1.85ns	-1.16ns	-0.73ns	-3ns
K18×K166B	827**	1411.14*	0.33-ns	-0.88ns	-1.29ns	10ns
K18×K3640/5	-356ns	-367.48ns	2.36ns	1.02ns	-1.67ns	2ns
K18×K47/2-2-1-21-2-1-1-1	429ns	99.81ns	-0.74ns	1.24ns	8.84ns	-5ns
K18×K19	-139ns	-981.7ns	-1.60ns	0.47ns	11.44*	12ns
K3651/1×A679	364ns	730.8ns	-0.37ns	0.26ns	4.16ns	4ns
K3651/1×K166A	124ns	-927.9ns	-0.83ns	0.34ns	0.66ns	-3ns
K3651/1×K166B	-171.25ns	-311.52ns	-0.52ns	0.07ns	0.77ns	15*
K3651/1×K3640/5	81.98ns	176.53ns	-0.17ns	0.41ns	0.05ns	1ns
K3651/1× K47/2-2-1-21-2-1-1-1	-49.38ns	14.48ns	1.79ns	-0.41ns	-4.45ns	-2ns
K3651/1×K19	-19.96ns	559.64ns	0.81ns	-0.26ns	-2.51ns	-6ns
A679×K166A	110.65ns	-86.3ns	0.22ns	0.95ns	-4.03ns	4ns
A679×K166B	-469.9ns	-1235.63ns	1.63ns	0.81ns	0.08ns	-10ns
A679×K3640/5	164.56ns	313.09ns	-0.46ns	-0.81ns	2.69ns	1ns
A679×K47/2-2-1-21-2-1-1-1	113.98ns	323.03ns	-1.41ns	-1.51ns	1.19ns	9ns
A679×K19	-65.35ns	-407.8ns	1.22ns	0.58ns	-3.86ns	0ns
K166A×K166B	-213.3ns	62.63ns	-0.41ns	-0.42ns	-4.09ns	-2ns
K166A×K3640/5	-5.64ns	399.42ns	-0.46ns	0.02ns	-0.47ns	1ns
K166A×K47/2-2-1-21-2-1-1-1	-57.62ns	242.7ns	0.8ns	0.97ns	13.03*	5ns
K166A×K19	254.67ns	715.2ns	-1.16ns	-0.71ns	-4.36ns	-3ns
K166B×K3640/5	101.44ns	-169.25ns	-0.63ns	-0.53ns	8.64ns	-3ns
K166B×K47/2-2-1-21-2-1-1-1	-222.29ns	58.03ns	0.75ns	0.66ns	-2.2ns	-3ns
K166B×K19	148.57ns	309.87ns	-0.48ns	0.29ns	-1.92ns	-7ns
K3640/5×K47/2-2-1-21-2-1-1-1	-10.36ns	-447.58ns	-1.52ns	-0.35ns	-4.59ns	-5ns
K3640/5×K19	23.86ns	92.25ns	0.88ns	0.23ns	-4.64ns	2ns
K47/2-2-1-21-2-1-1-1×K19	-202.93ns	-290.47ns	0.34ns	-0.59ns	5.86ns	1ns
SE (SCA)	309.54	642.78	1.25	0.82	5.68	7.11

ns, * and **:nonsignificant, significant at 5% and 1% probability levels, respectively.

Table 4. Analysis of mean of squares of diallel crosses of eight maize inbred lines in heat stress and normal conditions

Source of Variance	Df	Grain yield (kg/hac)		Grain protein percent		Grain starch percent	
		Stress	Normal	Stress	Normal	Stress	Normal
a	7	3990058**	1944439**	19.25**	8.23**	277.54**	461.82**
b	28	1377319**	2775917**	9.17**	3.82**	158.36**	297.16**
b1	1	1574644**	10723930**	1646**	3.4ns	5.2ns	1685.29**
b2	7	854254**	2488819**	7.33**	2.07ns	62.14**	81.87ns
b3	20	1645986**	2479001**	9.44**	4.6**	200**	303.11**
Error	126	192710	535380	1.44	1.25	15	107.44

ns, * and **:nonsignificant, significant at 5% and 1% probability levels, respectively.

Table 5. Estimation of statistical indices and genetics parameters for different traits in eight maize inbred lines diallel crosses in heat stress and normal conditions

Traits	Grain yield (kg/hac)		Grain protein percent		Grain starch percent	
Parameter	Stress	Normal	Stress	Normal	Stress	Normal
D	318442*	275424ns	2.5**	2ns	143.5**	133.4ns
H1	308959**	1982055**	6.66**	1.91*	104.8**	120.1*
H2	283308**	1499272**	5.19**	1.73*	93.9**	127.6*
E	64237**	178460**	0.47**	0.42**	5.93**	35.8**
$\sqrt{\dfrac{H1}{D}}$	0.98	2.68	1.63	0.98	0.85	0.95
$\dfrac{H2}{4H1}$	0.23	0.19	0.19	0.23	0.22	0.27
h^2b	0.86	0.71	0.81	0.64	0.85	0.56
h^2n	0.44	0.09	0.30	0.28	0.27	0.17

ns, * and **:nonsignificant, significant at 5% and 1% probability levels, respectively.

4. Discussions

Prediction in the case of additive gene action would be expected to be more reliable as compared to the traits which are controlled by non-additive type of gene action. In this research, grain yield under normal condition and grain protein percent trait under heat stress condition were under the control of over dominance type of gene action. But; grain yield in stress condition, grain protein percent in normal condition and grain starch percent in both conditions were under the control of partial domaiance with additive type of gene action. Over dominance for traits reveals that selection in later generations may be more effective and the selection in early generations will be more effective for the traits which is additively controlled.

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Introduction the medicinal species of *Asteraceae* family in Ilkhji and Sharafaldin regions of Esat Azarbaijan in Iran

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Abstract: As medicinal plants are suitable alternatives for synthetic and chemical drugs (Idu and Osemwegie) also because of medical and nutritional importance and valuable protein contents of Asteraceae species, all plants of *Asteraceae* family   are collected in Ilkhji and sharafaldin regions during growth seasons of 2007-2009. Plants were collected in 2 regions according to the classical method of regional floristical studies. Collected plants were recognized by valid references (Parsa and Reshinger). Then medical species are chosen by using pharmacopeias. The results of the current study demonstrated that at Ilkhji region 31 species belong to 24 genuses and at Sharafaldin region 25 species belong to 20 genuses that all of them belong to Asteraceae family. Among these species, 19 species at Ilkhji and sharafaldin region had medicinal properties. Medicinal species of these 2 regions consist of: Achillea tenuifolia, Achillea vermicularis, Achillea millefolium, Arctium lappa, Acroptilon repens, Cardus pycnocephalus, Carthamus oxyacantha, Centaurea aggregate, Cichorium intybus, Cirsium ravens, Cnicus benedictus, Cousinia calcitrapa ,Lactuca scarioloides, Lactuca serriola, Onopordon leptolepis, Senecio mollis, Sonchus oleraceus, Tragopogon marginatus, Xanthium spinosum. The results of this study showed that the region has a great potential for producing respective medicinal plants species belong to those families. Medicinal plants recently become more important because of their medicinal uses and in addition they are valuable source of protein. [Leila Joudi, Ghassem Habibi Bibalani and Hamide shadkami. Introduction the medicinal species of *Asteraceae* family in Ilkhji and Sharafaldin regions of Esat Azarbaijan in Iran. Journal of American Science 2011;7(5):455-458]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Family – Pharmacopeia – Medicinal plant

1. Introduction

Today according to the World Health Organization (WHO), as many as 80% of the world's people depend on traditional medicine for their primary health care needs. There are considerable economic benefits in the development of indigenous medicines and in the use of medicinal plants for the treatment of various diseases (Azaizeh, Fulder and Khalil, 2003). Plants have been used in traditional medicine for several thousand years (Abu-Rabia, 2007). The traditional culture worldwide are more or less endangered as a result of increasing legislative and moral supports accorded orthodox practice over native medicine(Ido,2007) Legumes are considered to be a very good source of polyphenolic compounds that may act as chemo preventive agents, especially by their antioxidant properties. With attention to exploration of important medicinal species of *Fabaceae* family in two regions (Joudi, 2010). Aim of this study was to introduce of medicinal species of Asteraceae family in Ilkhji and Sharafaldin regions, Eastern Azerbaijan province-Iran.

2. Material and Methods

All the plant samples in this research, belong to Fabaceae family, were gathered from Ilkhji and Sharafeddin areas which is located in East Azerbaijan province. Ilkhji area is located in 25 km south west of Tabriz and the geographic coordinates 45.59 to 12 and 46.3 eastern longitudes and 37.55 to 37.57 north latitude and Shabestar city is located in the north-west of Tabriz and the geographic coordinates 37 degrees and 42 minutes of north latitude and 45 degrees and 5 minutes and 46 degree and 9 minutes East longitude. Plant samples belong to Fabaceae family from Yal, Khaselar, Kordlar and Chaman areas and from Sharafaddin area of Shabestar city as well, were obtained during winter of year 2007 to fall year 2009. All the plant samples were pressed according to standard guides. If the plant samples were too long, then they were cut from several areas, so the sample contained the complete plant. At the next stage, samples were stick to the herbarium Cardboards and then were identified using floras, keys, illustrations and explanations which are available for different sources of plant Species. Finally, the medicinal species belong to this family were introduced using valid standard pharmacological sources.

Result

Result of survey show that 21 species belong to 10 genera (Table 1) and 6species with 6 genera are in common practice in the traditional system of health care of 2 regions. From this study 10 species were introduces as a medicinal plants. Results showed in table 1, table 2 and table 3.

Table (1): plant species in Asteraceae in Ilkhji

Family	Genus	species	Growth Form
Asteraceae	Achillea	A.millefolium	Hemicriptophite
	Achillea	A. vermicularis	Hemicriptophite
	Acroptilon	A. repens	Hemicriptophite
	Anthemis	A. hyalina	Therophite
	Calendula	C. persica	Therophite
	Carthamus	C. oxyacantha	Therophite
	Centaurea	C. depressa	Hemicriptophite
	Centaurea	C. pulchella	Hemicriptophite
	Centaurea	C. virgata	Hemicriptophite
	Cichorium	C. intybus	Hemicriptophite
	Cirsium	C. arvense	Hemicriptophite
	Cirsium	C. congestum	Hemicriptophite
	Cnicus	C. benedictus	Therophite
	Cosinia	C. rhaphiostega	Camephite
	Crepis	C. foetida	Hemicriptophite
	Crupina	C. Crupinastrum	Therophite
	Echinops	E. cephalotes	Therophite
	Helichrysum	H. araxinum	Hemicriptophite
	Helichrysum	H. rubicundum	Hemicriptophite
	Heteropappus	H. altaicus	Hemicriptophite
	Kolepinia	K. teniuisima	Therophite
	Lactuca	L.scarioloides	Hemicriptophite
	Lasiogon	L.muscoides	Therophite
	Onopordon	O.leptolepis	Hemicriptophite
	Senecio	S.vernalis	Therophite
	Sonchus	S.oleraceus	Hemicriptophite
	Taraxacum	T.vulgare	Therophite
	Tragopogon	T.buphthalmoides	Therophite
	Tragopogon	T.caricifolium	Therophite
	Tragopogon	T.graminifolius	Hemicriptophite
	Xanthium	X.spinosum	Therophite

Table (2) plant species in Asteraceae in Sharafaldin

Family	Genus	species	Growth Form
Asteraceae	Achillea	A.micrantha willd	Hemicriptophite
	Achillea	A.tenuifolia Lam	Hemicriptophite
	Achillea	A.vermicullaris	Hemicriptophite
	Acroptilon	A.repens(L)DC.subsp.repens	Hemicriptophite
	Arctium	A.lappa.L	Hemicriptophite
	Cardus	C.pycnocephalus L.	Therophite
	Carpesium	C.abrotanoides L	Hemicriptophite
	Carthamus	C.oxyacantha M.B	Therophite
	Centaurea	C. aggregate	Hemicriptophite
	Centaurea	C.balsamita.subsp.balsamita	Therophite
	Centaurea	C.cheiranthifolia	Hemicriptophite
	Centaurea	C.iberica.Trev.et Spreng	Hemicriptophite
	Centaurea	C.triumfetti All.	Hemicriptophite
	Centaurea	C.virgata	Hemicriptophite
	Cnicus	C.benedictus	Therophite
	Cichorium	C.intybus L.	Hemicriptophite
	Cirsium	C.osseticum(Adams)	Hemicriptophite
	Cousinia	C.calcitrapa	Hemicriptophite

	Cousinia	C.calcitrapa	Hemicriptophite
	Cousinia	C.turcomanica C.wink L.	Hemicriptophite
	Crepis	C.sancta(L.)	Therophite
	Lactuca	L.serriola L.	Therophite
	Matricaria	M.recutita.L	Therophite
	Onopordon	O.leptolepis DC	Hemicriptophite
	Pulicaria	P.dysentarica	Hemicriptophite
	Senecio	S.mollis willd	Hemicriptophite
	Senecio	S.vulgaris	Therophite
	Sonchus	S.tenerrimus	Hemicriptophite
	Taraxacum	T.syriacum Boiss	Hemicriptophite
	Tragopogon	T.marginatus	Geophite
	Tragopogon	T. pratensis	Geophite
	Xantium	X.spinosum	Hemicriptophite

Table (3) Medical species in Asteraceae in Ilkhji & Sharafaldin

Region	Genus	species	Medical property
Ilkhji	Achillea	A. millefolium	Blood stopping-digesting anti spasm
Ilkhji & Sharafaldin	Achillea	A.vermicularis	Antimicrobial- antioxidant
Sharafaldin	Achillea	A.tenuifolia	antioxidant
Ilkhji & Sharafaldin	Acroptilon	A.repens	Antimicrobial
Sharafaldin	Arctium	A.lappa.L	blood refining- ntimicrobial- Antidiurtic
Sharafaldin	Cardus	C.pycnocephalus	Antimicrobial
Ilkhji & Sharafaldin	Carthamus	C.oxyacantha	Antimicrobial- anti worm
Sharafaldin	Centaurea	C. aggregate	Antimicrobial
Ilkhji	Cichorium	C.intybus	Colleagues – blood refining- anti fever
Ilkhji	Cirsium	C.arvens	Notorious – appetizing – to cure skin diseases
Ilkhji & Sharafaldin	Cnicus	C.benedictus	Nutritious –sweaty – blood refining– anti fever
Sharafaldin	Cousinia	C.calcitrapa	Antimicrobial
Ilkhji	Lactuca	L.scarioloides	Anti convulsion – light sleeping pills - L. Anti tumour
Sharafaldin	Lactuca	L.serriola L.	Antimicrobial
Ilkhji & Sharafaldin	Onopordon	O.leptolepis	Anti tumour
Sharafaldin	Senecio	S.mollis willd	Blood stopping
Ilkhji	Sonchus	S.oleraceus	Effective in asthma and breathing diseases
Sharafaldin	Tragopogon	T.marginatus	appetizing
Ilkhji & Sharafaldin	Xanthium	spinosum L.	Anti inflammation – anti fever

Discussion

This report is based on the survey of medicinal plants from different communities in east Azerbaijan State, Iran. The present study documents data regarding the availability of ethno medicinal plant resources, which have various potential uses. All the plants mentioned in this paper are very popular among the communities of east Azerbaijan and enjoys a good reputation in Trado- medicinal practice in the areas. From this study, it was found that plants are used to treat mostly as Laxative, Anti bacterial, Antioxidant, Sedative, Diuretique, Cholagoge and Cardio tunica. We suggest a detail assessment of resource quantities productivity potential, sustainable harvesting methods, domestication possibilities, market value of potentially promising species and importantly, equitable benefit sharing regiments, this

view is also shared by Shrestha and Dhillion (Shrestha and Dillon, 2003). Bhat recently reviewed diverse sources of such information in traditional abstracting services as well as in a variety of online electronic databases (Bhat 1997). One hundred and sixty-one species out of 1132 are new records for the square B6 and 95 are new for C6.These new records have been published previously (Ekim, Yildiz and Elik, 1986). Properly studied and recorded, this traditional knowledge could revolutionize the world of medicine.

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Manifestation of Existential Issues As a Brilliant Function for Quality of Matrimony

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Abstract: There are some important issues in marital counselling which are discoursed in Existential thought. These issues are freedom, time, human communication, meaning of life, and anxiety, which are shared by the existential counsellors and philosophers. Even though there are full potentials of the existential issues to be applied during counselling sessions, most of them are ignored by couple counsellors. The purpose of this article is to highlight these issues as the key concepts in four different counselling theories of Existential thought. We found that, each theory used only certain issues as the key concepts. Therefore, this study gathers all of the applied existential issues for a future comprehensive marital counselling model. Applying these issues together seems to be a brilliant function for quality of matrimony. Journal of American Science 2011;7(5):459-465]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Existential thought; existential issues; marital counselling; quality of matrimony

1. Introduction

Nowadays, a major concern among marital counsellors is the survival of marital satisfaction and communication as the barometer of marital quality in matrimony (Halford, 2003; Patrick, Sells, Giordano, & Tollerud, 2007). Several studies have highlighted the fact that the levels of anxiety, depression and meaning in the quality of matrimony are significantly related to the level of marital satisfaction and communication (Frankl, 1984; Kalantarkousheh & Hassan, 2010c; Tompson, 1991).

It seems that the aforementioned matters, as factors in the quality of matrimony, have been discussed in Existential thought. Existential counselling has initiated its application among various settings, individuals, and groups (Charny & Asineli, 1996; Kalantarkousheh & Hassan, 2009a; Lantz & Alford, 1995). In fact, issues such as the existential I-You communication, existential freedom, existential meaning of life, as well as existential anxiety and existential time, have been identified as integral parts of human beings, even when individuals get married. These issues have been recognized and regarded as effective potentials which are used in a variety of existential counselling processes (See: Binswanger & Boss, 1993; Cook, 2005; Cooper, 2003; Deurzen, 2002a; Deurzen, 2006; Kalantarkousheh & Hassan, 2010b; Lantz, 2004, 2004b; Lantz & Gregoire, 2000b; Lantz & Gregoire, 2003; Randall, 2001; Schneider, Status, & Availability, 2007; Yalom, 2002). However, as far as the current findings are concern, there is no existential training plan for couples who do not have mental problem and who want to increase their quality of matrimony, whereas the potentials of existential issues are not deniable. Therefore, there is a gap which demands for research surrounding the existential issues.

2. Theories in Existential Counselling

In general, there are four theories in existential counselling (Cooper, 2003), and each of them uses some of the existential issues. The first theory is known as Daseinsanalysis, which was created by Ludwig Binswanger (1881-1966) and then by Medard Boss (1903-1990). The key concept of this counselling theory is paying attention to the two of the fundamental existential issues, namely being in the world with others and freedom. The second theory is known as Logotherapy. Viktor Frankl (1905-1997) is known as the author of Logotherapy. In this therapeutic theory, logotherapists help individuals to discover the meaning and purpose of their life. In doing so, they are observed to actualize their true potentials. In addition, freedom and time are two issues which have vital role in Logotherapy. The third is called the American Existential Humanistic theory. Rollo May (1904-1994) is known as the father of the Existential Humanistic theory. Other researchers who came after May were Bugental, Yalom and Schneider. It is important to note that practitioners of the Existential Humanistic theory, unlike Daseinsanalysts, emphasize on individuality, subjective reality, as well as inner world and inner experience of human existence. In fact, the awareness of the realities of existence, namely death, meaninglessness, freedom, and isolation which lead to real anxieties has an essential role in the Existential Humanistic theory. The final theory is known as the British School of Existential Analysis. This particular theory represents a brilliant

revival of the existential training in the world (Cooper, 2003). The main author of this theory is Emmy Van Deurzen (1951-Present). Just like Daseinsanalystic practitioners, Van Deurzen emphasizes on 'being in the world with self and others' and rejects the humanistic theory which focuses on individualism and subjectivism (Hanscomb, 2006). Indeed, Deurzen (2002a), proposed four existential worlds for human beings; which three of them namely natural world, personal world and spiritual world are related to being in the world with self. The fourth world in her theory is social world which is related to being in the world with others. Table 1 shows all the mentioned theories in brief.

3. Existential Issues for the Quality of Matrimony

The main duty of existential counsellor is helping individuals to be aware of variety of possibilities and conditions in their life to make a high quality of life. This assert has supported by Flanagan , Flanagan (2004) and Emmy van Deurzen (2006) since they explain that existential counselling is almost always to facilitate individual's self-awareness. Moreover, existential counsellors by emphasizing awareness of individuals explain that any change in a life is by-product of the discovery of authentic existence (Haldane & McCluskey, 1982).

However, there is no existential training to be applied for spouses do not have mental problem and who only wish to improve the quality of matrimony. Notwithstanding emphasizing on giving awareness is main duty of existential counsellors with several possibilities in the existential counselling. This is supported by Lantz (1999) who eloquently states that the goal of existential counselling is to help spouses to increase their awareness towards love, fidelity, caring, and meaning in their matrimony and decrease alienation.

As mentioned earlier on, each existential counselling theory uses some existential issues while ignoring the rest. The major goal of this review article is to highlight and gather all effective existential issues in a comprehensive model for the quality of matrimony. Hence, Table 2 illustrates both the existential counselling theories and the extracted relevant existential issues. These issues seem to have high potentials for the quality of matrimony.

a. Existential I-You Communication

One of the essential issues in Existential thought is being in different communicational situations based on the I-You communication and I-It communication. Martin Buber (1958), known as the existential philosopher of dialogue, believes that the

world of human beings has two kinds of communications, namely the I–You communication and I–It communication. From Existential thought, 'It' has only essence but 'you' as 'I' exists, and this creates the essence during his life when making communication with others (Heidegger, 1962; Macquarrie, 1972; Sartre, 1953). Moreover, 'You' and 'I' are unique, singular and irreplaceable; however, 'It' is replaceable and is not singular or unique (Sartre, 1953). Furthermore, matters which are referred by 'It', unlike human beings, are without aspiration. They cannot try, or hope, or wish, or long to be other than they are. Hence, they never expect human beings to pay attention to them because they do not have any feelings like human beings. Indeed, the I–You communication is an interaction between two human beings, whereas the I-It communication is between human beings and animals, or human beings and objects. Whenever 'I' takes a communication with 'It', this is because of the use of It, but the communication between I-You is transcended using the communication. Additionally, the I-You communication is always dependent on dialogue, which is impossible in the I-It communication. Furthermore, love is only between the I-You communication, so someone who does not care about that communication does not understand love (Buber, 1958). Furthermore, characteristics such as to be present for each other, the lack of looking at each other proprietary, believe in other individual's freedom, and admit others' ideas are outlined in the I-You communication. Therefore, to be fully human, we are obliged to open ourselves for I-You communication.

It is necessary to highlight that the I-You communication is sometimes reduced to I-It. As indicated earlier, however, the I-It communication is dependent on the use of human beings' sideways rather than mutuality. Therefore, it is duty of existential counsellor to help human beings to do and act in a manner to prevent the I-You communication from being reduced to I-It communication. It seems that these kinds of existential communications can form a communicative model in matrimony.

Accordingly, couples can find brilliant communications for their lives and consequently continue their marital lives successfully, and at the same time, with love if they become aware of the model(Kalantarkousheh & Hassan, 2010a). Buber (1958) declares that marriage will never give a new life except by that out of which true marriage always arises, the revealing by two people of the You to one another. Each spouse in the dialogue becomes a You for the other if each is committed to an honest interfacing (Ventimiglia, 2008). Fitzpaatrick and Noller (1993) state that the I-You communication is

problem–solving as it involves an open and direct expression of feelings, exploring the causes of the conflict, clarifying misunderstandings and looking for a solution that is satisfying to both partners. Indeed, being totally present and open to another leads to a highly positive anxiety which leads to height quality of life (May, Angel, & Ellenberger, 1958). Human beings, in this kind of encounter, will be able to make real communication and brilliant relatedness to others.   In this condition, their existential needs, such as love, finding meaning in life, human relatedness, and freedom from deception are highlighted in both their matrimony and their individual life.

b. Existential Freedom

Existentialists put a great emphasis on the awareness of human being's freedom and highlight that this can play a crucial role in matrimony (Cohn, 1997; Cooper, 2003; Deurzen, 2002a; Frankl, 1988; Lantz, 2004; Yalom, 1980). It is believed that the main factor in the development of the Existential thought is to recognize the importance of human encounter, choice and freedom (Aborms, 1993; Deurzen, 2002a; Lantz, 2004; Yalom, 1980). Therefore, freedom is emphasized by the existential counsellors who have shown a great legacy in the well-known sentence of Sartre (2003), i.e. "existence precedes essence". In reality, the existence of human is an upsurge (J. Sartre, 2003), i.e. a doing, becoming in the world out of willingness and freedom. The objects of the world, unlike individuals, are being rather than existence, which means they are fixed, static and substance.

Existential philosophers and counsellors believe that freedom accompanies with some elements in human being. The first one is limitations. Existential philosophers such Heidegger (1962) and Sartre (2003) point out that freedom "depends" upon the limitations of life. For Heidegger and Sartre without limitations the human being is not capable of choice in life and that the presence of limitations is the core ingredient of freedom. The second one is responsibility. To make matters even more daunting, human being is responsible not only for her/his choices, but also for her/his non-choices. This is because every choice s/he makes represents, at the same time, the death of hundreds of other possibilities. The third one is anxiety. Due to awareness of our forced freedom and making choice implies the rejection of other alternatives (Sartre.1948; Cohn, 1997); anxiety permeates to entire human life (Kierkegaard, 1984). In other words, faced with freedom, finitude and having a large load of responsibilities lead to variety of anxieties

(Deurzen, 2002a; Hanscomb, 2006; Kalantarkousheh & Hassan, 2009c; Kierkegaard, 1984).

In general , from existential marital counselling, the term freedom does not indicate an absence of limitations upon marital life (Lantz & Gregoire, 2000b). Existential counsellors do believe that there are internal and external limitations that constrict some responsibilities, and that spouses always have some choices about how to respond to the limitations in life (Frankl, 1988). Therefore, in existential marital counselling, counsellors utilize the opportunity for choice to exercise the spouses' freedom, responsibility, strength, and internal locus of control (Frankl, 1988; Lantz, 2004).

c. Existential Meaning of life

Every day, people are tormented by questions that underlie the existential crisis; these include: What do we live for? What is the meaning of life? If an individual cannot come to a satisfying and at the same time reasonable answer to these questions, he will see his whole life in ruin. Albert Camus (1955) believes that the only serious philosophical question in a man's life is whether one should go on living at the time he fully realizes the meaninglessness of human life. Camus (1955) continues on by saying, "I have seen many people die because life for them was not worth living." In this light, the existence of "meaning" in life definitely plays a significant role in one's motivation for continuing the life.

Additionally, in many researches the significance of establishing a meaning in the quality of matrimony is emphasized (Kalantarkousheh & Hassan, 2010c; Kantor & Lehr, 1975; Tompson, 1991). Some statistics also show that existence of meaning in matrimony positively affects marital relationship (Frankl, 1984).   Boerop (1975) has utilized existential counselling and indicated that matrimony is a vehicle for making meaning which initiates by spouses' creation of a real marriage. According to Frankl (1984), every person has a unique task waiting to be fulfilled in life and it is a person's responsibility to actualize its meaning. Lantz and Gregoire (2003b) believe that when such a sense of meaning in life is frustrated, disrupted, or ignored, individuals develop a psychological "existential vacuum" that either becomes filled with a developing sense of meaning and purpose or with symptoms such as depression. Eexistential couple counsellors declare that family change most frequently occurs when spouses are able to find the meaning for the change (Frankl, 1988; Lantz, 2004). They emphasize that existential counsellor's most important responsibility is to help them become more aware of the meanings and meaning potentials in their

matrimony (Frankl, 1988; Lantz, 2004). This kind of awareness is related to existential time which will be discussed in the following section.

d. Existential Time

Just like the physical time, existential time has the present, past and future. However, existential time is not distinct from human dimensions. Indeed, a human being, in the course of his or her life, will achieve or fail, so time from Existential thought is a reciprocal element. As for individual's relation to time, the individual in one time lives in three times, "by memory has brought his past with him into the present and by anticipation and imagination he has already laid holds on to his future and projects himself into it'' (Macquarrie, 1973, p. 156). Existentialists try their best to guide others to self-awareness of human conditions, i.e. their past and future are real concepts and we as human beings allow them to live in the present. Existential counsellors also point out different approaches, so time is known as an important and central aspect of the existential counselling (Frankl, 1988; Heidegger, 1962; Kalantarkousheh & Hassan, 2009b; Lantz, 2004b). They believe that individuals have different responsibilities in each part of their time. It is also believed that mental problems come from the lack of attention to the relationship between the responsibilities and each part of time. Thus, it is the role of the existential counsellors to help clients to become aware of this relationship.

First, in the present time individuals have the responsibility to actualize the potentials of meaning in life. Frankl (1986, 1988) believes that the present is the period in which human beings can utilize courage, wisdom, good faith, and responsibility to actualize and make use of the potentials of meaning and opportunities that are presented by life. Frankl (1986, 1988) also points out that the present is also the period of time in which individuals can use "bad faith" and "irresponsibility" by avoiding the actualization of the meaning potentials that are presented in life.

Second, future is the minute of time in which individuals have responsibility to notice the potentials of meaning in their future life. Frankl (1984, 1988), states that the future is the side of time that holds the meaning "potentials" and meaning "opportunities" of human life. Individuals, in this part, ought to pay attention to call for meaning. However, they have choice to select the call. From an existential counselling point of view, it is believed that change among couples occurs only when spouses are capable to find a reason or purpose for change, namely call dimension of life which is related to the future. Hence, the responsibility of existential

counsellor is to help the couples become aware of the meanings and potentials of meaning which are useful for the matrimony (Frankl, 1988; Lantz, 2004b).

Third, the past is the point of time which serves as a 'storehouse' in which all the actualized potentials of meanings are placed for real. This is a must dimension of human beings so that nobody can change his/her past. It is the responsibility of spouses, by recollection, to encounter, accept the reality, and then honour their past in order to settle and form their shining present and brilliant future (Frankl, 1959; Lantz, 1994a; Lantz, 1995; Lantz, 2004; Lantz & Ahern, 1998). Spouses need to remember even though they have some limitations in their past matrimony, namely must dimension, they have achieved many cases during that time. Spouses, by doing so, can find or make meaning for their matrimony. From existential counselling, focusing on the past provides an enhanced understanding of the future and the present (Lantz, 1998). Moreover, re-collection which is related to the past occurs every moment when each of spouses share their achievements, problems, joys, and actualized meaning potentials with each other in a regular and consistent way (Lantz, 1996a). This reminding helps spouses to recover and recollect the forgotten potentials of meaning that have been deposited in the past (Frankl, 1955; Lantz, 1995; Lantz & Alford, 1995).

According to existential marital counselling, many marital problems happen when spouses do not discover, experience, or make use of the meanings and potentials of meaning in matrimony (Lantz, 1974, 1991; Lantz, 1994b). Therefore, it is the counsellor's duty to help spouses extract the hidden potentials of meaning from the unconscious level into conscious awareness to be used in matrimony (Lantz & Raiz, 2004). The obtained results of the study showed the importance of existential time in existential counselling. Inevitably, the consequence necessitates investigating and considering existential time as a fundamental factor in the counselling.

e. Existential Anxiety

Anxiety is defined as a negative emotion which manifests on human's physical situation as well as mental one (Kalantarkousheh & Hassan, 2009c; Kirkland-Handel & Mitchell, 2005). However, from the existential counselling, the potentially beneficial effects of anxiety are preferred over its negative effects (Deurzen, 2002a; Kalantarkousheh & Hassan, 2009c). May (1977) was perhaps the first modern mental health professional to conceptualize anxiety as a good thing. He emphasizes that it is a normal and essential by-product of the human existence. In short, his

formulation of anxiety encourages individuals to view anxiety differently. Human beings should embrace it as a part of their experience. In other words, it should be explored, experienced, engaged in, and redirected into constructive activities — it should not avoided (Deurzen, 2002a). From the existential counselling point of view, other existential issues are known as the reasons of anxiety. These issues, like their result (i.e. anxiety), have positive fundamental roles in the growing of individuals. Due to the awareness towards forced freedom, making choice and responsibility implies the rejection of other alternatives (Sartre, 1948; Cohn, 1997), while anxiety permeates to entire human life (Deurzen, 2002a; Hanscomb, 2006; Kalantarkousheh & Hassan, 2009c; Kierkegaard, 1984). Although anxiety leads to the feeling of loneliness at first, freedom is a fundamental element to change this crisis into

opportunity (Kalantarkousheh & Hassan, 2009c). Authenticity is another positive existential dimension of anxiety. It causes individualization which brings human beings back from their falling so it makes manifest to him that authenticity and inauthenticity are the realms of their choices (Heidegger, 1973; Deurzen, 2002a). Meanwhile, anxiety has negative effects on sexual satisfaction (Adams, Harper, Emberly, & Cobia, 2006). The goal of existential counsellors is not to do away with anxiety, but to reduce neurotic anxiety. This is accomplished by helping their clients to live with and cope effectively and creatively with the normal anxiety that accompanies existence (Antoniadis, 1991; Deurzen, 2002a; Flanagan & Flanagan, 2004)

Table1: Theories in Existential Counselling

	Authors	Theory	Key concepts
1	Ludwig Binswanger (1881-1966) / Medard Boss (1903-1990)	Daseinsanalysis	∅ Being in the world with others ∅ Freedom
2	Viktor Frankl (1905- 97)	Logotherapy	∅ meaning of life ∅ Time ∅ Freedom
3	Rollo May (1904-94)	The American Existential Humanistic	∅ Encountering real anxieties
4	Emmy Van Deurzen (1951-present)	The British School of Existential Analysis	∅ Being in the world with self and others

Table 2: Existential Counselling Theories and the Extracted Existential Issues for the Quality of Matrimony

	Authors	Theory	Key concepts of the theory	Extracted Existential Issues
1	Ludwig Binswanger (1881-1966) / Medard Boss (1903-1990)	Daseinsanalysis	∅ Being in the world with others ∅ Freedom	-Existential I-You Relationship - Existential Freedom
2	Viktor Frankl (1905- 97)	Logotherapy	∅ meaning of life ∅ Time ∅ Freedom	- Existential Meaning - Existential Time - Existential Freedom
3	Rollo May (1904-94)	The American Existential Humanistic Approach	∅ Encountering real anxieties	- Existential Anxiety - Existential Freedom
4	Emmy Van Deurzen (1951-present)	The British School of Existential Analysis	∅ Being in the world with self and others	-Existential I-You Communication

4. Conclusion and Suggestions

In conclusion, there are various potentials in the Existential thought which can be useful for a brilliant matrimony. In this paper, on one hand, it has shown that existential issues have possibilities to be applied, while on the other, each of the theories has used some of these issues. Therefore, by integrating the aforementioned existential issues, they can be used in the form of a model for the quality of marital life. Additionally, it seems that conducting some experimental research to measure the effect of existential issues on quality of matrimony can be regarded as a response to therapists' and counsellors' concerns which are surrounding the survival of matrimony.

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Verbal Abuse and Coping Behaviors Directed to Operating Room Nursing Staff at University Hospitals

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Abstract: Verbal abuse is a most common form of workplace violence in the operating room settings. It affects operating room nurses personally and professionally. Such effects have a major implication for nursing profession in term of retention, satisfaction, and quality of care. So, the occurrence of verbal abuse depends on a great extent of coping behaviors among nurses working in the operating room environment. Thus this study aimed to determine the relationship between verbal abuse and coping behaviors directed at operating room nursing staff at university hospitals. This study was conducted in all operating room (n = 65) in five major governmental hospitals affiliated to University hospitals, Egypt. The subjects consisted of 206 operating room nursing staff categorized into operating room head nurses (n=16) and operating room nurses (n=190) working in the above mentioned settings. The participants completed a questionnaire includes the verbal abuse scale (VAS) , this questionnaire consisted of a five section related to frequency and stressfulness of incidence of verbal abuse , strength of feeling, similarity of thought, severity of long term negative effects, and coping behaviors. The finding of this study shows that 40% of operating room nursing staff reported that they had been abused by surgeons followed by another nurses 27.7%. The average number of reported incidents during the year was at least once a month or less episodes of verbal abuse. Judging and criticizing, abusive anger as well as blocking and diversity were the most frequent and stressful forms of verbal abuse. The most severe, long term effect of verbal abuse was reported to be its impacts on the physical health, relationship with other nurses as well as patient care outcomes. Threatened was the most intense of emotional reactions, indifferent and frustration. In addition the operating room nursing staff identified with a variety of adaptive and maladaptive coping behaviors and rated the similarity and effectiveness of these coping behaviors in responses to verbally abusive episodes. Conclusion, the need of nursing administrators for empowering operating room nurses to develop the formal protocols for adequately supported dealing with and prevent incidence of verbal abuse from surgeons against them. Also, training of nursing personnel is an essential element of effective verbal abuse prevention program.
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1. Introduction:

Verbal abuse has become an alarming phenomenon worldwide. It is increasingly known as serious health problem affecting all personnel of all educational levels [1]. Violence does not occur as one single incident, but also may be expressed in repeated small incidents which together create sever harm ranging from physical , psychological harm to permanent disability and even death [2] .

Verbal abuse is an insidious common form of workplace violence in today's health care environment that is a major contributor to dissatisfaction and high rates of attrition in nurses [3]. The term verbal abuse frequently defined as "any communication a nurse perceives to be a harsh, condemnatory attack upon herself or himself professionally or personally"[4]. According to Cook *etal* [5], they defined verbal abuse among perioperative nurses as "verbal behaviors that

humiliate, degrade, or otherwise indicate a lack of respect for the dignity and worth of another individual". These behaviors include yelling, swearing, verbal insults, and threats of harm. [5,6]

The literature reveals that all nurses are susceptible to the threat of verbal abuse episode , regardless of their level and areas of specialties, yet this is particularly true for those at special care units and in operating rooms [7]. Araujo and Sofield [8] reported that 91.1% of the 1000 operating room registered nurses that they surveyed had been victims of verbal abuse in the course of their nursing career. Moreover, Cook *et.al.*[5], in a study of verbal abuse of perioperative nurses reported that 45% of them experiencing verbal abuse once per month or less.

Multiple causes had been identified to spread verbal abuse rapidly in operating room. Among theses causes are surgeons change and/or add procedures or need equipment and supplies without

warning, working with a surgeon, anesthesiologist, or staff member whom she likes or dislikes may mitigate or exacerbate perceived stress, and hospital policy is another element of the environment that can produce stress for the individual nurse [9,10]. Also, operating room nurses can develop interdependency on one another to accomplish their goals. This constant exposure with high acuity situation, long hours, technology, time pressure, and professional expectations may increase stress, leading to verbal abuse situation. Because of the length of time needed to train an OR nurse, many nurses who go through the specialized training choose to remain in the OR for a very long time. This may create difficulty for new, younger nurses who may be seen as a threat to existing staff [10-12].

The operating room setting can be very stressful. A surgical team consists of the anesthesia, a surgeon, a scrub person, and a circulating nurse. The circulating nurse, team members must remain within the sterile area and, therefore, are unable to leave when verbal abuse occurs [12-14]. The incidence of verbal abuse in the OR may be related to changes in the health care delivery system. Mergers, downsizing, and reduced staffing levels have affected the demand for quality, cost-effective patient care [15]. Meeting these demands requires teamwork and harmonious relationships between nurses and physicians. [16]. In addition, it represents as a costly problem for managers of the operating room and administrators if incidents of verbal abuse are not dealt adequately, the consequences can be devastating, not only in terms of the psychological trauma, but also from a professional perspective in term of lowered morale, decreased job satisfaction, altered job performance, and turnover of qualified nurses. [13, 17].

Verbal abuse was recognized as the external, focal stimulus that immediately confronts the nurse to make responses. These responses are categorized in the regulator and cognator subsystems and manifested through adaptive modes of behaviors. The modes of behaviors were measured by response of incidence of verbal abuse, severity of stress, cognitive appraisal of the verbally abusive episode, identification and effectiveness of coping mechanism, emotions, and long –term effects of verbal abuse from physicians [5,11]. Nurses do not need to be victims of verbal abuse. A positive adaptation to verbal abuse would be to use positive coping mechanisms and resources to inactivate the abuser. Administrative policies of the nurse's employer, nursing regulatory bodied, as well as the legal system are social systems that can provide support [11,18].

Nationally, reviewed literature for studies conducted in Egypt revealed that has been focused on issues concerning workplace violence and job satisfaction [19], prevalence of workplace violence toward health care providers.[20] However, no attempt was made to determine the relationship between verbal abuse and coping behaviors directed at operating room nursing staff working at University Hospitals, Egypt. It is hoped that this study will help nurse managers to reinforce the idea that the nurses have a right to be treated with respect and work in a safe environment. In addition, will give valuable insights to the operating room nursing staff regarding the risk they face in their units and the effective methods to manage and prevent its occurrence.

Aim of the study:

This study aimed to determine the relationship between verbal abuse and coping behaviors directed at operating room nursing staff working at University Hospitals, Egypt.

2. Material and Methods:
Design:

A correctional descriptive research design was utilized for this study.

Settings:

The study was conducted in all operating rooms in five major governmental hospitals affiliated to University Hospitals, Egypt. They were approved to be the setting for study conduction. The study hospitals included twenty four (n=24) operating suites with sixty five operating rooms (n=65) (each suite comprised from 2 to 7 operating rooms).

Subjects:

The subjects solicited for the study consisted of a convenience sample of 206 nursing staff of all educational backgrounds, working in the selected settings and welling to be involved in this study. They were all head nurses (n=16), who have the responsibility for managing the operating room administrative activities, and all nurses (n=190) who have the responsibility of carrying out the manual activities in operating room for patients undergoing surgery. Also, they available at the time of data collection and inclusion criteria included a minimum of one year experience in the current operating rooms.

Tool: verbal abuse scale (VAS)

Verbal abuse scale is self report, retrospective questionnaire developed by Manderin and Banton [21], since the essential questionnaire was developed in agreement with nurses' working in the surgical environment; it was modified in a manner to be suitable to be used in operating room environment and nurse- nurse abuse. For this purpose, rewording or rephrasing of the statements was done. For

example, the word "operating room head nurse / operating room nurse" was used instead of "head nurse/ nurse", "operating room setting" instead of "Work setting". The questionnaire designed toward reflecting verbal abuse of nurses from others i.e. physicians and nurses during the past year. Verbal Abuse Scale comprises five subscales, and each item was scored on a seven-point Likert-scale. It consists of 60 items categorized into: three parts. Part one measured socio-demographic characteristics of the subjects as, operating room specialty, martial status, age, educational qualification, and years of experience in the O.R etc. Second part measured frequency of verbal abuse incidence and sources among operating room nursing staff. Part three, designed to identify frequency and stressfulness of verbal abuse forms, estimate responses to the verbal abuse in term of strength of feeling (emotional reactions), similarity of thought (cognitive appraisal), severity of long term negative effects, and describe perceived similarity and effectiveness of coping behaviors in handling verbal abuse.

I: Frequency and stressfulness of verbal abuse identifies the incidences of ten (n =10) forms of verbal abuse. These items were rated how often verbal abuse occurs ranging from 0 = repressing never to 6 = repressing every day. In addition, rated how stressful the event of verbal abuse with 0 = representing not at all to 6 = representing extremely stressful.

II: Strength of feeling, measures for emotional reactions in the context of the verbally abuse episodes encounter (n =13 items). The response to each item was assessed ranging from 0 = indicating not at all to 6 = indicating extreme feeling.

III: Similarity of thought, measures nurses' interpretations or cognitive appraisals thoughts through evaluation of personal significance for verbally abusive episodes (n= 11 items). Responses to each items was measured as following 0 = indicating not at all similar to 6 = indicating extremely similar.
V: Severity of long term negative effects describes negative effects caused by past experiences of being verbally abused by others i.e. physicians, nurses (n=13 items). The response items range from 0 = not negative effect at all to 6 = extreme negative effect.
VI: Coping behaviors perceived as effectiveness and similarity in handling verbal abuse during the past year (n =13 items). The responses to perceived similarity of coping behaviors ranged 0= not at all similar to 6 = extremely similar. Also the responses to perceived effectiveness of coping behaviors ranged

0= indicating not at all effective to 6 = indicating extremely effective. The reliability of the essential VAS had been previously established (the overall alpha coefficient ranged from 0.67 to 0.95 was [21, 22]. For the current questionnaire (VAS), alpha coefficient was ranged from 0.65 to 0.78 alpha coefficients

Methods:

After obtaining the official approvals from the selected settings, the researcher translated the original questionnaire into Arabic. Then submitted to five experts in the filed of the study to be tested for its statements relevance, and accordingly, necessary modification as rewording of a number of statements was done. Reliability for the questionnaire was tested to measure the internal consistency of the sub-items composing each verbal abuse scale using Cronbach alpha coefficient. Consequently, a pilot study was carried out on (10%) of the nursing staff as follow: O.R head nurses (n =2), O.R nurses (n =19) to check, insure the clarity of the statements and estimating time spending for fulfill the questionnaires. The decision was made to conduct the pilot study on those subjects in order not to contaminate the sample. Accordingly, they were excluded from the main study subjects and based on their opinions some statements were rephrased. After obtaining the subjects consent and assuring information confidentiality, they filled the sheets while they were in their work settings. All nursing staff was carefully instructed about the aim of the study were given before the distribution of the questionnaire. Filling the questionnaire consumed about 15-25 minutes to be completed and data collection in two months period from September to the end of November 2010.

Ethical considerations:

A cover letter sent with the questionnaire containing instructions, identifying the research purpose for the study and assure of confidentiality. Emphasizing that the participants were completely voluntary and the respondents would remain anonymous.

Statistical analysis:

After the questionnaire was collected, a codebook was developed to provide numerical results for analysis. Data were reviewed and transferred into a specially designed format to be suitable for computer feeding .A package for the Statistical Package for Social Science software (SPSS version 11.0) was used for statistical analysis of this data. Descriptive measures included frequency, percentage; arithmetic mean and standard deviation were used to measure data. Statistical tests utilized included: Chi-

square (X^2), Student t-test for analysis qualitative variables as well as Cronbach alpha coefficient was calculated to assess the reliability of the questionnaire. Level of significance selected for using this study was ($p<0.05$).

3. Results:

Table 1: shows frequency distribution of operating room head nurses and nurses in relation to their demographic characteristics. It indicated that, the age group of the operating room head nurses and nurses in this study ranged from 40 years old and more (50%, 24.7%, respectively), currently married (68.75%, 62.1%) with 16 years and more of experience (62.5%, 44.7%). The majority of them 87.5% and 86.8% held diploma degree in nursing and were working in general surgery specialty 25% for operating room head nurses as compared to 21.1% of operating room nurses in orthopedic surgery specialty. All operating room head nurses work in morning shift and about nearly half of operating room nurses stay for rotated shifts.

Table (1): Frequency distribution of operating room head nurses and nurses in relation to their demographic characteristics

Demographic Characteristics	O.R H.N (n = 16)		O. R. N (n = 190)		O.R nursing staff (n = 206)	
	NO.	%	NO.	%	NO.	%
Specialty						
General surgery	4	25.00	36	19.00	40	19.43
Thoracic and heart surgery	1	6.25	8	4.20	9	4.37
Urology surgery	1	6.25	9	4.70	10	4.85
Ophthmology surgery	1	6.25	8	4.20	9	4.37
Nero surgery	1	6.25	9	4.70	10	4.85
Maxillofacial surgery	1	6.25	9	4.70	10	4.85
Emergency surgery	1	6.25	6	3.20	7	3.40
Orthopedic surgery	2	12.50	40	21.10	42	20.39
Pediatric surgery	2	12.50	28	14.70	30	14.56
Obstetric surgery	2	12.50	37	19.50	39	18.93
Age (years):						
< 20 –	-	-	22	11.60	22	10.70
20 –<25	-	-	26	13.70	26	12.60
25 –<30	3	18.75	30	15.80	33	16.00
30 –<35	2	12.50	32	16.80	34	16.50
35 –<40	3	18.75	33	17.40	36	17.50
40 and more	8	50.00	47	24.70	55	26.70
Marital status:						
Single	3	18.75	67	35.30	70	34.00
Married	11	68.75	118	62.10	129	62.60
Divorced	2	12.50	4	2.10	6	2.90
Widow	-	-	1	0.50	1	0.50
Educational level:						
Secondary Technical Nursing School Diploma	14	87.50	165	86.84	179	86.90
Technical Institutes of Health diploma	-	-	16	8.42	16	7.80
Bachelor of Science Degree (BSc N)	2	12.50	9	4.74	11	5.30
Years of experience:						
1– 5	-	-	40	21.10	40	19.40
6 – 10	2	12.50	28	14.70	30	14.60
11 – 15	4	25.00	37	19.50	41	19.90
16 and more	10	62.50	85	44.70	95	46.10
Shift						
Morning	16	100.0	55	28.95	71	34.47
Evening	-	-	28	14.74	28	13.59
Night	-	-	30	15.79	30	14.56
Rotated	-	-	77	40.52	77	37.38

O.R H.N : Operating room head nurses   O.R N: Operating room nurses

Table 2: shows incidence, frequency and sources of verbal abuse as distributed by nurses' job categories. It was observed that about one third of operating room nursing staff 35.9% experience verbal abuse among operating room settings and they reported at least once a month or less episode of verbal abuse during the last year. Also operating room head nurses (37.5%) experienced more verbal abuse and reported that they getting verbal abuse several times a month (62.5%) as compared to operating room nurses 35.8% who reported occurrence of verbal abuse once a month or less 34.7%. A statistical significant difference was found between incidence of verbal abuse and nurses' job categories in term of operating room nurses , operating room nursing staff (X^2 = 15.347, and

16.330 <0.05 respectively). Also, between frequency of verbal abuse and nurses' job categories (X^2 = 19.000 p< 0.05, 73.432, and 90.796 p< 0.01 respectively).

Regarding, verbal abuse sources surgeon, surgical nurses as well as anesthesiologist reported to be the most significant identified as abusers to operating room nursing staff (40.3%, 27.7%, and 17.5% respectively). Surgeons are the principal abusers for verbal abuse significantly against operating room head nurses (43.8%) than operating room nurses (40%) while surgical nurses are the abuser for verbal abuse significantly against operating room nurses (28.4%) than operating room head nurses 18.75% (X^2 = 10.250, and 178.863 p < 0.01 respectively).

Table 2: Incidence, frequency and sources of verbal abuse as distributed by nurses' job categories

Verbal abuse variables	O.R H.N (n = 16)		O. R N (n = 190)		Total (n = 206)	
	NO.	%	NO.	%	NO.	%
Incidence of verbal abuse						
Yes	6	37.50	68	35.80	74	35.90
No	10	62.50	122	64.20	132	64.10
X^2	1.000		15.347*		16.330*	
P –Value	0.317		0.000		0.000	
Frequency of verbal abuse						
Never	1	6.20	24	12.60	25	12.10
Once to 6 times	3	18.80	48	25.30	51	24.80
Once a month or less	1	6.20	66	34.70	67	32.50
Several times a month	10	62.50	29	15.30	39	19.00
Once a week	1	6.30	12	6.30	13	6.30
Several times a week	0	0.00	11	5.80	11	5.30
Every day	0	0.00	0	0.00	0	0.00
X^2	19.000*		73.432**		90.796**	
P –Value	0.001		0.000		0.000	
Sources of verbal abuse						
Surgical nurse	3	18.75	54	28.40	57	27.67
Medical nurse	1	6.25	9	4.70	10	4.85
ICU nurse	-	-	2	1.100	2	0.970
Emergency nurse	1	6.25	11	5.80	12	5.83
Outpatient nurse	1	6.25	5	2.60	6	2.91
Surgeon	7	43.75	76	40.00	83	40.29
Anesthesia	3	18.75	33	17.40	36	17.48
X^2	10.250		178.863**		192.184**	
P –Value	0.068		0.000		0.000	

O.R H.N : Operating room head nurses   O.R N: Operating room nurses
   * p 0.05 at 5% level denotes a significant difference .
   ** p 0.01 at 1% level denotes a highly significant difference .

Corresponding to frequency and stressfulness of verbal abuse forms encountered by nurses' job categories (Table 3), it was observed that, judging ad criticizing followed by abusive anger and blocking and diversity were rated as the highest mean score that mostly frequent occurring forms of verbal abuse directed at operating room nursing staff, head nurses, and nurses (6.28±.98, 6.50±063, 6.26±1.00, 6.22±1.05, 6.44±081, 6.21±1.07, 5.84±1.36, 6.13±1.09, and 5.82±1.38, respectively). While accusing and blaming was the lowest mean score that rated least frequent occurring forms of verbal abuse among them (2.92±1.73, 3.56±1.86, and 2.87±071, respectively).   Also, a statistically significant difference was documented between frequency of verbal abuse forms and job categories in term of threatening (t = -2.25 p<0.05)

Concerning, stressfulness of verbal abuse forms, this table also reflects that trivializing, followed by judging and criticizing as well as abusive anger were the highest mean score as the most stressful forms of verbal abuse among operating room nursing staff, head nurses, and nurses (6.17±1.19, 6.19±1.28, 6.16±1.18, 5.49±1.60, 5.38±1.67, 5.50±1.60, 5.39±1.77, 5.63±1.31, and 5.37±1.80, respectively). On the other hand, discounting as well as accusing and blaming those least likely to occur as stressful forms of verbal abuse with low mean scores among them (3.07±1.28, 3.07±1.27, and 2.69±1.99 respectively). There is no significant difference in this respect.

Table 3: Frequency and stressfulness of verbal abuse forms encountered by nurses' job categories

Forms of verbal abuse	Frequency				Stressfulness			
	O.R Nursing staff				O.R Nursing staff			
	O.R H.N (n = 16)	O. R N (n = 190)	Total (n=206)	t-value	O.R H.N (n = 16)	O. R N (n=190)	Total (n=206)	t-value
	X±SD	X±SD	X±SD		X±SD	X±SD	X±SD	
Abusive anger	6.44±081	6.21±1.07	6.22±1.05	-0.85	5.63±1.31	5.37±1.80	5.39±1.77	0.33
judging and criticizing	6.50±063	6.26±1.00	6.28±.98	-0.95	5.38±1.67	5.50±1.60	5.49±1.60	0.30
Accusing and blaming	3.56±1.86	2.87±071	2.92±1.73	-1.55	2.69±1.99	3.12±2.08	3.09±2.07	0.80
Blocking and diverting	6.13±1.09	5.82±1.38	5.84±1.36	-0.87	4.06±1.98	4.45±2.29	4.42±2.27	0.65
Verbal abuse disguised	3.50±2.31	3.72±2.22	3.70±2.22	0.37	5.19±2.17	4.94±2.11	4.96±2.11	-0.46
Discounting	4.33±2.32	4.88±2.13	4.84±2.14	0.95	3.00±1.41	3.07±1.27	3.07±1.28	0.22
Trivializing	4.56±2.28	4.98±2.07	4.95±2.08	0.78	6.19±1.28	6.16±1.18	6.17±1.19	-0.08
Ignoring	4.31±2.21	4.72±1.97	4.69±1.99	0.79	3.69±2.18	4.27±2.28	4.23±2.27	0.99
Threatening	5.81±1.11	5.11±1.96	5.17±1.92	-2.25*	3.25±2.08	3.07±1.99	3.09±1.99	-0.34
Condescending	4.13±2.09	3.61±2.05	3.65±2.05	-0.97	4.81±2.20	5.33±1.96	5.29±1.98	1.01

* p   0.05 at 5% level denotes a significant difference .

Table 4: Presents the strength of feeling, similarity of thoughts, and severity of long-term negative effects as perceived by nurses' job categories. Concerning strength of feeling, it was found that, the most intense emotional reactions from a verbally abuse episodes that have a highest mean score was threatened, followed by indifferent and frustration as reported by operating room nursing staff (6.17±1.30, 6.16±1.26, and 6.14±1.22). On the other hand, shack/ surprise was rated as the lowest mean score that indicates strength of feeling among operating room nursing staff 3.00±1.94. Also, head nurses who engaged in OR had highest mean score of threatened feeling as compared to confusion feeling for nurses those working in OR. A statistically significant difference was found between strength of feeling and nurse' job categories in term of embarrassed / humiliated and threatened (t = -2.23, -2.06 p<0.05, respectively)

For similarity of thoughts, it was observed that the highest mean scores of cognitive appraisal thought that most frequently interpreted were "I don't deserver this treatment" followed by "this could potentially hurt me" among operating room nursing staff, head nurses and nurses (6.13±1.11, 5.80±1.43, 6.11±1.11, 5.76±1.43, 6.31±1.08, and 6.19±1.38, respectively). While "it must be my fault" is the lowest means score of cognitive appraisal thoughts that less frequently interpreted by operating room nursing staff and nurses (3.79±1.96, and 3.73±1.96 respectively). There is no statistically significant difference in this respect (p> 0.05)

The same table shows that, the highest mean scores of physical health followed by relationships with other nurses and patient care outcomes were the most frequently responses to severity of long term negative effects among operating room nursing staff, head nurses and nurses.(6.03±1.30, 5.89±1.25, 5.85±1.31, 6.50±0.82, 6.25±1.00, 6.00±1.55,

5.99±1.33, 5.89±1.27, and 5.85±1.32, respectively) However, trust and support at work was the lowest mean score of the least frequent responses to severity of long term negative effects (4.36±1.90, 4.31±1.70,

and 4.36±1.92, respectively). The relationship between severity of long term negative effects and job categories was not statistically significant.

Table 4: Strength of feeling, similarity of thoughts, and severity of long-term negative effects as perceived by nurses' job categories

Variables	O.R H.N (n = 16)	O. R nurses (n = 190)	Total (n = 206)	t-value	p
	X±SD	X±SD	X±SD		
Strength of feeling					
Confusion	5.88±1.31	6.16±1.22	6.14±1.22	0.90	0.37
Anger	5.94±1.48	5.58±1.70	5.61±1.69	-0.82	0.42
Sadness /hurt	5.56±1.63	5.44±1.70	5.45±1.69	-0.28	0.78
Shack / surprise	2.69±1.66	3.03±1.97	3.00±1.94	0.68	0.50
Misunderstood	6.38±1.02	6.07±1.25	6.10±1.24	-0.94	0.35
Shamed	6.06±1.44	5.58±1.64	5.62±1.63	-1.13	0.26
Felt responsible	6.31±1.54	5.57±1.90	5.63±1.88	-1.52	0.13
Embarrassed / humiliated	6.19±1.05	5.31±1.54	5.38±1.52	-2.23*	0.03
Threatened	6.81±0.40	6.12±1.34	6.17±1.30	-2.06*	0.04
Frustration	6.38±1.31	6.13±1.28	6.15±1.28	-0.75	0.46
Indifferent	6.50±0.82	6.13±1.29	6.16±1.26	-1.14	0.26
Intimidated	5.19±2.34	4.54±2.31	4.59±2.31	-1.08	0.28
Fear	5.44±2.37	5.58±1.87	5.57±1.91	0.28	0.78
Similarity of thoughts					
It must be my fault	4.50±1.83	3.73±1.96	3.79±1.96	-1.52	0.13
I don't deserve this treatment	6.31±1.08	6.11±1.11	6.13±1.11	-0.70	0.48
This could potentially hurt me	6.19±1.38	5.76±1.43	5.80±1.43	-1.14	0.26
She has no right to do this	5.19±2.14	4.58±2.11	4.63±2.12	-1.11	0.27
This is no big deal to me	5.19±2.07	5.57±1.60	5.54±1.64	0.89	0.37
What a jerk	4.56±2.00	4.31±2.04	4.33±2.04	-0.49	0.63
This is horrible	4.31±2.12	4.06±1.89	4.08±1.91	-0.51	0.61
I have not done anything wrong	4.94±1.73	4.45±2.00	4.49±1.98	-0.95	0.34
This will get me in trouble	6.00±1.32	5.60±1.30	5.63±1.30	-1.18	0.24
I did something wrong	5.69±1.74	5.59±1.65	5.60±1.65	-0.23	0.82
I can deal with this	5.38±1.96	5.71±1.30	5.68±1.36	0.95	0.34
Severity of long-term negative effects					
Confidence in yourself	5.88±1.54	5.71±1.36	5.72±1.37	-0.47	0.64
Sense of well-being of work	5.88±1.59	5.63±1.53	5.65±1.53	-0.61	0.54
Job satisfaction	4.63±2.22	4.37±1.93	4.39±1.94	-0.50	0.62
Your job performance	4.69±2.27	4.77±1.78	4.77±1.81	0.18	0.86
Trust and support at work	4.31±1.70	4.36±1.92	4.36±1.90	0.10	0.92
Relationships with other nurses	5.94±1.00	5.89±1.27	5.89±1.25	-0.15	0.88
Relationships outside work	5.00±1.93	4.98±1.68	4.99±1.70	-0.04	0.97
Mental health	6.00±1.55	5.44±1.46	5.49±1.47	-1.47	0.15
Physical health	6.50±0.82	5.99±1.33	6.03±1.30	-1.51	0.13
Turnover of nursing staff	4.88±2.31	5.29±1.71	5.26±1.76	0.91	0.37
The nursing shortage	5.56±2.13	5.38±1.70	5.39±1.73	-0.41	0.69
Patient care outcomes	5.94±1.24	5.85±1.32	5.85±1.31	-0.26	0.79
Productivity of work	6.25±1.00	5.51±1.53	5.56±1.51	-1.91	0.06

* p 0.05 at 5% level denotes a significant difference .

Similarity and effectiveness of coping behaviours as perceived by nurses' job categories were shown in table 5. The table point out that the most similar coping behaviors perceived by operating room nursing staff, head nurses, and nurses were "I deal directly with the nurse about the abuse" followed by "I engage in positive activities" (5.58±1.50 ,5.94±1.06, 5.55±1.53, 5.81±1.61, 5.81±1.56, and 5.81±1.61 respectively). Whereas "I engage in wishful thinking" was the least frequent similar coping behaviors used for operating room nursing staff, head nurses, and nurses (2.36±1.53, 2.63±0.96, and 2.25±1.48 respectively). Also, there was statistically significant difference among nurses job categories regarding mean scores for ssimilarity of coping behaviours as related to "I ask for assistance /support from others", and "I exercise or do some form of muscle relaxation". (t = -3.54 p<0.01, and -1.96 p<0.05, respectively).

Correspondingly, it is clear from this table that the highest mean score was for "I ask for assistance /support from others" followed by "I attempt to clarity any misunderstanding the nurse may have" as the most effective coping behaviors among operating room nursing staff, head nurses, and nurses (6.08±1.30, 6.19±1.60, 6.07±1.28, 6.01±1.48, 6.19±1.56, and 6.00±1.47, respectively). On the other hand, they perceived the lowest mean score for "I tend to blame myself" as the least effective coping behaviors (2.38±1.14, 2.44±0.96, and 2.37±1.16, respectively). The nurses' job categories differed statistically and significantly in mean scores for effectiveness of coping behaviors in term of "I deal directly with the nurse about the abuse ", "I ask for assistance /support from others" , and "I talk to myself in a reassuring way" (t = -2.38, 2.12, and -2.31 p<0.05 respectively).

Regarding, coping behaviors, table 6 describes the relationship between incidence of verbal abuse and coping behaviors among operating room nursing staff. In order of highest mean score of coping behaviors were "I ask for assistance /support from others" and "I deal directly with the nurse about the abuse" as most similar after verbally abusive events for operating room head nurses as compared to "I engage in positive activities" , and "I deal directly with the nurse about the abuse" for operating room nurses (6.67±0.52, 5.50±1.05, 5.97±1.51, and 5.54±1.64 respectively). Whereas, the lowest mean score was perceived for "I with draw" among operating room head nurses comparing to "I engage in wishful thinking" for operating room nurses as the least similar coping behaviors (2.17±0.41, and 2.31±1.53, respectively). Additionally, there was statistically significant difference between similarity of coping behaviors and incidence of verbal abuse

among operating room head nurses as related to "I become silent", "I tend to blame myself", and "I exercise or do some form of muscle relaxation" (t = 2.288, -2.761, and -2.502 p<0.05 respectively)

Form this table, it can be noticed that operating room head nurses tend to have significantly higher mean score for" I attempt to clarity any misunderstanding the nurse may have" and I engage in positive activities" as most effective coping behaviors subsequent to a verbally abusive events comparing with "I deal directly with the nurse about the abuse" and "I ask for assistance /support from others" (6.50±0..84, 6.33±1.216.13±1.16, and 6.12±0.99, respectively). Where "I engage in wishful thinking" perceived as the least mean score of effective coping behaviors for both operating room head nurses and nurses (2.67±0..82, and 2.35±1.21).This significance is reflected that there was relationship between mean score of effective coping behaviors and incidence of verbal abuse among head nurses only for "attempt to clarity any misunderstanding the nurse may have" (t = 2.230 p<0.05)

4. Discussion:

Verbal abuse in the organizations is a central feature of counter productive work behavior, and workplace activities. It has been argued that verbal abuse is a less extreme, but more widespread form of workplace violence that has been empirically neglected in comparison with the study of physical attacks [23].

Generally, this study provides up-to-date survey information on the verbal abuse in Egypt hospitals and reveals an important finding: Nursing staff working in operating room regardless of their position presented an overall perception of verbal abuse incidence at least once a month or fewer episodes during the last year was lower than that agreed upon in relevant literature. This finding is inconsistent with much of the previous research on verbal abuse among operating room nursing staff. They indicated that 91% of perioperative nurses reported experiencing verbal abuse at least once per year. This was apparent by decreased compensation, inexperienced operating room staff members, lack of available resources, and loss of physician autonomy and control, may be factors that create environments where nurses are vulnerable to verbal abuse [5,11].

Moreover, the current findings indicated that operating room head nurses experienced more verbal abuse at several times a month as compared to operating room nurses who experience it at once a month or less. A statistical significant difference was found between incidence of verbal abuse and nurses' job categories. Particularly, the current finding can

be justified due to OR head nurses spent much of their time in administrative work with direct contact together with surgeons and anesthesiologist. This result could be contributed to the demands of the management position in which they may not be able to verbalize their anger and frustration than operating room nurses. This finding goes parallel to Buback [24] who view that supervisors of OR personnel are susceptible to verbal abuse because their responsibility for ensuring that OR functions efficiently 24 hours/ day. In this respect Higgins and MacIntosh [25] stated that nurse managers who working in operating rooms feel more verbal abuse than staff nurses.

In the same line with the previous results, it is interesting to notice that operating room nursing staff seems to communicate their verbal abuse in multiple forms. The characteristics of verbal abuse were most frequent and stressful commonly in the form of judging ad criticizing followed by abusive anger, and trivializing encountered by operating room nursing staff. This result is supported by the finding, of Oweis and Diabat [26] surveyed 138 Jordanian nurses who had reported experiencing verbal abuse by physicians. Their results showed that judging and criticizing, accusing and blaming, and abusive anger were the most frequent and severe forms of verbal abuse reported. The result of this study is contradicted with Manderino and Berkey [21] who found that the most frequent and stressful types of verbal abuse encountered by perioperative nurses were abusive anger and condescension. These findings could may be related to the volume of verbal abuse experienced by operating room nursing staff violence has been and continues to be a popular theme in movies, television, and advertising to the extent that violent language and behaviors are embedded in society and thus have become a more common feature of everyday life. In accordance with this finding, Joubert *etal*. [27] found that judging and criticizing and abusive anger is identified as the most frequent and stressful type of abuse among nurses working in operating room settings seems to alienate the nurse and physician collaboration. Furthermore, Smith-Pittman and McKoy[28], Rowe and Sherlock [29]., they stated that extent of violent language and behaviors are embedded in operating room settings due to publicize violence topic in movies and television.

For the sources, the present study indicated that operating room nursing staff experience high risk of being exposed to verbal abuse from surgeons, surgical nurses as well as anesthesiologist as the most significant abusers to them. In addition, Surgeons are the principal abusers for verbal abuse significantly against operating room head nurses as compared to surgical nurses against operating room nurses. This finding was expected, due to the fact that operating room nursing staff was fear of retribution or blame affected their decision to report verbal abuse incidents. Therefore, these reasons support the explanations of acceptance of a culture of verbal abuse in operating room setting. This finding goes in congruence with Harulow.[30] they believed that there is a blame culture, with the actions of nurse victims seen as somehow justifying the circumstances for violence. Another explanation, may be due to the fact that operating room nursing staff in their work deals closely with physicians and surgical nurses under often very difficult and stressful situations, thus increasing their risk of verbal abuse from this source. According to Anderson [17] who found that nurses listed surgeons as the most common source of verbal abuse followed by other nurses. Duncan *etal.*[14] in a study of 6,526 nurses in Alberta, indicated that the verbal abuse was more evenly distributed among different sources, including physicians, co-workers, and other nurses.

Regarding strength of feeling, it was noticed that threatened followed by indifferent and frustration are the highest mean scores of emotional feelings identified by operating room nursing staff in reaction to verbal abuse. A statistically significant was found between strength of feeling and nurses' job categories in term of embarrassed/ humiliated and threatened. These findings can be explained due to nurses' inability to change or reduce the incidence of verbal abuse in operating room settings. Because, they have experience of blame, and responsibility for situations in which they have no control. These finding were supported by Manderino and Berkey [21], identified that most nurses appear to be able to manage their threatened and frustration in a constructive, and effective manner.

Regarding, the highest mean scores of similarity of thoughts, the finding of the present study proved that cognitive appraisal thought that most frequently interpreted were "I don't deserver this treatment" and "this could potentially hurt me" among operating room staff, head nurses and nurses. While the lowest mean score recorded for "it must be my fault" as less frequently interpreted by them. No significant difference among nurses 'job categories and similarity of thought. These findings is consistent with those of Spring, and Stern [31] who explained that "I don't deserver this treatment" was a thought processes most frequently selected and was considered to be adaptive, and interpretations of verbal abuse.This seems to be due to the fact that operating room nurses are not responsible for the verbally abusive behavior and physician may be angry with them so they need to take some kind of

positive action to remedy the problem. In this issue, Manderino and Berkey [21] supported this finding and identified that participants agree in order to the verbal abuse creates an unfavorable image of the physician. Moreover, Diaz and McMillan [32] acknowledged that verbal abuse from physicians was related to the physician's personal and professional problems.

With some specification, this study revealed that physical health followed by relationship with other nurses and patient care outcomes were the most frequently responses to severity of long term negative effects from verbal abuse among operating room nursing staff, head nurses and nurses. However, trust and support at work was the least one. There is no statistically significant difference in this respect. However, this finding is inconsistent with Cameron [13] and Nelson [16] they concluded that long term effects of verbal abuse lead to absenteeism, turnover of staff, and resignations. This is interpreted by the fact that nurses are not receiving any support from upper authority and physicians due to lack of an operating room policy that address the problems of verbal abuse or inappropriate behavior in the work place. Also, nurses identified that a gender factor that exists between them and physicians i.e. between male and female because females are predominates gender employed in nursing. Parallel to this finding, Rosenstein and O'Daniel [33] study found that male physicians believe, they can be over-powered and manipulated therefore, this lead to the explanation of why the prevalence of verbal abuse of nurses remains high.

It is interesting to notice that a significant difference was found between similarity, effectiveness of coping behaviours and nurses' job categories. Positive coping behaviors were identified as the most frequently used behaviors by operating room nursing staff to deal with verbal abuse in term of I deal directly with the nurse about the abuse" followed by "I engage in positive activities" and "I ask for assistance /support from others". While "I engage in wishful thinking" and "I tend to blame myself" were the least frequent similar and effective coping behaviors. Operating room nursing staff indicated that the positive behaviors of coping were much more similar and effective than the negative behaviors. This finding is in agreement with the study of Manderino and Berkey [21] who concluded that nurses selected and identified positive coping behaviors when they experienced verbally abusive episodes. Specifically, the current finding can be justified as nurses become abusive anger to others and controlled this situation by refusing to work with physicians who were critical of their work. Moreover, Pejic [34] described that nurses acquired helplessness and failed to report their experience to

verbal abuse when they dealing with difficult physicians.

Based on the previous results, the finding could be attributed to the conclusions that nurses working in operating room had significantly difference between incidence of verbal abuse and coping behaviors. This was apparent that coping behaviors has an impact on the incidence of verbal abuse operating room nurses, experienced at their work. Harulow [35] reported that perioperative nurses select and identify positive, adaptive behaviors as similar and effective when they experience a verbally abusive episode. This may be reflected that positive coping where the nurse was able to redirect the energy from verbal abuse incidents to channel it into effective change. Also, nurses indicated that they being indirectly forced to resign due to verbal abuse, and the expensive potential lawyer fees associated with dealing with it. This is substantiated by Lybecker [36] finding that responding to the stimulus of verbal abuse requires the person to spend more energy to adapt to the focal situation through using positive/ coping behaviors reactions.

5. Conclusion and Recommendation:

Two hundred and six of operating room nursing staff completing the questionnaire; more than one third of them reported experiencing at least once a month or less episode of verbal abuse during the past year in the operating rooms areas. Moreover, they more frequently show evidence of positive methods of coping behaviors in responses to verbally abusive episodes. In response to the marked findings, the following proactive approaches are recommended to facilitate the development of organizational standards, and policies guidelines. This is required to design materials, flyers and picture folders mobilizing for zero tolerance to verbal abuse at the workplace.

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Socio-demographic Determinants of Rubella Vaccine Uptake by Egyptian University Students Attended a Catch-up Vaccination Campaign

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Abstract: Rubella immunization of susceptible persons is the best strategy to prevent all cases of congenital rubella syndrome. In November-December 2008, university students were included -for the first time in Egypt - in a mass campaign for measles-rubella vaccination. However, their rate of vaccine uptake and its determinants were not explored enough. So, a cross sectional study was conducted to compare the university students' vaccine uptake by their socio-demographic characteristics and their knowledge and to identify motivating and de-motivating factors. Findings revealed vaccine uptake by 64.8% of the sample; significantly higher among younger students, who heard about the campaign and who knew its aim. Among the total sample, a high level of awareness was found in knowledge about rubella name, its hazards, suitable age for vaccination and hearing about the campaign while lower awareness level was found in knowing susceptible groups and campaign's aim. Being from a governorate other than that of the university is the significant factor for low hearing about the campaign while being a female and being an urban resident were the significant factors for low knowledge of the campaign's aim. Reported motivating factors for compliance were; knowing rubella hazards and the national aim and encouragement by family & friends while de-motivating factors were insufficiency of information, lack of trust in government and previous vaccination. In conclusion, rubella vaccine uptake by university students can be increased by more advertisement especially among older, female, urban and from other governorates students in addition to trust building and motivation.
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Key wards: Rubella vaccination- Compliance- Campaign – Socio demographic determinants - University students - Egypt

1. Introduction:

Maternal rubella infection in the first 8 to 10 weeks of pregnancy results in fetal death or congenital rubella syndrome in up to 90% of the affected pregnancies resulting in 14% of total fetal anomalies (Eason et al., 2001). Congenital rubella syndrome (CRS) is a major cause of handicapping among children in developing countries as it entails multiple defects including deafness, cataract, cardiac anomalies, microcephaly, mental retardation, bone alterations and liver & spleen damage (CDC, 2006).

Prevention remains the best strategy to eliminate all cases of congenital rubella syndrome (CRS) as there is no in-utero treatment available for infected fetuses (Dontigny et al., 2008). Vaccination stops the circulation of rubella virus in the community when sufficiently high uptake is insured by children and adults of both sexes. Otherwise susceptible pregnant women continue to be at risk of rubella infection (Australian national health and medical research council, 2008).

To accomplish the World Health Organization target of reducing congenital rubella syndrome to less than 1/100,000 live births by the year (2010), mass rubella vaccination was used in Latin America, Caribbean and many developing countries (Reef, 2006). Spain combined vaccination campaigns for women in childbearing age with an excellent MMR vaccine (Measles/Mumps/Rubella)

coverage in children (Sanz & De Ory, 2006). In Costa Rica, in addition to high coverage in children, a national immunization campaign targeting both men and women was followed by postpartum vaccination of women who had been pregnant when the campaign was held (Morice et al., 2009).

A susceptibility study involved Egyptian reproductive age women in (2005) concluded that the previous Egyptian policy against rubella had left 16.4% of reproductive age women reached this age with susceptibility to acquire rubella infection with risk of CRS .The susceptibility reached 25.7% in age group (15-25)years (Abou El-Fateh et al., 2006).

Egypt had an epidemic of rubella in (2007) with 11.4 thousand cases of students and adults denoting that supplementary immunization activities (SIAs) were highly indicated. So, a catch up vaccination campaign with rubella-containing vaccine was implemented using (MR)(Measles/ Rubella) vaccine in November / December (2008) targeting males and females in the age group (10-20) years (MOHP, 2008).

This was the first Egyptian vaccination campaign that included university students. Reports of MOHP reported that more than 18.3 million adolescents were vaccinated during the campaign with vaccination coverage rate of 96-99% (MOH, 2009) while a research assessed the vaccine uptake among one Egyptian university medical students

reported a much less percent (64.8%); 81.5% among females and 52.1% among males **(**Abd Elaziz et al., 2010). Vaccination decisions by university students during a vaccination campaign depends on their perception of risks/benefits of the vaccine which varies considerably by different variables (Hamilton-West, 2006).

So, this study aim was to study the uptake of MR vaccine among a university students sample including medical and non medical students and to illustrate the variation of vaccine uptake by some socio-demographic variables and level of knowledge as well as to identify motivating and de-motivating factors.

2. Subjects and Methods:
Study design and population:

A cross sectional study was carried out on a sample of university students in Egypt in the start of (2010). A systematic random sampling technique was used at each entrance of the selected university. The required sample size was calculated to be 128 students using (EPI-INFO version 6software). Students from all faculties were allowed to be included and the only requirement was being joined to the university during the (2008) measles-rubella vaccination campaign.

Ethical Issues:

The study proposal and instrument were approved by the institution's review board and voluntary informed oral consents were got from all students enrolled in the study and the identity of the students remained anonymous.

Data Collection and Scoring:

Data collection process was done by a trained collector using a self-administered questionnaire distributed during a short standardized interview to collect socio-demographic data regarding (age, gender, residence, faculty of study and government of residence). The second part of the questionnaire measured the most relevant knowledge for compliance including (hearing about rubella, knowing its hazards, susceptible groups to infection, appropriate age for vaccination, hearing about the campaign and knowing its aim). The rest of the questionnaire collect data about vaccine uptake in the campaign and motivating factors among compliant students and de-motivating factors among non-compliant students and their eagerness to comply if another campaign is held. In addition, inquiry of all participants about their willingness to know their sero-susceptibility and their acceptance to give blood sample for this purpose.

Calculation of the total knowledge score was performed for each student. Dichotomous questions

and questions with one correct choice were scored as "1" for "Yes or the correct choice" and "zero" for "No or wrong choice" while for questions with more than one correct choice, the participant got one score for each correct choice. Then a total score out of 12 was calculated and the Mean ± Standard deviation for knowledge score was computed. For questions with more than one choice, score equal or above the median was considered "Good" while less than the median was "Bad".

Statistical Analysis:

Data analysis was done using a data base software programs SPSS 10.0 (Statistical package for social science). Analysis included univariate, bivariate and multivariate analytical techniques. Independent variables were analyzed descriptively by frequency distribution and mean ± standard deviation (whenever possible). Chi square and Fisher's exact test were used to test the significance of qualitative variables as appropriate while independent samples T-test was used to compare means. Binominal logistic regression was done for significant items to find the predictors of vaccine uptake. The significant knowledge predictors of compliance to vaccination were again compared by different socio-demographic characteristics for more exploration of indicators of non uptake of the vaccine. The level of significance was considered at ($P < 0.05$).

3. Results:

As shown in Table (1) , about one half of the included students were between 16-18 years of age during the campaign while the other half were of 18-20 years . Females represented more than two-thirds and about 60% of the included students were urban residents. Students studying medical studies (faculties of medicine, pharmacy and nursing) were 48% while non-medical students (faculties of literature, commerce, law, education and production efficiency) were 52%. Approximately 15% of participants were from governorates other than the governorate of their university.

Table (1) also illustrates vaccine uptake by 64.8% of the sample; significantly higher ($p < 0.05$) among younger students compared to older (78% versus 57%). Vaccine uptake was more among rural residents, females, students from the same governorate of their university and surprisingly non medical students than medical (73% versus 57%) but these differences didn't reach statistical significance

High level of knowledge (Table 2) among the total sample weather vaccinated or unvaccinated was found in knowledge about rubella disease name (97%), its hazards (77%), suitable age for vaccination (86%) and hearing about the campaign (85%) while lower awareness level was found regarding

knowledge about susceptible groups to infection (49%) and campaign's aim (48%).On comparing knowledge of vaccinated versus unvaccinated, hearing about the campaign and knowing its aim were significantly higher among vaccinated (p < 0.001)and so does the mean of total knowledge score (p < 0.05).

It is important to mention that the mean knowledge score didn't significantly differ between medical and non-medical students in this study and so does the individual items of knowledge except knowledge about rubella hazards which was significantly higher among medical students. Among medical students, compliant students had a significantly higher mean knowledge score than non-compliant medical students. Mean scores were (7.5± 2 versus 6.1± 2.6) respectively (p < 0.05).

In logistic regression analysis for significant risk factors for vaccine uptake (Table 3), all of these factors (hearing about the campaign, knowing its aim and students' age) remained significant (p<0.05).

Exploration of the effect of socio-demographic factors on hearing about the campaign revealed that being from the same governorate of the university is the only significant factor associated with higher awareness (Table 4). Being a male and being from a rural area were the significant factors for higher awareness of the campaign aim (Table 5).

Motivating factors for vaccination mentioned by compliant students were knowing rubella hazards, knowing national aim of the campaign and encouragement by family & friends. De-motivating factors among non-compliant students were insufficiency of knowledge provided during the campaign, lack of trust in the government and previous vaccination (Table 6).

On exploring the attitude of unvaccinated students towards rubella vaccine uptake- if another campaign is held- 55.6% of them showed a positive attitude. Attitude of total student sample towards knowing their susceptibility status was positive among 67.2% (69.9% among vaccinated and 62.2% among non-vaccinated), however, their acceptance to give blood sample for this purpose was very low (10.0%) as they wanted an easier and more convenient method.

Table (1) Socio-demographic Characteristics of included university students sample by their vaccination state

Variables	Vaccinated		Unvaccinated		Total sample characters %	χ^2	P value
	N	%	N	%			
Age at campaign: 16-	46	78.0	13	22.0	51.3	5.71	0.02*
18-	32	57.1	24	42.9	48.7		
Gender: Male	23	57.5	17	42.5	31.5	1.28	0.26
Female	59	67.8	28	32.2	68.5		
Residence: Urban	46	63.9	26	36.1	59.5	0.39	0.53
Rural	34	69.4	15	30.6	40.5		
Faculty: Medical	35	56.5	27	43.5	48.4	3.72	0.054
Non-medical	48	72.7	18	27.3	51.6		
Government: Same	74	67.9	35	32.1	85.2	2.99	0.08
Other	9	47.4	10	52.6	14.8		
Total	83	64.8	45	35.2	100.0		

*Statistically significant

Table (2) Comparing vaccinated versus non-vaccinated students by their knowledge

Variables	Vaccinated		Unvaccinated		Total %	χ^2	P value
	N	%	N	%			
Know Rubella name: Yes	81	97.6	43	95.6	96.9	0.4	0.53
No	2	2.4	2	4.4	3.1		
Know Rubella hazards: Correct	61	73.5	37	82.2	76.6	1.24	0.27
Wrong	22	26.5	8	17.8	23.4		
Know Susceptible groups: Good	41	49.4	22	48.9	49.2	0.01	0.96
Bad	42	50.6	23	51.1	50.8		
Know Suitable age : Good	75	90.4	35	77.8	85.9	3.82	0.051
Bad	8	9.6	10	22.2	14.1		
Hear about campaign: Yes	81	97.6	28	62.2	85.2	28.9	0.000*
No	2	2.4	17	37.8	14.8		
Know Campaign aim: Correct	50	60.2	12	26.7	48.4	13.2	0.000*
Wrong	33	39.8	33	73.3	51.6		
Total	83	64.8	45	35.2	100.0		
Total knowledge score Mean ±SD	7.58 ±2.33		6.44 ±2.62			T = 2.5	0.01*

*Statistically significant   ** Mean score % =63.2% among vaccinated and 53.7% among no vaccinated

Table (3): Logistic regression analysis of significant factors affecting compliance to vaccination among participants (N=128)

Independent variables	B± S.E	Wald	P
Hear about campaign	2.89 ±0.85	11.67	0.001*
Know campaign aim	1.06 ± 0.47	5.06	0.025*
Age group	0.97 ± 0.48	4.14	0.042*
Constant	0.78 ± 1.04	0.56	0.455

*Statistically significant

Table (4): Comparing socio-demographic Characters of students heard about the campaign versus who didn't hear about it

Variables	Heard about campaign		Didn't Hear about campaign		χ^2	P value
	N	%	N	%		
Age at campaign: 16-	53	89.8	6	10.2	0.88	0.348
18-	47	83.9	9	16.1		
Gender: Male	33	82.5	7	17.5	0.296	0.586
Female	75	86.2	12	13.8		
Residence: Urban	60	83.3	12	16.7	0.45	0.502
Rural	43	87.8	6	12.2		
Faculty: Medical	49	79.0	13	21.0	3.57	0.059
Non-medical	60	90.9	6	9.1		
Government: Same	97	89.0	12	11.0	Fisher's exact test	0.009*
Other	12	63.2	7	36.8		
Total	109	85.2	19	14.8		

*Statistically significant

Table (5): Comparing socio-demographic Characters of students knew the campaign aim versus who didn't know it

Variables	Knew campaign aim		Didn't Know campaign aim		χ^2	P value
Age at campaign: 16-	34	57.6	25	42.4	1.44	0.23
18-	26	46.4	30	53.6		
Gender: Male	25	62.5	15	37.5	4.374	0.036*
Female	37	42.5	50	57.5		
Residence: Urban	29	40.3	43	59.7	6.61	0.013*
Rural	31	63.3	18	36.7		
Faculty: Medical	26	41.9	36	58.1	2.04	0.15
Non-medical	36	54.5	30	45.5		
Government: Same	54	49.5	55	50.5	0.358	0.55
Other	8	42.1	11	57.9		
Total	62	48.4	66	51.6		

*Statistically significant

Table (6): Motivating factors among vaccinated students (N= 83) and De-motivating factors among unvaccinated students (N= 45)

Motivating factors among vaccinated students		De-motivating factors among unvaccinated students	
Factor	%	Factor	%
Knowing rubella hazards	50.0	Insufficiency of Knowledge	48.6
Knowing national aim	29.4	Lack of trust in government	43.2
Encouragement by family & friends	20.6	Previous vaccination	8.1
Total	100.0	Total	100.0

4. Discussion:

Routine infant rubella vaccination without high vaccination coverage can lead to a paradoxical increase in susceptibility of women with a risk of increasing occurrence of congenital rubella. This phenomenon occurred in Greece during the 1980s **(**Gioula et al., 2007). Many Studies stressed on the age shift of rubella infection to young adults where adults above 15 years account for 70% of the cases of rubella in developed countries (Banerjee et al, 2007).

For progress towards elimination of rubella and congenital rubella syndrome in the Americas, they introduced rubella-containing vaccine (RCV) into routine vaccination programs of all countries for children aged 12 months and reach ≥95% coverage in all municipalities. Also, they conducted a one-time mass campaign among adolescents and adults and

periodic follow-up campaigns among children aged <5 years (CDC, 2008).

In Egypt, the previous policy didn't start the inclusion of rubella vaccine in the compulsory childhood vaccination until (1997) births when it was introduced in the form of MMR at 18 months (WHO, 2002). That policy has left 16.4% of women reached the reproductive age with susceptibility to acquire rubella (Abou El-Fateh et al., 2006).

Rubella epidemic in (2007) in Egypt rationalized changing the compulsory vaccination schedule since August (2008) to include MMR at 12 months and 18 months instead of measles at 9 months & MMR at 18 months (MOH, 2008). Also, this epidemic rationalized the vaccination campaign for rubella which was implemented in the period from 16th of November to 4th of December (2008) targeting more than 18.4 million persons aged 10-20 years with availability of 21.5 million doses of MR vaccine to enhance population immunity to rubella and strengthen measles eradication. New national strategy aims at rubella elimination (one case/ million) by 2012 and rubella eradication (No cases or virus) by 2015 (MOH, 2009).The MR vaccine was used in similar campaigns in other countries as Iran , Brazil and Costa Rica (Hamkar et al., 2006 & CDC, 2008).

The age group (10-20 years) was chosen for their susceptibility as they were borne before inclusion of rubella vaccine in the compulsory childhood vaccination. Also, highest susceptibility among Egyptian women was found in age group 15-25 years (25.7%) compared to (10.1%) in 26-35years and (3.1%) in 36-45 years (Abou El-Fateh et al., 2006). In another Egyptian study which found 9.7% seronegativity among females, the highest proportion of susceptible females was in the ages between 6 and 25 years (Hashem et al., 2010).It was also found that the incidence of cases during epidemics in other countries as Brazil was fourfold among individuals aged 14-19 years compared to children aged 1-13 years (Lanzieri et al., 2007).

Both sexes were covered by vaccination to protect females who are near their reproductive age or in its early stage from exposure and to stop the circulation of the rubella virus by minimizing the number of susceptible persons whether males or females (MOHP, 2008). Inclusion of both sexes was also done in Iranian mass campaign in 2003 (Soleimanjahi et al., 2005) and resulted in immunity of 97.5% of susceptible population (Hamkar et al., 2006). When males are not included in vaccination campaigns, they can trigger rubella outbreaks as previously occurred in Argentina, Brazil, and Chile in (2007) (CDC, 2008).

Our study to assess the vaccine uptake and its determinants included students from both genders, different faculties and different residents. Results revealed vaccine uptake by 64.8% of the sample. This equals what was previously found among medical students of another Egyptian university during the same campaign (Abd Elaziz et al., 2010). However, in the present study the vaccine compliance by medical students was 57% while among non-medical was 73%.The lower compliance rate among medical students denotes a big defect in mobilizing the medical community to support this campaign in which students of medical studies were supposed to play an active role in the campaign (Okamota, 2008). The compliance rate with MR vaccination of (64.8%) is lower than in Costa Rica where coverage in the MR campaign targeting persons aged 15-39 reached 95% (Morice et al., 2009).

The significantly higher vaccine uptake among younger students compared to older found in the present study was also found in the previous Egyptian study (Abd Elaziz et al., 2010). Younger students in the start of their university years may be more responsive to different invitations inside the university considering them as a part of their new experience of university life.

More vaccine uptake among females versus males without reaching the significance limit lies midway between results of two studies where the first revealed no gender difference in compliance (*Majdzadeh et al, 2008)* and the other showed significantly more female compliance than males (Abd Elaziz et al., 2010). Our obtained results denotes that both genders were in need for better awareness with the campaign aim to be more interested in prevention of rubella health hazards which endanger the expected kids.

More vaccine uptake by rural residents can be contributed to their significantly higher awareness of campaign's aim compared to urban residents. This most probably resulted from the more advertising efforts usually done by rural health units before campaigns and the rapid propagation of knowledge in rural communities which are more confined than urban ones. What is worrying is that urban residents in Egypt were found to be more susceptible (Abou El-Fateh et al., 2006). Hence, the more susceptible group was the less compliant.

Hearing about the campaign was significantly influenced by being from a governorate other than that of the university, where the percent of students from other governorates who didn't hear about the campaign was triple that of students of the same governorate. Up to my knowledge, this is the first report of such disadvantage affecting students studying away from their families –at least in Egypt. This should alert the authorities to give special care for this group as previously recommended (El-Sharkawy, 2011).

Non medical students were more compliant than medical. Although this difference didn't reach statistical significance, it gives an idea about the disability of current policy of medical faculties to sufficiently inform students about national health activities and motivate them not only to comply but also to feel responsible and participate in these activities. The previous study among medical students (Abd Elaziz et al., 2010) found that, non-compliant students had a higher mean knowledge score percent than compliant students but the difference was statistically insignificant**.** So, the knowledge alone are not sufficient to yield good attitude but motivation is required.

Comparing knowledge between medical and non-medical students revealed no significant difference between main score nor between the percent of students having good knowledge except for rubella hazards which wasn't stressed on during the campaign in enough degree while medical students knew it from their study. Disagreeing results were found in the study of Abd Elaziz et al. (2010) who studied the awareness in medical and non medical sample and found that the mean knowledge score about the vaccination was significantly higher among medical students compared to non medical students.

The level of knowledge among our total sample (vaccinated and unvaccinated) was higher than other Egyptian studies. Most students knew rubella disease name, its hazards and the suitable age for vaccination while in the study of Abd Elaziz et al.(2010) only little percent knew the hazards of getting rubella and the suitable age for vaccination. Also, very limited knowledge regarding rubella vaccine and infection among reproductive age females were previously reported by Abou El –Fateh et al. (2006) and Hashem et al.(2010). The posters supplied by the Ministry Of Health to all universities for announcement of the campaign might be more effective in some universities than others according to the places where they were put and the extent to which students were accustomed to the presence of posters around them. Also, the present study was carried out one year after the campaign and among a highly educated group who may got more knowledge after the campaign.

Relatively low awareness of knowledge about susceptible groups to infection and campaign aim found in obtained results agrees with Abd Elaziz et al.(2010) as the rational of the campaign was lacked from the posters.

Significantly higher mean total knowledge score among vaccinated versus unvaccinated and higher percentage of vaccinated students had correct knowledge in all aspects which reached statistical significance in hearing about the campaign and

knowing its aim denotes that generally there is an association between high awareness and vaccine uptake.

Reported motivating factors for compliance highlighted the influence of awareness of rubella hazards and national aim of the campaign on uptake of the vaccine and added the encouragement by family & friends as an important motive. De-motivating factors led to non-compliance of unvaccinated students were insufficiency of knowledge, lack of trust in government and previous vaccination. Similarly, insufficient information, previous vaccination or infection and lack of trust in things for free were of the previously reported reasons for non compliance by Abd Elaziz et al. (2010). Although Wicker et al. (2008) said that students' vaccination histories are not so reliable and students should comply with vaccination campaigns, the non-compliant students showed their false perception of low risk of getting infection, their unconcern besides lack of trust in government which may be referred to the political deterioration at that time. Attitude towards rubella vaccine uptake if another campaign is held was positive among only slightly more than one half of the unvaccinated students which denote that a new campaign has not been rationalized yet and if held in current circumstances, unsatisfactory uptake is expected.

Attitude of all students towards testing their susceptibility status was positive among much less percent than in the study of Abou El –Fateh et al. (2006) where all participants accepted screening for susceptibility as 93.3% of their study participants were married females while among our sample only 2 students were married. Low risk perception and fatalism among university students were previously reported (El-Sharkawy, 2005 and El-Sharkawy, 2011). This is especially higher when they are unmarried and the issue is about risks affecting embryos. Fear of giving a venous blood sample can be solved by ELISA testing of rubella IgG in a dried blood spot sample (Hardelid et al., 2008).Also, conducting opportunistic screening for both partners during premarital counseling and vaccination of the susceptible persons before marriage by enough time may be an appropriate method for seroprevalence survey and for susceptibility detection& management.

This study limitation was to test the awareness one year after the campaign. This gives the long term awareness of the problem not the awareness at campaign time.

5. Conclusion:
In conclusion, rubella vaccine uptake by university students can be increased by more announcement of rubella hazards, the campaign and its national aim

using mass media, health centers, different clinics, hospitals and pharmacies with social and medical community mobilization to raise awareness especially among older, urban & from other governorates students with use of positive peer pressure & family support. In addition, building trust in the government and motivation are required. After achieving these points and conducting a cost analysis study, a follow up campaign for 3 days can be done for the same age group or a slightly wider range (10-25 years). Alternatively, rubella susceptibility detection & management during premarital counseling can be used.

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Optimization of Bio-Fuel Production by *Saccharomyces cerevisiae* Isolated from Sugar Cane Bagasse

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Abstract: Twenty yeast isolates were tested for ethanol productivity, *Saccharomyces cerevisiae* isolated from sugar cane bagasse was the potent producer. Fresh *Saccharomyces cerevisiae* was grown overnight on YEPD medium and was tested to determine the optimum conditions for both biomass and ethanol production. The maximum production of ethanol was obtained at 30°C, pH 6, 35% sugar cane molasses as fermentation medium, 1% corn steep liquor, 1ml of 1 O.D. YEPD broth and shaking at 200 rpm. Different microelements also were tested.
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Keywords: Optimization; Bio-Fuel Production; *Saccharomyces cerevisiae;* Sugar Cane Bagasse

1. Introduction:

Due to the diminishing fossil fuel reserves, alternative energy sources are needed to be renewable, sustainable, efficient, cost-effective, convenient and safe. An eco-friendly bio-ethanol is one of such alternate fuel that can be used in unmodified petrol engines with current fueling infrastructure and it is easily applicable in the present day combustion engine, as mixing with gasoline *(Hansen et al., 2005)*. In 2005 Brazil produced 3.8 billion gallons of ethanol, represents 40% of the country`s consumption *(Baez et al, 2008)*. Also as a result, they have become 80% independent from foreign oil. Most of the new cars that were sold in Brazil are flexible-fuel vehicles that can run on ethanol, gasoline, or any blend of the two. The United States fuel ethanol industry is based largely on corn. Thailand, India, China and Japan have now launched their national gasohol policies.

The 1st generation bio-fuel faced many problems, the most known is Food Vs Energy crisis, due to the dependence on edible crops as feedstocks. Thus, there was a need for a 2nd generation which depends on non-food sugary materials as feedstocks. Various raw materials like sugarcane juice and molasses *(Morimura et al, 1997; Agrawal et al, 1998)*, sugar beet, beet molasses *(EI-Diwany et al, 1992; Agrawal et al, 1998)*, Sweet sorghum *(Bulawayo et al 1996)* and starchy materials like sweet potato *(Sree et al, 2000)*, Corn cobs and hulls *(Beall et al, 1992; Arni et al, 1999)*, cellulosic materials like cocoa, pineapples and sugarcane waste *(Othman et al, 1992)* and milk, cheese, and whey using lactose hydrolyzing fermenting strains *(Silva et al, 1995; Ghaly and Ben-Hassan , 1995)* have been reported in ethanol production.

In fermentation, of the various ethanol producing micro-organisms yeast belonging to *Saccharomyces cerevisiae* have been used most commonly *(Mike and Kavin, 2006)*. production from molasses using *Saccharomyces cerevisiae* & *Zymomonas mobilis*. yeast was found to be more ethanol tolerant and produced more ethanol at sugar concentration above 15% (v/v). The following table below lists some of the yeast strains used in distilleries and the amount of alcohol they produce.

Several reviews of literature *(Dale, 1987; Ferrari et al., 1992; Nigam, 1999; Olsson and Hahn, 1996; Beatriz et al., 2005; Martin et al., 2006)* available for the production of bio-ethanol from various sources, only a very few authors *(Doelle and Green-field, 1985; Huertaz et al., 1991; De Vasconcelos et al., 1998)* have studied optimization of ethanol production from sugar cane using yeast cells *(Saccharomyces cerevisiae)*. Hence, this work aimed to enhance ethanol production through screening for a good producing yeast, screening for suitable non-food feedstock, and optimization of fermentation conditions to reach maximum production.

Table: Different types of ethanol producing strains

Strain	Ethanol produced (%)
Saccharomyces cerevisiae	5.8-11.16
Zygosaccharomyces sp.	4.2
Saccharomyces ellipsoids	9.7
Schizosaccharomyces pombe	8.7
Schizosaccharomyces mallaeri	7.8

2. Materials and Methods:
Isolation

Samples were collected aseptically in sterile containers, processed and were cultured on acidified malt extract medium *(Spencer et al, 1995)*. Isolated yeasts were purified and maintained on YEPD agar

(1% Yeast extract, 2% Peptone, 2% Glucose, and 1.5-2% Agar) slants *(Atlas, 2004)*.

Growth conditions

To prepare the inocula, a loopful of the test organism was inoculated into 25 ml of YEPD medium in a 250 ml Erlenmeyer flask containing the same components as in the maintenance medium, except that agar was not added. The flasks were incubated in a shaking incubator at 30°C of 200 rpm for 24 h.

Identification of isolated yeast strains

Yeast isolated were identified according to their morphological and biochemical characteristics *(Barnett et al, 2000).*

Screening

Batch fermentation in 250 ml Erlenmeyer flask containing 100 ml fermentation medium (30% Glucose, 0.3% $(NH4)_2SO_4$, 0.2% KH_2PO_4, 0.1% $MgSO_4 .7H_2O$, 0.01% $CaCl_2 . 2H_2O$, 0.01% NaCl, and 0.3% Yeast extract), inoculated with 1 ml of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C of 200 rpm for 48 h.

Optimization of fermentation conditions

Raw Materials:

Fermentation media prepared as 10% of sugar cane molasses, 10% corn steep liquor, and 10% whey. Erlenmeyer flask (250 ml) containing 100 ml fermentation medium was inoculated with 1 ml of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C of 200 rpm for 48 h.

Molasses concentration:

Different concentrations of molasses (5%, 10%, 15%, 20%, 25%, 30%, 35%, and 40%) were prepared as fermentation medium in 250 ml Erlenmeyer flasks each contained 100 ml and inoculated with 1 ml of 24 h., 1 O.D. (at 600 nm) yeast culture, and incubated in a shaking incubator at 30°C and 200 rpm for 48 h.

Inoculum size:

Fermentation media with 35% molasses were prepared. Erlenmeyer flasks (250 ml) each contained 100 ml media were inoculated with different volumes (0.5, 1, 1.5, 2, 2.5, and 3 ml) of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C and 200 rpm for 48 h.

Incubation period:

Fermentation media contain 35% molasses were prepared. Erlenmeyer flasks (250 ml) each contained 100 ml media were inoculated with 1 ml of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C and 200 rpm for different periods (12, 24, 36, 48, 72, and 84 h.).

Initial pH Value:

Fermentation media contain 35% molasses were prepared at different pH values (3,4,5,6,7,8, and 9). Erlenmeyer flasks (250 ml) each contained 100 ml

media were inoculated with 1 ml of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C and 200 rpm for 72 h.

Temperature:

Fermentation media contain 35% molasses were prepared. Erlenmeyer flasks (250 ml) each contained 100 ml were inoculated with 1 ml of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 200 rpm and different temperatures (25, 28, 30, 35, and 40°C) for 72 h.

Shaking rate:

Fermentation media contain 35% molasses were prepared. Erlenmeyer flasks (250 ml) each contained 100 ml media were inoculated with 1 ml of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C and different shaking rates (100, 150, 200, and 250 rpm) for 72 h.

Nitrogen sources:

Fermentation media contain 35% molasses were prepared with equimolecular weights of Yeast extract, Peptone, Urea, Casein and Corn steep liquor, separately, Each Erlenmeyer flasks (250 ml) contained 100 ml media were inoculated with 1 ml of 24 h. old yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C and 200 rpm for 72 h.

Corn steep liquor (CSL) concentration:

Fermentation media (35% molasses) were supplemented with different concentrations of CSL (0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4%) in 250 ml Erlenmeyer flasks, each contained 100 ml and inoculated with 1 ml of 24 h yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C and 200 rpm for 72 h.

Microelements:

Fermentation media containing 35% molasses and 1% CSL with equimolecular weights of $FeSO_4.7H_2O$, $MgSO_4.7H_2O$, $ZnSO_4.7H_2O$, and $(NH_4)_2SO_4$ were supplemented, separately, in 250 ml Erlenmeyer flasks, each contained 100 ml and inoculated with 1 ml of 24 h yeast culture (0.01 at 600 nm), and incubated in a shaking incubator at 30°C and 200 rpm for 72 h.

Analytical methods

Growth*:*

Growth was measured by Optical Density (O. D.) at wavelength 600 nm.

Estimation of reducing sugars:

The DNS method of *Miller (1959)* was used to estimate reducing sugars.

Ethanol determination:

One ml of the fermented wash was taken in 500ml pyrex distillation flask containing 30 ml of distilled water. The distillate was collected in 50 ml flask containing 25 ml of potassium dichromate

solution (33.768 g of $K_2Cr_2O_7$ dissolved in 400 ml of distilled water with 325 ml of sulfuric acid and volume raised to 1 liter). About 20 ml of distillate was collected in each sample and the flasks were kept in a water bath maintained at 62.5ºC for 20 minutes. The flasks were cooled to room temperature and the volume raised to 50 ml. Five ml of this was diluted with 5ml of distilled water for measuring the optical density at 600nm using a spectrophotometer. A standard curve was prepared under similar set of conditions by using standard solution of ethanol containing 2 to 12% (v/v) ethanol in distilled water. Ethanol content of each sample was estimated and graph was made *(Caputi et al, 1968).*

Statistical analysis:

The data obtained were subjected to statistical analysis according to the procedure outlined by *sendecor and Cochran (1981)* and the means were compared using Duncan`s multiple range test *(Duncan, 1988).*

3. Results and Discussion
Isolation and identification:

Table 1 shows 5 yeast species and 10 genera isolated from different sources. *Candida sp* (*Candida albicans or Candida dubliniensis*), *Cryptococcus laurentii*, and *Saccharomyces cerevisiae* from sugar cane bagasse which matches results obtained by *Luciana et al, 1998. Candida guilliermondii, Saccharomyces cerevisiae*, and *Saccharomyces kluyveri* from banana matching the results obtained by *Brooks, 2008. Candida kruisii, Candida tamarandei, Candida sp*[1] from date. *Candida guilliermondii, Candida kruisii, Candida sp*, and *Debaryomyces hansenii* from grapes. *Trichosporon mucoides* was isolated from both Mediterranean sea and El-Nasr Solar salterns. *Auerobasidium sp.* was isolated from the nectar of Crimson bottle brush flowers.

Table 1: Screening for ethanol production by isolated yeast strains

Source	Yeast isolated	Ethanol produced (%)
Sugar cane bagasse	*Candida sp (albicans or dubliniensis)*	Not Tested
	Cryptococcus laurentii	1.56
	Debaryomyces hansenii	7.84
	Saccharomyces cerevisiae	10.95
Banana fruits	*Candida guilliermondii*	4.53
	Saccharomyces cerevisiae	9.68
	Saccharomyces kluyveri	6.32
Date fruits	*Candida kruisii*	7.12
	Candida tamarandei	2.06
	Candida sp(albicans or dubliniensis)	Not Tested
Grapes	*Candida guilliermondii*	4.00
	Candida kruisii	6.79
	Candida sp(albicans or dubliniensis)	Not Tested
	Debaryomyces hansenii	8.01
Mediterranean sea	*Trichosporon mucoides*	Nil
Solar salterns	*Trichosporon mucoides*	Nil
Crimson bottle brush	*Auerobasidium sp.*	Nil

Screening:

Germ tube forming *Candida sp* (*Candida albicans or Candida dubliniensis*) were avoided because of their known pathogenic behavior. Very high gravity ethanol fermentation *(Petra Bafrncova et al, 1999)* was used as screening method. Table 1 shows that *Saccharomyces cerevisiae* isolated from sugar cane bagasse produced (10.95%) highest

ethanol concentration as compared to others, followed by *Saccharomyces cerevisiae* isolated from banana fruit (9.68%).

Optimization of fermentation conditions
Raw Materials:

A huge backlash against using food crops for energy has developed in 2008 *(Mostafa, 2010)*. As a result, scientists now are looking to harvest energy

from nonfood crops and industrial wastes. Hence, this study tried 3 different industrial wastes; sugar cane molasses, corn steep liquor, and whey. Sugar cane molasses was found to be optimum for ethanol production, however, corn steep liquor was optimum for growth. Statistical analysis showed significance of results, and the optimum relationship between

growth and ethanol production was achieved when sugar cane molasses was the fermentation medium (Table 2). The obtained results matches the results obtained by *Doelle and Green-field, 1985; Huertaz et al., 1991; Morimura et al 1997; Agrawal et al 1998; and De Vasconcelos et al., 1998.*

Table 2: Effect of different raw materials on growth and ethanol production

Raw material	Corn Steep L.	Molasses	Whey
Ethanol (%)	0.19 e	2.27 a	0.01 f
Growth (O. D.)	2.12 b	1.33 d	1.48 c

Means followed by the same letter are not significantly different

Different Molasses concentration(Sugar Concentration):

Different concentration of sugar was tested in term of molasses concentration in the fermentation medium. Table 3 shows that 35% molasses which contains 20% reducing sugars was optimum for

ethanol production and optimum for the statistical relation among ethanol production, growth, and sugar concentration however, 5% molasses which represent 2.9% sugars was optimum for growth. This results are in agreement with that of *Kadambini, 2006 and Sivakumar et al, 2010.*

Table 3: Effect of sugar cane molasses different concentration on growth and ethanol production

Molasses Conc. (%)	5%	10%	15%	20%	25%	30%	35%	40%
Ethanol (%)	1.0 j	2.6 g	4.2 f	5.9 e	7.0 d	9.7 c	11.7 a	10.0 b
Growth(O. D.)	1.2 hij	1.1 ij	1.0 ij	1.5 h	1.4 hi	1.2 hij	0.95 j	0.57 k

Means followed by the same letter are not significantly different

Inoculum size:

Sivakumar et al, 2010 noticed that as the concentration of yeast increases, the yield of bio-ethanol increase up to specific point and then it starts to decrease. Mostly the same results were obtained and the specific point was at 1 ml of 24 h yeast culture (0.01 at 600 nm), then ethanol concentration

decreased. Figure 1 shows that as the concentration of yeast increased, the produced yeast biomass and reached maximum production at 2.5 ml then declined at higher concentrations.
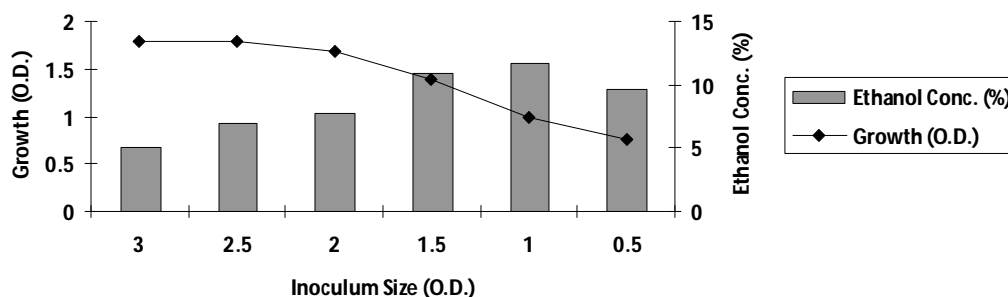
Figure 1: Effect of different inoculum size on both growth and ethanol production

Incubation period:

Most studies on ethanol production by Saccharomyces cerevisiae reported that the maximum productivity was at range from 48 to 84 hours (*Doelle et al, 1985; Huertaz et al., 1991;* *Morimura et al 1997; Agrawal et al 1998; De Vasconcelos et al., 1998; Kadambini, 2006; Brooks, 2008 and Sivakumar et al, 2010)*. In the present study the optimum incubation period for ethanol production was 72 hours, while 48 hours for biomass (Table 4).

Table 4: Effect of Different Incubation periods on growth and ethanol production

Incubation Time (hours)	0	12	24	36	48	72	84
Ethanol (%)	0.00 i	3.56 e	7.60 d	8.85 c	10.91 b	11.62 a	11.46 a
Growth (O. D.)	0.00 i	0.75 h	1.45 g	1.85 f	2.15 f	2.21 f	2.25 f

Means followed by the same letter are not significantly different

Initial pH Value:

Wide initial pH range was tested (Table 5), at pH value 3 no growth observed and no ethanol was produced, while pH 6 was the optimum for both biomass and ethanol production. The results are in agreement with that of *Kadambini, 2006*, but it doesn`t match results of *Sivakumar et al, 2010*, who found pH 4 optimum for ethanol production and this is due to difference in the tested strains.

Table 5: Effect of different pH values on growth and ethanol production

pH Values	3	4	5	6	7	8	9
Ethanol (%)	0.00 k	1.69 f	11.6 b	12.03 a	11.24 c	10.04 d	8.82 e
Growth (O. D.)	0.00 k	0.22 j	0.94 i	1.52 g	1.26 h	1.50 g	1.05 i

Means followed by the same letter are not significantly different

Temperature:

Temperature is one of the major constraints that determines the ethanol production. To know the optimum temperature for ethanol fermentation, the fermentation media were kept at 25, 28, 30, 35 and 40°C. Two parameters were studied, the growth and the ethanol yield (Figure 2). The maximum ethanol production and biomass was obtained at 28-30°C. this result are in agreement with most previous studies on *Saccharomyces cerevisiae*. Temperature tolerance was found to depend upon sugar concentration of the medium as *Morimura et al, 1997* observed that fermentation of molasses at 35°C was possible when sugar concentration was 20%(w/v), while no fermentation when sugar concentration was 22%(w/v).
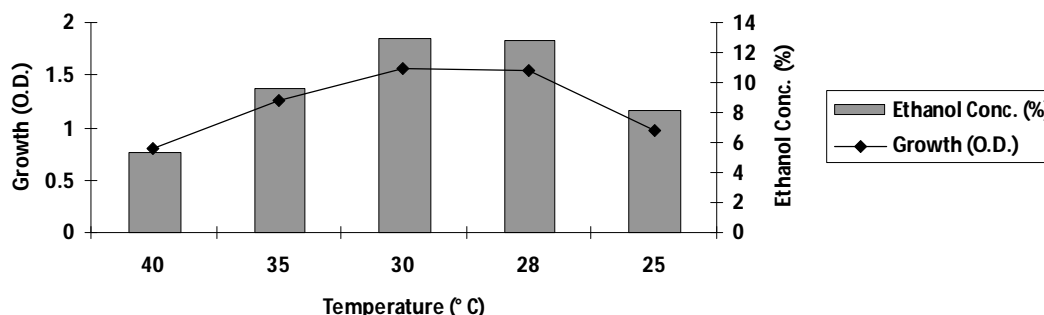
Figure 2: Effect of different temperature on both growth and ethanol production

Shaking rate:

Shaking is a vital factor that influence ethanol fermentation, so this study was interested to determine the optimum shaking rate for ethanol production through incubating the fermentation media at different shaking rates (0, 50, 100, 150, 200,

and 250 rpm). The optimum shaking rate for ethanol production was at 200 rpm, while growth was increased by increasing the shaking rate as shown in Figure 3.

Nitrogen sources:

Petra Bafrncova et al, 1999 noticed that the final ethanol concentration achieved was increased when excess assimilable nitrogen was added to the batch ethanol fermentations by *Saccharomyces cerevisiae*. Results obtained in this study assure the results of *Petra Bafrncova* and his team. Table 6 shows that most supplemented nitrogen sources improve ethanol production specially Urea and Corn Steep Liquor.
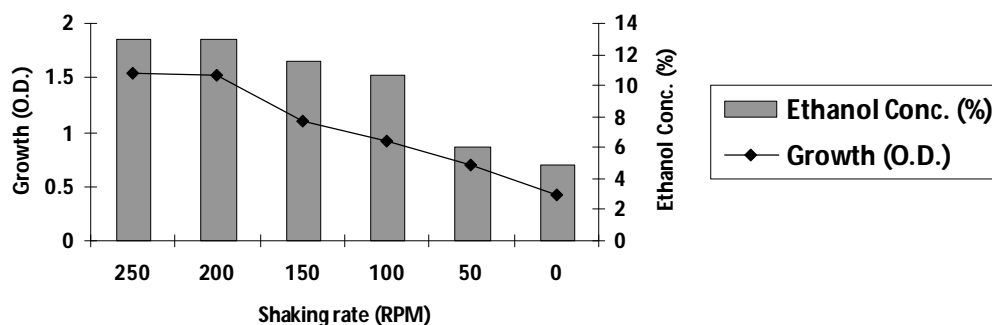
Figure 3: Effect of different shaking rate on both growth and ethanol production

Table 6: Effect of different nitrogen sources on growth and ethanol production

Treatment	Control	Peptone	Yeast extract	Casein	Urea	Corn Steep L
Ethanol (%)	11.60 c	12.03 b	12.04 b	10.17 d	13.08 a	13.02 a
Growth(O. D.)	1.56 h	1.88 g	2.13 f	1.60 h	2.47 e	2.49 e

Means Followed by the same letter are not significantly different

Corn steep liquor concentration:

Available, cheap industrial waste, nitrogen source, and improve ethanol production; these characters pushed us towards studying corn steep liquor different concentrations and its effect on ethanol production and biomass. The influence of different concentration of corn steep liquor on ethanol and biomass production represented in figure 4, and the optimum concentration for ethanol production was 1% (V/V) corn steep liquor, while statistical analysis tells that no great difference in biomass among concentration above 1% (V/V) corn steep liquor.
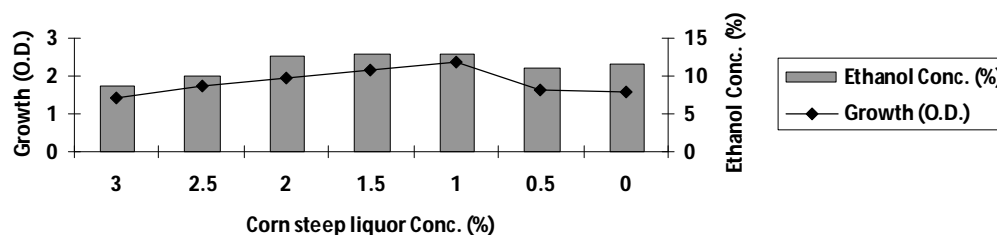
Figure4: Effect of different concentrations of CSL on both growth and ethanol production.

Microelements:

Jones et al. (1981), have listed out the various cations that may be used as supplements and their stimulatory effect on the physiology of fermenting organism. Iron, Zinc and Manganese are required as cofactors for several metabolic pathways (Morris, 1958). However, Mary et al, 2008 observed that ethanol yield has increased when supplemented with microelements, statistical analysis of our provided results (Table 7) show no significant difference among used microelements ($FeSO_4$, $MgSO_4$, $ZnSO_4$, and $(NH_4)_2SO_4$) and the control. This contrast may be due to difference of used feedstock as molasses are known to contain metals and Dhamija et al (1986) showed that the removal of metal ions from molasses enhanced ethanol production.

Table 7: Effect of Different Microelements on growth and ethanol production

Treatment	Control	$FeSO_4.7H_2O$	$MgSO_4.7H_2O$	$ZnSO_4.7H_2O$	$(NH4)_2SO_4$
Ethanol (%)	12.99 a	12.68 a	12.95 a	12.04 b	13.02 a
Growth (O. D.)	2.35 cd	1.87 ef	1.56 f	2.13 de	2.49 c

Means Followed by the same letter are not significantly different

4. Conclusion:

Biomass and ethanol (biofuel) production by Saccharomyces cerevisiae isolated from sugar cane bagasse was investigated in this study. Optimum conditions for ethanol production was 30°C temperature, 6 pH value, fermentation medium of 35% sugar cane molasses (20% reducing sugars) supplemented with 1% corn steep liquor as nitrogen source, 1 ml of 24 h yeast culture (0.01 at 600 nm) and shaking rate 200 rpm. Finally, around 13% ethanol was detected under optimum conditions by batch fermentation.

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Effect of Calcium chloride and Gibberellic acid on storability of "Succary Abiad" mango fruits under cold storage

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ABSTRACT: This study was carried out in two successive seasons (2007 and 2008) on Succary Abiad cv. mango trees grown in Abou Swear region, Ismailia Governorate, Egypt. The trees were 30-year-old, planted at 7×7 meters apart. Fruits storability was improved by $CaCl_2$ or GA_3 treatments under cold storage. Fruit weight declined starting from the first week of cold storage up to the end of storage period. GA_3 40 ppm dipping treatment showed the lowest fruit weight loss in the two seasons. The fruit pulp percentage gradually decreased as the storage periods elongated. Fruits from $CaCl_2$ 2% dipping showed the highest fruit pulp percentage compared with the control fruits. Fruit firmness was the highest in fruits treated with $CaCl_2$ 2% sprayed at two months after full bloom or dipping after harvesting. Moreover, SSC increased gradually up to the end of storage periods. While, titratable acidity in the fruits showed gradually decreasing up to the end of storage periods as compared with its values at the beginning of storage. The fruit SSC/acid ratios showed gradually increasing in its values higher than at zero time storage. Total sugars in the fruits increased as the storage period elongated to reach its maximum values at the end of storage period.

1. Introduction

Mango (***Mangifera indica*** **L**) is considered the king of fruits in many countries (Purseglove, 1972). In Egypt, mango cultivated area reached 184204 fed. (Ministry of Agriculture, 2007). More than 40% of this areas exists in Ismailia, where the main cultivar planted is "Succary Abiad". Low fruit calcium levels have been associated with reduced postharvest life and physiological disorders (Wills *et al*., 1998). For example, low levels have been correlated with physiological disorders of mangoes (Van Eeden, 1992). Calcium treatment has been shown to decrease respiration, reduce ethylene production and to delay the onset of ripening in mangoes (Yuniarti Suhardi, 1992).

Preharvest sprays of calcium compounds significantly retained more ascorbic acid in mature green fruits and during storage (Rani and Brahmachari, 2003). The soluble solids and firmness were also influenced by the higher $CaCl_2$ concentrations. Reddy and Haripriya (2002) found that the GA_3 (200 ppm) significantly reduced the physiological loss in weight, delayed color development and ripening and had longer shelf life. Besides, the fruits also exhibited better quality because of its favorable effect on slower increase in total soluble solids,

sugars and retaining more acidity thereby rendering them acceptable up to a period of 18 days in "Bangalora" and 17 days in "Neelum" cvs. Preharvest sprays of GA_3 significantly retained more ascorbic acid in mature green fruits and during storage (Rani and Brahmachari, 2003). Singh *et al*. (2007) studied the effect of GA_3 (0.5% w/v dipping) the ripening of mango "Dashehari" fruit was investigated at physiological and biochemical level. A decreased in fruit firmness was directly related with ripening. Firmness of untreated mango fruit (control) showed decrease from 181.3 to 112.7 N during the ripening period in this study. GA_3 did not reduce softening compared to their respective controls. The TSS increased gradually during fruit ripening in both treated and control samples. In untreated fruits, there was 1.88-fold increase in TSS during the study period. The difference in TSS between days 0 and 11 was 11 % on control and 8.5 % in GA_3 treated fruit.

The main objective of this study was to investigate the effect of calcium chloride and gibberellic acid on fruit storability during cold storage.

2. Materials and Methods

The present study was conducted throughout two successive seasons of 2007 and 2008 on mango cv. "Succary Abiad" at Abou Swear region, Ismailia Governorate, Egypt. The trees were grown in a sandy soil and irrigated with immerged irrigation system. The trees were 30-year-old and planted at $7 \times 7m$ space.

This work aimed to study the effect of calcium chloride and gibberellic acid on fruit quality of "Succary Abiad" mango during cold storage and marketability. Eight treatments with three replicates were used and arranged in complete randomize design. The treatments were as follows:-

No.	Treatments	Date of
1	Control (water)	One month after
2	$CaCl_2$ 2%	One month after
3	$CaCl_2$ 2%	Two months
4	GA_3 20 ppm	Two months
5	GA_3 40 ppm	Two months
6	$CaCl_2$ 2% dipping	After harvest
7	GA_3 20 ppm	After harvest
8	GA_3 40 ppm	After harvest

From each treatments, 30 fruits (10 fruits/replicate) were hand harvested and transported to the lab. of Hort. Dept. Fac. Agri. Suez Canal University within 1hours. of harvest, washed by chlorine solution (100 ppm) and air-dried. Fruits were stored to eliminate defects. 90 untreated fruits (from control trees) were divided into three equal groups each of 36 fruits; the first group dipped in 2 % Ca Cl$_2$ solution for 20 min., the second one dipped in 20 ppm GA_3 solution for 20 min. and the last group dipped in 40 ppm GA_3 solution for 20 min. then the treated fruits were air drayed. Ten sound fruits put in plastic foam dishes, covered with perforated colorless polyethylene bags (1 mm in diameter hole per 16 cm^2 area) and stored in cold air (12 ± 1 ºC) and 80-85 % RH up to 21 days. At the beginning of the experiment (Zero time storage), fruit samples (two fruits) were taken out for measurements the fruit quality parameters up to 21 days storage.

Studying parameters:

Fruit weight loss (%), pulp/fruit ratio (net ratio), fruit firmness (kg/cm^2) by using effegi pentrometer, soluble solids content (SSC %) by hand refractometer, fruit acidity, SSC/Acid ratio and total sugars were determined as described by A.O. A. C. (1995).

Statistical analysis:

Data were subjected to the analysis of variance and a complete block design was used (Steel and Torrie, 1980). Analysis of variance and mean comparison (LSD, at 5%) were done by MSTAT-C program version 7 (1990).

3. Results and Discussions

Effect of Calcium Chloride ($CaCl_2$) and Gibberellic Acid (GA_3) as pre or post-harvest treatments on fruit storability:

1- The effect on fruit weight loss:-

Data tabulated in table 1 indicated that all treatments appeared progressively decline in the fruit weight starting from the first week up to the end of storage periods (21 days). The different treatments varied in its effects on the fruit weight loss. In the first seasons, at the end of storage periods the treatment GA_3 40 ppm dipping showed the lowest fruit weight loss (4.31 %) while the control fruits appeared the highest fruit weight loss (5.65 %). The other treatments gave intermediate values in this regard. In the second season, the treatment GA_3 40 ppm sprayed at two months after full bloom showed the lowest fruit weight loss (4.42 %) while the control fruits gave the highest fruit weight loss (5.32 %). The other treatments showed intermediate values. The fruit weight loss could be attributed mainly to the water loss from fruit tissues and partially to the respiration process through the storage duration.

The composite effects of storage durations or different treatments were significant in the two seasons. In addition, the interaction effects among storage durations and the different treatments were significant in the two seasons.

The obtained results are in agreement with those of Ranjan et al. (2005), Waskar and Gaikwad (2005) and Singh et al. (2007) who found that $CaCl_2$ and GA_3 declined the weight loss of mango fruits during storage periods.

2- The effect on fruit pulp:-

Data in table 2 show that fruit pulp percentages gradually decreased as the storage periods elongated with significant differences. At the end of storage periods, in the first seasons, the treatment $CaCl_2$ 2% dipping showed the highest fruit pulp percentage (79.60) followed by those of fruits treated with GA_3 20 ppm sprayed at two months after full bloom (77.39). The lowest value appeared within the control fruits (75.30). In the second season, the fruits of $CaCl_2$ 2% dipping still have the superior effect (77.46) but followed by those from trees sprayed with

Table 1: Effect of CaCl2 and GA3 treatments and storage duration on Succary Abiad fruit weight loss (%) in 2007 and 2008 seasons.

Treatments	Storage duration (SD) (days)				
	0	**7**	**14**	**21**	**Mean**
	Season 2007				
Control	0.00	2.03	4.29	5.65	2.99 a
CaCl2 2% M. A. F. B.	0.00	1.65	3.24	4.76	2.41 e
CaCl2 2% 2 M. A. F. B.	0.00	1.93	3.56	4.86	2.59 d
GA3 20 ppm 2 M. A. F. B.	0.00	2.00	3.75	5.47	2.80 b
GA3 40 ppm 2 M. A. F. B.	0.00	1.96	3.66	4.84	2.62 d
CaCl2 2% Dipping	0.00	1.83	4.21	5.37	2.85 b
GA3 20 ppm Dipping	0.00	2.03	3.90	4.94	2.72 c
GA3 40 ppm Dipping	0.00	2.13	4.20	4.31	2.66 cd
Mean	0.00 D	1.94 C	3.8 B	5.02 A	
LSD 5% (T × SD)	0.147				
	Season 2008				
Control	0.00	1.93	3.59	5.32	2.71 a
CaCl2 2% M. A. F. B.	0.00	2.03	3.44	5.20	2.67 a
CaCl2 2% 2 M. A. F. B.	0.00	1.98	3.07	5.09	2.53 b
GA3 20 ppm 2 M. A. F. B.	0.00	1.90	3.42	4.94	2.57 b
GA3 40 ppm 2 M. A. F. B.	0.00	1.74	3.25	4.42	2.35 e
CaCl2 2% Dipping	0.00	1.71	3.21	4.93	2.46 c
GA3 20 ppm Dipping	0.00	1.87	3.26	4.72	2.46 c
GA3 40 ppm Dipping	0.00	1.95	3.13	4.56	2.41 d
Mean	0.00 D	1.89 C	3.30 B	4.90 A	
LSD 5% (T × SD)	0.099				

Values with the same small letter in each column are not significantly different at 5 % level DMRT
Values with the same capital letter in each row are not significantly different at 5 % level DMRT

M. A. F. B. = one month after Full Bloom   2 M. A. F. B. = Two months after Full Bloom

Table 2: Effect of CaCl2 and GA3 treatments and storage duration on Succary Abiad fruit pulp (%) in 2007 and 2008 seasons.

Treatments	Storage duration (SD) (days)				
	0	**7**	**14**	**21**	**Mean**
	Season 2007				
Control	80.97	80.82	77.59	75.30	78.67 e
CaCl$_2$ 2% M. A. F. B.	82.64	82.29	78.21	76.04	79.79 d
CaCl$_2$ 2% 2 M. A. F. B.	82.78	82.48	77.67	76.81	79.93 cd
GA$_3$ 20 ppm 2 M. A. F. B.	84.17	82.70	78.83	76.81	80.63 b
GA$_3$ 40 ppm 2 M. A. F. B.	81.91	81.12	79.98	77.39	80.10 cd
CaCl$_2$ 2% Dipping	83.45	83.27	81.37	79.60	81.92 a
GA3 20 ppm Dipping	83.77	83.69	76.38	77.20	80.26 bc
GA3 40 ppm Dipping	82.65	82.44	79.14	75.89	80.03 cd
Mean	82.79 A	82.35 B	78.64 C	76.88 D	
LSD 5% (T × SD)	0.782				
	Season 2008				
Control	74.65	73.80	73.55	72.95	73.74 f
CaCl$_2$ 2% M. A. F. B.	77.81	77.61	76.36	75.17	76.74 b
CaCl$_2$ 2% 2 M. A. F. B.	75.11	74.94	74.34	73.60	74.50 e
GA$_3$ 20 ppm 2 M. A. F. B.	76.32	75.40	74.74	74.27	75.18 d
GA$_3$ 40 ppm 2 M. A. F. B.	78.29	78.22	75.70	74.77	76.75 b
CaCl$_2$ 2% Dipping	79.30	78.72	77.82	77.46	78.33 a
GA$_3$ 20 ppm Dipping	76.95	76.28	74.97	74.87	75.76 c
GA$_3$ 40 ppm Dipping	76.93	75.45	75.44	74.79	75.65 cd
Mean	76.92 A	76.30 B	75.36 C	74.73 D	
LSD 5% (T × SD)	1.146				

Values with the same small letter in each column are not significantly different at 5 % level DMRT
Values with the same capital letter in each row are not significantly different at 5 % level DMRT

M. A. F. B. = one month after Full Bloom   2 M. A. F. B. = Two months after Full Bloom

CaCl₂ 2% applied at one month after full bloom (75.17). The control fruits showed the lowest fruit pulp (72.95) as in the first season. The significant decrease in the fruit pulp percentages could be due to the loss in the fruit fresh weight, which occurred mainly in the pulp while the stone was less affected as compared with its pulp.

3- The effect on fruit firmness:-

Table 3 shows the effect of different treatments on the fruit firmness. Data indicate that at zero time of storage, the fruit firmness differed within the various treatments. In the first seasons, the fruits harvested from trees sprayed with GA₃ 40 ppm at two months after full bloom appeared the highest values in this regard (5.35) while those treated with GA₃ 40 ppm dipping gave the lowest value (4.28). With the elongation of storage periods, fruits harvested from different treatment lost a part of its firmness. The lost in fruit firmness was gradually in the first week of storage and became faster in the second and third week. At the end of storage duration (21 days) the fruits from trees sprayed with CaCl₂ 2% at two months after full bloom showed the highest firmness values (0.98) followed by those treated with GA₃ 40 ppm dipping (0.95). The control fruits appeared the lowest fruit firmness value (0.78). In the second season at zero time storage, the fruits of CaCl₂ 2% dipping and these of GA₃ 20 ppm dipping treatments gave the highest values of fruit firmness (5.48 and 5.44, respectively). During storage periods, the fruit firmness was gradually decreased with storage duration elongation. At the end of storage periods (21 days) the fruits from trees sprayed with CaCl₂ 2% at one month after full bloom and those of GA₃ 40 ppm dipping showed the highest fruit firmness value (1.50) while those of control gave the lowest value in this regard (0.93). The other treatments showed intermediate values. The compositive effects of various treatments as well as those of storage duration were significant in the two seasons. Moreover, the interaction effects of treatments and storage durations were also significant in two seasons.

The positive effect of CaCl₂ could be due to that Calcium has long been known to confer rigidity of cell walls, which in turn reflected on increasing the tissue firmness. Moreover, CaCl₂ is very effective in preventing pectin solubilization.

The obtained results are in harmony with those of Hojo *et al.* (2009) who found that calcium is known to delay senescence resulting in firmer fruits and that mango fruit firmness was increased with treatment of calcium as compared to the control.

4- The effect on fruit SSC:-

Data in table 4 indicate that SSC increased in the fruits as a result of different treatments at the beginning of storage higher than control fruits. This was evident in the two seasons, except in the fruits of GA₃ 40 ppm dipping in the first season and those of either CaCl₂ 2% sprayed at two months after full bloom or those of GA₃ 20 ppm sprayed at two months after full bloom. Throughout the storage durations, SSC increased gradually up to the end of storage periods. The increments in SSC during storage periods could be a result of the conversion of organic matter in the fruits to soluble solids throughout the enzymatic activities and processes. The composite effects of each treatments or storage durations on the fruit SSC were significant in the two seasons. Moreover, the interaction effects of storage durations and treatments were also significant in the two seasons.

The obtained results confirmed those of Singh *et al.* (2007) and Hojo *et al.* (2009) who found that CaCl₂ or GA₃ treatments increased SSC fruits of mango cvs. as storage durations elongated higher than control.

5- The effect on titratable acidity (TA) content:-

Table 5 shows the effect of the different treatments and storage durations on the fruit titratable acidity contents. Data indicate that at the beginning of storage all treatments increased TA contents in the fruits higher than in control fruits. These were evident in the two seasons of study. During the storage durations, TA in the fruits showed gradually decreasing up to the end of storage periods as compared with its values at zero time of storage. This was noticed in the two seasons within all treatments and all storage periods. The observed decreasing in the fruit acidity could be due to that acids partially are a respiratory substrate and its consumption in respiratory increase with the progresses of storage periods and this may be responsible for the observed decreasing in acidity during the last days of storage.
The compositive effects of treatments or those of storage durations were significant in the two seasons. The interaction effects of treatments and storage durations were also significant in the two

Table 3: Effect of CaCl2 and GA3 treatments and storage duration on Succary Abiad fruit firmness (kg/cm2) in 2007 and 2008 seasons.

Treatments	Storage duration (SD) (days)				
	0	7	14	21	Mean
	Season 2007				
Control	4.45	2.34	0.97	0.78	2.13 e
CaCl$_2$ 2% M. A. F. B.	4.74	3.20	1.65	0.85	2.61 d
CaCl$_2$ 2% 2 M. A. F. B.	4.79	3.20	1.83	0.98	2.70 cd
GA$_3$ 20 ppm 2 M. A. F. B.	4.98	3.68	1.25	0.84	2.69 cd
GA$_3$ 40 ppm 2 M. A. F. B.	5.35	3.43	1.30	0.94	2.76 c
CaCl$_2$ 2% Dipping	4.84	4.49	2.80	0.87	3.25 a
GA$_3$ 20 ppm Dipping	4.36	4.33	2.57	0.90	3.04 b
GA$_3$ 40 ppm Dipping	4.28	4.18	1.48	0.95	2.72 c
Mean	4.72 A	3.61 B	1.73 C	0.89 D	
LSD 5% (T × SD)	0.187				
	Season 2008				
Control	5.14	4.55	2.84	0.93	3.37 d
CaCl$_2$ 2% M. A. F. B.	5.22	5.15	2.85	1.50	3.68 b
CaCl$_2$ 2% 2 M. A. F. B.	4.93	4.80	3.33	1.24	3.58 bc
GA$_3$ 20 ppm 2 M. A. F. B.	5.14	5.00	3.33	1.17	3.66 b
GA$_3$ 40 ppm 2 M. A. F. B.	4.84	4.75	2.98	1.33	3.47 cd
CaCl$_2$ 2% Dipping	5.48	4.64	3.05	1.26	3.61 b
GA$_3$ 20 ppm Dipping	5.44	5.39	3.44	1.40	3.92 a
GA$_3$ 40 ppm Dipping	5.24	5.18	3.84	1.50	3.94 a
Mean	5.18 A	4.93 B	3.21 C	1.29 D	
LSD 5% (T × SD)	0.261				

Values with the same small letter in each column are not significantly different at 5 % level DMRT
Values with the same capital letter in each row are not significantly different at 5 % level DMRT
M. A. F. B. = one month after Full Bloom   2 M. A. F. B. = Two months after Full Bloom

Table 4: Effect of CaCl2 and GA3 treatments and storage duration on Succary Abiad fruit SSC (%) in 2007 and 2008 seasons.

Treatments	Storage duration (SD) (days)				
	0	7	14	21	Mean
	Season 2007				
Control	12.40	16.57	18.80	19.53	16.83 a
CaCl$_2$ 2% M. A. F. B.	13.40	13.47	16.07	18.27	15.30 bc
CaCl$_2$ 2% 2 M. A. F. B.	13.60	15.40	17.67	19.27	16.48 a
GA$_3$ 20 ppm 2 M. A. F. B.	12.20	13.57	17.13	17.47	15.09 cd
GA$_3$ 40 ppm 2 M. A. F. B.	13.40	13.40	17.50	18.47	15.69 b
CaCl$_2$ 2% Dipping	12.33	16.27	18.47	18.40	16.37 a
GA$_3$ 20 ppm Dipping	12.73	11.77	16.27	17.83	14.65 d
GA$_3$ 40 ppm Dipping	11.80	12.80	17.40	18.13	15.03 cd
Mean	12.73 D	14.15 C	17.41 B	18.42 A	
LSD 5% (T × SD)	1.016				
	Season 2008				
Control	8.00	16.47	17.40	23.13	16.25 a
CaCl$_2$ 2% M. A. F. B.	9.07	10.47	17.73	21.33	14.65 b
CaCl$_2$ 2% 2 M. A. F. B.	7.53	9.33	15.87	17.27	12.50 d
GA$_3$ 20 ppm 2 M. A. F. B.	7.00	10.13	14.87	17.73	12.43 d
GA$_3$ 40 ppm 2 M. A. F. B.	8.40	10.50	12.87	16.33	12.03 d
CaCl$_2$ 2% Dipping	8.07	11.27	15.33	19.20	13.47 c
GA$_3$ 20 ppm Dipping	8.20	11.73	17.20	17.33	13.62 c
GA$_3$ 40 ppm Dipping	8.13	11.20	17.40	21.07	14.45 b
Mean	8.05 D	11.39 C	16.08 B	19.18 A	
LSD 5% (T × SD)	1.147				

Values with the same small letter in each column are not significantly different at 5 % level DMRT
Values with the same capital letter in each row are not significantly different at 5 % level DMRT
M. A. F. B. = one month after Full Bloom   2 M. A. F. B. = Two months after Full Bloom

Table 5: Effect of CaCl2 and GA3 treatments and storage duration on Succary Abiad fruit TA (%) in 2007 and 2008 seasons.

Treatments	Storage duration (SD) (days)				
	0	7	14	21	Mean
	Season 2007				
Control	1.67	1.36	1.33	1.23	1.40 f
CaCl$_2$ 2% M. A. F. B.	1.74	1.39	1.24	1.22	1.40 e
CaCl$_2$ 2% 2 M. A. F. B.	1.79	1.72	1.44	1.31	1.57 c
GA$_3$ 20 ppm 2 M. A. F. B.	1.82	1.72	1.47	1.14	1.54 d
GA$_3$ 40 ppm 2 M. A. F. B.	1.89	1.44	1.42	1.26	1.50 e
CaCl$_2$ 2% Dipping	1.98	1.86	1.67	1.31	1.71 a
GA$_3$ 20 ppm Dipping	1.87	1.82	1.44	1.37	1.62 b
GA$_3$ 40 ppm Dipping	1.85	1.56	1.36	1.26	1.51 f
Mean	1.83 A	1.61 B	1.42 C	1.26 C	
LSD 5% (T × SD)	0.051				
	Season 2008				
Control	1.89	1.87	1.43	1.65	1.71 f
CaCl$_2$ 2% M. A. F. B.	2.49	2.43	1.66	1.24	1.96 abc
CaCl$_2$ 2% 2 M. A. F. B.	2.26	2.37	1.64	1.75	2.00 a
GA$_3$ 20 ppm 2 M. A. F. B.	2.15	2.09	1.68	1.58	1.88 de
GA$_3$ 40 ppm 2 M. A. F. B.	2.18	2.21	1.77	1.77	1.98 ab
CaCl$_2$ 2% Dipping	2.10	1.84	1.61	1.72	1.82 e
GA$_3$ 20 ppm Dipping	2.16	2.14	1.73	1.60	1.91 cd
GA$_3$ 40 ppm Dipping	2.28	2.16	1.54	1.72	1.93 bcd
Mean	2.19 A	2.14 B	1.63 C	1.63 C	
LSD 5% (T × SD)	0.130				

Values with the same small letter in each column are not significantly different at 5 % level DMRT
Values with the same capital letter in each row are not significantly different at 5 % level DMRT
M. A. F. B. = one month after Full Bloom   2 M. A. F. B. = Two months after Full Bloom

Table 6: Effect of CaCl2 and GA3 treatments and storage duration on Succary Abiad fruit SSC/TA ratio in 2007 and 2008 seasons.

Treatments	Storage duration (SD) (days)				
	0	7	14	21	Mean
	Season 2007				
Control	7.43	12.18	14.14	15.88	12.41 a
CaCl$_2$ 2% M. A. F. B.	7.70	9.71	12.96	14.97	11.34 b
CaCl$_2$ 2% 2 M. A. F. B.	7.60	8.96	12.27	14.67	10.87 c
GA$_3$ 20 ppm 2 M. A. F. B.	6.70	7.91	11.69	15.32	10.40 e
GA$_3$ 40 ppm 2 M. A. F. B.	7.09	9.33	12.31	14.69	10.85 cd
CaCl$_2$ 2% Dipping	6.24	8.75	11.05	14.01	10.01 e
GA$_3$ 20 ppm Dipping	6.82	6.47	11.30	13.06	9.41 f
GA$_3$ 40 ppm Dipping	6.39	8.21	12.77	14.39	10.44 de
Mean	7.00 D	8.94 C	12.31 B	14.62 A	
LSD 5% (T × SD)	0.870				
	Season 2008				
Control	4.23	8.80	12.22	14.16	9.85 a
CaCl$_2$ 2% M. A. F. B.	3.64	4.32	10.68	17.25	8.97 b
CaCl$_2$ 2% 2 M. A. F. B.	3.33	3.94	9.77	9.89	6.73 fg
GA$_3$ 20 ppm 2 M. A. F. B.	3.25	4.85	8.84	11.26	7.05 ef
GA$_3$ 40 ppm 2 M. A. F. B.	3.86	4.75	7.26	9.23	6.28 g
CaCl$_2$ 2% Dipping	3.85	6.15	9.51	11.17	7.67 cd
GA$_3$ 20 ppm Dipping	3.80	5.49	9.97	10.82	7.52 de
GA$_3$ 40 ppm Dipping	3.57	5.19	11.28	12.25	8.07 c
Mean	3.69 D	5.44 C	9.94 B	12.00 A	
LSD 5% (T × SD)	1.026				

Values with the same small letter in each column are not significantly different at 5 % level DMRT
Values with the same capital letter in each row are not significantly different at 5 % level DMRT
M. A. F. B. = one month after Full Bloom   2 M. A. F. B. = Two months after Full Bloom

seasons of study. The available results in this study are in agreement with those of Santos *et al.* (2004) and Bringas-Taddei *et al.* (2005). All of them mentioned that TA in mango fruits decreased as a result of $CaCl_2$ or GA_3 treatments with the elongation of storage periods.

6- The effect on fruit SSC/ acid ratio:-
Table 6 shows the effect of different treatments and storage durations on the fruits SSC/ acid ratio. Data appear that at the beginning of storage these ratios fluctuated between 6.24 and 7.70 in the first season while these fluctuations were between 3.25 and 4.23 in the second season. Throughout storage durations, the fruits from all treatments showed gradually increasing in its values in this regard. The increasing in these ratios are due to the increasing in fruit SSC (table 4) and decreasing in acid contents in the same fruits (table 5) with these ratios fluctuated between 6.24 and 7.70 in the first season while these fluctuations were between 3.25 and 4.23 in the second season. Throughout storage durations, the fruits from all treatments showed gradually increasing in its values in this regard. The increasing in these ratios are due to the increasing in fruit SSC (table 4) and decreasing in acid contents in the same fruits (table 5) with

increasing storage durations. On the other hand, this ratio was the higher in control fruits than in GA_3 or $CaCl_2$ treated fruits during the different storage periods.

The composite effects of treatments or storage durations were significant in the two seasons. In addition, the interaction effects between treatments and storage durations were significant in the two seasons of study.

The obtained results are in agreement with those of Ahmed and Singh (2000) who found that mango fruits treated with GA_3 showed the lowest SSC/acid ratio.

7- The effect on total sugars content:-
Table 7 shows the effect of various treatments on the total sugars content throughout the storage periods. Data revealed that total sugars in the fruits increased as the storage period elongated to reach its maximum values at the end of storage period. This was evident in the two seasons of study within all treatments. The increasing in total sugars through the storage durations could be due to the conversion of some carbohydrate component like starch to sugars by the enzymatic analysis. At the end of the storage periods, the highest values of total sugars content (18.46 %) were observed in the fruits harvested from trees

Table 7: Effect of CaCl2 and GA3 treatments and storage duration on Succary Abiad fruit total sugars (%) in 2007 and 2008 seasons.

Treatments	Storage duration (SD) (days)				
	0	7	14	21	Mean
	Season 2007				
Control	11.47	15.77	17.49	17.79	15.63 a
CaCl₂ 2% M. A. F. B.	8.87	12.03	14.59	16.50	13.00 fg
CaCl₂ 2% 2 M. A. F. B.	8.78	14.30	16.74	18.46	14.57 bc
GA₃ 20 ppm 2 M. A. F. B.	8.76	12.55	15.35	16.79	13.36 ef
GA₃ 40 ppm 2 M. A. F. B.	10.45	12.12	16.37	17.33	14.07 cd
CaCl₂ 2% Dipping	9.07	15.28	16.86	17.40	14.65 b
GA₃ 20 ppm Dipping	9.96	10.49	14.08	16.63	12.79 g
GA₃ 40 ppm Dipping	10.43	11.48	15.96	17.07	13.73 de
Mean	9.72 D	13.00 C	15.93 B	17.25 A	
LSD 5% (T × SD)	1.027				
	Season 2008				
Control	6.07	15.48	16.03	21.39	14.75 a
CaCl₂ 2% M. A. F. B.	7.82	8.34	16.67	19.51	13.09 b
CaCl₂ 2% 2 M. A. F. B.	6.88	8.45	14.50	15.13	11.24 cd
GA₃ 20 ppm 2 M. A. F. B.	5.63	8.25	13.88	16.37	11.03 de
GA₃ 40 ppm 2 M. A. F. B.	7.61	7.18	11.50	15.44	10.43 e
CaCl₂ 2% Dipping	5.23	14.13	14.06	18.28	12.93 b
GA₃ 20 ppm Dipping	5.92	10.49	15.55	15.66	11.91 c
GA₃ 40 ppm Dipping	5.95	10.27	16.61	19.47	13.07 b
Mean	6.39 D	10.32 C	14.85 B	17.66 A	
LSD 5% (T × SD)	1.385				

Values with the same small letter in each column are not significantly different at 5 % level DMRT
Values with the same capital letter in each row are not significantly different at 5 % level DMRT
M. A. F. B. = one month after Full Bloom   2 M. A. F. B. = Two months after Full Bloom

sprayed with $CaCl_2$ 2% applied at two months after full bloom and those of controls (21.39 %) in the first and second seasons, respectively. The other treatments showed intermediate values in this regard. The composite effects among either treatments or storage durations were significant in the two seasons. Moreover, the interaction effects among treatments and storage durations were significant in the two seasons.

The obtained results confirm those of Kumar and Singh (1993), Singh *et al.* (2000), Silva & Menezes (2001) and Reddy & Haripriya (2002) who reported that $CaCl_2$ and GA_3 treatments significantly increased total sugars during cold storage of mango fruits.

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Role of Bacterial Treatments for Upgrading Nutritive Value of Bean Straw and Native Goats Performance

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Abstract: Twenty baladi kids (16.20 ±0.52 kg; four months age) were divided into four equal groups (five animals each). The animals were randomly assigned using a complete randomize design to receive one of the four rations for 90 days. All animals fed 50% concentrate feed mixture plus one of the roughages as follows: 50% rice straw (R1), 50% untreated bean straw (R2), 50% bean straw treated with *Bacillus sp.* (R3) and 50% bean straw treated with *Ruminococcus albus* (R4). Four digestion trails were carried out using metabolic cages to determine nutrients digestibility and feeding values. In addition, some rumen and blood parameters of experimental rations were determined. Data obtained revealed that treated bean straw with *Ruminococcus albus* (R4) was the highest CP and the lowest value of CF, ADF, ADL and cellulose. No significant differences were observed in total dry matter intake DMI **(kg/ h/d)** among R2, R3 and R4. Total gain, average daily gain (ADG) and feed efficiency (kg gain/kg DMI) were significantly (P<0.05) higher for R4 and R3 followed with R2 then R1. Bean straw treated with *Bacillus sp.* Or *Ruminococcus albus* had significantly (P<0.05) higher digestibilities of OM, CP, CF, EE, NFE, NDF, ADF and cellulose % than bean straw without treatment (R1) or control ration (R1). Total digestible nutrient (TDN) and digestible crude protein (DCP) had significantly (P<0.05) higher values for R4 (67.76% and 10.32%) and R3 (66.88% and 10.05%) than those of R2 (63.55% and 7.28%) then R1 (62.15% and 5.36%), respectively. Total volatile fatty acids (TVFA's) mean value and blood total protein for R4 was significantly higher (12.97 m.equ./100ml and 12.07 mg/100ml, respectively) than that of R3 then R2, and the lowest value was observed with R1. Further more, rumen ammonia NH_3-N (13.95mg/100ml) and blood plasma urea (10.63 mg/100ml) were recorded significant higher values (P<0.05) for R4 and R3 than those of R2 and R1, while creatinine had no significant differences among all treatments. It was concluded that treatment of 50% bean straw treated with bacteria (*Ruminococcus or Bacillus)* improved its nutrient digestibility, ADG, and feed efficiency.

1. Introduction:

In Egypt the annual agriculture by-products estimated to be around 30 million tons of dry material (Nawar, 2007). Approximately two thirds of the crop residues are burned or wasted, and hence lead to environmental pollution and consequently health hazards. Utilization of such by-products can not only be used in favor of solving feed shortage problem but also as a method to control environmental pollution (Zaza, 2004).

Ruminant livestock in tropics and sub-tropics receive most of their dietary needs from native pasture and crop residues (Mekasha *et al.,* 2002). By-product and crop residuals are becoming more important in livestock feeding system for availability for use at competitive prices relative to other commodities (Grasser *et al.* 1995).

Recently, prices of concentrate feedstuffs increased dramatically. Since most of concentrate feedstuffs used in animal feeding in Egypt is imported from abroad. Feeding is the most important cost item for livestock production which represents about 70% of the total production costs in Egypt (Borhami and Yacout, 2001); therefore, more attention was given to agro industrial by-products.

Every year, many millions tons of carbohydrate remain unused as celluloltic wastes in field and factories, because there are no simple technique allow to utilize such agricultural wastes. The agricultural by-products considered as stable source of ruminant feeds and nowadays interest in their effective utilization is increasing all over the world due to economical factors and pollution.

Non traditional feed resources such as crop residues and agro-industrial by–products must searched in order to decrease the relay on traditional resources to fill the gap and to decrease feeding costs (Zaza, 2005).

Most legumes are used for human consumption, while the by-products are usually utilized as animal feeds. Despite the high amount of legume by-products produced, information about their nutritive value is scarce. Feedstuffs consumed by ruminants are exposed initially to a fermentative activity in the rumen prior to gastric and intestinal digestion.

The main components of agro-industrial residues (cellulose, hemicellulose and lignin) are complex and its biodegradability is low, due to their resistance to degradation by ruminal microorganisms (Jarrige *et al.* 1995). Nevertheless, biotechnology could offer opportunities to modify the chemical structure of these substrates and to improve their digestion. Some efforts have been made to apply biotechnological processes to the improvement of the nutritious quality of agro-industrial residues like ruminant feed. Villas-Boas *et al*. (2003) treated apple pomace using *Candida utilis* in submerged culture, followed by *Pleurotus ostreatus* in solid substrate fermentation (SSF). They found that after *C. utilis* fermentation, protein and mineral content increased 100 and 60%, respectively, accompanied by an 8.2% increase in digestibility, while sequential fermentation with *C. utilis* and *P. ostreatus* achieved a high protein level with 500% of crude protein enrichment after 60 days of fermentation, as well as a considerable increase in the mineral content. Bauer *et al*. (2003) evaluated the effect of enzymatic treatments on several substrates rich in carbohydrates, showing that the fermentabilities of the enzyme-treated and untreated substrates were different. Thus, the utilization of SSF(solid state fermentors), which requires sophisticated technology and is of low cost offers the potential of improving the nutritional value of agro-industrial residues (Ghydal *et al.,* 1992). SSF has been defined as the growth of the micro-organisms on (moist) solid material in absence or near-absence of free water (Pandey, 2003). Under these conditions, the favored microorganisms are filamentous fungi, due to its capacity to grow in media with low water activity (Cannel and Young 1980).

In the extensive Mediterranean production systems, fibrous feeds, particularly cereal straws and stubbles, are the most important diet ingredients for ruminants. Therefore, it is necessary to evaluate the non-conventional feed resources that can use as animal feeds. A wide variety of arable legume crops are grown on Upper Egypt. Many of these crops have residues which can form an important source of livestock feed, following grain harvest, such as bean straw.

Although quantitatively less important, legume straws can represent a valuable feed resource for those animals. The available information on the nutritive value of legume straws is scarcer in case of cereal straws or grass hays (Bruno-Soares *et al.* 2000). So, the objective of this study was to evaluate the nutritive value of treated bean straw with two kind of bacteria as well as estimate effect of its inclusion in ration on goat productive performance.

2. Material and Methods

The present study was carried out at Agriculture Experimental and Research Center, Ain Shams University, Faculty of Agriculture and Department of Animal Nutrition, Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture.

Bacterial cultures:

Two strains of cellulolytic bacteria were isolated from rumen fluid of goats and were grown as pure cultural. Rumen fluid was collected by stomach tube. The separated strains were *Bacillus sp.* and *Ruminococcus albus* . The isolation of species used the pour-plate technique for pure preparation of cultures according to A.T.C.C. (1992).

Ensiling (small scale silo study):

Bean straw was sun dried to 90% DM, chopped to 2-5 cm and mixed with 2 water: 1 air dry roughages. It was mixed with (5% w/w) molasses, (1% w/w) urea and (0.3% w/w) formic acid and (0.5% w/w) acetic acid according to Abd El-Galil (2000). The samples were subjected with one of the following treatments by at 1.5 liters (5.8×105 viable anaerobes/kg of wet silage) /ton:

T1: Untreated bean straw (Control).
T2: Bean straw treated with *Bacillus sp*.
T3: Bean straw with *Ruminococcus albus*.

Treated samples were pressed in 2 liters jars for laboratory use or barrels (200 liters capacity) for farm use and incubated for 8 weeks.

Animals and feeding:

Twenty baladi kids with mean initial live body weight of 16.20 ±0.52 kg (four months age) were divided into four equal groups, five animal each (for 90 day). The animals were randomly assigned to receive one of the four rations as following.

R1= 50% Commercial concentrate feed mixture (CFM) +50% rice straw. (control ration)

R2= 50% CFM + 50% bean straw without treatment

R3=50% CFM + 50% bean straw treated with *Bacillus sp.*

R4=50% CFM + 50% bean straw treated with *Ruminococcus albus.*

The concentrate portion was offered to animals in two equal meals twice daily (8.00 am and 3.00 pm), the amount of offered CFM and bean straw was

adjusted biweekly for each group according to NRC (1981).

Each group was kept in separate shaded pen and feeding as group. Fresh water and salt blocks were available for each group all the day. Animals were weighed biweekly. Feed consumption, live weight gain and feed efficiency were determined. The chemical compositions of feed ingredients used in the experiment are shown in Table (1).

Metabolism trials:

At the end of the experimental period, four digestion trials were carried out to determine nutrients digestibility, feeding values and nitrogen balance of tested ration using metabolic cages. Three kids were randomly chosen from each group were subject to the digestion trials. Sample of rumen fluids were collected from each animal at zero, 3 and 6 hrs post feeding by stomach tube at the end of the digestibility trial.

The kids were fed individually in metabolism cages, water was available free. The trial extended for 21 days, adaptation period lasted for 14 days and collection period lasted for 7 days. Feces and urine were daily collected quantitatively during the collection period as described by Maynard *et al.* (1979). Solution of 10% H_2So_4 was added to the representative feces samples before drying in oven at 60 °C for 24 hrs. Dried samples were ground and kept for chemical analysis. 50 ml diluted sulfuric acid (10%) was put in urine collect containers each day. A representative samples (10%) of urine volume stored for nitrogen determination.

Blood samples:

The blood samples were taken at zero, 3 and 6 hrs post morning feeding from 3 animals of each treatment. The blood plasma was obtained by centrifuging the blood samples soon after collection at 4000 rpm for 15 minutes. Blood plasma was transferred into a clean dried glass vials and then stored in deep freezer at -20° C for subsequent specific chemical analysis.

Analytical methods:

Samples of feedstuffs and feces were taken and air dried at 55 °C for 48 hrs in forced air oven up to about 10 -12 % moisture, then kept to subsequent analysis. Dried samples were ground through a Wiley Mill fitted with a 1 mm screen and chemically analyzed according to A.O.A.C (1995), while NFE content was calculated by difference. Neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL) were determined according to Van Soest *et al.* (1991). Hemicellulose was calculated as (NDF-ADF) and cellulose as (ADF- ADL). Urine samples were subjected to N determination according to A.O.A.C (1995). Ruminal pH was immediately determined before rumen liquor was stored with a digital pH meter (pH ep®, pocket-sized pH meter Hana instruments, Italy). Concentration of NH_3-N was immediately determined using micro-diffusion method of Conway (1963). Frozen rumen liquor samples were analyzed for total volatile fatty acids (TVF's) by steam distillation according to Warner (1964).

Blood plasma was analyzed using special kits for urea (Patton and Crouch, 1977), total protein (Henry, 1964) and Creatinine (Henry, 1974).

Statistical Analysis:

Data were statistically analyzed by using system User's Guide, (SAS, 1998). Separation among means was carried out by using Duncan's multiple range test (Duncan, 1955). The model used was as follows:

$Yij = \mu + Ti + eij$

Where: Yij = The observation on the Ith treatment

μ = Overall mean

Ti = Effect of the Ith treatment

eij = Random experimental error

3. Results and Discussion
Chemical composition and cell wall constituents:

The data of Table (1) indicated that untreated bean straw (T1) had high content of DM, OM, CF, ADF, ADL and cellulose and lower content of CP, EE, NFE and ash compared with those of treated straws (T2 and T3). Bean straw treated with *Bacillus sp*. (T2) was lower hemicellulose than other straws (T1 and T2).

Data in Table (1) showed that microbial treatments (T2 and T3) used in the present study increased CP and minerals percentage but decreased CF% consequently fiber fraction percentage of bean straw compared with untreated bean straw (T1). Reasons of increasing CP with microbial treatment may be due to the nitrogen content of the microbial treatment and ensiled with 1% urea. This results confirmed with Dahanda *et al.* (1994) and Soliman *et al.* (2009) who mentioned that CP content of spent biologically treated straw increased from 3.42% to 6.1% and CP content of bean straw increased from 5.96 % to 10.71%.

Table (1): Chemical composition of tested feed ingredients

Item	CFM	Rice straw	T1	T2	T3
Dry matter (DM)	92.10	89.00	91.68	90.12	89.40
Chemical analysis (%) on DM basis:					
Organic matter (OM)	91.91	85.56	90.28	88.91	87.55
Crude protein (CP)	15.70	1.92	7.33	14.56	15.22
Crude fiber (CF)	14.50	45.09	41.94	30.54	28.35
Ether extract (EE)	3.22	2.24	2.19	3.23	2.98
Nitrogen free extract (NFE)	58.49	36.31	38.82	40.58	41.00
Ash	8.09	14.44	9.72	11.09	12.45
Cell wall constituents (%):					
Neutral detergent fiber (NDF)	42.32	79.09	59.79	48.65	49.87
Acid detergent fiber (ADF)	20.10	48.28	42.98	33.72	30.59
Acid detergent lignin (ADL)	5.93	10.55	12.07	10.36	9.58
Hemicellulose	22.22	30.81	16.81	14.93	19.28
Cellulose	14.17	37.73	30.91	23.36	21.01

*Ingredients of CFM: Concentrate feed mixture contained un decorticated cotton seeds 35%, yellow corn 34%, wheat bran 21%, rice bran 4% , molasses 2% , lime stone 2% , common salt 2%

T1: (Control) untreated bean straw. T2: bean straw treated with *Bacillus sp*. T3: bean straw treated with *Ruminococcus albus*.
Hemicellulose= NDF-ADF   Cellulose= ADF-ADL

On the other hand, chemical composition of tested ration indicated that group of animals which fed treated bean straw with *Ruminococcus albus* (R4) and *Bacillus sp.*(R3) were higher CP, NFE than other rations (R1 and R2). So, R4 and R3 were the lowest value of CF, ADF, ADL and cellulose than those of control ration (R1) and untreated bean straw (R2). This may be due to microbial treatment which convert complex fiber to simple fiber (easy digestion). The improvement in the chemical composition of lignocellulosic residues may be a result of the action of enzymes secreted by *Ruminococcus albus*. and *Bacillus sp.* .

Table (2): Chemical composition of experimental rations

Item	R1	R2	R3	R4
Dry matter (DM)	90.55	91.89	91.11	90.75
Chemical analysis (%) on DM basis:				
Organic matter (OM)	88.74	91.10	90.41	89.73
Crude protein (CP)	8.81	11.52	15.13	15.46
Crude fiber (CF)	29.80	28.22	22.52	21.43
Ether extract (EE)	2.73	2.71	3.23	3.10
Nitrogen free extract (NFE)	47.40	48.66	49.54	49.75
Ash	11.26	8.91	9.59	10.27
Cell wall constituents (%):				
Neutral detergent fiber (NDF)	60.70	51.05	45.49	46.10
Acid detergent fiber (ADF)	34.19	31.54	26.91	25.35
Acid detergent lignin (ADL)	8.24	9.00	8.15	7.76
Hemicellulose	26.52	19.52	18.58	20.75
Cellulose	25.95	22.54	18.77	17.59

Where:
R1=50% CFM +50% rice straw (control ration)   R2= 50%CFM +50% control bean straw
R3=50%CFM + 50% bean straw treated with *Bacillus sp.* R4= 50%CFM +50% bean straw treated with *Ruminococcus albus*

These results are coincide with those obtained by Fadel (2001) who illustrated that these enzymes hydrolyses the biopolymer to fermentable sugars used as carbon source for fungal growth to produce biomas enriching the treated crop residues. Similar results were recorded by El-Ashry *et al.* (2002), Kholif *et al.* (2005) and Mahrous (2005). Abd El- Galil (2008) found that using bacterial treatments (*Ruminococcus albus* and *Clostridium cellulovorans)* caused increase in crude protein (from 1.45 to 15.16%) and decrease in crude fiber (from 44.08 to 28.44%) of rice straw. The two treatments significantly ($P<0.05$) decreased NDF, ADF, cellulose and hemicellulose.

Feed intake:

No significant differences were observed in total dry matter intake DMI (kg/ h/d) among R2, R3 and R4. Which mean that untreated bean straw and treated straws have approximately the same palatability (Table 3). While, R1 had a significantly (P<0.05) lower DMI (kg/ h/d) than other rations contained bean straw treated or untreated.

On the other hand, crude protein intake (CPI; 128.32 g/h/d) was significantly (P<0.05) higher for R4 than R3 followed by R2 then R1 (123.31, 93.23 and 68.72; respectively). This results were agreement with El-Banna *et al.* (2010) who found that total intake of CP decreased with inclusion of bean straw either biologically treated or supplemented with probiotic in sheep rations compared with control ration (concentrate feed mixture plus berseem hay).

The same trend was observed for total gain, average daily gain (ADG) and feed efficiency (kg gain/kg DMI) with no significant differences between R4 and R3 (Table3). This results due to high level of protein in R4 and R3 than other rations (R2 and R1). The same trend was observed in CP intake. This in agreement with Mekasha *et al.* (2002) who observed that the high DM intake could result from the lower fiber content and high CP content in basal diet. These results are disagreement with El-Banna *et al.* (2010) who reported that control ration was higher ADG and total gain than bean straw biologically treated this contrast may be due to the control ration that containing berseem hay plus CFM, while in the present study the control ration was containing rice straw plus CFM or due to type of microorganisms which used in treated bean straw.

Table (3): Effect of feeding experimental rations on feed intake, total gain, average daily gain and feed efficiency by kids.

Item	R1	R2	R3	R4	±SE
Experimental Period	90	90	90	90	-
No. of Animal	5	5	5	5	-
Average initial weight(kg)	16.00	16.50	16.00	16.25	-
Average final weight(kg)	23.00	24.00	24.75	25.25	-
Dry matter (DMI; kg/ h/d)	0.780^b	0.810^a	0.815^a	0.830^a	0.12
Crude protein (CPI; g/h/d)	68.72^d	93.32^c	123.31^b	128.32^a	0.24
Total gain(kg)	7.00^c	7.50^c	8.75^b	9.00^a	0.19
Average daily gain (ADG; kg/ h/d)	0.078^c	0.083^b	0.097^a	0.100^a	0.23
Feed efficiency (kg gain/kg DMI)	0.100^b	0.102^b	0.119^a	0.120^a	0.48

a,b,c and d, Means with different superscripts within each row for each parameter are significantly different. (P < 0.05).
Where:
R1=50% CFM +50% rice straw (control ration)   R2= 50%CFM +50% control bean straw
R3=50%CFM + 50% bean straw treated with *Bacillus sp.*   R4= 50%CFM +50% bean straw treated with *Ruminococcus albus*
SE: standard error

Digestion coefficients and nutritive values:

Data of digestibility trials (Table 4) showed that the highest (P<0.05) values of DM and hemicellulose digestibility were found for R4 than those for the other rations. Bean straw treated with *Bacillus sp.* Or *Ruminococcus albus* had significantly (P<0.05) higher digestibilities of OM, CP, CF, EE, NFE, NDF, ADF and cellulose than bean straw ration without treatment (R2) or control ration (R1). These results may be resulting from the increasing in the numbers of bacteria, especially cellulolytic bacteria and fungi in the rumen (Ali, 2005).

The estimated *In vivo* OM digestibility for bean straw was in the 60-70% range calculated by Shem *et al.* (1995) and are slightly higher than cereal straw OM digestibility (C.I.H.E.A.M, 1990). In this study

the results coincided with the results of El-Banna *et al.* (2010) who reported that highest digestibilities of CF, CP, NDF, ADF and cellulose were recorded for rations containing biologically treated (*T. reesei plus S. cervisiae or T. reesei* alon) bean straw compared with rations containing berseem hay, and agreement also, with those obtained by Mahrous (2005) and Al-Asfour (2009) who found that sheep rations containing either cotton stalk or wheat straw treated with *Trichoderma sp.* increased the digestibilities of CF, CP, NDF, ADF and cellulose.

Nutritive values as TDN for ration (R4) was significantly higher (67.76%) than R3 (66.88%) then R2 (63.55%) and the lowest value was recorded in R1(62.15%).

Table (4) : Effect of feeding experimental rations on digestion coefficients and nutritive values in kids .

Item	R1	R2	R3	R4	±SE
Digestion coefficients %					
Dry matter (DM)	63.59 [d]	66.47 [c]	71.69 [b]	73.36 [a]	0.31
Organic matter (OM)	65.28 [c]	69.33 [b]	70.94 [a]	71.31 [a]	0.33
Crude protein (CP)	60.86 [c]	63.17 [b]	66.43 [a]	66.78 [a]	0.34
Crude fiber (CF)	52.37 [c]	57.21 [b]	59.61 [a]	60.36 [a]	0.30
Ether extract (EE)	68.38 [c]	70.72 [b]	71.83 [a]	72.11 [a]	0.26
Nitrogen free extract (NFE)	72.27 [c]	74.56 [b]	76.34 [a]	77.12 [a]	0.25
Neutral detergent fiber (NDF)	62.24 [c]	63.99 [b]	65.51 [a]	65.89 [a]	0.22
Acid detergent fiber (ADF)	73.57 [c]	76.70 [b]	77.11 [a]	78.32 [a]	0.23
Hemicellulose	80.32 [d]	82.22 [c]	84.68 [b]	85.61 [a]	0.24
Cellulose	75.58 [c]	78.93 [b]	79.44 [a]	80.55 [a]	0.22
Nutritive value %					
TDN*	62.15 [d]	63.55 [c]	66.88 [b]	67.76 [a]	1.80
DCP**	5.36 [c]	7.28 [b]	10.05 [a]	10.32 [a]	0.87

a,b,c and d; Means with different superscripts within each row for each parameter are significantly different. (P < 0.05).
*Total digestible nutrient **digestible crude protein
Where: R1=50% CFM +50% rice straw (control ration)　　　R2= 50%CFM +50% control bean straw
　R3=50%CFM + 50% bean straw treated with *Bacillus sp.*　　R4= 50%CFM +50% bean straw treated with *Ruminococcus albus*

On the same trend, DCP had significantly (P<0.05) higher values for R4 (10.99%) and R3 (10.75%) than R2 (9.89%) then R1(8.65%). These results were compatible with CP contents in the rations. These results were harmony with results of El-Banna *et al.* (2010) who found that DCP was higher in rations containing bean straw biologically treated than ration containing berseem hay as control.

Abd El-Galil (2008) found that using bacterial treatments (*Ruminococcus albus* and *Clostridium cellulovorans)* caused increase digestibility (P<0.05) compared with the untreated rice straw. Gado *et al.* (2009) reported that *Cellulomonas* and *Bacillus* isolated from camel had the highest *In vitro* fermentation of cellulose of bagasse (44.17% and 30.5%, respectively). Also, *Cellulomonas* and *Bacillus* isolated from sheep origin recorded *In vitro* fermentation of cellulose of bagasse (42.50% and 30.84%, respectively).

Rumen parameters:
Rumen parameters which recorded were illustrated in Table (5). Ruminal pH value is one of the most important factors, which affect microbial fermentation in the rumen and influenced its functions. It is apparent that, the pH values were within the normal range with no significant differences among the experimental rations at mean of zero, 3 and 6 hours post feeding. Meanwhile, the pH values tend to decrease by prolongation of time post-feeding, reaching lowest at 3hrs post-feeding then increased after 6 hrs feeding. Baker *et al.* (1959) reported that the rumen pH values were between 6.39 and 7.57 at the different sampling time after feeding.

Such range is suitable for growth and activity of cellulolytic bacteria (Prasad *et al.* 1972).

While, TVFA's mean value for R4 was significantly higher (12.97 m.equ./100ml) than R3 then R2 and the lowest value was recorded with R1. In the present study, greater TVFA's concentration in rumen liquor for kids which fed ration containing bean straw treated with *Ruminococcus albus.* may be due to the increase in all, OM, CP and CF digestibilities than the control ration (Table 4).

Further more, rumen NH_3-N (mg/100ml) was recorded higher significant values for R4 and R3 than R2 and R1. Over all observation, TVFA's (m.equ./100ml) and NH_3-N (mg/100ml) values were higher after 3 hrs and then decreased after 6 hrs morning feeding for all of rations.

The rumen bacteria change qualitatively and quantitatively in response to the changes in chemical composition of diet of the animals (Maklad and Mohamed, 2001). These values were similar to that reported by Abd El-Galil (2000 and 2006), who found the highest ammonia-N concentration after 4 hrs. These differences in ammonia-N concentration are referred to difference in treatments. However, it is well recognized that the ammonia-N concentration found in the rumen at any given time presented the net concentration value of its production, utilization by rumen microbes and absorption across the rumen wall, the dilution by other factor and passage to the lower gut. Ruminants utilize VFA as an energy source, allowing the production of meat and/or milk. Van Houtert (1993) indicated that relatively large amounts of propionic acid are reported when easily digestible substrates are supplied to rumen microbes

Table (5): Effect of feeding experimental rations on Rumen parameters in kids

Item	R1	R2	R3	R4	±SE
_pH_					
0hr	7.1	6.9	6.8	6.7	
3hrs	6.4	6.6	6.7	6.5	
6hrs	6.9	6.8	6.9	6.8	
Overall Mean	6.80	6.76	6.80	6.67	± 0.11
_NH3-N(mg/100ml)_					
0hr	10.62	11.76	11.98	12.21	
3hrs	13.75	14.54	16.71	16.90	
6hrs	11.55	12.10	12.67	12.75	
Overall Mean	11.37 [c]	12.80 [b]	13.79 [a]	13.95 [a]	±1.04
TVFA's(m.equ./100ml)					
0hr	9.7	9.6	10.20	10.7	
3hrs	12.8	13.5	14.9	15.1	
6hrs	11.6	12.3	12.8	13.1	
Overall Mean	11.37 [d]	11.80 [c]	12.63 [b]	12.97 [a]	±1.04

a,b,c and d, Means with different superscripts within each row for each parameter are significantly different. (P < 0.05).
where
R1=50% CFM +50% rice straw (control ration)   R2= 50%CFM +50% control bean straw
R3=50%CFM + 50% bean straw treated with *Bacillus sp.*   R4= 50%CFM +50% bean straw treated with *Ruminococcus albus*

Blood parameters:

Data in Table (6) showed blood plasma total protein, urea and creatinine levels. Blood plasma total protein was higher record (12.07 mg/100ml) for animals fed ration containing bean straw treated with *Ruminococcus albus* (R4) than ration containing bean straw treated with *Bacillus sp.(*R3) and the last ration had no significant difference with untreated bean straw (R2). All of rations had significantly (P<0.05) higher than control ration (R1). This was reflects on total body gain (Table 3). In addition, blood plasma urea (mg/100ml) values for R4 and R3 were significantly (P<0.05) higher than those in R2 and R1. This was the same trend with rumen ammonia-N, while creatinine had no significant differences (P>0.05) among all treatments. These mean that treated bean straw not affected on kidney function as creatinine. The increase in blood plasma studied constituents may be due to the role of *Ruminococcus albus* as biological treatment in improving all nutrient digestibility (Table 4) and rumen parameters (Table 5) of kids fed bean straw treated with *Ruminococcus albus*, and also may be probably led to an increase in the absorption rate from the digestive tract, thus blood constituents of the supplemented animals reflected a corresponding increase of these values. These results came on line with those obtained by Abd El-Galil (2000, 2006 and 2008).

Table (6) Effect of feeding experimental rations on Blood parameters in kids .

Item	R1	R2	R3	R4	±SE
Total Protein (mg/100ml)					
0hr	9.90	10.80	10.67	10.92	
3hrs	10.32	11.54	11.62	11.87	
6hrs	12.68	12.99	13.20	13.41	
Overall Mean	10.96 [c]	11.78 [b]	11.83 [b]	12.07 [a]	0.64
Urea(mg/100ml)					
0hr	6.60	7.90	8.10	8.22	
3hrs	8.25	9.89	10.70	10.85	
6hrs	11.32	11.60	12.50	12.83	
Overall Mean	8.72 [c]	9.79 [b]	10.43 [a]	10.63 [a]	0.68
Creatinine (mg/100ml)					
0hr	1.00	0.95	0.98	0.99	
3hrs	1.30	1.20	1.35	1.40	
6hrs	1.20	1.00	1.10	1.10	
Overall Mean	1.17	1.05	1.14	1.16	0.059

a,b,c Means with different superscripts within each row for each parameter are significantly different. (P < 0.05).
where
R1=50% CFM +50% rice straw (control ration)   R2= 50%CFM +50% control bean straw
R3=50%CFM + 50% bean straw treated with *Bacillus sp.*   R4= 50%CFM +50% bean straw treated with *Ruminococcus albus*

4. Conclusion

It can be concluded that under this study the bacterial treatments with *Ruminococcus albus* and *Bacillus sp*., isolate from rumen liquid of goat, had the highest effect on chemical composition, cell wall constituents and digestibility of treated bean straw. These results exhibited that *Ruminococcus* and *Bacillus* were more effective on cellulose, total gain, average daily gain and feed efficiency for bean straw compared with untreated one.

The bacterial treatments with *cellulolytic bacteria* could be used successfully to improve the quality of bean straw (as roughage) with increased protein, nutrients digestibility and nutritive value. In addition to decrease fibrous fraction of rations without any side effects on animal performance, health and decreased of pollution.

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Fungal occurrence in physic nut *((Jatropha curcas)* seeds during storage and possibility aflatoxin production by *Aspergillus flavs* and *Aspergillus paraziticus* isolates.

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Abstract: The aims of the current study were to determine the seed quality of *J. curcas* of peeled and non peeled nut during storage and the capability of *Aspergillus flavus* and *Aspergillus paraziticus* isolates to produce aflatoxin. Seeds of peeled or non peeled nuts stored for one year and the recent collected seeds of non peeled nut were contaminated with fungi with an average of 37.8% on PDA medium and with an average of 48.9% on Czapek's agar medium. The percentage of fungal infection was higher in seeds stored for one year than in the seeds of the other two sources of non peeled nuts. The obtained results also showed that the number of fungi as cfu per seed was ranged from 0.8 to 6.7cfu/seed with an average of 2.93 and 3.3 cfu/seed on PDA and salt Czapek's agar media respectively. Twelve species which belong to seven genera were detected and they were classified as, *Alternaria tenuis* (11.03%), *A. flavus* (11.77%), *A. niger* (9.77%), *A. paraziticus* (2.05%), *A. terreus* (3.05%), *Fusarium* spp. (22.13%), *Mucor* spp. (6.20%), *Penicillium* spp. (11.03%), *Rhizopus* spp. (8.73%) and *Rhizoctonia solani* (11.87 %). Among the so called storage fungi, *Aspergillus* spp. was the most dominant fungi occurred in highest frequent (30.16%), beside the field fungi (damping –off, root rot and wilt pathogens), i.e., *Fusarium* spp and *Rhizoctonia solani* were also found in high frequencies. The current data showed that the highest percentage of contamination with *A. flavus* was detected in seeds of non peeled nut stored for one year (12.5%) followed by seeds of recent collected non peeled nut (12.1%), while *A. Paraziticus* were detected only in seeds of recently collected of non peeled nut by 6.1%. 62. Percentae of *A. flavus* isolates had a higher ability to produce aflatoxin B_1 with maximal level reached to 20.6µg /100ml, while 60.0% isolates of *A. paraziticus* were able to produce aflatoxin in lower level than *A. flavus,* where the maximum level reached to 17.2µg /100ml.

1- Introduction

Physic nut (*Jatropha curcas* L.) globally known as jatropha belongs to the family Euphobiaceae. It is a large shrub or small tropical tree widely distributed in arid and semiarid areas. Jatropha is a main commodity source for biodesel in several countries. The tree has only a few pest and disease problems. However, recently due to the expansion of this crop throughout the plant pathogens may be spreads through infected seeds. The mycological profiles of jatropha seeds have been studied. Neves *et al*. (2009) reported that *Fusarium , Rhizoctonia and Alternaria* spp. were the major fungi detected in the blotter test.While, Worang (2008) isolated sixteen fungal species from physic nut seeds (jatropha) during six months of storage. They also reported that at the beginning of storage , most of the fungi that infected the seeds were classified as field

fungi such as *Colletotricum* spp. *Cladosporium* spp. and *Fusarium* spp. after three months of storage , the existence of field fungi was generally replaced by storage fungi, such as *Aspergillus* and *Penicillium* spp. dominate the population.

However, recently root rot caused by *Rhizoctonia bataticola* has been recorded as one of the most divesting disease of jatropha (Sharma and Kumar, 2009 and Kumar *et al*., 2011). In the same direction, Hedge *et al*. (2009) isolated *Sclerotium rolfsii* from seed and seedling of *J. curcas*.

It has been well established that fungal that fungal invasion of different agricultural commodities is occasionally associated with the development of mycotoxins. Along with this view, Lillard *et* al. (1970) isolated 71 cultures of *Aspergillus flavus* and *A. paraziticus* most of which produced aflatoxins *in-vitro*. Aflatoxins producing fungi have been isolated

from cereal grains, wheat, oil seeds and nut products (Yu *et al*., 2004). *A. flavus* are natural contaminants of many feeds and raw materials for human and animal consumption. On a survey conducted during four years, Martins (1987) found *A. flavus* in about 70.0% of feeds (1,103 samples), and in 42.6% of raw materials. Martins (1989) in a study about *in vitro* aflatoxin production by *Aspergillus flavus* (114 strains) isolated from raw materials and mixed feed found 60.5% toxigenic strains and the range of the aflatoxin B_1 was 0.004 to 391.9 mg/kg. Those aflatoxins producing fungi are widely distributed in nature and can grow over wide range environmental conditions (Holmquist *et al*. 1983). They are known to be hepatotoxic , carcinogenic and teratogenicto different species of animals (Yu *et al.,* 2002)

Therefore, it seems of importance to study the fungal flora of jatropha seeds and their percentage occurrence. The study also include the capability of *A. flavus* and *A. paraziticus* isolates isolated from jatropha seeds to produce aflatoxins.

2- Materials and Methods

1- Seeds of Jatropha nut samples

Jatropha nut samples were collected from environmental farm at Aloksour Governorat (five samples). The nut samples were tested for current studied for isolation of fungi from jatropha seeds and aflatoxin determination.

2- Recovery, identification and enumeration of the mycoflora

Fungi associated with   seeds were isolated according to the Foor *et al*. (1976). Each five seeds were placed in 20 ml sterile container, then sterilized distilled water was added and left for 2 minutes, to allow seeds to sink. Water was drained off and 2.5% equal solution of sodium hypochlorite was added and left for 3 minutes. Drain of excess solution and immediately rinse in 3 changes sterilized distilled water. Drain off water, dried between two layer of sterilized filter papers. The seeds of 50 pods were plated on potato dextrose streptomycin agar medium (A.T.C.C., 1978) at rate of five seeds / dish. Plates were incubated at 28ºC± 2 for 5-8 days.

The fungal colonies were microscopic examined by observing the colonial morphology color of colony, texture, shape and surface appearance and cultural characteristic - a sexual and sexual reproductive structures like sporangia, conidial head, arthrospores, the vegetative mycelia, septate or non-septate. All fungal isolates were identified to the generic or species level according to Gilman (1957); Nelson *et al*. (1983) and Barnett and Hunter (1986).

The percentage of natural seeds infection, the total fugal counts and the frequency occurrence of different fungi associated seeds were determined.

3- Efficacy of isolates to produce Aflatoxin

3-1: *Chemicals*: aflatoxin B_1 (AFb$_1$) standers were purchased from sigma chemical Comp. (St. Louis, Mo). The purity was confirmed by capillary GC-Mass spectroscopy and UV spectrophotometry.

3-2: *Media used***:** the cultures were cultivated on yeast extract sucrose broth. All chemicals used were in high purity.

3-3: *Preparation of spore suspension***:** the pure isolated and identified of *A. flavus* and *A. paraziticus* were grown on slants of potato dextrose agar medium and incubated for 7 days at 28ºC± 2 .Spores were harvested by adding sterilizes water with few drops of Tween 80 solution (0.42% v/v) filtered through several layers of cheese cloth. The number of conidia was estimated by Hemacytometer and the suspension was adjusted to contain approximately 10^6/ ml.

3-4: *Culture preparation***:** the ability of *A. flavus* and *A. paraziticus* to produce aflatoxin were tested on yeast extract sucrose broth (YES medium) A set of three flasks as replicates containing 100ml of YES broth were inoculated with 1ml of spore suspension (10^6 spores/ ml) and then incubated at 28ºC± 2 for 7 days in dark. The aflatoxin was determined in the culture broth as described in AOAC (1995).

3-5: *Aflatoxin determination***:** aflatoxin was determined in the culture broth as described in AOAC (1995) using HPLC analyses according to the Hutchins and Hagier (1983). Water HPLC (EX. 365, EM, 450nm). Millennium soft ware programe was applied for calculation NOVA Pak C18 column (3.4x 150 mm 4μ). Mobile phase A: Acetonitrile : H_2O, 15: 85(v/v). Mobile phase B: (Methanol 100%)

3- Results and Discussions

1- Percentage of the natural fungal infection

It is clear from the data presented in Table(1) that seeds of peeled or non peeled nuts stored for one year and the recent collected seeds of non peeled nut were contaminated with fungi with an average of 37.80% on PDA medium and with an average of 48.9% on Czapek's agar medium.

The percentage of fungal infection was higher in seeds stored for one year than in the seeds of the other two sources of non peeled nuts, as the mean percentage of infection were 56.70, 26.70 and 46.65 in seeds stored for one year and seeds of non peeled nuts stored for one year or recently collected respectively.

Table 1. Percentage of fungal infection and fungal count (cfu/seed) of jatropha seeds recently collected or stored for one year on PDA and salt Czapek's agar media

Source	PDA medium		Czapek's agar medium		Mean of % infection
	% infection	Count of CFU/seed	% infection	Count of CFU/seed	
Seed stored for one year	46.7	4.7*	66.7	6.7	56.70
Seeds of non peeld nut stored for one year	26.7	0.8	26.7	0.6	26.70
recent seeds of non peeled nut	40.0	3.3	53.3	2.6	46.65
Average	37.80	2.93	48.90	3.3	

- Tests were rune in quadruplicate
- Counts represent the number of fungi / seed incubated at 28±2ºC for 7 days

On the other hand, seeds of non peeled nut stored for one year represented the lowest densities of contamination on the two tested media. Almost similar results were obtained by earlier finding by Worang (2008) and Neves (2009).

It is clear also from Table 1 that the number of fungi as cfu per seed was ranged from 0.8 to 6.7cfu/seed with an average of 2.93 and 3.3 cfu/seed on PDA and salt Czapek's agar media respectively. Moreover, seeds of non peeled nut showed low fungal densities on the two tested media than the corresponding figures of seed from peeled nut and stored for one year. As, the count were decreased on PDA medium from 4.7 to 0.8 cfu/seed (82.9% reduce) in seeds of peeled and non peeled stored for one year respectively. These results can explained by the finding of Worang (2008) who reported that at the beginning of storage, most of the fungi that infected the seeds were classified as field fungi, while after three months of storage , the existence of field fungi was generally replaced by storage fungi ,or may be due to the antifungal activity of jatropha seed oil on fungal growth.

2- Frequency occurrence of fungi infected jatropha seeds

The data of all samples per principle fungal genera or species given in Table (2) indicate that the surface contamination occurred within intact nuts of each sample. Great variation in types and in numbers of propagation s among samples was noted and many fungal isolates which found in seeds of recently collected nuts were absent in seeds of non peeled nuts stored for one year. Data also showed that fungi were much more abundant in seeds stored for one year due to apparently to the absence of cortex of the nut consequently infection with soil fungi were occurred. Twelve species which belong to seven genera were detected and they were classified as, *Alternaria tenuis* (11.03%), *Aspergillus flavus* (11.77%), *Aspergillus niger* (9.77%), *Aspergillus paraziticus* (2.05%), *Aspergillus terreus* (3.05%), *Fusarium* spp. (22.13%), *Mucor* spp. (6.20%), *Penicillium* spp. (11.03%), *Rhizopus* spp. (8.73%) and *Rhizoctonia solani* (11.87 %). The obtained results agree with Sharma and Komar (2011) and differed than results obtained by Hedge *et al*. (2009), they isolated *Sclerotium rolfsii* from seed and seedling of *J. curas*.

Depending upon their frequent of occurrence the genera and species were grouped as major and minor component include: *Fusarium* spp. (22.13%) and *Aspergillus* (30.16%), were the most frequent isolated fungi. Species of *Fusarium* and *Aspergillus* also found in high incidence in seeds of jatropha study by Melo *et al.* (2007) and Neves *et al.* (2009) which agrees with the obtained result here.

Table 2. The frequency occurrence percentage of fungi isolated from jatropha seeds recently collected or stored for one year of peeled and non peeled nut on PDA medium

Fungi	Seeds stored for one year	Seeds of non peeled nut stored for one year	Recently collected seeds of non peeled nut	Mean %
Alternaria tenuis	14.9	-	18.2	11.03
Aspergillus flavus	10.7	12.5	12.1	11.77
Aspergillus niger	10.7	12.5	6.1	9.77
Aspergillus paraziticus	-	-	6.1	2.05
Aspergillus terreus	-	-	6.1	3.05
Aspergillus spp.	10.7	-	-	3.57
Fusarium spp.	10.7	37.5	18.2	22.13

Mucor spp.	-	12.5	6.1	6.20
Penicillium spp.	14.9	-	18.2	11.03
Rhizopus spp.	10.7	12.5	3.0	8.73
Rhizoctonia solani	17.0	12.5	6.1	11.87

* Tests were run in quadruplicate.

* Counts represent the number of fungi / seed incubated at $28\pm2°C$ for 7 days

Among the so called storage fungi, *Aspergillus* spp. was the most dominant fungi occurred in highest frequent (30.16%). On the other hand, the field fungi fungi (damping –off, root rot and wilt pathogens), i.e., *Fusarium* spp and *Rhizoctonia solani* were also found in high frequencies. This important plant pathogenic fungus is consistently found associated with seeds of different plant species and have the potential cause sever damage (Tanaka, 2001 and Neves *et al*., 2009). Species of *Fusarium* have also found in association with seeds of caster bean (*Ricinus communities* L.) another important plant for production of biodesel and belonging to the family Euphrbiaceae, like jatrpha (Mariotti *et al.,* 1987).

Besides the potential of pathogenic fungi induce disease and cause damage, seed analyzed of different sources detected fungi that produce mycotoxins and the presence of such harmful substances is another major problem associated with seeds. As, the current data showed that the highest percentage of contamination with *Aspergillus flavus* was detected in seeds of non peeled nut stored for one year (12.5%) followed by seeds of recent collected non peeled nut (12.1%), while *A. Paraziticus* were detected only in seeds of recently collected of non peeled nut by 6.1%. Mycotoxigenic species can be found in all major groups fungi ,specially the genera *Aspergillus, Penicillium* and *Fusarium* (Scussel, 1998). Such fungi were found in the analysis made of

the seeds which, although not edible may cause other types of toxicity to be handled.

3- Efficacy of *A. flavus* and *A. paraziticus* to produce aflatoxin

The results in Tables 3 and 4 revealed that 5 out of 10 isolates of *A. flavus* had a higher ability to produce aflatoxin B_1 with maximal level reached to 20.6μg /100ml, while 6 out of 10 isolates of *A. paraziticus* were able to produce aflatoxin in lower level than *A. flavus,* where the maximum level reached to 17.2μg /100ml. Data also indicated that the ability of all positive isolates of *A. flavus* were in a wide range that the aflatoxin was produced in amount ranged between 3.3 to 20.6 μg /100ml. Results agree with Martins (1989) reported in a study about *in-vitro* aflatoxin production by *Aspergillus flavus* (114 strains) isolated from raw materials and mixed feed found 60.5% toxigenic strains and the range of the aflatoxin B_1 was 0.004 to 391.9 mg/kg. On the other hand, the aflatoxin B_1 was not detected in 5 of 10 (50%) and in 4 of 10 (60.%) of the total isolates of *A. flavus* and *A. paraziticus* respectively.

Moreover, data presented in Table (4) revealed that *A. flavus* isolate No. 7 was the higher producer compared to the other *A. flavus* isolates while, the lowest producer being isolate No. (4). On the other hand, *A. paraziticus* isolate No. 5 showed the higher aflatoxin production, whereas isolate No. 3 was the lowest producer.

Table 3 Efficacy of isolated *A. flavus* and A. paraziticus to produce aflatoxin B_1

Fungal species	No. of tested isolates	No. of positive isolates	Range (μg /100ml)
Aspergillus flavus	10	5 (50.0%)	3.3 – 20.6
Aspergillus paraziticus	10	6 (60.0%)	5 – 17.2

The variation in the amount of aflatoxin B_1 may be related to genetic criteria in the fungal species. These reason were confirmed by the results obtained previously by Aly and Nader (2003) who found that 25% of *A. flavus* isolates have the ability to produce aflatoxin B_1 in amount ranged between 10 to 100 μg/Kg on corn culture. This discrepancy might be due to the variation in the origin of raw material,

which play an important role in distribution of mycotoxin producing fungi (Llewellyn *et al*., 1981). Also, our results in good agreements with those reported by Lillard et al. (1970), Abbas *et al.* (2004) and Yu *et al.* (2004). In this concern, Martins *et al.* (2000) reported that both *A. flavus* and *A. paraziticus* showed a variation in aflatoxin production which mainly depend on abiotic and genetic parameters.

Table 2 Aflatoxin B_1 production in different Asp. flavus and Asp. paraziticus isolates (mean ± standard error).

Isolates No	*Asp. flavus*	*Asp. parasitcus*
1	-	-
2	8.17 ± 3.5	6.37 ± 0.55
3	10.7 ± 0.9	5.13 ± 0.46
4	6.87 ± 0.72	-
5	6.7 ± 3.26	17.17 ± 0.47
6	-	15.4 ± 0.42
7	20.67 ± 0.86	6.1 ± 0.38
8	-	-
9	-	-
10	-	6.73 ± 0.33

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Microbiological evaluation of Egyptian white soft cheeses style

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Abstract: A total of 70 samples of the Egyptian   white soft cheese style, different varieties, (30 samples of Domiati , 15 samples of Tallaga , 10 samples of Feta and 15 samples of Kariesh) were collected from Cairo & Giza governorate markets and microbiologically examined as well as the presence of mycotoxins .Aerobic colony bacterial counts (ACC) and molds & yeasts counts (M/YC) revealed that there are clear differences between the cheese varieties. Coliform group and *Escherichia coli* as fecal indicator contamination were implicated in 50 and 24 % of the retailed white soft cheese samples, respectively. The pathogenic *E.coli* O157H7 has been isolated from 19% of the total samples. Also, *Salmonella spp*, has been only isolated from Domiati and Tallaga cheese varieties in 3 and 7 % of the samples, respectively. Meanwhile, the other enteric gram negative foodborne bacteria as *Proteus spp*, *Pseudomonas* spp and *Citrobacter spp* have been isolated from all samples in an average of 24 % .Gram positive bacteria as *staphylococcus aureus, Bacillus cereus* and *Listeria monocytogenes* were isolated from different Egyptian varieties of white soft cheese in rates of 25.7, 11.4 and 14.2% respectively. Therefore, the presences of these pathogens in 26% of the total white soft cheese samples were not accepted according to the Egyptian standard (ES) 1008-2000. *Campylobacter jejuni* was not found in any of the Egyptian white soft cheese style.The other part of study was to apply new methods as Food system (FS) kit, a rapid microbiological test which revealed complete compatibility with the conventional methods (CM) for mold and yeast and most likely for *Salmonella spp*. For the gram positive bacteria, FS test results revealed a relatively lower incidence percentages than the CM. According to the microbiological specifications of the ES 1008-2000, most of Domiati and Kariesh samples were not comply with the ES due to one or more of criterion, 80 and 86.6 % of samples, respectively. Totally , 28.6 % of the Egyptian style white soft cheese were accepted and meet the ES 1008-2000 , using the microbiological conventional methods .While using FS kit test as a rapid method , results revealed 73.3 % of the tested samples (35 sample) did not meet the ES due to mold and yeast similar to that found by CM. Contrarily. However, FS test for the other ES specifications as *Listeria monocytogenes*, the presence of pathogenic bacteria as *S. aureus ,B. cereus* and *Salmonella spp* , results were near but lower than obtained by CM. Thus, the deficiency the FS test is due to the lack of counts and coliform not set up, and subsequently the test is not highly recommended for compromising cheese samples with the ES. Aflatoxin M_1, presence was studied in the same 70 samples of the Egyptian style white soft cheese retailed in great Cairo and Giza markets. Results revealed that 4 out of 15 Kariesh , 7 out of 30 Domiati , 3 out of 15 Tallaga and 2 out of 10 Feta cheese samples were positive for the presence of aflatoxin M1 . The highest and lowest aflatoxin concentrations were 0.4 to 0.1 microgram / kilogram of the cheese.

1. Introduction

White soft cheese is one of the common delicious cheeses consumed in Egypt. There are many varieties of white soft cheese depend on the technique of manufacture, salt percentage and many other factors. Domiati cheese is pickled cheese manufacture by the traditional methods using 5-7% salted milk, Abd El Salam et al., (1976) and Abou-Donia,(1986), while Feta cheese manufactured by using UF technique, Anifantakis (1991), Kariesh cheese produced from skim milk by using acidification coagulants containing about 70% moisture and not more than 10% fat, El Gendy (1983). Tallaga cheese were manufactured by using low salt percent and stored in refrigerator at (5-7°C),

Abou-Donia (1986). All the above cheese verities are differing in their organoleptic, chemical and microbiological properties. So there are large variations in their properties especially the microbiological quality and the type of microorganisms.

Microbiological and aflatoxin M_1 investigations for the different varieties of Egyptian white soft cheese have been carried out either to evaluate their qualities , hinder or minimize microbial spoilage and to determine the cheese safety as free from foodborne microorganisms and aflatoxins. ,Abou-Dawood et al,(2005) found that microbiologically, 10 % of the samples were positive for *Salmonella*. All cheese samples had higher molds & yeast counts than

that allowed by the legal standards. As for Kariesh cheese they found that the samples had higher moisture content, higher coliforms and molds & yeast counts than the standard requirements

Domiati cheese (Gbnah Beeda) is the most popular soft white pickled cheese in Egypt and makes up about 75% of the cheese produced and consumed in that country ,Zhang and, Mohammad, (2003); Gaber et al(2007).

Milk and dairy products represent fundamental items in the human diet and can be the principal way for aflatoxins to be ingested ,Galvano et al., (1998 and2001). Aflatoxin B$_1$ (AFB$_1$) is the most common mycotoxin produced, and the one best studied. The demonstrated toxic and carcinogenic effects of AFM$_1$ recently lead WHO-IARC to change its classification from group 2 to group 1 (IARC, 2002). Moreover, the content of AFM1 in milk is not reduced by pasteurisation, sterilisation or freezing milk or dairy products ,Carvajal, et al., (2003); Govaris et al., (2002). Thus, strict regulatory limits for these compounds are currently in force in developed countries.

The microbial quality and safety of Egyptian varieties, white soft cheese, is the   major area of concern for producers, public health authorities and consumers. It depends on the types of microorganisms introduced from raw milk, efficiency of processing and the hygienic practice applied in small or big dairy plant or informal producers. Handling of milks during cheese manufacture play an important role in the proliferation of microbial flora and consequently impair its utility and render the product unfit for human consumption ,Aly and Galal.,(2002) and ,EL-Baradei et al., (2007) . The aim of thie study is evaluate the microbiological quality and the presence of aflatoxin in Egyptian white soft cheese which consumed in the Egyptian market.

2. Materials and Methods
Materials:
Seventy samples of the Egyptian white soft cheese style (1kg of each variety) as 30 samples of Domiati, 15 samples of Tallaga, 10 samples of Feta and 15 samples of Kariesh were collected from Cairo, Giza and Helwan governorate markets in sterile plastic bags along a period of two months. Samples were transferred to the laboratory in ice box and refrigerated until microbiological examination and toxicological & food contaminants analysis.

Food System Kits*:* Miniaturized biochemical food-system, kits (micro titer plates) for identification of pathogenic germs were delivered from the supplier," Liofilchem.", via Scozia-Zona Ind. Le-64026 Roseto D.A. (TE) Italy. The kits of food system for detecting

foodborne microorganisms were used according to El Kholy et al (2008).

I-Microbiological examination:
Presumptive Identification of foodborne Microorganisms:
Foodborne microorganisms were detected and identified via this method by observing the changes in colors according to the instructions of the supplier and Zeinab et al (2009).

Aerobic colony bacterial count:
The aerobic colony count (ACC) was carried out as the conventional method, FDA, (2002*)* using plate count agar (Oxoid).

Molds and yeasts counts:
Enumeration and counts of yeasts and molds were carried out in the samples using the media of acidified potato dextrose agar (Oxoid). The method recommended by, FDA. (2002) was followed up.

Detection of *Listeria monocytogene:*
Each sample (25g) was homogenized and mixed with 225ml tryptose soy broth (Fluka Co., Switzerland) supplemented with yeast extract and Listeria selective enrichment supplement (Oxoid), in 500ml flasks. , Lovett et al, (1987). Flasks incubated at 30º C for 7 day. Every day a plate of oxford agar base (Oxoid) supplemented with Listeria supplement was streaked from each of an enrichment flask and incubated at 35º C for 48h as reported by, Curtis et al., (1989). Suspected colonies were picked up and propagated for further specific morphological, biochemical and serological tests as recommended by, FDA, (2002).

Enumeration of *Staphylococcus aureus:*
Enumeration of *S. aureus* in the samples was carried out by, APHA, (1976) and FDA, (2002*)*.

Enumeration of *Bacillus cereus:*
Bacillus cereus was determined by the surface plating technique onto the manitol egg yolk - polymyxin ager, MYPA, Oxoid,(2005). The suspected colonies were further tested for specific identification according to, FDA,(2002).

Determination of coliforms and *Escherichia Coli:*
Coliform group was determined using solid medium method onto plates of violet red bile agar (VRBA) (Difco) according to the method reported by, FDA, (2002). Positive tubes were streaked onto MacConkey agar (Merck, Germany) according to, APHA, (1976). Suspected red colonies were tested for IMVIC test ++ - - for typical *E.coli.* Enteropathogenic & enterotoxigenic *E.coli* identification within the (+) IMVIC test isolates were examined using the serological reactions and indicators.

Detection of *Escherichia Coli O157: H7*
Samples dilutions were spread onto plates of medium Sorbitol Mac Conkey agar (Oxoid, England).

After 18-24h at 35º C incubation, sorbitol negative colonies (pale - colored, typical E. coli 0157: H7) were serologically tested, as outlined by, FAD, (2002).

Isolation and identification of *Salmonellae*:

Isolation of *Slmonellae* was carried out by enrichment using selenite cystein broth (SC) (Oxoid). Plates of *Salmonella & Shigella* ager (SS) were streaked. Lactose negative suspected *Salmonella or Shigella spp.* were biochemically and serologically, using the antisera, identified according to, FDA. (2002) and APHA. (1976).

Isolation and Identification of other Members of Gram — Negative Bacilli :

The non - lactose fereementers of the gram negative bacilli: *Citrobacter spp*, *Pseudomonas spp.*, *Proteus / Providencia spp.* were isolated onto MacConkey agar and SS agar and the other biochemical Tests, FDA, (1992) were carried out.

Isolation and identification of *Yersinia enterocolitica*:

The samples were prepaired as described by, Walker and Gilmour. (1986). After that 0.1 ml of the culture broth was streaked onto Yersinia selective CIN agar plates, ,Schiemann, (1979). Typical colonies were picked up, purified and identified .Identification of the isolates was carried out biochemically tests and fermentation of the carbohydrates according to ,Berocovier and Mollarett.,(1984).

Isolation and identification of *Campylobacter jejuni*:

Using Preston enrichment medium ,Bolton et al., (1983), followed by incubation for 18 h at 42 C under microaerophilic conditions ,Doyle and Roman, (1982). Resulting cultures were streaked onto plates of campylobacter blood free selective medium supplemented with cetoperazone (Oxoid, SR 125) .Plates were incubated under microaerophilic condition at 42C for 24 h according to Bolton et al.,(1984). Isolation and confirmation of C. jejuni was carried out according to, Smibert, (1984).

II- Mycotoxins: aflatoxin M₁:

Reagents and materials

1. HPLC-grade acetonitrile & methanol, MQ- water, HCl, ammonium formate, Sep-pak C18 cartridges and vacuum manifold, Centrifuge with temperature control, pH meter and -20 °C freezer

Aflatoxin M₁ extraction

Cheese was collected into a sterile plastic container. The sample was kept at 4°C and frozen within one day at –20°C before extraction. Extraction of aflatoxins from cheese samples was modified from the method of, El-Nezami *et al.*, (1995). Briefly, 10-g cheese samples were warmed with 20 ml distilled water to 37°C and shaken to distribute fat. For

defeating, the samples were centrifuged (3000g, 15 min, 5°C) and filtered via glass wool. To facilitate the passage through a C18 cartridge (Strata C18-E, 50 mm, 70A, Phenomenex, Torrence, USA), the samples were diluted 1 : 1 with Milli-Q water. The cartridge was pre-activated with 10 ml acetonitrile and then 10 ml water before passage of diluted cheese at a flow rate of 3.5 ml min–1. The loaded cartridge was then washed with 10 ml water, 10 ml basic acetonitrile/water (1% ammonia, 10% acetonitrile) and 10 ml acidic acetonitrile/water (1% acetic acid, 10% acetonitrile). AFM_1 was eluted with 5ml acidic acetonitrile (1% acetic acid, 40% acetonitrile).

AFM1 was extracted twice from the eluent with 2ml dichloromethane. Following centrifugation (3000g, 15 min) to separate the layers, the two dichloromethane fractions were pooled and dried under nitrogen gas. The residue was dissolved in 0.7 ml methanol.

3. Results and discussion

Foodborne microorganism's Total bacteria and mycological counts.

White soft cheese in different Egyptian varieties due to different salt concentrations ,acidity as Kariesh acid coagulation or Domiati , enzyme coagulation , ripening in brine solutions , keeping temperatures are factors affecting the microbiological quality of these varieties . Results as shown in Fig (1) for aerobic colony bacterial counts (ACC) and molds and yeasts counts (M/YC) revealed that there were wide differences between the cheese varieties. Domiati and Tallaga cheese variety samples showed the higher ACC and the worst microbiological quality, as reached ~10^{11} to 10^{12} cfu/g as a maximum count with an average ~10^7 cfu/g. Meanwhile, Kariesh cheese variety, acid coagulation, showed the higher MYC and the worst mycological quality as MYC reached 8×10^8 cfu/g with an average of 3×10^4 cfu/g. So, 87% of Karish cheese samples would not be exceed due to high mycological counts exceeded 10 cfu/g mold or 400 cfu/g yeast, according to the Egyptian Standard ES 1008-2000, as shown in Table (1).

Results of MYC and ACC in Tallaga cheese were similar to that found by El Kholy et al.,(2008), since the rejected 80% of the vended Tallaga cheese were not meet the ES because of high mycological counts. In the same concern, Abou Dawood et al.,(2005) found that many of Domiati cheese samples collected from Giza governorate contained higher counts of yeast than the standard specifications .For Feta cheese, Bintsis et al., (2000) reported higher counts of bacteria in Greek Feta samples than that obtained in the Egyptian Feta in the current study. For Kariesh cheese, similar results were obtained for

ACC and MYC by Abou Dawood et al., (2005), but higher than found by El Ghish.,(2004) and Tawfek et al.,(1988).

Indicator and gram negative foodborne bacteria:

Coliform group and *Escherichia coli* as fecal indicator contamination were implicated in 50 and 24 % of the retailed white soft cheese samples ,and mostly in Kareish variety with maximum counts of $3x10^4$ cfu/g and $3x10^3$ cfu/g in averages of $2x10^3$ and $1x10^3$ cfu/g ,respectively as shown in Fig (2) . The pathogenic *E.coli* O157H7 has been isolated from 19% of the total white cheese samples. Also the most hazardous enteric foodborne bacteria, *Salmonella spp*, has been only isolated from Domiati and Tallaga cheese varieties in 3 and 7 % of the samples, respectively. Meanwhile, the other enteric gram negative foodborne bacteria as *Proteus spp*, *Pseudomonas* spp and *Citrobacter spp* have been isolated from the total white soft cheese samples in an average of 24 %.

The obtained data indicate how is the inferior quality and risky hazardous as food as white soft Egyptian style cheese with different varieties which might be an etiology for foodborne illness for Cairo locals. According to the Egyptian Standard ES 1008-2000 ,there were 50 and 24 % of the samples would not accepted due to the high counts of coliform and the presence of *E.coli* , respectively ,as shown in Table (1) .

For Tallaga cheese , El Kholy et al.,(2008) found the higher the incidence of coliform ,but with similar incidence and counts of *E. coli* and *E.coliO157H7* ,*Salmonella spp* and the other gram negative enteric bacilli *as Proteus spp, Pseudomonas* spp and *Citrobacter spp* . Also, they reported nearly similar percent of samples not meet the ES due to coliform count and *E. coli* presence.

For Domiati cheese, Ahmed, (1988), detected the coliform group and *E. coli* in Domiati cheese samples collected from Assiut and Bani-Swef governorates with similar incidence and count rates as obtained in the current study. The pathogenic *type E. coli* O157 H7 was not detected after 4 weeks of storage of Domiati cheese, El Gazzar, (1993), while it could not survive one day in cheese made from milk inoculated with mixed cultures of lactic acid bacteria Abd El Ghani, (2001) . Though, Farag et al., (1997) reported that it could be recommended the use of good starter lactic acid bacteria, suitable concentration of salt (~6 %) and storage for more than one month may assure the safety of the cheese from *E. coli* O157 H7. Similar results were obtained by Abou Dawood et al., (2005) for the coliform counts in Kariesh samples higher than the Egyptian standard, but these counts were less than that reported by Moussa et al.,(1984) and Kaldes., (1997) while

higher than those found by Ahmed, (1988) and El Ghaish., (2004). Similar results were also obtained by Tawfek et al., (1988) and El Ghaish.,(2004) for *Salmonella* in Kariesh cheese as none of the samples were found to contain this bacterium, they attributed that to the low pH of Kariesh cheese .Although, Al Jedah and Robinson., (2001) reported that neither coliform nor *E.coli* were detected in Kariesh, Feta or Egyptian Domiati cheese samples imported for Qatar that contradict the obtained results. They reported that products imported to Qatar would seem to be of a very high microbiological quality and standard and hoped that this trend becomes increasingly widespread.

Gram positive Foodborne bacteria:

Gram positive bacteria as *Staphylococcus aureus, Bacillus cereus and Listeria monocytogenes* were isolated from many samples of the 4 different Egyptian varieties white soft cheese were shown in Fig (3 & 4). The maximum the counts of ~ 10^6 -10^7 cfu/g of *S. aureus and B. cereus,* in at least 3.3 % to 6.6 % of Domitai and Tallaga cheese samples made them suspicious for causing food intoxication cases due to the probable enterotoxins formation . Moreover, the higher that incidence rates of these pathogens in Domiati cheese samples pay much attention to that variety in particular from the side of hygienic quality. Furthermore and legally, the presence of these pathogens as 26 % of the total white soft cheese samples contained *S. aureus and B. cereus,* while 14 % contained *Listeria monocytogens*, in particular, were not accepted according to the ES 1008-2000, as shown in Table (1).

El Kholy et al., (2008) found similar results for the incidence and counts of these pathogens in Tallaga cheese samples collected from Cairo & Giza areas during 2004 to 2005 .In Domiati cheese, Nour et al., (1987 & 1992) and El Zayat., (1988) and Kaldes., (1997) reported the presence of *S. aureus* in Domiati cheese samples collected from different sites in Egypt with nearly similar incidence close to that obtained in the current study. They also pay similar attention to the probable intoxication due to enterotoxins might be produced at the optimal level of contamination and conditions. Contrarily, El Zayat., (1988) could not isolate *B. cerues* from any of 50 Domiati cheese sample collected from Ismailia governorate, that contradicting the obtained results for *B. cereus* in 7 % of the samples. As for *Listeria monocytogens* , Fathi and Soad., (1992) could isolate this microbe from only 2 % of the Domiati cheese samples collected from Assiut city , much lower than revealed ,14%, in the current study as shown in Fig (3) .Similar counts were obtained by Abou Dawood et al,(.2005) for *S. aureus* but much higher incidence than that found in the current study,

as they found this bacterium in all of the Kariesh samples .These counts were less than those found by Naguib et al.,(1986) and Kaldes., (1997) but higher than those reported by El Ghaish.,(2004)

Once again, this is emphasized that the high microbial contamination the high risk of consuming as hazardous food as Egyptian style white soft cheese, particularly the Domiati and Tallaga varieties.Since these types of cheese contained much higher incidence and counts of either of gram positive or negative foodborne bacteria.

Rapid methods detecting foodborne microorganisms:

Food system (FS) kit, as rapid microbiological test, was compatible most likely with the conventional methods (CM) for *Salmonella spp*, 2.8 % of the total cheese samples tested by the tow methods, as shown in Table(2), *Proteus spp*, *Pseudomonas spp and Citrobacter spp*, as gram negative enteric bacteria were detected 28.5 % by CM and 22.8 % by FS of the total Egyptian style white soft cheese samples revealing very close results and subsequently a strong reliability on FS for those foodborne bacteria. On the other hand, FS kit for testing *E. coli* was unreliable as E. coli was detected in 28.5 % of the Egyptian style white soft cheese samples by CM while it was detected in only 8.5 % of the same tested samples.

Food system kit for mold and yeast testing in the Egyptian white soft cheese results (Table 3), revealed complete compatibility with the conventional methods, in 74.2 % of the total samples, but FS test was carried out in shorter time, 48 h. Also , as for the gram positive bacteria , FS test results revealed a relatively lower incidence percentages than the MC ,as 20 to 25.7 % for *S. aureus* , 11.4 to 14.2 % *for B. cereus* and 14.2 to17.1 % for *Listeria monocytogens* .

The obtained results were in confronted with these found by El Kholy et al., (2008) and Zeinab et al., (2009), home reported the reliability of FS test as a rapid microbiological test for Tallaga and Ras cheese. So, FS test is recommended for survey studies of whit soft cheese , but not highly recommended for testing food poisoning incriminated foods or remains , as cheese .

The Egyptian style white soft cheese with the Egyptian standard:

According to the microbiological specifications of the Egyptian standard ES 1008-2000 , most of Domiati and Kariesh samples were not accepted to the ES due to one or more of criterion , 80 and 86.6 % of samples , respectively , as shown in Table (1) . Meanwhile and to a lesser extent, samples of the other varieties Tallaga and Feta were not accepted to the ES, 53.3 and 50 % of the samples respectively. Totally, 28.6 % of the Egyptian style white soft cheese were accepted and meet the ES 1008-2000, using the microbiological conventional methods .While using FS kit test as a rapid method, results revealed 73.3 % of the tested samples (35 sample) did not meet the ES due to mold and yeast similar to that found by CM ,as shown in Table(4 & 5). Contrarily, FS test reveal again the poor the test for E. coli as it was indicated in only 8.5 % of the total samples, while it appeared in 22.5 % of the samples by CM. However, FS test for the other ES specifications as Listeria monocytogenes, the presence of pathogenic bacteria as *S. aureus, B. cereus* and *Salmonella* spp, results were near but lower than obtained by CM, as shown in Tables (4 & 5). Thus, the lack the FS test is due to counts and coliform not set up, and subsequently the test is not highly recommended for compromising cheese samples with the ES. Similar results were obtained by El Kholy et al., (2008) for FS in Tallaga cheese.

Finally, there is a great need for rising up, developing and spreading the hygienic knowledge, attention and control measures where cheese is made, handled   and served for the public health good and particularly when exportation is attempted. Also, the newly known foodborne bacteria must be always in concern when establishing quality control measures and standard. Again, rapid methods, as Fs test, are recommended only for survey study not for applying standard or testing food poisoning remains.
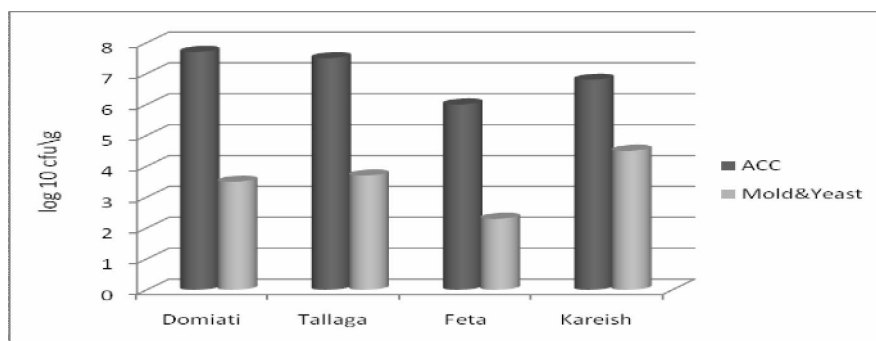
Fig (1): Microbial indicators determining the quality of the retailed Egyptian white soft cheese varieties.
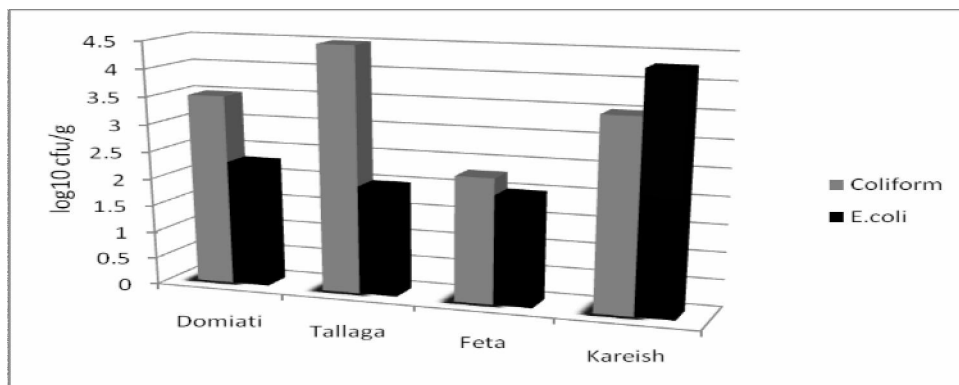
Fig(2) ; Coliform group , *E.coli* , as indicators and foodborne etiologies in the retailed white soft cheese Egyptian varieties .

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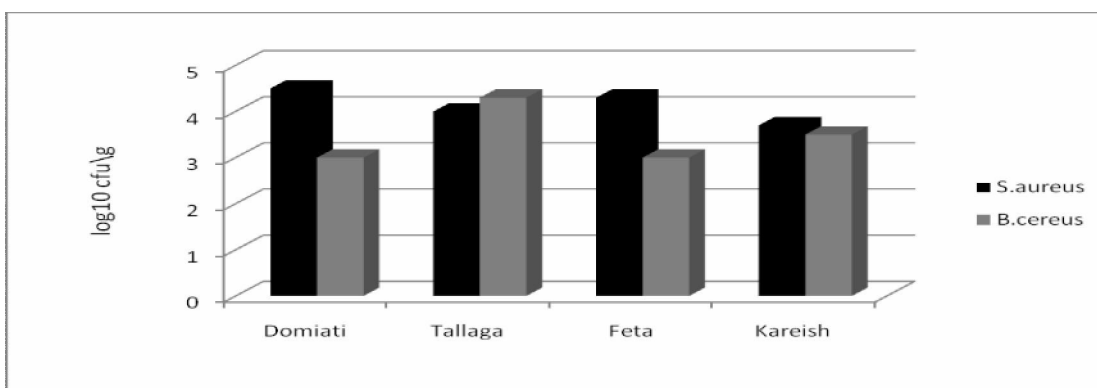
Fig (3): *Staphylococcus aureus and Bacillus cereus* **in the retailed Egyptian varieties of white soft cheese.**
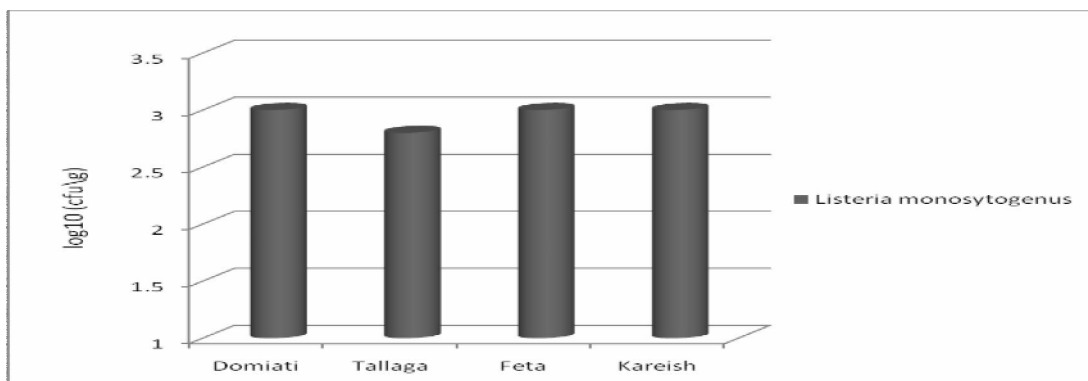
Fig (4): *Listeria monocytogens* **in the retailed Egyptian varieties of white soft cheese.**

Table (1) : microbiological specification of the Egyptian Standard ES-1008-2000 for white soft cheese.

Microbiological item	Criteria
Mold count	Not exceed 10 cfu/g
Yeast count	Not exceed 400 cfu/g
coliform	Not exceed 10 cfu/g
Escherichia coli	Free
Listeria monocytogens	Free
other pathogenic bacteria	Free

Table (2): Food system (FS) *, rapid microbiological kit, in comparison with the conventional methods (CM) for Enterobacteriaceae in the retailed Egyptian white soft cheese varieties.

Cheese variety	No.samples	E.coli %*by		Salmonella % by		Other G- Bacilli.*** %. by.	
		CM	FS	CM	FS	CM	FS
Domiati	10	30	10	0	0	30	20
Tallaga	10	40	20	10	10	40	40
Feta	5	20	0	0	0	20	20
Kariesh	10	20	0	0	0	20	10
total	35	28.5	8.5	2.8	2.8	28.5	22.8

*Food system (FS),from Liofilchem., via Scozia-Zona Ind. Le-64026 Roseto D.A. (TE) Italy .

**% approximate to the nearest whole number.

*** *include Proteus , Pseudomonas , Citrobacter spp*

Table (3): Food system (FS) * rapid microbiological kit, in comparison with the conventional methods (CM) for the gram positive foodborne microorganisms in the retailed Egyptian varieties of white soft cheese.

Cheese variety	No.samples	Mold/yeast %		*S. aureus* %		*B. cereus* %		*Listeria spp* %	
		CM	FS	CM	FS	CM	FS	CM	FS
Domiati	10	80	80	40	20	20	10	20	20
Tallaga	10	60	60	20	20	10	10	10	10
Feta	5	40	40	20	20	20	20	20	20
Kariesh	10	100	100	20	20	10	10	20	10
Total	35	74.2	74.2	25.7	20	14.2	11.4	17.1	14.2

*Food system (FS), from Liofilchem., via Scozia-Zona Ind. Le-64026 Roseto D.A. (TE) Italy.

Table (4): Cairo area retailed Egyptian varieties of white soft cheese samples with the microbiological specification of the Egyptian Standard* ES-1008-2000, by the conventional methods (CM).

Cheese variety	No. samples	Not fit to ES due to					total	
		Mold/ yeast %	Coliform%	*E.coli* %	Listeria%	Pathogens% **	Not fit %	Fit %
Domiati	30	80	50	20	16.6	30	80	20
Tallaga	15	53.3	53.3	33.3	6.6	26.6	53.3	46.7
Feta	10	50	20	10	20	20	50	50
Kariesh	15	86.6	66.6	26.6	13.3	20	86.6	13.4
total	70	71.4	50	22.8	14.2	25.7	71.4	28.6

Table (5): Cairo area retailed Egyptian varieties of white soft cheese samples with the microbiological specification of the Egyptian Standard ES-1008-2000*, by the food-system kit** (FS).

| Cheese variety | No. samples | Samples Not fit to the ES due to | | | | | total | |
		Mold/yeast %	Coliform%	E.coli %	Listeria%	Pathogens %**** %****	Not fit %	Fit %
Domiati	10	70	NS***	10	20	20	70	30
Tallaga	10	50	NS	10	10	20	50	50
Feta	5	40	NS	0	20	20	40	60
Kareish	10	80	NS	10	10	20	80	20
total	35	73.3	NS	8.5	17.1	20	73.3	26.7

Mycotoxins , aflatoxin M1 , in Egyptian styles whit soft cheeses :

The presence of aflatoxin M_1 in 70 samples of different kinds of Egyptain cheese were collected from markets of Cairo, Giza and Helwan ,as shown in Table (6) . Aflatoxin M_1 was determined by HPLC. The results indicated that 4 out of 15 Kariesh cheese samples, 7 samples out of 30 of Domiati cheese samples, 3 samples out of 15 Tallaga cheese samples and 2 samples out of 10 Feta cheese were positive for aflatoxin M1 which collected from Cairo, Giza and Helwan araes. The highest and minimum concentration was 0.4 and 0.1 μg/Kg of cheese respectively.

Table (6) : Aflatoxin M_1 in different varieties of white soft cheese samples collected from Cairo area

| Number&Type of samples | Number of samples | Positive samples | % of positive samples | Concentration of aflatoxins M_1 μg/L | |
				Minimum	Maximum
I-Karesh cheese	15	4	26.6	0.2	0.4
II-Domiati cheese	30	7	23.3	0.1	0.2
III-Tallaga cheese	15	3	20.0	0.1	0.15
IV- Feta cheese	10	2	20.0	0.0	0.1
Total	70	16	22.85	0.1	0.4

The present data are in agreement with those obtained by Amra (1998) who studied the occurrence of aflatoxin M_1 in Egyptian soft cheese and he found that 14% of Karish cheese samples were positive for aflatoxins M_1, meanwhile the other types of soft cheese samples were contaminated at levels ranged from 0.25μg/kg to 4.12μg/kg. Commercial cheese samples were tested for the presence of aflatoxins had been found to contain AFM_1 at levels greater than the legal limets.

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Microbiological quality of different varieties of Ready to Eat Foods retailed in Cairo area

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Abstract: One hundred and thirty five different predefined / reference strains of mold, yeast and foodborne pathogens were recovered by FS kits to check up the reliability of the kits to be used as a rapid test for ready to eat different foods. A total of one hundred sixty five samples of ready to eat foods (meat, carbohydrate, savory, salad, dairy) were collected from Cairo area restaurants and take away shops and were tested microbiologically by the conventional (CM) and FS (RM) methods. Microbiological analysis encompassed the pathogenic food borne bacteria and other microbiological criteria determining food safety and according to Communicable Disease and Public Health CDPH, 2000. The results of FS test were reliable for different varieties of ready to eat foods as a rapid method with the conventional methods for detecting foodborne microorganisms. The microbiological analysis revealed that the worst the quality was due to salad foods 70%, then cheese samples 40%, meat different categories 30%, and carbohydrate foods 15% fit out the CDPH, 2000. The main etiologies were due to the presence and high levels of Enterobacteriaceae members and the pathogens of *Salmonella spp*, *E. coli O157H7*, *S. aureus*, *B. cereus* and *L. monocytogenes*.

1. Introduction

Ready to eat food is an any food , including beverage, which is normally consumed in its raw state or any food handled, processed, mixed, cooked or otherwise prepared into a form in which it is normally consumed without further processing (CODEX STAN,1999). Catering, where ready to eat foods handled, is one of the largest industries in Egypt as in allover the whorled become more and more of outlets which are independently owned and operated. The small and medium size enterprise nature of the catering sector is demonstrated by the simple average that less than nine staff is employed per outlet (JHIC, 1998). The guidelines or the microbiological quality of some ready to eat foods at the point of sale reported by the Communicable Disease and Public Health , CDPH 2000 (Gilbert et al., 2000) incorporate many of provisional microbiological guidelines that were practical to use by microbiologists and environmental health officers throughout the United Kingdom. Eating out has increased considerably over recent years with tow thirds of population in 2000 occasionally or regularly using take away to eat out (COI, 2001). In Egypt consumption of ethnic foods (out side the home) continues to increase considerably with more purchases of popular foods and sandwiches. As in England, Sandwiches are a popular food; a fifth (20%) of the total market volume (1,796 million) of sandwiches are purchased from bars or cafes, and

chicken sandwiches account for the third (12%) most sandwich filling (Taylor , 2001).

Food safety and suitability are assurance that food will not cause harm to the consumer and is acceptable for human when it is prepared and/or eaten according to its intended use (Codex Stan, 1999). Hence, inadequate cooking or reheating (50%), inappropriate storage (45%), and cross contamination (39%) have been identified as important contributory factors of foodborne outbreaks in England and Wales (Evans et al, 1998).

Although, ready to eat food samples collected for surveillance and monitoring purposes are often multi-component products for which there are no microbiological standards. Interpreting the significance of the types and levels of microorganisms reported when these foods are tested may therefore be difficult.

Again and according to the guidelines for the microbiological quality of some ready to eat foods sampled at the point of sale (CDPH, 2000), provided new guidelines identify five categories of food. The categories, 1 to 5, are based solely on expected aerobic colony counts, from $< 10^3$ cfu/g to not applicable, (NA) in addition to indicator organisms and pathogens.

Rapid methods for detection of pathogenic bacteria and their toxin in foods are considered as important food safety new developments during the last 10 years. Diagnostic kits, like API, enterotube

and Minitek etc., are one of these developments through the miniaturized system (Fung, 2002). Food-system (FS) is a 24 – well microtiter plate miniaturized biochemical system containing desiccated biochemical substrates and culture media for detection and presumptive identification of pathogenic germs from food stuffs. The system provides detection and presumptive identification of: *Salmonella spp., Citrobacter spp., Proteus/ Providence spp., Pseudomonas spp., Staphylococcus aureus, Escherichia coli, Bacillus cereus, Listeria spp.,* yeasts and moulds. FS was used successfully in testing milk and milk products (Zeinab et al, 2009 and Hosny et al, 2010).

In this study, food system (FS) as miniaturized rapid microbiological kits for testing different Gram positive and Gram negative foodborne bacteria and mold & yeast as well in ready to eat foods retailed in Cairo area has been suggested ,in comparison with the conventional methods (CM), for easy and reliable routine work by the public health authorities. Furthermore, the point of microbiological evaluation of the Cairo retailed different ready to eat foods as meat, milk, carbohydrate and salad products is to determining their safety, quality and specifications .

2. Materials and Methods:

Test Strains: The following different strains of pathogenic & non – pathogenic microorganisms were obtained from Central Public Health laboratories (Ministry of Health) and isolates from different dairy products in our Laboratory. They were *Aspergillus* spp *Penicillin spp.* (mold), *Saccharomyces sp* (Yeast) – *Salmonella typhimurium*, Proteus *spp, Providence spp., Pseudomonas spp., Escherichia coli, Staphylococcus aureus, Bacillus cereus* and *Listeria monocytogens*.

Ready to eat food Samples collection:

One hundred and sixty five ready to eat food samples representing different varieties of meat group (60), salad and savor group (30), carbohydrate group (40) and white cheese group samples (35), were collected from different restaurants, street vendors and food shops Cairo market in sterile plastic bags. Samples were transferred to the laboratory in ice box and refrigerated until microbiological analysis.

Ready to eat food sample Preparation:

Each food sample, of meat group (60), salad and savor group (30), carbohydrate group (40) and white cheese group samples (35), as ready to eat foods, was mixed and homogenized in sterile mixer, mortar or flasks and diluted with saline or sodium citrate solutions to make the sufficient dilutions for the microbiological analysis.

Food System Kits: Miniaturized biochemical food-system, kits (micro titer plates) for identification of pathogenic germs were delivered from Liofilchem. Via Scozia-Zona Ind. Le-64026 Roseto D.A. (TE) Italy. **Methods of Analysis:**

Food-System method:

Preparation of the Sample:

An appropriate quantity of the cheese sample (10g) was homogenized in buffered peptone water (90ml) and incubated at 36º C, 24 hrs. Aliquot of 0.2ml of the sample was dispensed into the vial of the physiological solution contained in the kit, and 0.2ml (4 drops) of the sample suspension was transferred into each well of the system. The first wells 1- LDS, 2- H_2S and 3- UR was covered with 2 drops of Vaseline oil and the system was covered with the lid and incubated at 36º C for 18 – 24 hrs.

Presumptive Identification of foodborne Microorganisms by FS:

Salmonella spp. is detected by a change in colour from yellow to red in the well 1- LDS, by the change in colour from yellow to black in well 2- H_2S and by the yellow colour in well 3- UR. *Citrobacter spp.* is detected by the yellow colour of well 1- LDC, by the change in colour from yellow to black in well 2- H_2S and by the yellow colour in well 3- UR. *Proteus / Providence spp.* is detected by the yellow colour of well 1- LDC, by the change in colour from Yellow to red - fuchsia of well 3- UR. Confirmation of *Proteus / Providence spp.* is provided by the change in colour from yellow to brown - black of well 4 - PRO. *Pseudomonas spp.* is detected by the change in colour from yellow to turbid green of well 5- PSE. *Staphylococcus aureus* is revealed by the appearance of a black ring in the button of well 6 - STA. *Escherichia coli* is apparent by the change of red to blue colour in well 7- ESC and by the appearance of a pink- red ring following the addition of kovac's reagent to well 8- IND. *Bacillus cereus* is detected by the change from yellow to turbid green colour in well 9- BCE. *Listeria spp.* is apparent from the change yellow to black colour in well 10- Lis and by the development of bubbles following addition of H_2O_2 reagent to well 11- CAT. Yeasts and moulds are detected by the change from green to yellow colour in well 12- Y/M and observation under the microscope of mycelia strands (hyphae) and chlamydospores.

Methods of conventional microbiological (CM) analysis:

Aerobic colony bacterial count (ACC):

The aerobic colony count (ACC) was carried out as the conventional method *(FDA, 2002)* using plate count agar (Oxoid). After 48 ± 2h incubation at 35± 1Cº colony forming units were accounted and calculated per gram of sample.

Molds and yeasts counts:

Enumeration and counts of yeasts and molds were carried out in the samples using the media of acidified potato dextrose agar (Oxoid). The method recommended by FDA (2002) was followed up. Plates were incubated at 22-25º C for 3-5 days, and colonies of yeasts and molds were accounted and calculated per gram of sample.

Detection of *Listeria monocytogenes:*

Each sample (25g) was homogenized and mixed with 225ml tryptose soy broth (fluka, Switzerland) supplemented with yeast extract and listeria selective enrichment supplement (Oxoid), in 500ml flasks. (Lovett et al, 1987). Flasks incubated at 30º C for 7 day. Every day a plate of oxford agar base (Oxoid) supplemented with listeria supplement was streaked from each of an enrichment flask and incubated at 35º C for 48h as reported by Curtis et al (1989). Suspected colonies were picked up and propagated for further specific morphological, biochemical and serological tests as recommended by FDA (2002).

Detection and Enumeration of *Staphylococcus aureus:*

Enumeration of *S. aureus* in the samples was carried out by spreading 0.l ml of each of sufficient (expected) dilution onto the surface agar media. Baird Parker media (Fluka, Switzerland) supplemented with egg yolk and potassium telurite solution was used for enumeration as the method and media were recommended by APHA (1976) and FDA (2002).

Detection and Enumeration of *Bacillus cereus:*

Bacillus cereus was determined by the surface plating technique onto the manitol egg yolk - polymyxin ager (MYPA, Oxoid 2005). The suspected colonies peacock blue - coloured and surrounded by a zone of precipitation of egg yolk *(Holbrook & Anderson, 1980)* were further tested for specific identification according to FDA (2002).

Determination of Coliform and *Escherichia Coli:*

Coliform group was determined using solid medium method onto plates of violet red bile agar (VRBA) (Difco) according to the method reported by FDA (2002). Plates were incubated 24h at 32- 35º C. A portion of purple red colonies (5/ a plate) per each plate was transferred (loopful) into tubes of MacConkey broth medium (Oxoid,England.) which were incubated at 35º C. Positive acid and gas tubes, after 24 and/or 48h, where further transferred into EC broth which in turn are incubated at 45.5º C for 48h. Positive tubes were streaked onto MacConkey agar (Merck, Germany) according to APHA (1976). Suspected red colonies were tested for IMVIC test ++ - - for typical *E.coli*. Enteropathogenic & enterotoxigenic *E.coli* identification within the (+)

IMVIC test isolates were examined using the serological reactions and indicators.

Detection of *Escherichia Coli O157: H7:*

Samples dilutions were spread onto plates of medium Sorbitol Mac Conkey agar (Oxoid, England). After 18-24h at 35º C incubation, sorbitol negative colonies (pale - coloured, typical E. coli 0157: H7) were serologically tested, as outlined by FAD (2002).

Isolation and identification of *Salmonellae*:

Aseptically 25g of each sample was mixed with 225ml of sterile lactose broth and incubated at 35º C for 24h.A 1ml to 10ml mixture was transferred to selenite cystein broth (SC) (Oxoid) and incubated at 35º C for 72h. Plates of *Salmonella & Shigella* ager (SS) were streaked every day and incubated at 35º C for 24h. Lactose negative suspected *Salmonella or Shigella spp*. were biochemically and serologically identified according to FDA (2002) and APHA (1976) using the recent reagent kits.

Isolation and Identification of other Members of Enterobacteriaceae:

The non - lactose ferementers of the gram negative bacilli : *Citrobacter spp*, *Pseudomonas spp., Proteus / Providencia spp*. were isolated onto MacConkey agar and SS agar as described for *Salmonella* onto TSI agar and the other biochemical Tests (FDA,1992) .

Isolation and identification of *Campylobacter jejuni*:

Twenty five gram of each cheese sample were mixed with 100ml Preston enrichment medium (Bolton et al., 1983), followed by incubation for 18 h at 42 C under microaerophilic conditions (Doyle and Roman, 1982) .Thereafter, the resulting cultures were streaked onto plates of campylobacter blood free selective medium supplemented with cetoperazone (Oxoid, SR 125) .Plates were incubated under microaerophilic condition at 42C for 24 h according to Bolton et al., (1984). Isolation and confirmation of C. jejuni was carried out according to Smibert (1984).

3. **Results and Discussion**

Recovery of the test strains by FS system:

One hundred and thirty five different predefined/ reference strains of mold, yeast and foodborne pathogens were recovered by FS test to check up the reliability of these kits to be used as a rapid test for ready to eat different foods; results are shown in Table (1) and Fig. (1).

For mold and yeast, results of applying FS for mold / yeast with different strains are shown in Table (1), Fig (1). Results reveal a strict and very close conformity (100 %) and reactivity of Y/M (12) of FS with different strains of mold and yeast.

Concerning the Gram negative pathogens, application of FS for G-ve pathogens with pre-

defined different strains are shown in table (1), fig (1). Results reveal that except *E. coli* strains, G-ve pathogens identified by FS showed high identity with the pre-defined strains. Since, *Salmonella spp, Pseudomonas spp* appeared in 80 and 78% of the strains; while *Citrobacter spp* and *Proteus / Providence* were in 100%. Only, *E. coli* showed the lowest reactivity (55%) among G-ve pathogens.

For the Gram positive pathogens: the lowest the reactivity of FS was shown for G+ve pathogens with different strains (table 1, figure 1). Results reveal that *S. aureus*, the most common G-ve pathogen, appeared in 60% of the strains followed by *B. cereus* and *Listeria spp,* 33% each. This is indicated the unreliability of FS for the later bacteria.

In conclusion FS with pre-defined culture strains emphasizes the recommendations which have been taken through its application with different dairy products. As good as enough, this test would be used as it fulfilled the minimal and general requirements given by. Fung (1992 & 2000). However, the classic methods are still the main, reference and official microbiological assays.

Food system (FS), the rapid method (RM), for testing food borne bacteria in different varieties of ready to eat foods:

A total of one hundred sixty five samples of different varieties of ready to eat foods (uncooked or cooked foods) were collected from Cairo area restaurants, take away shops, street vendor and were tested microbiologically by the conventional (CM) and FS (RM) methods. Microbiological analysis encompassed ACC, indicator bacteria and the pathogenic food borne bacteria and other criteria determining food safety according to the Egyptian Public Health Laboratories, ministry of Health and Communicable Disease and Public Health (CDPH, PHLS, Gilbert et al., 2000).

Meat group, results as shown in table (2) and figure (2) reveal incidence of food borne bacteria in 60 samples of meats foods (cooked and uncooked) as ready to eat foods that categorized according to CDPH,2000. The *Enterobacteriaceae* bacteria, as one of the criteria required by CDPH, 2000 (Table, 6) for ready to eat foods, were found in ~ 21.6% of meat samples by FS or 46.6 % by CM. Also, *E.coli* and *Salmonella* spp were detected in 6.6 % and 3.3 % of the samples by FS and 11.6% and 3.3% by CM, respectively. Foodborne enterotoxic bacteria as *S. aureus* and *B. cereus* were found in meat products in 3.3% and 1.6% by FS and 3.3 and 3.3% by CM, respectively. Also, *Listeria monocytogenes* was detected in 1.6 % of the total meat products by both of FS and CM methods.

Carbohydrate food, results as shown in table (3) and figure (3) reveal the incidence of food borne bacteria in 40 samples of carbohydrate foods as ready to eat foods that categorized according to CDPH,2000 (Table,6). The *Enterobacteriaceae* bacteria, as one of the criteria required by CDPH, 2000 for ready to eat foods , were found in 15% of carbohydrate food samples by FS or 40% by CM. Also, *E.coli* was detected in 5 % and 12.5% of the samples by FS and CM, respectively. Enterotoxin foodborne bacteria as *S. aureus* and *B. cereus* were found in carbohydrate food products in 2.5%, 5% by FS and 5%, 5% by CM, respectively. Meanwhile, *Listeria monocytogenes* and *Salmonella* were not detected in all of the carbohydrate food products by either of FS or CM methods.

Salad and savory, results as shown in table (4) and figure (4) reveal the incidence of food borne bacteria in 30 samples of salad foods as ready to eat foods that categorized according to CDPH, 2000 (Table, 6). The *Enterobacteriaceae* bacteria, as one of the criteria required by CDPH, 2000 for ready to eat foods , were found in 23% of salad and savory food samples by FS or 70% by CM. Also, *E.coli* was detected in 20 % and 40% of the samples by FS and CM, respectively. Enterotoxin foodborne bacteria as *S. aureus* and *B. cereus* were found in salad food products in 6.6%, 3.3% by FS and similarly by CM, 6.6%, and 3.3%, respectively. Meanwhile, *Listeria monocytogenes* has been detected in 6.6% by either of FS or CM. However, *Salmonella* spp was not detected in all of the salad food products by either of FS or CM methods.

Dairy products, results as shown in table (5) and figure (5) reveal the incidence of food borne bacteria in 35 samples of white soft cheese as ready to eat foods that categorized according to CDPH,2000 (Table, 6) . The *Enterobacteriaceae* bacteria, as one of the criteria required by CDPH, 2000 for ready to eat foods, were found in 14.2% of cheese samples by FS or 74.2% by CM. Also, *E.coli* was detected in 11.4 % and 25.7% of the samples by FS and CM, respectively. The most hazardous Gram negative bacteria the *Salmonella spp* was detected in 2.8% of the samples either by FS or CM. Enterotoxin Gram positive foodborne bacteria as *S. aureus* and *B. cereus* were found in cheese samples in 22.8%, 14.2% by FS and 28.5%, 17.1% by CM, respectively. Meanwhile, *Listeria monocytogenes* was detected in 17.1% by FS and 20% by CM

The obtained results for FS testing different varieties of ready to eat foods as a rapid method with the conventional methods for detecting foodborne microorganisms , were at the lower acceptable level of reliability according to the reports by(Fung 2002) . Moreover, the obtained results for ready to eat foods were in confront with these found by (El Kholy et al. 2008 and Zeinab et al., 2009), who reported the

acceptable reliability of FS test as a rapid microbiological test. Though, FS test is recommended for survey studies but not for testing food poisoning incriminated foods or remains from ready to eat foods.

Ready to eat food quality according to CDPH (2000): The CDPH, 2000 guidelines for the microbiological quality of some ready to eat foods at the point of sale depend on number of provisions. The term aerobic colony count (ACC) has replaced the previous name "aerobic plate count". The test of *Enterobacteriaceae* has replaced the tests for coliforms that traditionally have been used as indicators of hygiene and contamination after processing. The major problems with the Coliform tests are the variability in definition of the term coliforms and the fact that only lactose fermenting organisms are detected (Edwards and Ewing, 1972). Ready to eat foods containing *Salmonella spp, E. coli* O157H7 and verocytotoxin types or other pathogens may not always cause illness but there is good microbiological and epidemiological evidence that small number of pathogens in food have caused illness, however food should be free (Gilbert et al., 2000 and HCAC, 1997). The criteria for E. coli and *Listeria spp*. have been modified. Quantitative levels in the counts of *Listeria spp.* in previous versions of the guidelines (PHLS, 1996) excluded *L. monocytogenes*. This has been changed to include *L. monocytogenes* and hence the term is fully inclusive of all *Listeria spp.* The microbiological criteria for *S. aureus* and *B. cereus* differ for the quantitative levels as lower for the first, but at the same group of pathogens (CDPH, 2000).

Hence, results as shown in Table (2) reveal that 33.3% out of 60 samples of different meat categories fit out the CDPH microbiological guidelines. The main etiologies were due to the presence of the pathogens, *Salmonella spp, E. coli O157H7*, S. *aureus* and *B. cereus*. Also, results as shown in Table (3) reveal that only 15% out of 40 samples of different carbohydrate food categories fit out the CDPH microbiological guidelines. The main etiologies were due to the presence of the pathogens, *E. coli O157H7* and *B. cereus*. Meanwhile, results as shown in Table (4) reveal the worst the microbiological quality that 76.6% out of 30 samples of different salad and savory food categories fit out the CDPH microbiological guidelines. The main etiologies were due to the presence and high levels of *Enterobacteriaceae* members and the pathogens of *E. coli O157H7*, *S. aureus*, *B. cereus* and *L. monocytogenes*. Furthermore, results as shown in Table (5) reveal that 40% out of 35 samples of white soft cheese categories fit out the CDPH microbiological guidelines worse than meat and carbohydrate foods. Also, the main etiologies were due to the presence and high levels of *Enterobacteriaceae* members and the pathogens of *Salmonella spp*, *E. coli O157H7*, *S. aureus*, *B. cereus* and *L. monocytogenes*.

Therefore appropriate control measures during production, adequate hygiene standards and appropriate cooking during final preparation should ensure that the end products are free from viable organisms and that food are of good quality.

Table (1): Food system* for identification and recovery of the test Strains of the concerned microorganisms

| Microorganisms | Number of Biochemical wells must be positive for microbial identification / strains | | | | | | | | | | | | |
	No.of strains	1 LDC	2 H$_2$S	3 UR	4 PRO	5 PSE	6 STA	7 ESC	8 IND	9 BCE	10 LIS	11 CAT	12 Y/M
Salmonella spp	15	14	12	12	-	-	-	-	-	-	-	-	-
Citrobacter spp	4	4	4	4	-	-	-	-	-	-	-	-	-
Proteus/prov. spp	10	10	10	9	10	-	-	-	-	-	-	-	-
Pseudomonas spp	19	-	-	-	-	15	-	-	-	-	-	-	-
E. coli	22	-	-	-	-	-	-	19	12	-	-	-	-
S. aureus	22	-	-	-	-	-	13	-	-	-	-	-	-
B. cereus	6									2			
Listeria spp	12										4	10	
Mold/yeast	25												25
total	135												

*   FS: Liofilchem miniaturized microbial, liofilchem Co., Italy

Table (2): Foodborne bacteria in meat group as ready to eat foods by rapid method (FS)*[1] and conventional methods (CM), according to CDPH, 2000.

Meat group products/categories	No of samples	Criteria /Foodborne bacteria	% by FS	% or cfu/g by CM	% Fit out CDPH, 2000*[4]
Cooked meat (boiled and spicy) / cat. 3	20	Average .ACC*[3]	-	$<10^6$	45
		Coliform *[2]	-	30	
		Proteus	20	20	
		E. coli	10	10	
		E.coli O157H7	0	10	
		L .monocytogenes	5	5	
Fried meat / cat. 2	10	Average .ACC**	-	$<10^5$	20
		Coliform [2]	-	10	
		Citrobacter	10	10	
		S. aureus	10	10	
Fried beefburger / cat.1	10	Average .ACC**	-	$<10^4$	20
		Coliform [2]	-	10	
		E. coli	0	10	
		S. aureus	10	10	
un-fried beefburger / cat. 1	10	Average .ACC**	-	$<10^4$	40
		Coliform [2]	-	50	
		B. cereus	20	20	
		Listeria sp	10	10	
		Pseudomonas	20	30	
		E. coli	10	20	
Meat poultry / cat.3	10	Average .ACC**	-	$<10^6$	30
		Coliform *[2]	-	40	
		Salmonella spp	20	20	
		Pseudomonas	10	20	
		E. coli	10	20	
Total	60	Enterobacteriaceae	21.6	46.6	
total	60		33.3	58.3	33.3

*[1] RM, rapid method by FS: food system from **,** liofilchem Co., Italy
*[2] Coliform or Enterobacteriaceae not set up in FS,
*[3] Aerobic colony count, ACC in cfu/g
*[4] CDPH, Communicable Disease and Public Health, (Gilbert et al, 2000)

Table (3): Foodborne bacteria in carbohydrate ready to eat foods by (FS)*[1] test and conventional methods (CM) , according to CDPH, 2000

Carbohydrate foods/categories	No.of Samples	Criteria/Foodborne bacteria	By FS %	% or cfu/g by CM	% Fit out CDPH, 2000*[4]
Sweet macaroni Boiled /cat. 2	10	Average ACC *[3]	-	$<10^5$	10
		Coliform *[2]	-	20	
		E.coli		10	
		Pseudomonas	10	10	
Macaroni with tomato / cat. 2	10	Average ACC *[2]	-	$<10^5$	20
		Coliform	-	20	
		E.coli O157H7	0	10	
		Proteus	10	10	
		Pseudomonas		10	
		S. aureus	10	10	
Oven milk meat macaroni / cat. 3	10	Average ACC *[2]	-	$<10^6$	20
		Coliform	-	20	
		E.coli	10	20	
		Proteus		20	

Cooked rice / cat. 1	10	Average ACC [*2] Coliform *E.coli* *B. cereus*	- - 10 20	<10[4] 10 10 20	10
Total	40	Enterobacteriaceae	15	25	40
Total	40		17.5	47.5	15

[*1] Rapid method by FS: food system from **,** liofilchem Co., Italy
[*2] Coliform or Enterobacteriaceae not set up in FS,
[*3] Aerobic colony count, ACC in cfu/g
[*4] CDPH, Communicable Disease and Public Health, (Gilbert et al, 2000)

Table (4): foodborne bacteria in salad types as ready to at foods by FS [*1] test and the conventional methods (CM), according to CDPH, 2000.

Savoury & Salad/category	No. of samples	Criteria/Foodborne bacteria	% by FS	% or cfu/g by CM	% Fit outCDPH, 2000[*4]
Vegetable salad Fresh and pickled / cat.5	10	Average ACC[*3] *Coliform* [*2] *E.coli* *E. coli O157H7** *Pseudomonas* *Listeria spp* *B. cereus*	- - 50 - 50 10 10	NA[*5] 100 60 20 60 10 10	60
Potato and others burette / cat. 2	10	Average ACC[*3] *Coliform* *S. aureus* *Listeria spp* *E.coli* *E.coli O157H7*	- - 20 10 10 0	<10[5] 80 20 10 40 20	60
Maize with olives / cat. 2	10	Average ACC[*2] *Coliform* *Pseudomonas spp* *E.coli*	- - 10 0	<10[5] 30 20 20	30
	30	*Enterobacteriaceae*	23	70	
Total	30		50	90	76.6

[*1] Rapid method by FS: food system from, liofilchem Co., Italy
[*2] Coliform or Enterobacteriaceae not set up in FS,
[*3] Aerobic colony count, ACC in cfu/g
[*4] CDPH, Communicable Disease and Public Health, (Gilbert et al, 2000)
[*5] NA, not applicable

Figure (1): Compatibility of the typical positive reactions for the test strains, according to the supplier instructions.
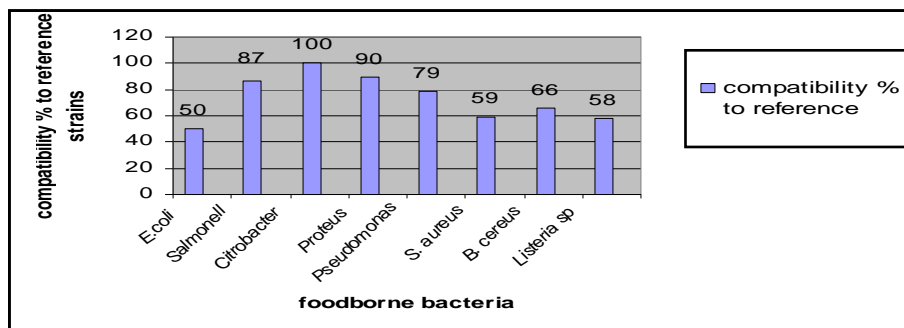
Table (5): Foodborne bacteria in different varieties of white soft cheese, as ready to eat foods by (FS)[1] test and conventional methods (CM) according to CDPH, 2000.

Cheese varieties/categories	No.of Samples	Foodborne bacteria	% by FS	% or cfu/g by CM	% fit out CDPH 2000[4]
Domiati /cat.	10	Average ACC[3]	-	NA	40
		Coliform[2]	-	50	
		Salmonella	0	0	
		E.coli	10	30	
		S.aureus	20	40	
		B.cereus	10	20	
		Listeria monocytogens	20	20	
Tallaga	10	Average ACC	-	NA	50
		*Coliform**	-	50	
		Salmonella	10	10	
		E.coli	20	30	
		S.aureus	20	20	
		B.cereus	10	10	
		Listeria monocytogens	10	10	
Feta	5	Average ACC	-	NA	20
		*Coliform**	-	20	
		Salmonella	0	0	
		E.coli	0	10	
		S.aureus	20	20	
		B.cereus	20	20	
		Listeria monocytogens	20	20	
Kariesh	10	Average ACC	0	NA	40
		*Coliform**	-	40	
		Salmonella	0	0	
		E.coli	10	20	
		S.aureus	20	20	
		B.cereus	10	10	
		Listeria monocytogens	10	20	
total	35		68.5	94.2	40

[1] Rapid method by FS: food system from, liofilchem Co., Italy

[2] Coliform or Enterobacteriaceae not set up in FS,

[3] Aerobic colony count, ACC in cfu/g

[4] CDPH, Communicable Disease and Public Health, (Gilbert et al, 2000)

[5] NA, not applicable

Figure (2): Foodborne bacteria incidence in meat ready to eat foods by FS* and CM.
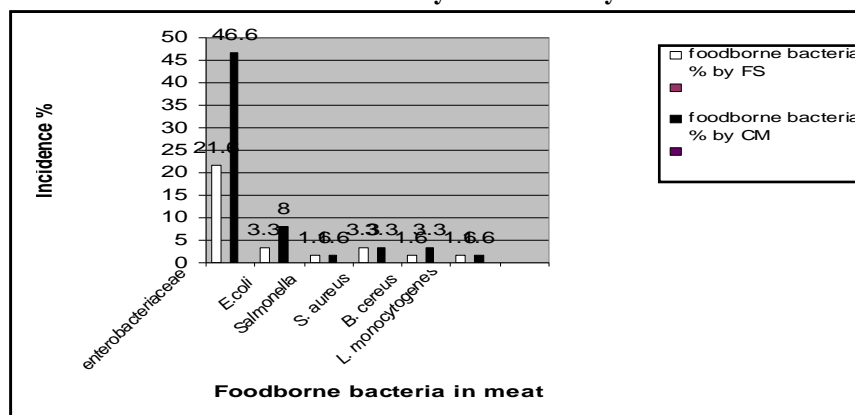
*FS test: food system kits from, liofilchem Co., Italy and CM: conventional methods

Figure (3): Foodborne bacteria incidence in carbohydrate foods as ready to eat foods by FS* and CM.
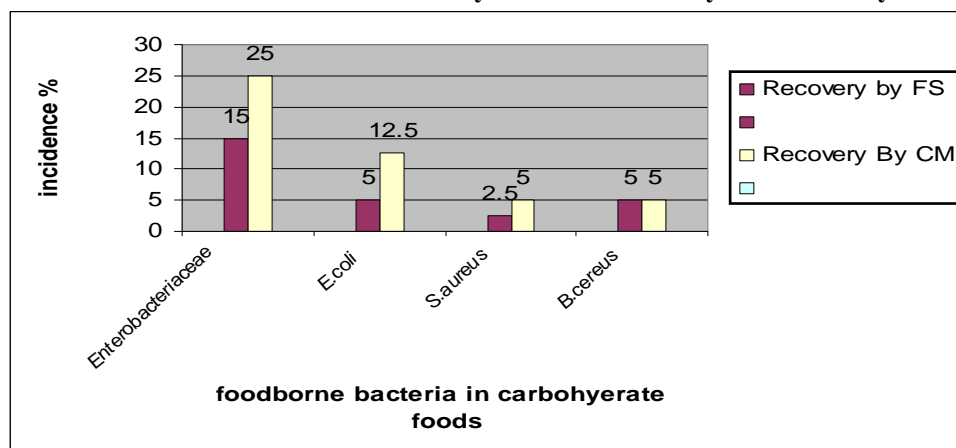
*FS test: food system kits from, liofilchem Co., Italy and CM: conventional methods

Figure (4): Total of foodborne bacteria incidence in salads as ready to eat foods by FS* and CM.
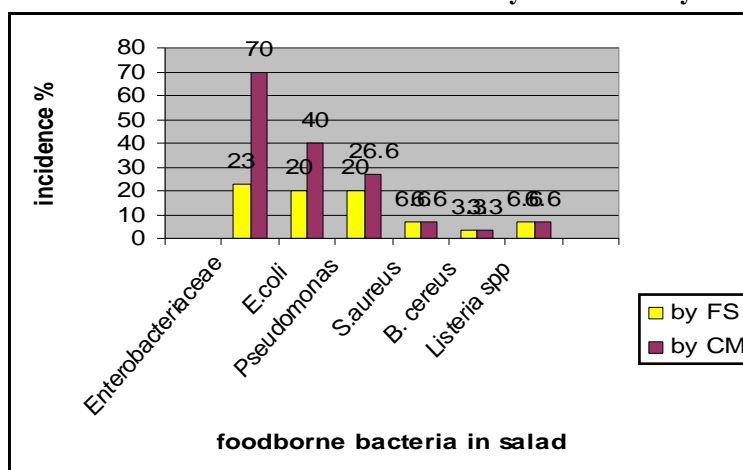
*FS test: food system kits from, liofilchem Co., Italy and CM: conventional methods

Figure (5): Foodborne bacteria incidence in white soft cheese as ready to eat foods by FS* and CM.
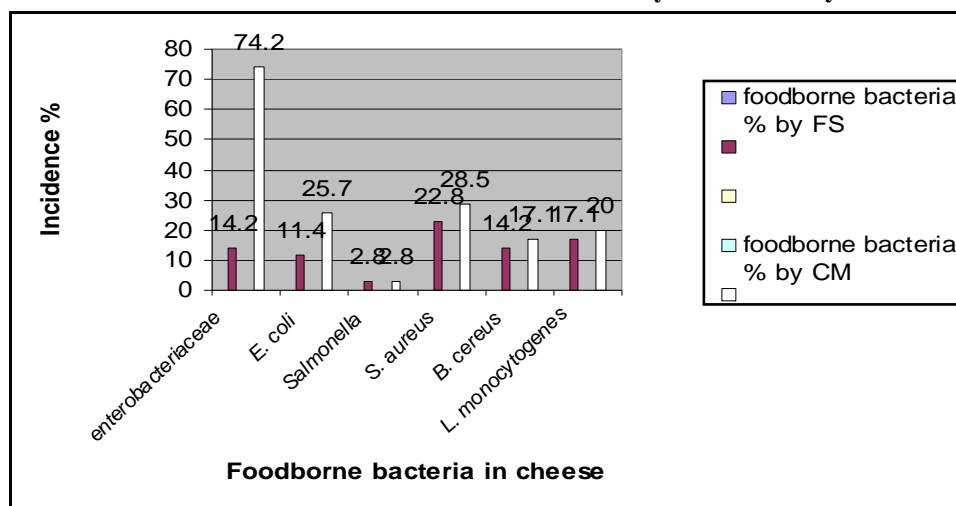
*FS test: food system kits from, liofilchem Co., Italy and CM: conventional methods

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5/1/2011

The Effect of Calcium Nitrite on the Electrochemical Characterization of 3003 Aluminum Alloys in Sea Water

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Abstract: The electrochemical behavior of 3003 aluminum alloys with calcium nitride in sea water was tested using electrochemical techniques. It was found that calcium nitride can be used as an inhibitor to protect the 3003 aluminum alloy from corrosion in sea water, if used with a specific volume. Cyclic polarization testing was conducted to investigate the corrosion behavior of the 3003 aluminum alloys at different calcium nitride volumes. The studies showed that at high volumes (13 ml and up of calcium to 250 ml of sea water) or low volumes (1-7 ml of the calcium nitride 10 250 ml of sea water), the 3003 aluminum alloy has higher susceptibility to corrosion. When 8ml of the inhibitor used a noticeable difference was observed. Passivation was clear from the cyclic polarization curves. In addition to the cyclic polarization testing, SEM was used to study the surface of the alloys after being exposed to different volumes of calcium nitride. The results were matched.
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Keywords: Effect; Calcium Nitrite; Electrochemical Characterization; Aluminum Alloys; Sea Water

Introduction

Aluminum alloys are well known of their strength, and relatively acceptable corrosion resistance [1]. They are widely used in many industries such as heat exchange systems, food handling, and electronic devices [1, 2]. The corrosion behavior of aluminum alloys in highly corrosive environment depend on the atomic structural of the alloy, chemical composition, the temperature of the solution, the oxygen content, and the effectiveness of the protection method [3]. Many corrosion inhibitors were studied by scientists. The inhibitors can be divided into either organic or inorganic ones [1]. Chromates are one of the major inorganic inhibitors that are still in use. Due to the toxic nature of the chromate, the urge to find an inhibitor that can work as good as chromate but with less toxicants. Citric acid as an inhibitor was studied and it was found that it will protect the aluminum alloys at a specific concentration, while this protection will be decreased as the concentration of the citric acid increased [1].

The effectiveness of the corrosion inhibitors or the corrosion inhibition efficiency is a function of fluid composition, quantity of water, presence of oxygen, and temperatures. With the correct concentration of the fluid and the inhibitor, the inhibition efficiency could increase. One of the mechanisms of the inhibitors effect is the formation of a passive layer that will stop the access of the corrosive substance [4]. Calcium nitrite is an anodic inhibitor, and with anodic inhibitors if too low

concentration used, it will aggravate pitting corrosion, and that was observed in this study [4].
3003H14 aluminum alloys is the focus of the study in this research. 3003 is the most widely used due to the increase of strength over the other types of the aluminum alloys such as 1100 grade [5]. It was found that calcium nitrite is a good corrosion inhibitor for steel in alkaline and concrete environments [6]. In this study the calcium nitrite was tested on 3003 H14 aluminum alloys in 0.5 M NaCl environment. In general aluminum alloys when present in oxygen containing environment such as water or air, they form an oxide layer, which is responsible for the aluminum alloys corrosion resistance property. This property can be affected by many factors, for instance: If the pH of the solution is acidic or basic, continuous temperature change, and the presence of an aggressive ions such as chlorine ions, as the case in this study [7]. It was found in another study that the corrosion rate depend on the pH of the solution, and the Nitrite ions act as anodic inhibitor especially in a highly corroded environment [8]. In this study cyclic polarization measurements and SEM were used to investigate the effect of the calcium nitrite addition to 3003 Aluminum alloys in 0.5M NaCl solution.

2. Experimental procedures

The aluminum alloy used in this study is the bare aluminum panels that are made from 3003 H14. They are 0.025 inches thick. The specimens were 4 by 12 inches. Each sample was cleaned with an alcohol, and air dried for about 15 seconds, before

hooked with the flat cell. After, the samples were placed into a flat electrochemical cell that allowed a 1 cm2 area of the sample to be exposed to 0.5 M NaCl solution. . The sample was the working electrode; a platinum counter electrode and a saturated calomel reference electrode were placed in the cell. Cyclic polarization technique was used to test the corrosion behavior of the samples, with and without calcium nitrite using a potentiostat. The voltage was scanned from -0.6 mv below the measured open circuit potential up to 1v at a scan rate of 1mv/s while the resulting current was measured and recorded. Calcium nitrite used in this experiment was the standard 30% solution. A pippet was used to deliver different amounts into the 0.5 M NaCl solution, 1ml-15ml. Each test was repeated three times to check the reliability of the test where a new spot on each sample was cleaned as mentioned above for every trial. Each of these samples was then prepared for the SEM.

3. Results and discussion

Figure 1 shows the polarization curves of 3003 Al at different amount of calcium nitrite added as an inhibitor. From the figure, it was noticed that if calcium nitrite added in small quantities it will act as if there is no inhibitor added into the solution. The same trend was observed when more than 8 ml was added to the test solution. The inhibitor addition will increase the passivity of the Al, but as it appears from the graph it is clear that 8 ml of calcium nitrite is providing the lowest corrosion potential if compared when other amounts were added. In addition, the passivity region when 8 ml used was larger compared to the others. SEM was used to look at four different

3003 Al alloy surfaces. Figure 2 shows the surface as the sample received, it is clear that the surface has few scratches from handling the sample and there is no corrosion to begin with. Figure 3, shows the surface with 5ml of calcium nitrite was added. Figure 4 shows the surface when 8 ml of the inhibitor was used, and Figure 5 shows the surface when 15 ml of the inhibitor was used.

It is seen that, calcium nitrite addition, resulted in corrosion potential reduction and formation of passive layer on the Al surfaces with 8 ml Calcium nitrite. The SEM pictures show a match to the cyclic polarization curves, same conclusion reached as when 8ml of calcium nitrite used providing better protection than if other quantities used. Figure 3 and Figure 5 show a rough surface, with deep pitting, while Figure 4 show the surface that was treated with 8ml calcium nitrite, the difference is clear. With the 8ml of the inhibitor a clear protection is obvious; the surface looked as smooth as never touched any corrosive solution, similar to the surface as received . The reason behind these results could be the PH change that the inhibitor will do to the solution, and hence to the samples. The following table shows the PH for different amount of the inhibitor used:

Table 1: The effect of calcium chloride volume and the pH of the solution

ml Calcium Nitrite	PH
5	7.02
8	8.68
15	8.91
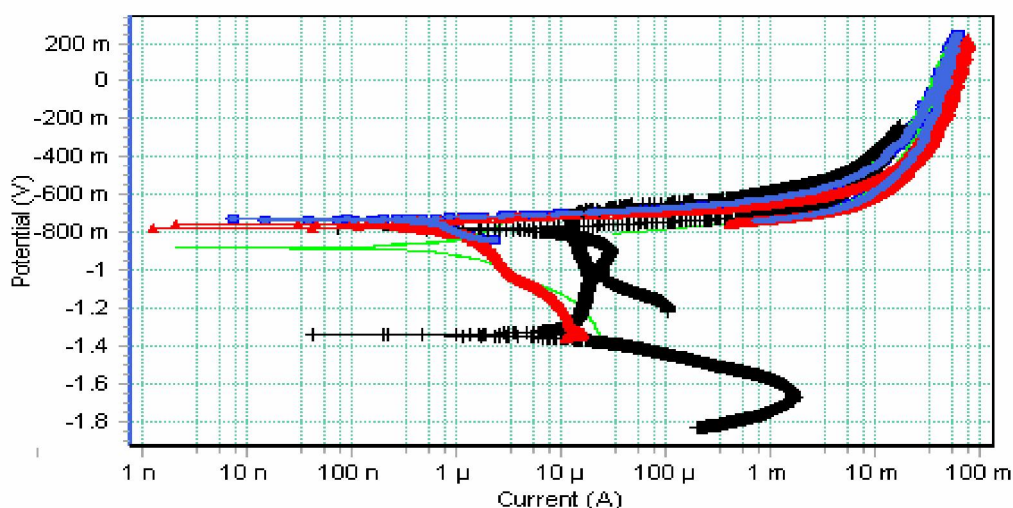
Figure 1: Cyclic polarization curves
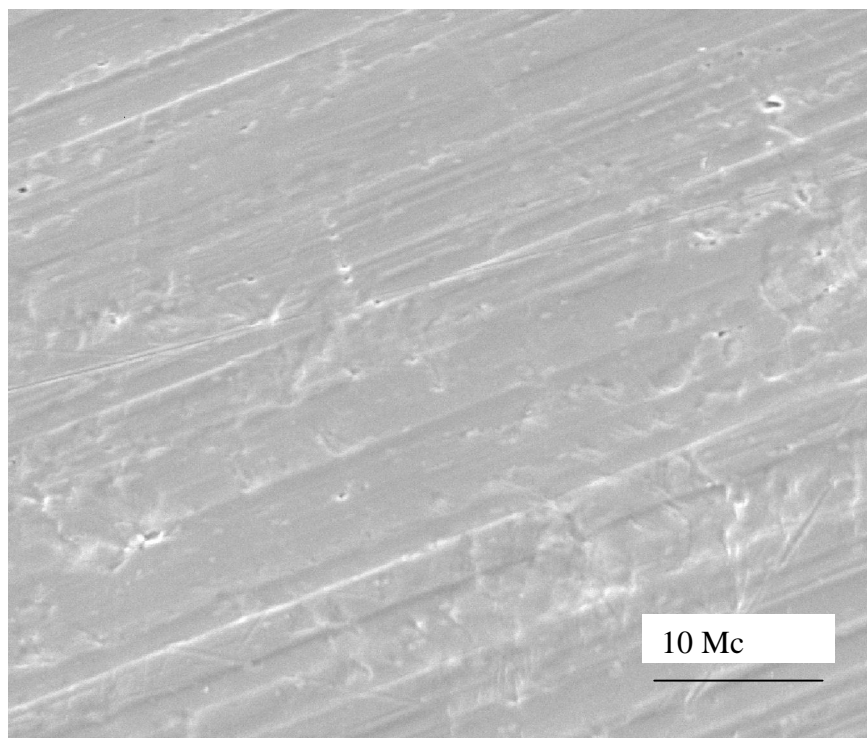
Figure 2 SEM as the sample received
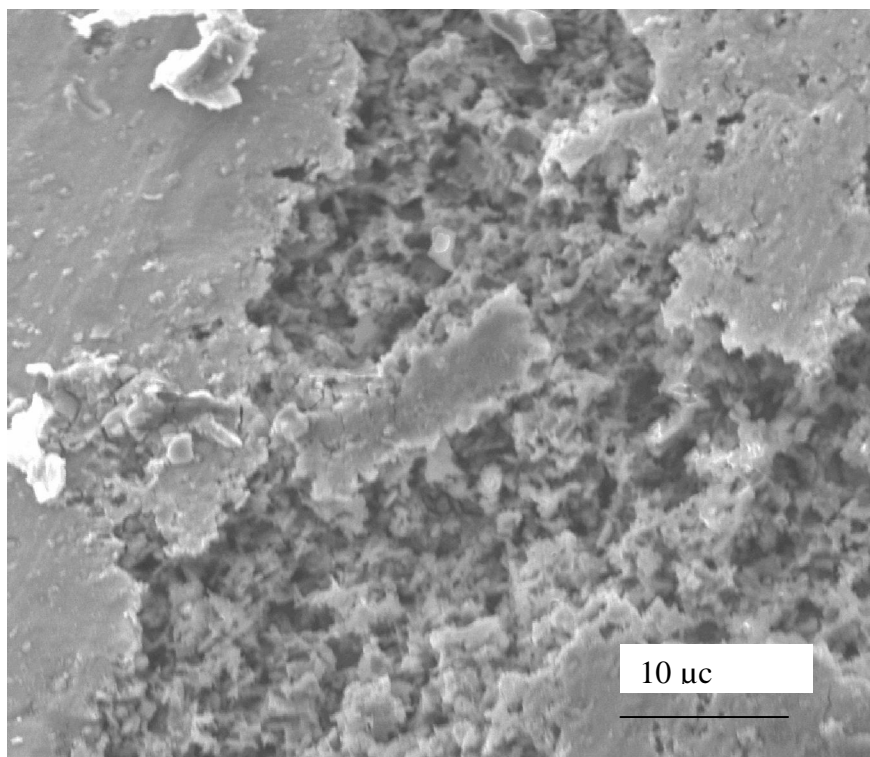
Figure 3 SEM when 5 ml Ca (NO$_2$)$_2$ used
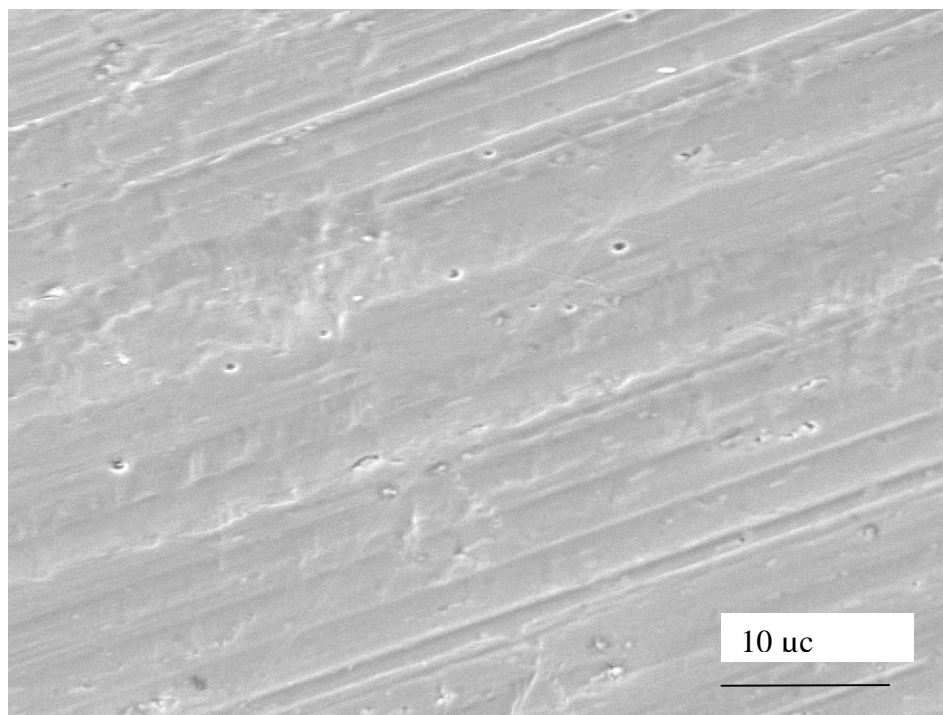
Figure 4 SEM when 8 ml Ca (NO$_2$)$_2$ used
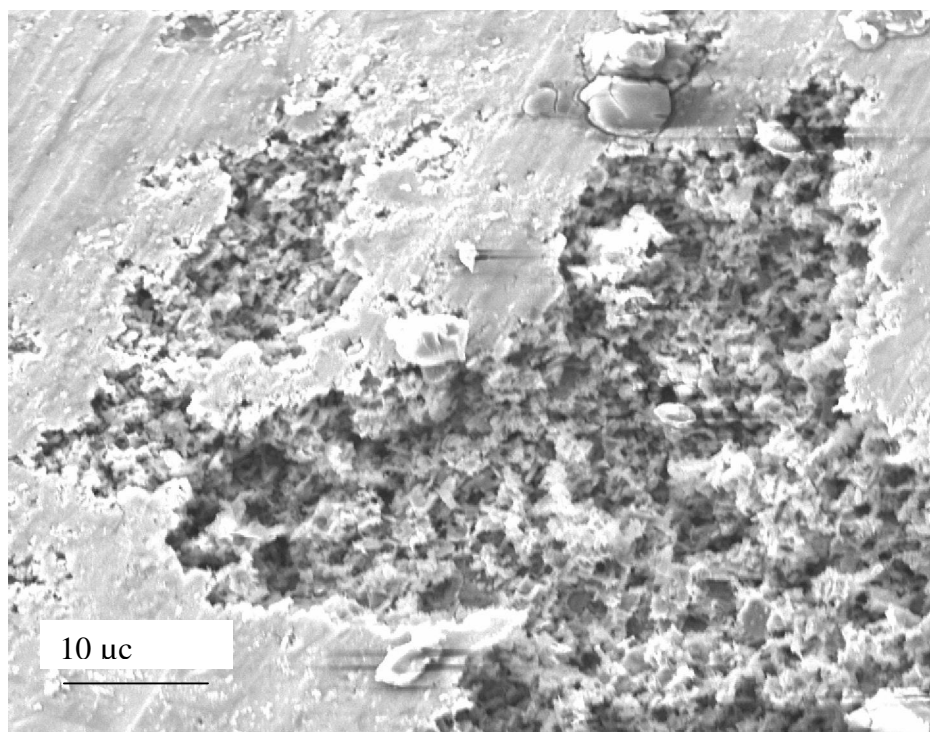
Figure 5 SEM when 15 ml Ca (NO$_2$)$_2$ used

All the above samples were tested under the same conditions of temperatures, room temperature of 25 C was assumed. From the table, when small amount of the inhibitor used, the solution acts neutral, because NaCl when added to water produces a solution with a pH of 7, as both ions are neutral. Na+ is the conjugate acid of a strong base, and Cl – is the conjugate base of a strong acid, according to the following equation:

$$NaCl + H_2O \longrightarrow NaOH + HCl$$
Equation 1
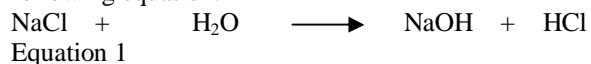
The products will have to effect on the PH of the solution; the solution will corrode the sample due to the presence of the chlorine ions, which is the usual reason for corrosion of the Aluminum alloys. The addition of a small amount of the inhibitor will have no positive or negative effect on the surface of the alloy, the alloy will be have as if there is no inhibitor been added, and the chlorine ion will still attack the surface.. With 15 ml calcium nitrite, the surface as it was shown in Figure 4 was attacked aggressively, and it is clear from the above table, the PH of the solution shows a basic behavior, which could explain the reason for the corrosion. The following molecular equation can explain the chemistry:

$$Ca\,(NO_2)_{2(aq)} + 2NaCl_{(aq)} \longrightarrow CaCl_{2(s)} + 2\,NaNO_{2(aq)}$$ Equation 2
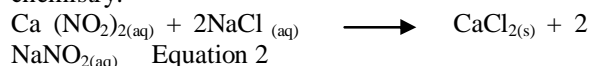
$NaNO_2$ is a soluble compound; its pH is greater than 7. The NO2- is basic as its conjugate base of a weak acid. The Na+ ion is neutral as it is the conjugate acid of a strong base. The basic NO2- ion will raise [OH-] in the solution through the following reaction:

$$NO_2^- + H_2O \longrightarrow HNO_2 + OH^-$$
Equation 3
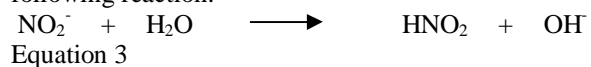
Increasing the [OH-] increases the pH of the solution, which will have a corrosive effect on the surface if it exceeded a certain amount. If compared to Figure 3, which shows the effect of adding 8 ml of the inhibitor into the solution. The difference is clear that at this stage calcium nitrite is acting as an inhibitor to corrosion, as the nitrite ion in the presence of the hydroxide and aluminum ions will produce the barrier layer of aluminum oxide, as it follows in equation 4.

$$2Al^{+3} + 4NO_2^- + 2OH^- \longrightarrow 4NO + Al_2O_3 + H_2O$$
Equation4
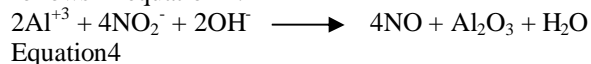
4. Conclusions

The inhibitor used for this experiment was the calcium nitrite. It was found that the amount of the inhibitors has to be used with care. From the results, it was clear that using a small amount of the

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inhibitor compared to the total sodium chloride solution, will have no inhibition effect on the aluminum alloy surface. In addition it was found with exceeded amount of the inhibitor in the sea water, the inhibitor can actually act as a corrosive material, and it will accelerate corrosion. Hence, there is a higher susceptibility to pitting corrosion with either small or large amount of the inhibitor. Using just right amount, will actually help in forming the barrier protective oxide layer on the surface of the aluminum alloys, and minimize the pitting corrosion as it was clear from the SEM pictures.

The increase in the amount of the inhibitor will not result in more corrosion protection, it will increase the susceptibility to pitting corrosion.

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Importance of Micro-Credits for Rural Women

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Abstract: Women's agriculture activities in villages of Iran in three sections of recent history of rural improvement have been affected by developmental factors. Before land reforms (1962), according to conventional laws in Iran, women were kept apart from having farm lands. According to customs, if farmer was farming in farm system and also if he had large farms so he must used his family workforce (especially woman workforce), but if it was small, he used to work at other's fields for wage. In many cases, women had to work at other parts. Before land reforms and because of being traditional of instruments and production tools, using women's roles was often in conservation and harvesting. While cultivating, most of picking cotton, was done by women, exclusively. In same period (before 1962), women roles was remarkable in cultivating rice. While plowing and preparing fields, they took part in third time trowel, also they had significant role in preparing natural fertilizer.
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Keywords: women, rural, credit, empowerment

Introduction

Since women have significant role in agriculture workforce, for country (e.g. Iran) that seeking for improving rural economy and supporting of production of food products, identifying women's role in this theme is very important (Changizi, 2003). Preparing seed and preparing them for transferring to storage, were done by women. Transplanting (most important stage in cultivating rice) and weeding were done by them, completely. And finally we should remark, their roles in cultivating wheat, before land reforms. Land reform (1962) was a breaking factor for traditional capitalism relations, and it was facilitator way for renewing agriculture and making investment relations at agriculture section. Although no land was considered for women (indeed by this, major proportions of agriculture workforces was deprived from having production instruments that they work on) but, it has affected on women's roles in agriculture activity. (Banihashem, 1999)

By the way, lord-vassal relation was broken approximately, and peasant's production relation and capitalist exploitation systems were established. In peasant production, (at fertile lands) farmer's wife had to work on family land with other family members .at peasants lands; women were working out of their family farms. In capitalist exploitation systems, women workforce was considered as cheap workforce at farms. Generally, land reforms caused those women workforce is used as secondary (balali, 2005).

Now, because independent peasant exploitation systems, women workforce is used as gratis family labors that this caused, real value of women roles being unknown in surplus economic productions of peasants family . Generally, nowadays, in minor agriculture, women role and activity is necessary.

Women activities in agriculture are more than their capacities. Because, it doesn't decrease from her home duties and consequently, and by analogy with pure housekeeper, they bear more labors. Indeed, it should be considered more importance for rural women who take part in agriculture activities and surplus economic productions, because not only they are participant in workforce market, but they play very important role in renewing economic of family (Lahsaeezade 2000)

2. Rural women's roles in economy of village

Most women, especially in developing countries are working three shifts in a day indeed, but, instead for their exhausting activities, they receive: less health care, less literacy and fewer wages. Compensation for them is vast sex discrimination that exists all over the worlds in various forms. For example in India, Pakistan and Bangladesh, about 1million girls die, due to lack of proper health care.

World Health Organization estimated that women work 2times more than men averagely (Bahar, 2001). In United Nation researches, except Australia, Canada and US, women in all countries work more hours than men. But major problem here is that, work means everything that leading to financial income. So, in government statistics, women are considered as unemployed and few of female employees are counted as productive and employed forces.

In India, in one survey, and according to this perspective (Financial income) this result emerged that only 34% of women (compare to 63% of men) is counted as workforces of society. While if we also consider doing services and home productions and preparing family needs , as productive activities (without leading to Financial income) , we would find different results and value of this deprived group of society , will be clear to us. By considering work and home productions in India, these results emerged: 75% of women compared with 64% of men are working (compared to 34% versus 64% of pervious statistics). (Balali, 2005)

Also in another survey in Nepal villages and according to financial income criterion, just 20% of women are working, while by considering home production criterion, women's share of workforce, reached to 53% (Bahar, 2001). By the way researches show that women have basic role in economics of family.

About rural women in agriculture productions , some researches is done by some scholars such (Shauver , Saches , Adams and Alston) that all believe that women in activities such as cultivating (seeding) conservation (weeding, spading and sifting) and harvest (cut sugarcane branches) and they also participate in activities like doing pastoralist and caring animals , milking , nurturing poultry, gardening, fixing yard , snow removal, repairing building , handicrafts and etc (Navabakbar 1997).

So, rural women are great part of workforce, needed for agriculture and rural societies. In 1966, according to F.A.O reports to food security congress, women doing 50% of productions in agriculture part averagely and this issue in developing country has very special importance. in African desert area about 70-80%, Asia 65%, in Latin America 45% and Caribbean and in Tunes 89% of workforces are women (Varzgar 2001:217) and in Iran more than 50% of agriculture workforce are women (Banihashem, 1999) .

Most rural women's service work, pertain to out of house. For example: rural women not only traditionally strive for environmental protection, they also take part in maintaining forest, plant cultivation and weeding in rural regions.

So rural women, doing major part of affairs in services and doing services inside and outside the house, isn't with any risk for them. They aren't secure while cleaning stall, milking, nurturing livestock and other activities. And they are at risk of common diseases between human and livestock. In fact they haven't security against any risk of work conditions (Emadi, 2001).

Summaries of woman service activities include housekeeping duties and also service activities out. So it's necessary to revise definition and classification service activities by women. Thus, according to rural women's basic role in productive activities and even rural developing, importance of rural women's role isn't considered properly. Maybe the reason of this inattention is that rural women's productions are used inside the family. This inattention caused that no changes happen for decreasing exhausting rural women's activities, in spite of development of technology and using various new tools that leads to remarkable decrease in using human resources. In so many developing countries yet, women use traditional cultivating tools that have little efficiency and demand more activities. Further, their agriculture activities accompanied by housekeeping duties that force them excessive efforts. One of the reasons is that rural women's role, remained unknown in economical productions. Because objective evidences at all over the world, especially in developing countries (particularly in our country) show that lost work or intangible activities is done by women that finally isn't considered as their efforts. Other reasons are: role of rural women and different productive activities remained unknown; and even lack of varying their position at different activities of village (Saadi, 2005).

Necessity of credits program for rural women

Women compare to men, face more cultural, social, and economic and laws obstacles, especially in developing countries and even its intensity is more for them too. In rural societies women and girls have less food, healthcare educational equipments, capital and income. thus in order to access to economic development and making optimum of using production input (especially workforce) it should pay proper consideration through emphasizing on rural women's roles in production and giving scientific approach in order to establishing cooperation between institutions to increase women contributions in productive and economic activities (Araghzade 2002) .

If rural women can work through receiving credits , loan and others finance facilities at favorite jobs and live through earned income (as it called "self-reliance and independence), so undoubtedly we would see changes in social, economic and cultural relations of village.

Here, Basic issue is that if changes happened following of these events in villages, have positive aspects or negative? Naturally, every change in institutions and social phenomena has both positive and negative dimensions (Farghdan, 2001).

Being high and low of each one is depended on various conditions and terms so it is varied from one society to another society. In Iranian rural societies, cultural and social context is such that, consequences of these phenomena maybe being different and sometimes contradictory. However these actions caused that women stand in good economic condition and also gain self reliance and rely themselves with no help from husbands, but dominant cultural space on villages may create some disorders. At most of villages in Iran, patriarchal with all features dominate and women's financial self reliance may not being pleasant for some human and rural groups. When women gain financial independence in villages, impacts and social and cultural consequences would emerge. (Chabokru and etal, 2005)

Increasing Suffrage, lack of relying on vast patriarchal families, increasing cultural acknowledgment, relation with newer institutions, having intellectual independence, making decision for marrying, occupation, emigration and etc are those rights that they gain. gaining aforementioned rights by women in context of cultural and social framework followed some changes that maybe lead to disfunctions and even create disorders and abnormalities at traditional , familial and kinship relations that dominated on villages (Fakhraee 2002).

Rural occupation stirred with farming and ranching and rural economy is subsistence economy so subsistence culture is formed. In subsistence economy all of family members engage in economic activity.

Every empowering action of each member certainly affects totality of economy of family and creates remarkable evolution. One of important plan for empowering subsistence economy at village is, performing credits program through institutions that work for rural developing. But these programs are also done by private institutions that have expertise and experience in development programs. (Ghaffari, 2000)

Since, rural family members have little power to save, so saving and credits programs start with least or even no deposit. One of other features of these programs is, persuading rural family members in order to expanding initiatives and creativity for making occupation and income. But also it should be considered that various deposit practices and micro loans must be base on the need and culture of various societies and also base on current condition of market. Appropriateness or inappropriateness of deposit practice with culture and regional economic geography can affect on extent of effectiveness at credits program. And finally is that, identifying real participants need at micro credits program and also

their participation in loaning and deposit managements, can affect on increasing effectiveness of program. (Rahmani, 2001)

Availability of credits in the format of inclusive program for rural women to apply at services and productive activities is necessary base on some reasons:

a- rural women's role, as productive workforce at agriculture and rural developing.

in rural regions of country , women , form major part of productive workforce that more than 40% of value of conducted activities at rural regions in various issues like handicrafts, ranching, natural sources, conversion and services industries is done by rural women . So if it is aimed to retain these activities or this part of productive human resources has active and affective role in production and activity cycle, its essential to provide them necessary funds and credits to develop and stabilize their activities inappropriate availability to credits sources, for rural women

Rural women base on different cultural, social and bureaucracy factors, couldn't have credit sources as same as they had role at agriculture and rural development.

Dominant social culture on credits system of country, rural women incapability for pledging to sources of credit provider, social and cultural limitation from family supervisor, are among those factors that prevent rural women access to credit sources (Moazami 2005)

b- level of capital efficiency at small scale

Contrast to intellectual imagery, level of factors efficiency at small scale production and service unites is more than great ones. Conducted research in many Asian and European countries (specially central bank of Islamic republic of Iran researches) has shown that capital and workforce efficiency at micro productive unites, is more than those at macro scale units or agro-industry, thus it's more economical if needed capital, provided for micro scale productive units with knowledge and skills of production as "suitable Technology"

(Rahmani, 2001).

c- importance of little increase in villagers income on family economy

rural society , including rural women more than others, have endured poverty and it's shortage , so performing micro scale projects by providing little credits, lead to improvement of income and life level that have high importance and more desirability at rural family economy (Moazami, 2005).

d- limitation in formal credits sources (government)

In addition to lack of proper rural women access, compared to men, formal sources of countries have some limitations that can't response to credit needs of

agriculture part exploiters and rural regions. results of researches show that governmental credits sources which are given to rural regions applicants by agent banks , is enough just for 50% of demands and rest of them is provided by informal sources with high costs or even applicant can't supply their requested demands and finally investment would stopped.

So this limitation is one of other factors that make, creating credits program for rural exploiter groups necessary, especially for rural women (Khazaee. 2001).

6. Conclusion and discussion:

Researches studies and surveys show that Iranian rural women that constitute 21% of whole population and half rural population have key role at production and at economic and social reproduction. Their major activities are at three parts: agriculture, handicrafts and centralized services. (Fami, 2001)

However no inclusive studies conducted About Iranian rural women's role in production and about how they participate in production process and surveying real value of their workforce , but theoretical surveys has shown their part at agriculture about 40% that proportion of their activities partly depend on cultural , social , different kind of exploiting and even kind of production and activity (farming , gardening and ranching) , culture diversity and climate condition on different regions of Iran . Nature of these activities is base on gender and social work dividing. They have complementary roles at production system.

In spite of that, by conducted researches , rural women's roles has been surveyed very low , but another study has shown that at villages of Iran , women, especially elder , has specific dignity and have important roles at decision making .

Women Corporation would increase in decision making. (Planning and research institute of agricultural economics 1997).

Supplying credits and analyzing credits approaches cause opportunity to activate poor men's working power , establishing field for sustainable production and income , prevent usurers and pre shoppers of agriculture productions to plunder poor rural men and finally empowering poor people especially women who can work but were deprived to have capital and work tools , and extension accordance to their activities such as needs assessment , identifying target group , organizing poor people , giving needed specialized and public training and … have important role on effectiveness and make effective activities of these credits .

Woroniuk and Schalkwyk (1998) at their conducted research believe that now, micro credits, micro finance sources and small business units are most effective mechanism to decrease poverty.

Plitt and others, conducted research as they called it "do credits programs, can empower women "? Results showed that corporation at credits programs helps empowering women. Goetz Sengupta (2003), presented negative image of credits effects on empowering women. They concluded that most women have minimum control on their loans. And when repayment period is short, this shortage of control has devastating effects on women welfare. Hashemi and others (2004) found that joining to Gramin Bank, has meaningful positive effects on controlling women, and helps to family income.

In researches that conducted by Nanda (2004) became clear that women participation in credits programs had positive effects on their demand about health care. Fiona Steele and etal (2008) in researches that conducted as called " influences of credits programs on empowering women at Bangladesh , found that women who joined to credits programs , have participated in more educational programs and have married with more educated men and also they have saved more and they had more cash .

Ellen and her colleagues (2009) used approach called it "credits and education at Bolivia, Ghana, Honduras, Mali and Thailand". This approach looks for empowering women through financial services with education. In this approach, women get familiar with importance of credits through education and extension and also familiar with ways to access it through establishing different groups.

In order to overcoming dominant consideration, experts believe that we should consider following in protection process of these social institutions

-Relating public established institutions with each other and networking established institutions

-Emphasis on stability and self reliance of management system of credits institutions from financial and economic dimensions

-Efforts to gain local confidence and credibility among contacts

-Effectiveness of costs and economic and financial efficiency inside established institutions

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Role of rural women in rural economy

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Abstract: rural women are great part of workforce, needed for agriculture and rural societies. In 1966, according to F.A.O reports to food security congress, women doing 50% of productions in agriculture part averagely and this issue in developing country has very special importance. in African desert area about 70-80%, Asia 65%, in Latin America 45% and Caribbean and in Tunes 89% of workforces are women (Varzgar 2001:217) and in Iran more than 50% of agriculture workforce are women . Most rural women's service work, pertain to out of house. For example: rural women not only traditionally strive for environmental protection, they also take part in maintaining forest, plant cultivation and weeding in rural regions.
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Keywords: women, rural, credit, empowerment

Introduction

Women's agriculture activities in villages of Iran in three sections of recent history of rural improvement have been affected by developmental factors. Before land reforms (1962), according to conventional laws in Iran, women were kept apart from having farm lands. According to customs, if farmer was farming in farm system and also if he had large farms so he must used his family workforce (especially woman workforce), but if it was small, he used to work at other's fields for wage. In many cases, women had to work at other parts. Before land reforms and because of being traditional of instruments and production tools, using women's roles was often in conservation and harvesting. While cultivating, most of picking cotton, was done by women, exclusively. In same period (before 1962), women roles was remarkable in cultivating rice. While plowing and preparing fields, they took part in third time trowel, also they had significant role in preparing natural fertilizer (Changizi, 2003).

Preparing seed and preparing them for transferring to storage, were done by women. Transplanting (most important stage in cultivating rice) and weeding were done by them, completely. And finally we should remark, their roles in cultivating wheat, before land reforms. Land reform (1962) was a breaking factor for traditional capitalism relations, and it was facilitator way for renewing agriculture and making investment relations at agriculture section. Although no land was considered for women (indeed by this, major proportions of agriculture workforces was deprived from having production instruments that they work on) but, it has affected on women's roles in agriculture activity. (Banihashem, 1999)

By the way, lord-vassal relation was broken approximately, and peasant's production relation and capitalist exploitation systems were established. In peasant production, (at fertile lands) farmer's wife had to work on family land with other family members .at peasants lands; women were working out of their family farms. In capitalist exploitation systems, women workforce was considered as cheap workforce at farms. Generally, land reforms caused those women workforce is used as secondary (balali, 2005).

After Islamic revolution, although exploitation systems haven't changed lot, but developing agriculture processes on women's roles weren't affectless. in cultivating, time consuming productions (e.g. rice and tobacco) women's production roles, has remained significant and even at farms that has changed their usage to business purposes and products cash productions , women workforce is used as a cheap workforce source (as laborer). But in cultivating productions (e.g. wheat) because of using agriculture machinery in capitalist exploitation systems, we have faced with decreasing in using women workforce (same source).

Rural women's roles in economy of rural

Most women, especially in developing countries are working three shifts in a day indeed, but, instead for their exhausting activities, they receive: less health care, less literacy and fewer wages. Compensation for them is vast sex discrimination that exists all over the worlds in various forms. For example in India, Pakistan and Bangladesh, about 1million girls die, due to lack of proper health care.

World Health Organization estimated that women work 2times more than men averagely (Bahar, 2001). In United Nation researches, except Australia, Canada and US, women in all countries work more hours than men. But major problem here is that, work means everything that leading to financial income. So, in government statistics, women are considered as unemployed and few of female employees are counted as productive and employed forces.

In India, in one survey, and according to this perspective (Financial income) this result emerged that only 34% of women (compare to 63% of men) is counted as workforces of society. While if we also consider doing services and home productions and preparing family needs , as productive activities (without leading to Financial income) , we would find different results and value of this deprived group of society , will be clear to us. By considering work and home productions in India, these results emerged: 75% of women compared with 64% of men are working (compared to 34% versus 64% of pervious statistics). (Balali, 2005)

Also in another survey in Nepal villages and according to financial income criterion, just 20% of women are working, while by considering home production criterion, women's share of workforce, reached to 53% (Bahar, 2001). By the way researches show that women have basic role in economics of family.

About rural women in agriculture productions , some researches is done by some scholars such (Shauver , Saches , Adams and Alston) that all believe that women in activities such as cultivating (seeding) conservation (weeding, spading and sifting) and harvest (cut sugarcane branches) and they also participate in activities like doing pastoralist and caring animals , milking , nurturing poultry , gardening , fixing yard , snow removal , repairing building , handicrafts and etc (Navabakbar 1997).

So rural women, doing major part of affairs in services and doing services inside and outside the house, isn't with any risk for them. They aren't secure while cleaning stall, milking, nurturing livestock and other activities. And they are at risk of common diseases between human and livestock. In fact they haven't security against any risk of work conditions (Emadi, 2001).

 Summaries of woman service activities include housekeeping duties and also service activities out. So it's necessary to revise definition and classification service activities by women. Thus, according to rural women's basic role in productive activities and even rural developing, importance of rural women's role isn't considered properly. Maybe the reason of this inattention is that rural women's productions are used inside the family. This inattention caused that no changes happen for decreasing exhausting rural women's activities, in spite of development of technology and using various new tools that leads to remarkable decrease in using human resources. In so many developing countries yet, women use traditional cultivating tools that have little efficiency and demand more activities. Further, their agriculture activities accompanied by housekeeping duties that force them excessive efforts. One of the reasons is that rural women's role, remained unknown in economical productions. Because objective evidences at all over the world, especially in developing countries (particularly in our country) show that lost work or intangible activities is done by women that finally isn't considered as their efforts. Other reasons are: role of rural women and different productive activities remained unknown; and even lack of varying their position at different activities of village (Saadi, 2005).

Credits and its importance

One of important factor for production and occupation is capital. In developing societies that most of their exploiters are novice, lending and credit projects is suitable tool for accessing purposes such as increasing efficiency and obliterating deprivation from rural society. But at on side, we need credits to make technological changes in productive activities and at the other hand we need suitable technical technologies to use credits with optimum efficiency. (Fani, 1999)

So credits beside technology and skills of technical production, is complementary for each other. In order to invested credits being effective in productive activities and gain acceptable efficiency, suitable technology in that productions or activity should be provided accordant to economic and societal conditions of villagers. So from the development perspective, not only credits are used but they call it as credit program. credit program isn't just receiving and paying money but this program contains several stages in order that finally, exploiter and farmer stand in one inclusive program in this process, And educational needs , marketing services and production distribution, input and credit supply and loan be considered.

Among purposes of credit programs, it can mention to increasing efficiency in activity, job, stabilizing occupation which faced financial crisis, increasing level of income and exploiters life's level, empowering villagers and novice exploiters and also breaking deprivation cycle at society and rural families.(Rahmani 2001).

So if credits, is used as a coherent and inclusive program framework and is considered base on need ,

power and reinforcing its proficiency level, so we can access to aforementioned purposes and also we can prepare suitable technology of production and activity with demanded credit. Finally, production and service efficiency will place at acceptable level. This systematic approach can save exploiter from deprivation and poverty cycle. conducted researches at countries like Pakistan , India and Iran showed that invested credits for productive activities was suitable if it is used with suitable technology . So credits wouldn't be effective if it is provided for exploiter exclusively and without considering his/her skill needs (Amiri, 2000).

Its result is that, exploiter can't access to desirable condition of production efficiency at first. Secondly, he would incapable for loan repayment. Third, his activity doesn't contain consistency. Fourth, remarkable part of provided credits would exit from production cycle due to exploiter's incapability and lack of skill in exploiter. His technical and occupation skill would improve, if credit is being provided for exploiter as a credit program. and he knows and can applies loan properly and well timed for production and activity, so condition of production and level of income , level of life and … would improve (Rahmani, 2001).

Conclusion and discussion:
no inclusive studies conducted About Iranian rural women's role in production and about how they participate in production process and surveying real value of their workforce , but theoretical surveys has shown their part at agriculture about 40% that proportion of their activities partly depend on cultural , social , different kind of exploiting and even kind of production and activity (farming , gardening and ranching) , culture diversity and climate condition on different regions of Iran . Nature of these activities is base on gender and social work dividing. They have complementary roles at production system.

Women largely are active at micro exploiter units and they work at larger units as form of salaried employee or receive wage.

They have not desirable conventional condition about their accessing to productive factors and sources, because of some customs and common traditions and also common norms. their limitation to access to field, bank facilities, education services, education-applied science, mechanization, modern technology and formal associations has kept their direct and independent access to production services and decision to use production sources and factors at minimum level. Women's literate proportion is less than rural men and urban men so we can explore main reason at cultural beliefs, dominant social

conditions on rural society, low education scope for girls and women and lack of training importance for them (Fami, 2001).

Fortunately in two recent decades considerable efforts have been done to eradicate illiteracy that it was more remarkable about rural women so that percent of rural women literacy from 17.3% on 1355 increased to 62.4% on 1996. But 37.6% of rural women remained illiterate yet (Statistical center of Iran 2006).

Thus, what is concluded from this debate is that generally, women's economic, cultural and social conditions improved compare to past but hasn't take affective steps toward better improvement, properly. And now they aren't at proper place that they have right to be. rural women have responsibility of maternal , wife and home management in addition to associate in production and helping agriculture workforce so that they spend two third of their times to production , home management and organization , while this , reduced to one third about men (Varzgar, 2001) .

But consider that aforementioned subjects, based on researches that has conducted at north of Iran that in these regions women have more active contribution from social, economic and cultural perspective.
Point that true about most of villages of Iran is that more active women economic contribution that leads to more income for family, cause that women be at higher rank for family decision making (Same source, 1997)

In spite of that, by conducted researches , rural women's roles has been surveyed very low , but another study has shown that at villages of Iran , women, especially elder , has specific dignity and have important roles at decision making .
Women Corporation would increase in decision making. (Planning and research institute of agricultural economics 1997).

Woroniuk and Schalkwyk (1998) at their conducted research believe that now, micro credits, micro finance sources and small business units are most effective mechanism to decrease poverty.
Plitt and others, conducted research as they called it "do credits programs, can empower women "? Results showed that corporation at credits programs helps empowering women. Goetz Sengupta (2003), presented negative image of credits effects on empowering women. They concluded that most women have minimum control on their loans. And when repayment period is short, this shortage of control has devastating effects on women welfare. Hashemi and others (2004) found that joining to Gramin Bank, has meaningful positive effects on controlling women, and helps to family income.

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Shahnaj and chaudhury(2009) in research as "credits and its role on empowering women " concluded that there is meaningful relation between attending in credits programs and empowering women , at economical dimensions .Ruhal amin and others (2010) found that those who joined credit funds had more ability rather than those who didn't. Jameela (2010) presented that credit programs has shown lot of affects on empowering women so that has increased their social, politic and economic ability. Thus it is obvious that credits programs and its educational and empowering programs can be affective on social, humane and economic development or rural society, if it be associated with proper and gradual practices and base on reciprocal communications principles and apply opinion of local society. Maybe the main challenges that threaten credits associations , is lack of necessary emphasizes on social dimensions and on reinforcing their basics , that practically cause that this social foundations lose its efficiency soon and practically changed to unsuccessful institution .

Also following suggestions has been offered:
- providing extension educations for men in order to believe economic role of their women , and give them chance of corporation on all economic , credits fields
- Since that base of credit association, forms base on People Corporation, so it's good chance to use these communities to expand extension-education activities. so it is better to consider special programs on different extensional filed such as agriculture , ranching, family health, housekeeping economy and other fields accordance to condition of region and rural women's needs.

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Associative Effect of the Rhizobacteria *Streptomyces Chibaensis* and Commercial Biofertilizers on the Growth, Yield and Nutritional Value of *Vicia Faba*

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Abstract: A pot experiment was done to investigate the effect of the commercial biofertilizers Biogen (B) and Potassiomage (PG) as well as the rhizobacteria *Streptomyces chibaensis* on the growth of faba bean (*Vicia faba* CV Giza 843). The experiment was done through two successive growing seasons (2008-2009, 2009-2010). In the first season, three different doses of each inoculant were used to select the profitable dose while in the second growing season 2009-2010 the co-inoculation of the three profitable doses were used as inoculant for faba bean seeds. Data was illustrated as growth, yield parameters, seed content of minerals (N, P, K), protein, vitamins (ascorbic acid, riboflavin and thiamin) and carbohydrates were estimated by applying the co-inoculant of the three biofertilizers. The highest values of all these items were obtained from the application of the Biogen + *S. chibaensis* followed by Potassiomage+ *S. chibaensis*

Key words: biofertilizers, *Vicia faba*, PGPR.

1. Introduction:

Symbiotic nitrogen fixation is the result of a delicate balance between a higher plant and specific bacteria. Most of nitrogen–fixing prokaryotes are free–living microorganisms found in soil (Nosheen *et al.*, 2004). Use of soil microorganisms which can either fix atmospheric nitrogen, solubilize phosphate or stimulate plant growth through synthesis of growth promoting substances by deliver a number of benefits including plant nutrition (kaci *et.al.*, 2005).

Bio-fertilizers being essential components of organic farming play vital role in maintaining long term soil fertility and sustainability by fixing atmospheric dinitrogen (N=N), mobilizing fixed macro and micro nutrients or convert insoluble P in the soil into forms available to plants, there by increases their efficiency and availability (Mahdi *et.al.*, 2010).

Legume seeds are one of the most important sources of food in the world which have made a significant contribution to the diet since ancient times. They are known to be a good and inexpensive source of protein, and they are also rich in carbohydrates, some vitamins such as thiamin, riboflavin, niacin and certain minerals like phosphorus, potassium and sodium (Ejigui et.al., 2005).

Faba bean is a legume which is used as a green vegetable or dried, freshed or canned in the Middle East, Mediterranean region, China and Ethiopia. Also,it is considered as a cash crop in Egypt and Sudan (Nabil and Talaat, 2007).

Thus the objectives of this study were to investigate the effect of increasing concentrations of biofertilizer inoculation (Biogen and Potassiomage) either with plant growth promoting rhizobacteria (PGPR) *Streptomyces chibaensis* on growth and yield of faba bean ,nodulation parameters, acetylene reduction, NPK uptake, crude protein content in seeds, total carbohydrates and vitamins (ascorbic acid, riboflavin and thiamine).

2. Materials and Methods

Description site:

Two pot experiments were conducted in sandy soil at the experimental garden of the Botany department, Women's College, Ain Shams Univ., Heliopolis, Cairo, during the two growing seasons 2008/2009and 2009/2010. Soil characters are presented in Table (1).

Faba bean seeds:

Cultivar Giza 843 was obtained from Agriculture Research Center (ERC), Ministry of Agriculture, Giza. Egypt.

Biofertilizers:

Three types of biofertilizers were used: The commercial Biogen and Potassiomage obtained from Biofertilizers Unit, General Organization of Agriculture Equalization fund (G. O. A. E. F.), Agriculture Research Center (ARC), Ministry of Agriculture, Giza, Egypt and *S. chibaensis* which was isolated and characterized from Toushka's region,

Egyptian soil, by Hewedy (2003), It was maintained on starch- Nitrate agar medium.

Biofertilization treatments:

Faba bean seeds were sowed in pots of 35cm diameter and 40 cm depth contained 5kg of loamy – sand soil. 5 seeds / pot were used and 6 replicates for each treatment were tried.

First pots experiment: was done during winter season of 2008 -2009, consisted of four main groups:

- Uninoculated seeds(C).
- Seeds inoculated with Biogen (B) using each of three doses (B1 0.08g, B2 0.16g and B3 0.32g/pot).
- Inoculation with Potassiomage (PG) using each of three doses (PG1 0.04g, PG2 0.08g and PG3 0.16g/pot).
- Inoculation with the rhizobacteria *Streptomyces chibaensis* (S1 10^{-4}, S2 10^{-5} and S3 10^{-6} CFU/ml) (20ml/pot). Biofertilizers inoculation treatments were done after planting and plants were irrigated weekly using tap water to the field capacity, supporting dose was given after 2 weeks later for each pot.

Data recorded:-

At 60 days after sowing 3 plants were randomly uprooted from each pot to determine: shoot fresh weight (SFW), shoot dry weight (SDW), number of flowers (NF) and number of pods (NP)/plant.

At harvest (120 days after sowing), a random sample of 3 plants were taken from each treatment to determine: number of pods (NP), pods length (PL), fresh and dry weight of pods (FWP, DWP) and dry weight of seeds (DWS).

During the next growing season (2009-2010), the best doses of the previous treatment (B:0.32g, PG 0.16g.*)* were mixed and used as co-inoculant for bean seeds in addition to the best conc. 10^{-4} of rhizobacteria (*S. chibaensis*) to determine the following growth parameters after 50 days: shoot and root dry weight (SDW and RDW), number of nodules (nN), dry weight of nodules (DWN) and acetylene reduction (ARA) (Hardy *et al.*, 1973). At plant maturity (120 days) the following data were determined: number of pods (NP), dry weight of pods (DWP), dry weight of seeds (DWS), and number of seeds (NS) all by ten plants.

Chemical Analysis:

Seed content of N, P and K were determined according to A. O. A. C (1975). Crude protein % of seeds was obtained by multiplying N% x 6.25, extraction and determination of total carbohydrates

content was carried out using spectrophotometer according to Dubois *et al.*, (1956).

Quantification of vitamins:

The vitamins content was determined by using KNAUER Smartline HPLC system in Agricultural Research Center (ARC), Plant Pathology Institute, Center Laboratory of Biotechnology, Giza, Egypt. Three seed vitamins (riboflavin, thiamin and ascorbic acid) were determined by KNAUER Smartline HPLC system equipped with Autosampler 3900, Pump 1000 with 10 ml pump head, SmartMix static mixer, Manager 5000 with low pressure gradient and degasser modules, column Oven 4000 and UV Detector 2600 with analytical flow cell. Since each vitamin has a slightly different optimal absorption wavelength, a wavelength switching program was used to increase the sensitivity of quantification for each vitamin according to Newsletter for HPLC & more, 2007.

3. Results:

1) First pot experiment:-

As shown in table 2, the effect of individual treatment with different concentrations due to the discrepancy of biofertilizers Biogen (B) and Potassiomage (PG) also the PGPR *S. chibaensis* used with different concentrations, a positive significant effect was shown. Plants   treated with *S. chibaensis* generally gave best results; shoot fresh weight (SFW) number of flowers (NF) and number of pods (NP) at 60 days plant age compared with untreated plants (C) and the two other biofertilizers used (Table 2). At full maturity we observed that the application of *S. chibaensis* produce the highest yield expressed as: number of pods (NP), pod length (PL), fresh weight of pods (FWP), dry weight of pods (DWP) and dry weight of seeds (DWS), after 120 days (Table 3), generally the measured parameters at 60 and 120 days old were increased with increasing the doses of each inoculant. Nitrogen deficiency indicated by brown pigment of leaves was not observed at high concentration (0.33g of Biogen, 0.16g of Potassiomage and 10^{-4} CFU/ml of *S. chibaensis*) but was observed clearly at untreated plants and lightly at the other plants supplied with other concentrations of biofertilizers and *S. chibaensis*.

2) Second pot experiment:-

In season 2009-2010, growth of *Vicia faba* was studied during plant development by combining the best three best concentrations of Biogen (0.33g), Potassiomage (0.16g) and *S. chibaensis* (10^{-4}CFU/ml) individually which were profitable as growth parameters of faba bean plants and their cooperation when used as co-inoculant for the same plant.

Root nodulation and acetylene assay:-
Nodules were formed on all plants (either inoculated or not) which indicates the presence of the native rhizobia. Root nodulation was characteristically promoted in plants treated with B +*S. chibaensis* followed by plants treated with Biogen respectively (Fig 1a, b), these treatments also gave the highest results for shoot and root dry weight (Fig 2).
The nitrogen fixation levels were estimated by measuring Acetylene reduction to assay nitrogenase activity. At 50 days plant age, the nitrogenase activity of B+ *S. chibaensis* was the highest in all treatments (Fig 3).

Yield and its components:
The results presented in table (4) indicated that either single or mixed inoculants showed significant positive response on SDW, RDW, NP, DWP, NS and DWS. A non-significant increase between unique and dual treatments was shown in almost all treatments. Plants treated with B + *S.chiabensis* gave the best results.

NPK uptake:
Data presented in Fig (4a, b and c) illustrated that NPK uptake in seeds was significantly increased by the different treatments. The dual inoculations gave the greatest of N%, P% and K% values, plants treated with B + *S. chibaensis* gave the highest uptake of N&K followed by PG + *S. chibaensis* which gave the highest uptake of P.

Crude protein of bean seeds and total carbohydrates
Crude protein content and total carbohydrates were illustrated in Fig (5a and b). The combination of S. *chibaensis* with the biofertilizers used gave the highest protein and carbohydrates content: B + *S. chibaensis* > PG + *S. chibaensis* respectively.

Thiamin, riboflavin and ascorbic acid:
Generally, the most efficient treatments in the production of thiamin and riboflavin were the combined treatment of B + *S. chibaensis*, the corresponding observed values for thiamin was 63.869 mg/ml and 48.496mg/ml for riboflavin, while both vitamins were completely absent in case of *S.chibaensis* , while ascorbic acid in the individual inocula gave the highest amount: *S.chibaensis* (22.497 mg/ml) Biogen (15.640 mg/ml) > control (14.859 mg/ml) > Biogen +*S. chibaensis* (1.834 mg/ml)(fig 6).

Table 1: Chemical analysis of soil

pH	8.5	E.C. (m mos/cm)	0.56
CaCO$_3$ %	4.6		
Soluble Cations (meq./L)		Macronutrients (ppm)	
Ca	2	N	5
Mg	2	P	36
Na	1.73	K	264
K	0.25		
Soluble anions (meq./L)		Micronutrients (ppm)	
CO$_3^{--}$	0	Fe	8.62
HCO$_3^-$	0.8	Cu	1.4
Cl-	1	Zn	1.56
So$_4^{--}$	4.18	Mn	7.46

Table 2: Effect of individual inoculants of Biogen, Potassiomage and *Streptomyces chibaensis* **on certain growth parameters with different concentrations after 60 days**

Treatments	Shoot Fresh wt./3 plants (g)	Shoot dry wt./3plants (g)	No. of flowers/3 plants	No. of pods/3plants
C	112.8i	18.1f	27g	20e
B1	134.0h	20.1e	30fg	27de
B2	149.8gh	20.9ce	47e	33cd
B3	159.8fg	29.4a	70c	37bc
PG1	218.0c	21.4ce	37f	0
PG2	176.3ef	24.7b	57d	23e
PG3	202.2cd	26.2b	103a	40b
S1	256.4a	25.6b	103a	53a
S2	232.4b	22.0c	80b	30d
S3	188.5de	12.3g	50de	27de
LSD at 5%	**20.5**	**1.8**	**9.5**	**6.2**

Values in the same column with the same letter not significance difference at p<0.05%

Table 3: Effect of individual inoculants of Biogen, Potassiomage and *Streptomyces chibaensis* on the yield of *Vicia faba* plants

Treatments	No. of pods/3 plants	Pod length (cm)	Fresh wt. of pods/3plants	Dry wt. of pods/3plants	Dry wt. of seeds/3plants
C	23f	6.3c	16.8e	9.44e	7.05e
B1	30e	7.0bc	16.2e	15.18d	11.89c
B2	33de	7.2b	20.2d	15.75d	11.98c
B3	47c	7.3b	33.2b	20.43b	14.84b
PG1	30e	7.3b	11.2f	7.02f	4.27f
PG2	37d	8.2a	20.1d	14.96d	9.56d
PG3	53b	8.5a	27.2c	18.78c	14.42b
S1	77a	9.0a	37.5a	22.96a	15.71a
S2	53b	8.7a	30.5bc	21.28b	13.78bc
S3	47c	9.0a	20d	15.77d	10.45
LSD at 5%	**5.6**	**0.8**	**3.2**	**1.5**	**2.0**

Values in the same column with the same letter not significance difference at p<0.05%

Table 4: Effect of individual and dual inoculants of Biogen, Potassiomage and *Streptomyces chibaensis* on the yield of *Vicia faba* plants

Treatments	No. of pods /10	Dry wt. of pods (g/10plants)	No. of seeds/10plant	Dry wt. of seeds g/10plants)
C	70c	7.10c	100d	4.36c
B	80a	11.81a	190a	9.47a
PG	77a	7.01c	100d	5.72c
St.	73bc	10.14b	100d	7.83b
B+St.	80a	11.56a	153b	9.55a
PG+St	73bc	6.94c	135c	7.41b
LSD at 5%	**5.0**	**1.4**	**15.0**	**1.5**

Values in the same column with the same letter not significance difference at p<0.05%
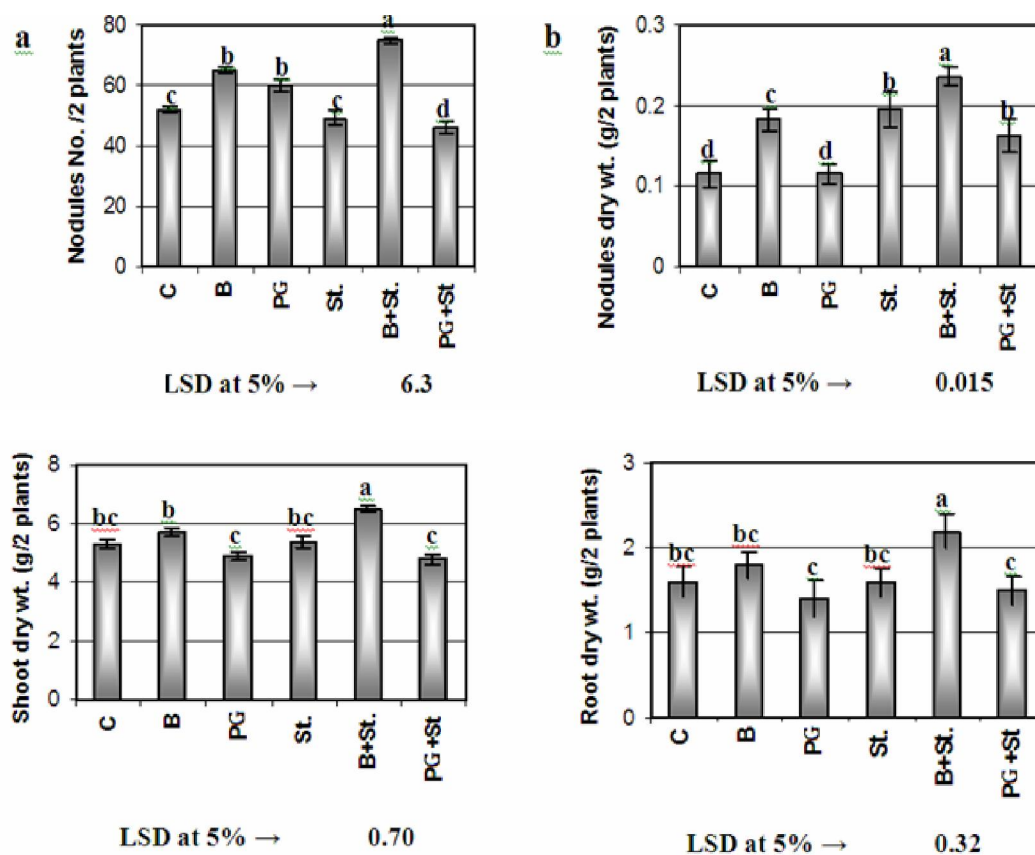
Fig. 2: Effect of individual and dual inoculants of Biogen, Potassiomage and *Streptomyces chibaensis* on shoot and root dry weight of *Vicia faba*.
Columns with the same letter not significance difference at p<0.05%
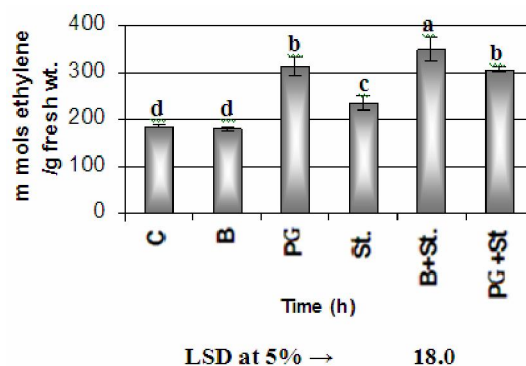
Fig. 3: Effect of individual and dual inoculants of Biogen, Potassiomage and *Streptomyces chibaensis* on acetylene reduction activity of *Vicia faba*.
Columns with the same letter not significance difference at p<0.05%
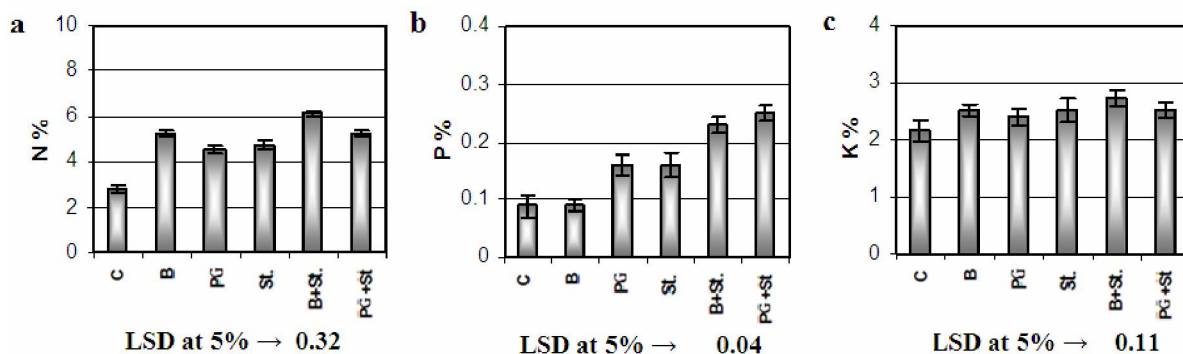
Fig. 4: Effect of individual and dual inoculants of Biogen, Potassiomage and *Streptomyces chibaensis* on the NPK and crude protein content *Vicia faba* seeds.
Columns with the same letter not significance difference at p<0.05%
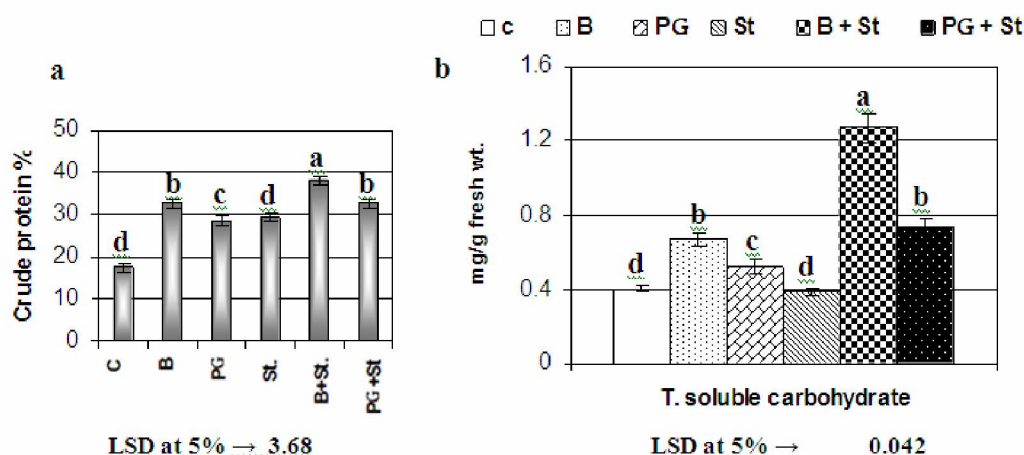
Fig 5: Effect of individual and dual inoculants of Biogen, Potassiomage and *Streptomyces chibaensis* on total soluble carbohydrate of *Vicia faba* plants
Columns with the same letter not significance difference at p<0.05%
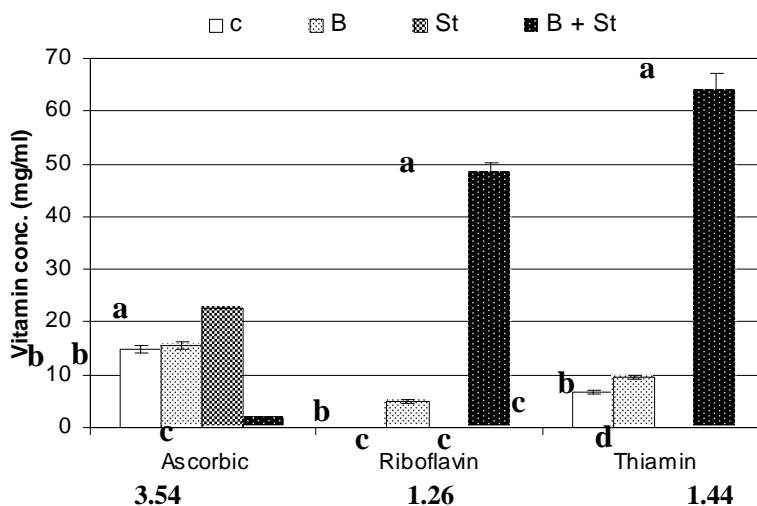
Fig 6: Effect of single and dual inoculants of Biogen and *Streptomyces chibaensis* on vitamin concentration of *Vicia faba* seeds
Columns with the same letter not significance difference at p<0.05%

4. Discussion:

Biological nitrogen fixation is the key to sustain agricultural productivity through the application of biofertilizers in the field. Application of biofertilizers is an acceptable approach for higher crops with good quality and safe to human health. This work showed that either single or mixed inocula gave positive response to the studied plant parameters. The highest concentration of each treatment gave the best results: SFW, SDW, NF and NP at 50 days and NP, PL, FWP, DWP and DWS after 120 days, plants treated with different concentrations of *S. chibaensis* was surpassed Biogen and Potassiomage and gave significant high results in the majority of parameters. Growth parameters of *Vicia faba* treated with best concentration of each treatment individually or combination gave promotive effect compared to control within two seasons, these results were on line with Gomaa et al., 2002 and Hewedy et al., 2006 who cleared that the biofertilizers were used to stimulate plant growth by producing plant growth regulators.

The competitiveness between *S. chibaensis,* Biogen and Potassiomage gave results in which B+ *S. chibaensis* was the winner followed by Biogen, this result improved the ability of *S. chibaensis* to compete for *Vicia faba* nodulation and exhibition for acetylene reduction than that of other treated, which means that *S. chibaensis* had an indication to promote N_2 fixation, Hewedy (2003) indicated that a neutralism relationship between *S. chibaensis* and N_2 fixing bacteria which are widely distributed in Egyptian soil, that is why might be the results of dual treatments were positive.

Maximum values of NPK and crude protein content in seeds were found in presence of *S. chibaensis,* this could be explained as both biofertilizers and PGPR filamentous bacteria might improved the rhizosphere conditions which is mainly due to the bacterial production of N,P and indole 3–acetic acid (Wu S. C. et al., 2005, Rothballer, et al., 2006) also it might be due to the capability of *S. chibaensis* to dissolve P and its affectivity to fix N_2 (Hewedy, 2003 and Hewedy et al., 2006).

With regard to yield parameters in the present study the used biofertilizers could improve the growth of the economic crop faba bean, but in presence of *S. chibaensis* these biofertilizers gave the best results. This improvement might be due to the inoculants filament bacteria which degraded organic matter and supplied to plants also converted atmospheric nitrogen into available form, and stimulated plant growth directly thought the production of phytostimulating compounds (Nafie, 2003, Hewedy, 2006 and Elkholy et al., 2010), also because of their ability to produce antibacterial and antifungal compounds (Hewedy, 2003and Hosseny & Ahmed 2009).

It is obvious from the data recorded that the seeds produced from the plants treated with PGPR *S. chibaensis* individually or combined with Biogen and Potassiomage had significant increase in seeds protein and total carbohydrates content .Biogen + *S. chibaensis* gave the highest protein content followed by Potassiomage+ *S. chibaensis*, this result was in agreement with Abu-Zekry (2000) and Hewedy *et al.*, (2006) who recorded that soybean treated with biofertilizer gave the highest yield and seed protein and carbohydrates.

Because of its promising results with *S. chibaensis*, Biogen was chosen for studying its effect on the content of vitamin in seeds. It is clear that this combination increases the production of both thiamine and riboflavin than control, on the contrary ascorbic acid production increased in presence of *S. chibaensis* individually followed by Biogen>control>Biogen + *S. chibaensis*. Ata et al, (2008) reported that the spectroscopic analysis (UV, IR and HPLC spectrum) were used to perform comparative studies between vitamin B12 and two mixed cultures *S. halstedii* AZ-8A and *Bacillus firmus* AZ-78B which showed an increase in the mixed culture (peak was at 2.503) than the standard (peak was at 2.496). Sierra *et al.*, (1988) found that thiamin and riboflavin were found in high abundance early in the development of lupins and peas, but their content decrease during maturation, the thiamin content of faba bean seeds increased from 33 to 47 days after flowering (DAF) then a decrease was observed until 61 DAF, the riboflavin increased after 54 DAF .

Further investigation for screening of this work will prompt further screening of actinomycetes, especially streptomycetes as potential plant growth promoters for use in nutrient impoverished soils. The isolate of *S. chibaensis* examined in this study, in addition to being a native of Egypt soils is most suited for seed inoculation because of its high levels of rhizosphere competency.

Therefore, this work recommends the utilization of the commercial inoculants in combination with *S. chibaensis* which gives a good response as a PGPR commercially for improving production of faba bean with its competitive ability to survive and affect growth of inoculated plants at the presence of indigenous microflora to protect the environment from chemical pollution and its harmful effect on nature. This helps in modern agriculture through the increased use of microorganisms, which is now seen as an advantageous alternative to chemical treatments and will contributes

substantially to the goal of environmental friendly agriculture.

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Average stem biomass of SANGUISORBA MINOR in Shanjan Rangelands, East Azerbaijan, Iran

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Abstract: Plants can be used for animal grazing, in wind erosion control, to reduce water flow rates, and to increase evaporation and transpiration. In the NW of Iran (East Azerbaijan Province), rangelands previously used to animal grazing were changed to agricultural land use; this vegetation is unsuitable vegetation coverage. We studied SANGUISORBA MINOR to determine its stem biomass characteristics. Data were collected using an accidental sampling methodology (1*1 m). In total, 8 plots were identify and 40 samples were collected for this research. In the minimum, maximum and mean stem biomass for this plant were found to me 4.5, 16.5 and 8.5 g, respectively.
[Ghassem HABIBI BIBALANI. **Average stem biomass of SANGUISORBA MINOR in Shanjan Rangelands, East Azerbaijan, Iran.** Journal of American Science 2011;7(5):560-563]. (ISSN: 1545-1003). http://www.americanscience.org.

Keyword: SANGUISORBA MINOR , Iran, Rangeland, stem Biomass.

1. Introduction

Rangeland ecosystem stabilizing, optimum and continual utilization of range without studding and knowing the influencing factors on its segments and animal pasturage are of special importance (Bibalani et al., 2011a; Bibalani et al., 2011b; Mozaffarian, 2007; Shadkami-Til and Bibalani, 2010; Shadkami-Til and Bibalani, 2011). There are different methods of evaluating rangelands and all of them have advantages and disadvantages. Factors such as vegetation species composition, annual production, area coverage, plant density, soil surface coverage, constitution, and presence of succulence plants were used (Bidlock et al., 1999; Mogaaddam, 2001) but estimation of these parameters are time consuming and expensive.

Fresquez (Fresquez et al., 1990) reported an increase in vegetative production and forage quality of Blue Grama (Mata-Gonza´lez et al., 2002). Benton & Wester (Benton and Wester, 1998) reported an increase in Tobosagrass (Hilaria mutica) yield following applications of biosolids at levels of 7, 18, and 34 dry Mg ha-1 in the Chihuahuan Desert. Although dormant season applications of biosolids seem to be more beneficial for plant growth than growing season applications during the year of biosolids application (Benton and Wester, 1998), explanations for this phenomenon have not been documented (Mata-Gonza´lez et al., 2002).

Most evidence is related to its negative effect on aboveground vegetative and reproductive plant biomass (Hutchings and John, 2003;Milchunas and Lauenroth, 1993), changes in the spatial patterning of plant canopies and soil resources (Adler et al., 2001; Bertiller and Coronato, 1994; Callaway, 1995; Schlesinger et al., 1990), the reduction of soil seed banks (Bertiller, 1996;Bertiller, 1998), the decrease in

the availability of safe micro sites for plant reestablishment (Bisigato, 2000;Oesterheld and Sala, 1990), and the invasion of woody plants (Milchunas and Lauenroth, 1993;Rodriguez et al., 2007;Schlesinger et al., 1990).

Aboveground defoliation can modify the partitioning of assimilates between belowground and aboveground organs and consequently the root growth of defoliated plants (Belsky, 1986; Richards and Caldwell, 1985; Rodriguez et al., 2007; Snyder and Williams, 203).

In this research we have studied the amount of above ground biomass and occurrence of SANGUISORBA MINOR (Gharaman, 2003) (Figure 1) at the rangeland area of Shanjan village, Shabestar district, NW Iran. This parameter needs more attention, but it is one of the determining Factors of rangeland ecosystem.

2. MATERIALS AND METHODS:

The research area is part of Shanjan rangeland in Shabestar district with distance about 5 Kilometers from Shabestar city. The terrain in this area is hilly and we carried out the study on a site with a northerly aspect (Bibalani et al., 2011a; Bibalani et al., 2011b) (Figure 1). This region is component of Iran-Turan Flora with elevation between 1700-1850 m (Bibalani et al., 2011b).

Sanguisorba minor (Salad burnet, Garden burnet, Small burnet, burnet) is a plant in the family Rosaceae (Table 1, figure 2). It is a perennial herbaceous plant growing to 40-90 cm tall, typically found in dry grassy meadows, often on limestone soils. It is drought-tolerant, and grows all year around. (Wikipedia, 2011). SANGUISORBA MINOR is a perennial plant of this genus.

Figure 1: Part of Shanjan rangeland in Shabestar district, East Azerbaijan province, Iran.

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Table 1: Scientific name for SANGUISORBA MINOR Classification Report (USDA, 2011).

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Magnoliopsida* – Dicotyledons
Subclass	*Rosidae*
Order	*Rosales*
Family	*Rosaceae* – Rose family
Genus	*Sanguisorba* L. – burnet
Species	*Sanguisorba minor* Scop. – small burnet

Figure 2. SANGUISORBA MINOR species

In this research, Stem biomass has been sampled in May and June, 2010. For sampling, we used an accidental sampling methodology (1*1 m plot) in this research and selected 40 (8 plots with 5 sub sample for each of them) samples in total (Xiaoyan et al., 2001) (Figure 3).
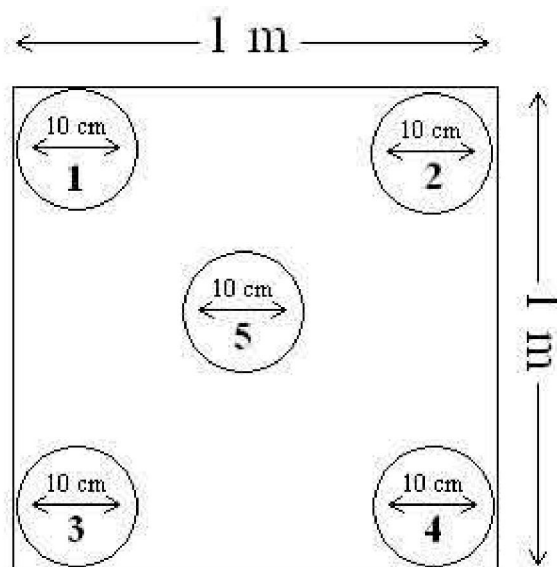
Figure 3. Sampling design in 1*1 m plot (Xiaoyan et al., 2001). 1, 2, 3, 4 and 5 is sub sample in each main sample.

After sapling from studding area, they have been scaled fresh weight of above ground part of plant with sensitive scale then dried by Avon set in 80° c during 24 hours (Xiaoyan et al., 2001) and scaled dried weight separately. This study have been work in Shanjan rangeland at Shabestar district in East Azerbaijan, Iran in summer 2010.

3. RESULTS

Results from this study showed that the maximum, minimum and medium stem biomass of SANGUISORBA MINOR in the study area were 4.5, 16.5 and 8.5 g, respectively (Figure 4).
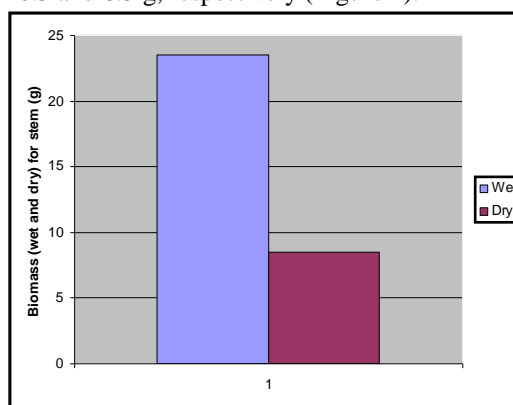
Figure 4. SANGUISORBA MINOR stem weight (fresh and dried weight).

Stem height SANGUISORBA MINOR was unsteady from 300 to 1000 mm, that average of it is about 600 mm.

4. Conclusion

In total of 8 plots were identified and 40 amples were studied in this research work. From 40 samples about 66.82% of stem weight was lost when samples were dried.

Vegetation species can have an effect on soil chemical and physical properties (Ardekani, 2003). Increasing SANGUISORBA MINOR species in the study area could cause specific biological qualification, and as this species increasing density of above ground Biomass will increase, and also the amount of Soil protection and stabling will increase specially protection with wind erosion and soil lost with runoff (Bibalani et al., 2011a;Bibalani et al., 2011b;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011). Study on this plant over ground biomass is so much important information especially for medicinal plant. Joudi and Bibalani (Bibalani et al., 2010) have been studied and recognized some medicinal plant of Ilkhji region, Eastern Azerbaijan Province (Northwestern Iran).

In this study we examined the biomass of this plant and results suggest that changes in the above ground cover of this plant affect by grazing or soil compaction with animal at this area as found in other studies (Bibalani, 2011a;Bibalani, 2011b;Bibalani, 2011c;Bibalani et al., 2010;Bibalani et al., 2011a;Bibalani et al., 2011b;Rodriguez et al., 2007;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011) and The difference of wet weight and biomass of this plant would be expected in this area (Bibalani, 2011a;Bibalani, 2011b;Bibalani, 2011c;Bibalani et al., 2010;Bibalani et al., 2011a;Bibalani et al., 2011b;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011).

This study has revealed and quantified the stem biomass of the SANGUISORBA MINOR in the Shanjan rangelands, the plant has good biomass in this research area and probably also in other areas where the SANGUISORBA MINOR is growing that need studding separately in another areas. It is a pioneer study, and the results have given estimations of the stem biomass of the SANGUISORBA MINOR for the first time in Shanjan rangeland. It is needed for studying this and other shrub species in the area and could be used in identifying plants best suited for rangeland ecosystem stability and specifically for stabilizing surface soil layers especially from water and wind erosion.

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Applications of the Policy Analysis Matrix in Iranian Bottled Drinking Water Factory: The Case study, Sistan & Baluchestan Region, Iran

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Abstract: In this study the comparative advantage of bottled drinking water production in Sistan and Baluchestan province was investigated using DRC index and policy analysis matrix (PAM) in 2009. Data was collected from the site of External Trade Statistics Yearbook, FAO and annual foreign trade database. The Nominal protection coefficient showed that there was an indirect tax on producers in all sectors. The NSP index was positive in all regions. Result supports this idea that Sistan and Baluchestan has comparative advantage in bottled drinking water production. When yield increase and production cost decrease, bottled drinking water production is usefulness in Sistan and Baluchestan province.
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Keywords: Comparative advantage, policy analysis matrix, drinking water, Sistan and Baluchestan

1. Introduction

Sistan & Balouchestan province lies on the south-east of the country and is one of the largest provinces of Iran. The mythical land of Sistan & Balouchestan consists of two regions: north & south. There are 10 cities in the province; Zahedan is the centre of province. The province lies on the south-east of Iran with two different structures. In the north Dasht- e- Sistan formed by Hirmand alluvium holds the largest fresh water lake of the world as well as Khaje Mountain. The 120-day winds are a distinguishing feature of this region. The southern part is mostly mountainous with a variety of climates due to the vicinity with Taftan Volcano & Oman Sea. Among the rivers Hirmand, Bampoor, Kajo, Sarbaz, and Kahir can be named as the most important. Industry is new to the province. Total cultivable lands in famine status are about 400000 Hectares equals 2% of province area. Due to famine, this amount reduces to 65% and totally includes 190000 Hectares. There land area of industrial towns here is more than 3920 hectares. Comparing with total country, 7% of lands and 11% of registered documents of industrial towns belong to this province. Some of the important factory under execution now is car parts, boats, ship scrape, water pipes, cement factories, Granite stone production and mineral water factory. The province extends from the lake Hamun in the north to the indigo plain of the Oman Sea in the south. Water for drinking, agriculture, and industry is supplied through two ways in the province: surface and subterranean. Surface sources are the 6 permanent rivers Sistan, Shirdel, Golmir in Sistan and Ladiz, Bampour,Sarbaz in Balouchestn. Water for agriculture in Sistan is supplied through river Hirmand and un the time of water shortage through half well reservoirs having capacity of about 660 million cubic m. but There are drought and water shortage in this province. Water shortage in arid and semiarid regions of the world has motivated the development of the innovative management measures. Therefore water management is necessary to solve this problem. Without improvement in water management, urban water demand will continue to increase, water supplies will diminish and the population pressure will decay infrastructures (Iran Statistic Center, 2010). Water in some region of sistan and Balouchestn province is not suitable for drinking; therefore establish bottled drinking water factory is necessary and important in this region.

Several methods have been developed to measuring comparative advantage of bottled drinking water factory. The Ricardian model of trade, which incorporates differences in technologies between countries, concludes that everyone benefits from trade, whereas the Heckscher-Ohlin model, which incorporates endowment differences, concludes that there will be winners and losers from trade. Change the basis for trade and you may change the outcomes from trade. In the real world, trade takes place because of a combination of all these different reasons. Each single model provides only a glimpse of some of the effects that might arise. Consequently, we should expect that a combination of the different

outcomes that are presented in different models is the true characterization of the real world. Unfortunately, because of this, understanding the complexities of the real world is still more of an art than a science. In economics, the law of comparative advantage refers to the ability of a party (an individual, a firm, or a country) to produce a particular good or service at a lower opportunity cost than another party. It is the ability to produce a product with the highest relative efficiency given all the other products that could be produced. It can be contrasted with absolute advantage which refers to the ability of a party to produce a particular good at a lower absolute cost than another. Comparative advantage explains how trade can create value for both parties even when one can produce all goods with fewer resources than the other. The net benefits of such an outcome are called gains from trade. It is the main concept of the pure theory of international trade (Pearson et al, 2003).

In this section After Bruno(1963), Gonzales and colleagues (1993), Master and Nelson (1995), shujie Yao (1997), Zhong and colleagues (2001), Shahabuddin and Dorosh (2002), Warr (2002), page (2002), Lagos and Mardones (2003), Huang et al (2003) and

fung(2004) investigated comparative advantage of agricultural and industrial products in different countries. In internal studies , Haji Rahimi (1999), Hadrbady(2001), Dehghani(2003), Mohammadi(2004), Karbassi et al (2005), Azizi and Yazdani, (2006), Mehdipour and Kazem Nejad(2006), Mehrabi Abadi(2007), Shahnvshy et al(2007), Kakhky Daneshvar et al (2007) and Zare(2008) to review policy and comparative advantage of crops in the Province.

In this study the ability of Sistan and Baluchestan in the production of bottle drinking water factory in 2009 years was investigated by using DRC index and policy analysis matrix (PAM) during 2009 year. This study assessed the overall goals and determines comparative advantage in producing drinking water and exchange rate sensitivity analysis and product price indices of comparative advantage.

2. Material and Methods

The policy analysis matrix is a product of two accounting identities, one defining for profitability as the difference between revenues and costs and the other measuring the effects of divergences (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergences were removed. By filling in the elements of the PAM for a management system, an analyst can measure both the extent of transfers occasioned by the set of policies acting on the system and the inherent economic efficiency of the system. Profits are defined as the difference between total (or per unit) sales revenues and costs of production (Monke and Pearson, 1989).

This definition generates the first identity of the accounting matrix. In the PAM, profitability is measured horizontally, across the columns of the matrix, as demonstrated in Table 2 Profits, shown in the right-hand column, are found by the subtraction of costs, given in the two middle columns, from revenues, indicated in the left-hand column. Each of the column entries is thus a component of the profits identity-revenues less costs equal profits. Each PAM contains two cost columns, one for tradable inputs and the other for domestic factors. This process of disaggregation of intermediate goods or services separates intermediate costs into four categories-tradable inputs, domestic factors, transfers and no tradable inputs (which themselves have to be further disaggregated so that ultimately all component costs are classified as tradable inputs, domestic factors, or transfers). Policy analysis matrix (PAM) represent in table 1. Private profits, D, equal A minus B minus C. Social profits, H, equal E minus F minus G. 'Output transfers, 1, equal A minus E. 1nput transfers, J, equal B minus F. Factor transfers, K, equal C minus G. Net transfers, equal D minus H; they also equal I minus J minus K. Domestic resource cost ratio (DRC): G/(E - F) Nominal protection coefficient(NPC) on tradable outputs (NPCO): A/E on tradable inputs (NPCI): B/F Effective protection coefficient(EPC): (A - B)/(E - F) Profitability coefficient (PC): (A - B - C)/(E - F - G) or D/H Subsidy ratio to producers (SRP): L/E or (D - H)/E. The data entered in the first row of Table 1 provide a measure of private profitability. The term private refers to observed revenues and costs reflecting actual market prices received or paid by manager in system. The private, or actual, market prices thus incorporate the underlying economic costs and valuations plus the effects of all policies and market failures. In Table 1, private profits, D, are the difference between revenues (A) and costs (B + C); and all four entries in the top row are measured in observed prices. The calculation begins with the construction of separate budgets for farming, marketing, and processing. The components of these budgets are usually entered in PAM as local currency per physical unit, although the analysis can also be carried out using a foreign currency per unit. The private profitability calculations show the competitiveness of the system, given current technologies, output values, input costs, and policy transfers. The cost of capital, defined as the pretax return that owners of capital require to maintain their investment in the system, is included in domestic costs (C); hence, profits (D) are excess profits-above-

normal returns to operators of the activity. The second row of the accounting matrix utilizes social prices, as indicated in Table 2. These valuations measure comparative advantage or efficiency in the system. Efficient outcomes are achieved when an economy's resources are used in activities that create the highest levels of output and income. Social profits H, are an efficiency measure because outputs, E, and inputs, F + G, are valued in prices that reflect scarcity values or social opportunity costs. Social profits, like the private analogue, are the difference between revenues and costs, all measured in social prices-H = (E - F - G). For outputs (E) and inputs (F) that are traded internationally, the appropriate social valuations are given by world prices-cif import prices for goods or services that are imported or fob export prices for exportable. World prices represent the government's choice to permit consumers and producers to import, export, or produce goods or services domestically; the social value of additional domestic output is thus the foreign exchange saved by reducing imports or earned by expanding exports (for each unit of production, the cif import or fob export price). Because of global output fluctuations or distorting policies abroad, the appropriate world prices might not be those that prevail during the base year chosen for the study. Instead, expected long-run values serve as social valuations for tradable outputs and inputs. The services provided by domestic factors of production-labor, capital, and land-do not have world prices because the markets for these services are considered to be domestic. The social valuation of each factor service is found by estimation of the net income forgone because the factor is not employed in its best alternative use. This approach requires the commodity systems under analysis to be excluded from social factor price determination. The practice of social valuation of domestic factors begins with a distinction between mobile and fixed factors of production. Mobile factors, usually capital and labor, are factors that can move from this section to other sectors of the economy, such as agricultural, services, and energy. For mobile factors, prices are determined by aggregate supply and demand forces. Because alternative uses for these factors are available throughout the economy, the social values of capital and labor are determined at a national level, not solely within the industry sector. Actual wage rates for labor and rates of return to capital investment are therefore affected by a host of policies, some of which may distort factor prices directly. The social opportunity cost of the land is not accurately approximated by the net profitability of a single best alternative industry; instead, it is measured by some weighted average of the social profits accruing from the set of industries. Because the correct weights and

social profits associated with each crop in the set are generally not known, it is convenient in assessing industry activities to reinterpret crop profits as rents to land and other fixed factors (for example, management and the ability to bear risk) per hectare of land used. This reinterpretation includes private (and social) returns to land as parts of D (and H). Profitability per hectare is then interpreted as the ability of a industry activity to cover its long-run variable costs, in either private or social prices or as a return to fixed factors such as land, management skill, and water resources (Monke and Pearson, 1989, Pearson et al, 2003).

In this study the theory of equality of purchasing power (PPP) was used to calculate the relative and absolute shadow exchange rate. Using this method, shadow exchange rate is calculated by this formula (Central Bank of Iran, 2010).

$$PER = Er \times (WPI / CPI) \quad (1)$$

ER is the free exchange rate, WPI is the wholesale price index outside the country and CPI is the domestic consumer price index (Base year is 2004). Market exchange rate of the central Bank of Iran was obtained. Also, Using this method, shadow exchange rate is calculated by this formula (Central Bank of Iran, 2010).

$$E = P_{ig} \div P_{dg} \quad (2)$$

P_{ig} and P_{dg} which is respectively market price of a domestic (per Rials) and the global market (per dollar).

Transfers are shown in the third row of the PAM. If market failures are unimportant, these transfers measure mainly the effects of distorting policy. Efficient systems earn excess profits without any help from the government, and subsidizing policy (L > 0) increases the final level of private profits. Because subsidizing policy permits inefficient systems to survive, the consequent waste of resources needs to be justified in terms of no efficiency objectives. Comparisons of the extent of policy transfers between two or more systems with different outputs also require the formation of ratios (for reasons analogous to those offered in the discussions of private and social profits). The nominal protection coefficient (NPC) is a ratio that contrasts the observed (private) commodity price with a comparable world (social) price. This ratio indicates the impact of policy (and of any market failures not corrected by efficient policy) that causes a divergence between the two prices. The NPC on tradable outputs (NPCO), defined as A/E, indicates the degree of output transfer. Similarly, the NPC on tradable inputs (NPCI), defined as B/F, shows the degree of tradable input transfer. The effective protection coefficient (EPC), another indicator of

incentives, is the ratio of value added in private prices (A - B) to value added in world prices (E - F), or EPC = (A - B)/(E - F). This coefficient measures the degree of policy transfer from product market-output and tradable-input-policies. But, like the NPC, the EPC ignores the transfer effects of factor market policies. Hence, it is not a complete indicator of incentives. An extension of the EPC to include factor transfers is the profitability coefficient (PC), the ratio of private and social profits or PC = (A - B - C)/(E - F - G), or D/H. The PC measures the incentive effects of all policies and thus serves as a proxy for the net policy transfer, since L = (D - H). Its usefulness is restricted when private or social profits are negative, since the signs of both entries must be known to allow clear interpretation. A final incentive indicator is the subsidy ratio to producers (SRP), the net policy transfer as a proportion of total social revenues or SRP = L/E = (D - H)/E. The SRP shows the proportion of revenues in world prices that would be required if a single subsidy or tax were substituted for the entire set of commodity and macroeconomic policies. The SRP permits comparisons of the extent to which all policy subsidizes agricultural systems. The SRP measure can also be disaggregated into component transfers to show separately the effects of output, input, and factor policies. This formula is presented in Table 2.

3. Results

In this study, financial processes, including costs and revenues is reviewed from water factory project in the province of Sistan & Baluchistan. Costs are including land, equipment, machinery, office equipment and other. Project income is including income from product sales a year. More clear after the shadow price of production and raw materials, possible indicators of comparative advantage comes from providing drinking water production. Table 3 and 4 showed the results of policy analysis matrix based on absolute and relative PPP mode shows. The results are in Table 5. According to the results of Table I <0, which means the market price is less than the shadow price of the product. An implicit tax on domestic producers has been imposed. J matrix in the two cases is less than zero, the domestic producers of inputs imported from the higher world prices to buy it. K matrix that represents the difference between the costs of domestic inputs required producing a single product to market and shadow price is greater than zero. L is income difference matrix calculated based

on market and shadow prices shows the effect of government intervention in the profits of production is considered here in a state of relative ppp .L <0 obtained in this case, profit shadow gained market and profit producer with acts of government policy intervention can be affected.

DRC in table 5 is less than one. This means that there is comparative advantage in bottled drinking water production. The nominal protection coefficient (NPC) is a ratio that contrasts the observed (private) commodity price with a comparable world (social) price. This ratio indicates the impact of policy (and of any market failures not corrected by efficient policy) that causes a divergence between the two prices. The NPC on tradable outputs (NPCO), defined as A/E, indicates the degree of output transfer; Nominal protection coefficient of gain (NPC) in the form of PAM in both cases is less than unit, in other hand the market price is less than product shadow prices . An NPC on inputs of 0.27 shows that policies are reducing input costs; the average market prices for these inputs are only 27 percent of world prices.

Nominal protection coefficient of input (NIPC), indicating that how the support of external inputs (interchangeable) is using the appropriate relationship in the context of PAM in the two cases is less than one and this means that the cost of inputs can be traded at market prices less than its shadow price cost. The effective protection coefficient (EPC), another indicator of incentives, is the ratio of value added in private prices (A - B) to value added in world prices (E - F), or EPC = (A - B)/(E - F). This coefficient measures the degree of policy transfer from product market-output and tradable-input-policies. EPC is less than one in this project. Finally, net social profitability (NSP), which profits from production with the application of shadow prices and product production and internal and external inputs are calculated according to formulas that value in the PAM framework in both cases is positive. The results are in Table 6 having been changed.

NIPC index value based on PPP is reduced relative to the improved exchange rate means increasing the shadow price of inputs increased, while its shadow price is stable. As well as increased exchange rate index is less than NPC. Because it increases exchange rate and imports more expensive while the price of imported products are expensive product prices in the domestic market remains constant.

Table 1 - policy analysis matrix (PAM)

	Revenues	Costs		Profit
		Tradable Inputs	Domestic Factors	
Private Prices	A	B	C	D
Social Prices	E	F	G	H
Divergences	I	J	K	L

Source: Pearson et al: 2003

Table 2 - Introduction and comparative advantage index

index	Defined	Description
DRC	$DRC = \dfrac{G}{E-F}$	DRC<1: Production has a comparative advantage DRC>1: :Production has not a comparative advantage DRC=1: Head to head point
NPC	$NPC = \dfrac{A}{E}$	NPC<1: Indirect subsidies to producers will receive NPC>1 : Indirect taxes are imposed on producers NPC=1: the product does not support
NIPC	$NIPC = \dfrac{B}{F}$	NIPC<1: indirect subsidies for inputs to be paid trade NIPC>1: Manufacturers in the use of these inputs indirect tax paid to NIPC=1: Support any policy in this case does not apply inputs
EPC	$EPC = \dfrac{A-B}{E-F}$	EPC<1: Government intervention in production loss is EPC>1: government policy supports the production process EPC=1: Public policy the government does not apply to product
NSP	$NSP = (E-F-G)$	NSP>0: Comparative advantage in production is NSP<0: Comparative advantage in production is not NSP=0: Head to head point

Source: Pearson et al: 2003

Table 3 - policy analysis matrix (PAM) based on relative PPP

	Revenues	Costs	Profit	Revenues
		Tradable Inputs	Domestic Factors	
Private Prices	150000	8859	115721	25418
Social Prices	546063	9149	114234	422679
Divergences	-396063	-289	1486	-397260

Source: Computing Research

Table 4 - policy analysis matrix (PAM) based on absolute PPP

	Revenues	Costs	Profit	Revenues
		Tradable Inputs	Domestic Factors	
Private Prices	150000	8859	115721	25418
Social Prices	566357	9315	114433	442608
Divergences	-416357	-455	1287	-417189

Source: Computing Research

Table 5- Comparative advantage in two cases Relative and Absolute ppp

index	Relative ppp	Absolute ppp
I	-396063	-416357
J	-289	-455
K	1486	1287
L	-397260	-417189
D	25418	25418
H	422679	442608
DRC	0.21	0.20
NPC	0.27	0.26
NIPC	0.96	0.95
EPC	0.26	0.25
NSP	422679	442608
SRP	-0.72	-0.73

Source: Computing Research

Table 6- Effect of exchange rate changes on the comparative advantage indicators of drinking water

index	700	800	900	1000	1100	1200
DRC	0.31	0.27	0.24	0.21	0.19	0.18
NSP	0.39	0.34	0.30	0.27	0.25	0.23
NIPC	1.03	1.01	0.99	0.97	0.95	0.93
EPC	0.38	0.33	0.29	0.26	0.24	0.22
NSP	260196	314720	369245	423770	478294	532819

Source: Computing Research

4. Discussion

The interpretation of PAM results generally follows a set pattern. The analyst first explains private profitability (moving across the top row of the PAM) and then discusses social profitability (moving across the second row of the PAM). S/he next turns to the causes of the difference between private and social profits. This task requires the identification of divergences (moving separately down each revenue and cost column of the PAM). The logic is straightforward. Private valuations (of outputs and inputs) differ from social valuations because something gets in the way to make the observed market valuation (the private price) diverge from the efficient valuation or social opportunity cost (the social price). What might go wrong? The government might have decided to raise or lower the market price by introducing tax or subsidy policies, trade restrictions, or other policy interventions – collectively called distorting policies. Or the markets might be imperfect and fail to provide efficient valuations because of market failures (monopolies, externalities, or underdeveloped factor markets). Hence, if the observed market price differs from the desired efficient level, the divergence must be caused either by a distorting policy or by a market failure.

Calculated based on a policy analysis matrix, results showed that the production of drinking water in Sistan and Baluchestan is a social benefit. This means that after the national areas of comparative advantage, such as production, employment and value added in the drinking water production is economic justification.

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Bone and lipid profile changes in anandamide injected and high fat fed rats

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Abstract: Background: Endocannabinoid system has recently attracted the attention not only for the physiological functions, but also for the promising therapeutic potentials as drugs. Bone has been identified as major target for endocannabinoids in which anandamide and 2-arachidonoylglycerol are present at high levels. Also, obesity represents a risk factor for many health disorders including cardiovascular disease, diabetes and cancer. Aim: to explore the effect of high fat diet and anandamide on lipid profile and bone in normal and high fat fed rats. Design: A total number of forty healthy, adult, male albino rats were divided into 4 equal groups each (n=10): Group I: lean control group, Group II: lean injected group, injected with anandamide (0.02 mg/kg i.p., daily for 2 weeks), Group III: high fat-fed group(high fat diet control group) fed with (58% fat) for 12 weeks and Group IV: high fat-fed injected group fed with (58% fat) for12 weeks and then injected with anandamide (0.02 mg/kg i.p., daily for 2 weeks) , in all groups initial body weight, final body weight, cholesterol, triglycerides, high density lipoproteins, serum calcium, serum phosphate, serum alkaline phosphatase, dry femur weight, ash weight, bone calcium content, bone phosphorus content were measured and histopathological studies for bone sections were done. Results: high fat diet fed rats showed significant increase in final body weight, total cholesterol (TC), triglycerides (TG), alkaline phosphatase activity, dry and ash femur weight, as well as significant decrease in serum level of high density lipoproteins (HDL), bone calcium and phosphorus content and corrected dry and ash femur in comparison to lean control group. While, anandamide injected groups (lean and high fat fed) showed significant increase in final body weight, total cholesterol (TC), triglycerides (TG), dry and ash femur weight, bone calcium and phosphorus content with significant decrease in serum level of high density lipoproteins (HDL) in comparison to their corresponding control groups. Alkaline phosphatase activity was significantly increased in lean injected, but significantly decreased in high fat injected rats in comparison to their control groups. The histopathological study showed normal bone architecture in lean control group, foci of new bone formation in lean injected group while high fat fed groups showed thinning in bone trabeculea with mild correction and foci of new bone formation in high fat fed injected group. Conclusion: High fat diet and anandamide caused disturbances in body weight and lipid profile. High fat diet was detrimental to bone health while, anandamide was able to produce beneficial effects on bone.
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Keywords: Anandamide; bone; High fat diet; obesity; bone turnover.

Introduction:

The endocannabinoid system is present in some mammalian organs and tissues, the endocannabinoids anandamide and 2-arachidonoylglycerol (2-AG) have been demonstrated in a variety of tissues (**Mechoulam et al., 1995, Howlett, 2002**). The endocannabinoids bind to and activate two G protein coupled seven-transmembrane domain receptors, the cannabinoid receptors CB1 and CB2 (**Devane et al., 1992**). CB1 and CB2 receptors couple primarily to the Gi/o subtypes of G protein, although coupling to adenylate cyclase through Gi/o usually results in inhibition of cyclase activity, cannabinoids can also stimulate isoforms of adenylate cyclase (**Rhee et al., 1998**). CB1 is present in the brain and in the peripheral neurons (**Herkenham et al., 1990, Zimmer et al., 1999**). CB2 has been reported in the immune system, liver cirrhosis and atherosclerotic plaques (**Munro et al., 1993, Steffens et al., 2005**).

Endocannabinoids and their receptors have been discovered in bone (**Tam et al., 2008**). The main endocannabinoids, anandamide and 2-AG, are present in bone at levels similar to those found in the brain. Because the blood endocannabinoid levels are several orders of magnitude lower, it is very likely that anandamide and 2-AG are synthesized locally in bone (**Bab et al., 2008**). Indeed, both ligands are produced by osteoblasts and osteoclasts in culture (**Tam et al., 2008**), In line with the occurrence of the endocannabinoid ligands in bone, both CB1 and CB2 cannabinoid receptors are also present in bone (**Bab et al., 2008**). The endocannabinoid system has aroused enormous interest not only for the physiological functions, but also for the promising therapeutic potentials against numerous diseases (**Berry and Mechoulam, 2002)** or the use of drugs interfering with the activity of cannabinoid receptors (**Pagotto et al., 2006)**.

The mammalian skeleton undergoes a continuous remodeling process whereby the mineralized matrix is being continuously removed and subsequently replaced with newly-formed bone tissue. This renewal process has a key role in maintenance of the skeleton and in its physiologic function (**Bab et al., 2008**). Also, obesity affects more than 300 million adults worldwide, and its prevalence is predicted to rise over the next decades (**Haslam and James, 2005**). Although obesity is associated with increased risk of many chronic diseases, including cardiovascular disease, diabetes, hypertension and cancer, some reports suggest that it may protect against osteoporosis (**Wang et al., 2005**) and it may increase bone mineral density (**Villareal et al., 2005**), others suggest that marrow adipogenesis is negatively correlated with osteoblastogenesis (**David et al., 2007, Sen et al., 2008**) and obesity is detrimental to bone in animals (**Cao et al., 2009, 2010**) and humans (**Pollock et al., 2007**).In view of all previous reports this study was designed to explore the effect of anandamide and high fat diet on lipid profile and some bone parameters.

Materials and methods

This study was conducted on 40 healthy, adult, male albino rats weighing 120–140 gm (animals were obtained from animal house in faculty of medicine and the animal experiments were approved by the local ethics committee) divided into four equal groups (n=10). The rats had free access to water and chow and are kept at room temperature, 12 hours day and night cycles for 2 weeks, then the following protocols were performed: **Group I:** lean control group, rats received standard chow [25.8 % protein, 62.8 % carbohydrate and 11.4 % fat (**Ahren and Scheurink, 1998**)]. The animals were fed standard chow for 12 weeks and injected (i.p) with a single daily dose of 0.1 mL/rat of the vehicle [ethyl alcohol, propylene glycol (ADWIC Laboratory Chemicals, Egypt) and normal saline in a ratio of 1:1:2 respectively] (**da Veiga et al., 2008**) for another 2 weeks. **Group II:** lean injected group, rats received standard chow for 12 weeks and then injected with anandamide (arachidoneal ethanolamide, approx.98% TLC, Sigma Chemical, St. Louis, MO) in a dose of 0.02 mg/kg i.p. (dissolved in the same vehicle and equalized in 0.1mL/rat) (**da Veiga et al., 2008**) daily for another 2 weeks. **Group III:** high fat-fed group, rats received high-fat chow (16.4% protein, 25.6% carbohydrate, and 58.0% fat (**Ahren and Scheurink, 1998**) in the form of cotton seed oil added to the laboratory chow diet. The animals were fed high fat diet for 12 weeks and injected (i.p) with a single daily dose of 0.1 mL/rat of the same vehicle for another 2 weeks. **Group IV:** high fat-fed injected group fed

with high-fat chow for 12 weeks and injected with anandamide in a dose of 0.02 mg/kg i.p. (dissolved in the vehicle and equalized in 0.1mL/rat) daily for another 2 weeks. Diets were obtained from faculty of agriculture, Zagazig University.

At the end of the experimental period; animals were sacrificed, the blood was collected in clean centrifuge tubes. Serum was separated by centrifugation of blood for 10 minutes at 3000 rpm. The supernatant serum was pipetted off using fine tipped pipette and then kept frozen at -20 C° for subsequent determination of:

• **Serum cholesterol levels:** Cholesterol was estimated according to the method described by **Tietz (1995)**.

• **Serum Triglycerides:** triglycerides were estimated according to the method described by (**Fossati, 1982 and Nauck et al., 1997**).

• **Serum High density lipoproteins (HDL):** HDL was estimated according to the method described by (**Nauck et al., 1997**).

• **Serum calcium level:** was estimated according to the method described by (**Gindler et al., 1972**).

• **Serum phosphate level:** was estimated according to the method described by (**Goldenberg and Fernfindez 1966**).

• **Serum alkaline phosphatase activity (SAP):** was determined by alkaline phosphatase assay kits (Biochain, USA) according to (**Eaton, 1977**).

Bone tissue samples (right and left femur); right femora were removed and cleaned of from adhering tissue. The whole bone was extracted two times with a 1:1 mixture of absolute ethanol and diethyl ether for 48 h and one time with diethyl ether for 24 h. The dehydrated and defatted bones were dried in 80 C° oven for 48 h to measure the dry weight. The bones were ashed in a muffle furnace at 600°C for 48 hours after putting each bone in a clean porcelain dish, after that bone ash weights were measured then bones were hydrolyzed in 6 N hydrochloride solution for determination of calcium and phosphorus concentrations in bone.

• **Dry weight and ash weight of femur:** were measured according to (**Doster et al., 1969**).

• **Calcium and inorganic phosphorus level in bone:** both Calcium and Phosphorus content was determined by atomic absorptiometry (**Yamazaki and Yamaguchi 1989**)

• **Histopathological study:** The left femur was removed from each animal, cleaned of adhering soft tissue, after proper fixation and staining with Heamatoxylin and Eosin stain (H&E) the specimen were prepared for light microscopy examination according to (**Bancroft and Cook 1984, Raab et al., 1991**).

• **Statistical analysis:** Data were expressed as mean ± SD, and statistically analyzed by One-way analysis of variance (ANOVA) followed by LSD test using SPSS for widows version 11.5. Differences were considered to be significant at P <0.05.

Results

   Table (1): There was significant(P<0.05) increase in final body weight, serum total cholesterol (TC) (P<0.01), triglycerides (TG) (P<0.05), significant (P<0.05) decrease in high density lipoproteins (HDL) in group II, III and IV in comparison to group I, also group IV showed the same effects when compared to group III.

   Table (2) shows serum alkaline phosphatase level was significantly (P<0.05) higher in group II, III and IV in comparison to group I, but it was significantly lower (P<0.05) in group IV compared to group III.

• **Table (3) shows that** there is significant (P<0.05) increase in dry and ash femur weight, with significant (P<0.05) decrease in corrected dry and ash weight and in bone calcium and phosphorus content in group III and IV compared to group I. Group II showed significant (P<0.05) increase in dry and ash femur weight compared to group I and so was group IV compared to group III.

•

Table (1): Body weight and lipid profile in all studied groups:

	Group I	Group II	Group III	Group IV
Initial BW (gm)	129 ± 6.3	128.3 ± 3.4	127.17 ± 5.8	130.33 ± 7.9
Final BW (gm)	221.7 ± 18.6	244.2 ± 9.5*	317.3 ± 8.7*	344 ± 19*#
TC (mg/dl)	114.7 ± 7.2	142.3 ± 10.1*	185.7±19.2*	214 ± 21.1*#
TG(mg/dl)	51.8±4.1	61.2 ± 5.3 *	75.3 ±6.5*	91.2 ±12.1*#
HDL(mg/dl)	61.7±10.5	50.3 ± 6.3 *	45.5± 6.8 *	35.2±4.7 *#

   * Significant (P< 0.05) versus group I   # Significant (P< 0.05) group IV versus group III

Table (2): Serum calcium level, serum phosphate level and serum alkaline phosphatase level in all studied groups:

	Group I	Group II	Group III	Group IV
Serum Ca+2 (mg/dL)	9.5 ± 0.89	9.7 ± 0.45	9.4±0.9	9.6 ± 1.01
Serum P (mg/dL)	3.7 ± 0.96	4.7 ± 0.51	3.9 ± 0.76	3.8 ± 0.92
SAP activity (U/L)	151.5 ± 14.1	191 ± 8.7*	283.7 ±33.1*	245 ± 47.9*#

   * Significant (P< 0.05) versus group I   # Significant (P< 0.05) group IV versus group III

Table (3): bone parameters in all studied groups:

	Group I	Group II	Group III	Group IV
Dry femur weight (mg)	318.3 ±8.2	362.5±12.3*	362.3 ±23.5*	433±51.4*#
Ash weight (mg)	221±8.7	240.2±13.6*	236.8 ± 8.1*	280 ± 6.7*#
Corrected Dry femur weight (mg/100gm B.W.)	144.3± 10.3	148.8± 9.9	114.3± 8.4*	125.6±9.8*
Corrected ash weight (mg/100gm B.W.)	99.1± 8.4	98.4± 3.8	77.9±5.3*	82.5± 5.7*
Femur Ca+2 content (mg/gm ash)	104.8 ±7.1	115.3± 11.4*	82.2 ±5.03*	93.5 ±6.2*#
Femur Pi content (mg/gm ash)	47.8 ± 4.6	53.8 ± 5.1*	35.2 ± 3.2*	41.5 ± 4.6*#

   * Significant (P< 0.05) versus group I   # Significant (P< 0.05) group IV versus group III
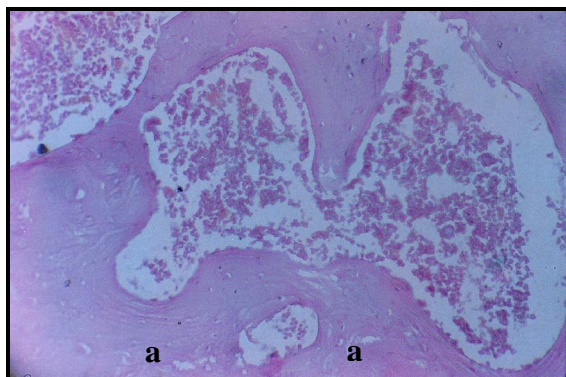
Figure (1): (H&E X 400) metaphysis of long bone showing normal bone trabeculea (a) in group I
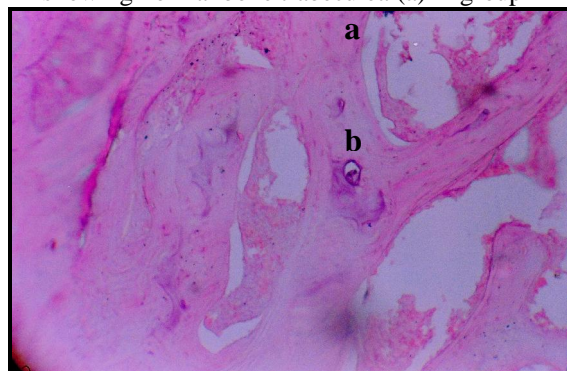
Figure (2): (H&E X 400) metaphysis of long bone showing normal bone trabeculea (a) with new bone (b) in group II.
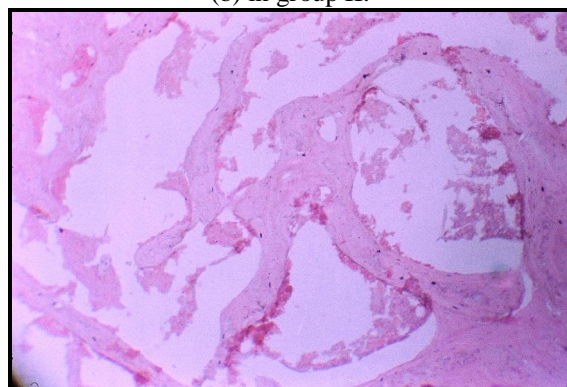
Figure (3): (H&E X 400) metaphysis of long bone showing thin bone trabeculea (a) in group III.

Discussion

The skeleton is a dynamic tissue, constantly remodeling itself by the coordinated removal and replacement. A delicate balance between these processes is essential for maintaining both the mechanical and mineral homeostatic functions of the skeleton (**Wong et al., 2008**).

Our results showed that, high fat diet resulted in a significant increase in final body weight, serum levels of total cholesterol, triglycerides and a significant decrease in serum level of high density

lipoprotein HDL, these results are in agreement with the results of **Kalaivanisailaja et al. (2003)** in mice and the results of **Woo et al. (2008)** in rats. These dyslipidemic disturbances may be attributed to increased GIT absorption of cholesterol and triglycerides or altered cholesterol and HDL metabolism (**Schaalan et al., 2009)**.These changes in final body weight and lipid profile were significantly exaggerated in anandamide injected rats (lean and high fat) than corresponding control groups. This may be attributed to the effect of anandamide on body weight and lipid profile due to increase in food intake as shown by **Costa et al. (1999)** who reported that anandamide is capable of increasing food intake in rat through central action of CB1 receptors in the hypothalamus (**Berry and Mechoulam, 2002)** or direct effect of anandamide on clearance, hepatic production or catabolism of plasma lipoproteins as reported by **Jeong et al. (2008)** through CB1 receptors (**Ruby et al. 2008**). In contrast, **Karimi and Hayatghaibi**, **(2006)** reported a significant increase in levels of HDL in rats upon treatment with cannabinoids.
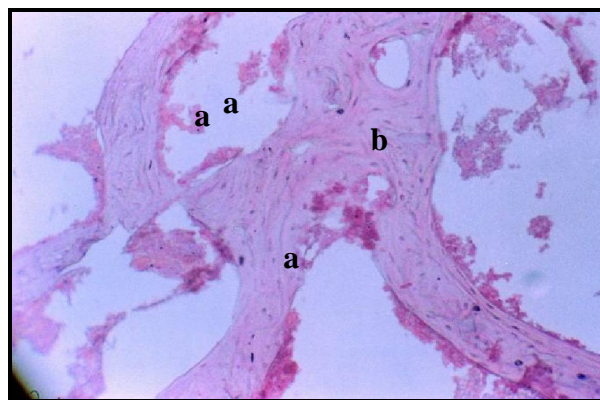
Figure (4): (H&E X 400) metaphysis of long bone showing partially corrected thin bone trabeculea (a) with new bone formation (b) in group IV

Our result showed significant increase in dry and ash weight of femur and alkaline phosphatase activity of high fat diet fed groups in comparison to lean control group.

The increased bone mass in high fat fed rats is in agreement with **Iwaniec et al. (2009)** who reported that increased body mass has a positive effect on bone mass in high fat diet fed mice and with the results of **Ricci et al. (2001)** in postmenopausal women and the results of **Radak (2004)** who showed that obesity is correlated with increased bone mass in premenopausal women. The increased bone mass in obesity may be attributed to systemic factors (e.g., elevated sex steroid and leptin levels) and increased skeletal loading due to increased body mass (**Felson**

et al., 1993). This denotes increased bone formation supported by increased alkaline phosphatase activity which is a marker of bone formation (**Yamaguchi and Uchiyama 2003**).

On the other hand, our result showed a significant decrease in corrected dry and ash femur weight, femur calcium and phosphorus content in high fat diet fed groups in comparison to lean control group indicating bone resorption. This was observed also by **Xiao et al. (2011)** who reported that high fat diet inhibited bone formation and enhanced bone resorption in mice , also **Patsch et al. (2011)** reported that, short-term and extended high-fat diet–induced obesity caused significant bone loss in male mice mainly because of resorptive changes in trabecular architecture. However, **Tarquini et al. (1997)** found no significant difference between bone mineral density in obese women and control group and **Villareal et al. (2005)** reported that obesity increases bone mineral density is a protective factor for osteoporosis in humans.

Histopathological results showed thinning of bone trabeculea in high fat fed rats indicating bone resorption which may be caused by either low grade inflammation occurring in obesity leading to release of multiple cytokines which cause increased osteoclastic activity (**Khosla 2001, Shoelson et al. 2007**) or increase bone marrow adipogenesis that inhibits osteoblastogenesis (**David et al., 2007, Sen et al., 2008**) or interference with intestinal calcium absorption (**Nelson et al. 1998**) or inhibition of bone formation through central action of leptin (**Shoelson et al. 2007**). Taken together, high fat diet caused increase bone quantity (dry and ash weight) meanwhile bone was of low quality (low mineral content and thin trabeculea).

This study revealed also, significant increase in femur dry, ash weight, calcium and phosphorus content in anandamide injected rats than the corresponding control groups, while alkaline phosphatase activity was significantly higher in lean injected and significantly lower in high fat injected compared to the corresponding control, also the histopathological sections showed foci of new bone formation in both injected groups and partial correction of thin bone trabeculea in high fat injected group showing positive effect of anandamide on bone mineral content and architecture. This is in agreement with the results of **Napimoga et al. (2009)** who found that the administration of cannabidiol (cannabinoid component from Cannabis sativa) significantly inhibited the volume of bone loss in rat, and **Bab et al. (2008)** who demonstrated that both osteoblasts and osteoclasts produce anandamide and express CB2 receptors whose stimulation in these cells decreases bone resorption and enhances bone

formation. By contrast, **Idris et al. (2005)** reported the stimulation of osteoclast formation and bone resorption by anandamide and the inhibition of these effects by cannabinoid receptors antagonists in vitro. Anandamide is considered as non-selective CB1 and CB2 agonist; it was found to affect bone cells directly by binding to CB2 receptors (**Bab and Zimmer 2008**) which are expressed in osteoblasts, osteoclasts and their precursors (stromal cells and monocytes respectively) leading to direct stimulation of osteoblasts/ stromal cells; and inhibition of osteoclasts /monocytes (**Ofek et al. 2006**) or indirectly via activation of CB1 receptors that negatively regulate noradrenaline release from sympathetic nerve terminals in the vicinity of osteoblasts, noradrenaline suppresses bone formation by binding to osteoblastic adrenergic receptors (**Takeda et al., 2002**), and this suppression is apparently alleviated by activation of CB1 on sympathetic nerve terminals (**Tam et al., 2008**). Collectively anandamide effect on bone appears to be biphasic; stimulation of bone formation and inhibition of bone resorption.

Conclusion: High fat diet and anandamide caused increased body weight and dyslipidemia which were detrimental to bone health in high fat diet, but not anandamide treated animals denoting beneficial effects of anandamide on bone in both normal and high fat fed rats. Further studies are needed to evaluate its effect in humans and evaluate the medical use of other cannabinoids agonist as therapeutic agents as regard their effect on bone.

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Over-under ground Biomass characteristic of perennial Species (*Lappula microcarpa*) in northwest Iran (Till area of Shabestar)

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ABSTRACT: *Lappula microcarpa* (Ledeb.) is an important perennial shrub widespread in the range areas of the arid and semi-arid phytogeographical region in northwest Iran. Previous studies have shown great variability in forage biomass production per plant among different varieties. Research area is of rangeland of Till village from Shabestar distract with distance is 25 Kilometers from it. This area is semi arid area and this land covered with natural range land grasses. Root and shoot in these species were sampled in one stage from Mar to Aug. roots of plants stable soils on slope and provide resistance against the forces that improve slope instability. We studied: *Lappula microcarpa* to determine its characteristics. Data were collected with random sampling in this aria with $1m^2$ in 64 quadrate plots. Mean, Max and Min over ground biomass of this plant is 0.17, 1.58, 1.25 g^{-2}, respectively.

1. Introduction

Many scientists believe that the relative production of different plant species is the best measure of these species' role in the ecosystem. Therefore, some measure of production is often used in dominance studies. Production is considered a good measure of plant dominance on a site because it reflects the amount of sunlight, water and minerals a plant is able to capture and turn into biomass. Biomass in rangeland studies generally refers to "phytomass" only because weight of animal mass in a given area is extremely difficult to measure. Clipping vegetation to ground level and then weighing it is the most direct and objective way to measure herbaceous biomass (Kirmse and Norton, 1985, Lambert, Ung, and Raulier, 1996).

There is little information on root architecture of plants growing on semi-arid rangeland where soil nutrient heterogeneity and defoliation might impose particular restrictions on root growth. In this research we determined root biomass and production of perennial plant species (*Lappula microcarpa* Ledeb.) stands during one growing seasons. The understudy root biomass, encompass and production varied in relation to stand age, although the variation was not statistically significant. The depth distribution of biomass and encompass of fine roots varied with stand age. Most of the *Lappula microcarpa* (Ledeb.) fine roots were located in the mineral soil in the mature and pole stage stands. But

estimation of these Parameters are time consuming and expensive. This parameter need

More attention, but it is one of the determined of stabling position of slope area in that place.

2. Material and Methods

Siding area is lied in 25 kilometer of Shabestar between 38° 15´ to 38° 17´ 30" from northern width and 45° 27´ 30"- 45° 30´easten length of prime meridian and the total space of the area is almost 310.31 k/m^2 for Studding this research, we selected 10 hectare spas from Till Range that it includes foot with southern facing of geographic. This land covered with natural range land grasses. Misho Mountain can cause weather adjustment and finally it can cause engendering of mountainous weather (Farahvash, 2004, Salimi faed, 2003). Vegetal Species , that grows naturally in Azerbaijan of Iran and commonly found in rangelands areas, were selected this species for test in (table1) the Scientific and Farsi name of that species with blossoming time and local position.

ETHODS OF DOING RESEARCH

Because of an irregular interference specially in northwest of the country and changing control pasture to agricultural lands, in recent decades, *Lappula microcarpa* Species is omitted from Range area. And its density has remarkable decrease. We use accidental sampling method for determine this

species for sampling. In simple accidental sampling method we were given equal chance to each people or society (Farahvash, 2004). In this stage we survey 1m2 Surface Plat and with rate of 3.33% from total stage by noting to studying area extent and spread Species. Sampling is done from beginning of Apr to the late of the Jul. And the end of that is done the late of the May when 60% were used from above statistics method in this season. And all of the present Plants in Plats were measured separately in two parts but after Plants sampling (Shadkami and Bibalani, 2010$_a$, Shadkami and Bibalani, 2010$_b$).

LABRATORIES STUDYING

Produced sapling from area studying Plants after sending to laboratories, each plant was photographed to record general above- ground and below-ground morphology/architecture prior to bang dissected into its component parts to determine biomass. Above-ground biomass was measured by separating the foliage, branches and stem. Each component was oven-dried at 80˚c for 24 h then weighed. Below-ground biomass was determined by hosing roots clean of soil.

Before they were oven- dried at 80˚c for 24 h then weighed. The dry weigh of each plant component was recorded to the nearest 0.1g^{-2}. And statistical analyzing is done by Excel.

Table 1. Collected and determined species with blossom time and geographic height (Ghahraman, 2002, Mozaffarian, 2007).

Dicotyledonous	Angiosperms gamopetalous
Family	Boraginaceae
Species binominal name	*Lappula microcarpa*
Species Persian name	Khar langariye miveriz
Blossoming time	May to Jul
Geographic height	Collecting place: Hussein abad till Height 1425 m

3. RESULTS

Results of this showed that in studying area root depth of Plant was 11.5 cm and average stem height 41.25 respectively, the max, min and med root of Biomass in studying area 0.61, 0.36, 0.25 g^{-2}/m^2.

Table2. Calculation is done for vegetal species.

Plant binominal name	Average height (cm)	Average root depth (cm)	Total Weight dry stem (g^{-2})	Total Weight dry root (g^{-2})
Lappula microcarpa Average				
In unit Surface	41.25	11.5	0.17	0.61
Max	47	12	1.58	0.36
Min	35.5	11	1.25	0.25

Lappula microcarpa Species results show that average over ground of Plant Biomass is about 0.17 g^{-2}/m^2 and average under ground of Plant biomass is about 0.61 g^{-2}/m^2 (Fig1).
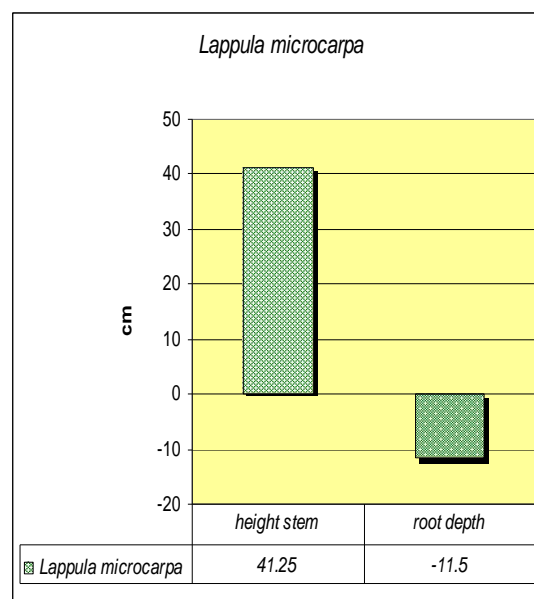
Fig1. *Lappula microcarpa* species average over underground biomass.

The results showed that *Lappula microcarpa* species root depth is 11.5 mm and stem height is 41.25 mm (Fig 2).
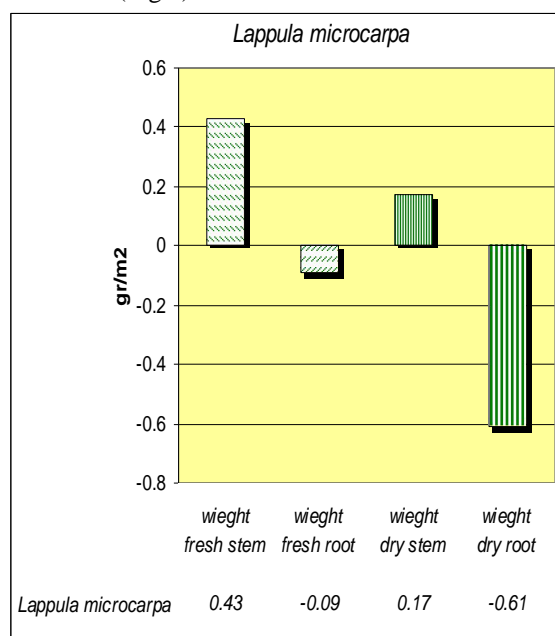
Fig2. *Lappula microcarpa* species average root depth and stem height.

4. Discussions

At various places in a pasture the plate is allowed to fall freely into the vegetation. The height of the plate on the pole is recorded. Plate meter readings are related to biomass because how far the disk falls depends on the height and density of the vegetation in the plot. Cover, height, and density estimates have also been used to estimate biomass and have been found reliable in some vegetation types. Aboveground net primary productivity (ANPP) is a useful synthetic indicator of grass response to shrub encroachment, climate change and activities such as livestock grazing and fire; and peak current year's biomass is often used to estimate grass ANPP (Scurlock, Johnson, and Olson 2002). Algometric models are based on correlations between biomass and morphological characters, such as basal diameter (or area), height, canopy diameter, or canopy volume. They have been used to estimate biomass of trees and shrubs (Ares and Fownes2000). These results are consistent with previous work for grasses (Andariese, Covington 1986, Assaeed, 1997 and Guevara, Goninet, and Estevez 2002), and trees (Cook, Stubbendieck, 1986, Lambert, Ung, and Raulie1996), where there was little improvement in predictive strength when adding height to single-species or multi species models that already contained diameter. In this experiment, the increases in the root/shoot ratio showed by Ancon implied a trade-off in total dry matter production. Root biomass (coarse and fine roots) as a proportion of total plant biomass varies between 18 and 40% depending on the species, age and site (Shadkami and Bibalani, 2010_a, Shadkami and Bibalani, 2010_b).

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Parallelism Study between Biochemical, Immunological and Histochemical Parameters of Liver Injury Induced by Carbon Tetrachloride on Rats

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Abstract: This study was carried out to investigate, the parallism between biochemical, histochemical and immunological parameters in liver injury model induced by CCl_4. We evaluated, (a) The activities of serum aminotransferases (ALT, AST), blood platelets count, hepatic antioxidant enzymes [superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH), hepatic hydroxyproline concentration, serum collagenase activity and hepatic DNA content. (b) Serum autoantibodies (ANA, ASMA and AMA or LKM). (c)Liver histology in control and CCl_4-treated rats at different interval times 24, 72 hrs and 1, 4, 8 and 12 weeks. The activities of ALT, AST, collagenase and hydroxyproline concentration, were significantly elevated, while hepatic antioxidant enzymes, blood platelets count and hepatic DNA content were decreased in toxicated rats as compared to non-toxicated rats at 24-72 hrs. On histological examination, steatosis, lymphocyte inflammation and fibrosis were illustrated at 24-72 hrs in CCl_4-treated rats compared to control rats. Absent of autoantibodies from the serum but lymphocytes in tissues were observed began from sample of 72 hrs. Thus we concluded that a parallelism study was demonstrated between biochemical, immunological and histochemical parameters in CCl_4-induced liver injury rats.

1. Introduction:

Carbon tetrachloride (CCl_4) is one of the most used hepatic toxins for experimental induction of liver fibrosis on rats[1,2]. The mechanism of CCl_4-induced hepatotoxicity, especially necrosis and fatty liver, has long been a challenging subject of many researchers from various fields over the past 50 years. Even though the mechanisms of tissue damages are different among chemicals and affected tissues, CCl_4 has played a role as a key substance of tissue injury. A number of studies have been conducted and various hypotheses have been raised. As a result, several important basic mechanisms of tissue damages have emerged; involving metabolic activation, reactive free radical metabolites, lipid peroxidation, covalent binding and disturbance of calcium homeostasis[1].

Carbon tetrachloride has been used extensively to study liver injury induced by free radicals in an animal model system. Liver damage (inflammation) caused by CCl_4 in mouse model system is closely to analogue of hepatotoxicity in human[3]. The compound is bioactivated by cytochrome P-450-mediated reactions to $^{\cdot}CCl_3$ free radicals[4-8], which is further converted to a peroxy radical, $CCl_3O^{\cdot}_2$[7,9]. The free radicals $^{\cdot}CCl_3$ and

$CCl_3O^{\cdot}_2$ readily react with polyunsaturated fatty acids of the endoplasmic reticulum and other hepatocellular membranes to initiate the formation of organic lipid peroxides. In the presence of cellular O_2, these organic peroxy radicals in turn can react with other polyunsaturated fatty acids to perpetuate a series of self-propagating chain reactions, known as "propagation of lipid peroxidation"[10].

In addition, it has been shown that CCl_4-induced toxicity may stimulate endogenous reactive oxygen and nitrogen species that have also been suggested to play an important role in the pathogenesis of hepatotoxicity[11]. **Hierholzer et al.**[12] suggested that inducible nitric oxide synthase (iNOS)-generated nitricoxide not only directly contributes to tissue damage but that it also up regulates the inflammatory response through specific signaling mechanisms. Some reports have demonstrated that induced nitric oxide overproduction occurs in the liver of rats with CCl_4-induced acute liver injury[13,14] and suggested that iNOS may act as a mediator in the pathogenesis of hepatotoxicity in rats[14,15].

On the other hand, trichloromethyl free radicals can react with sulfhydryl groups such as glutathione and protein thiols. The covalent binding

of trichloromethyl free radicals to cell protein is considered the initial step in a chain of events that eventually leads to membrane lipid peroxidation and finally cell necrosis[16]. Moreover, hepatic glutathione level was decreased after CCl_4 administration due to the reaction of glutathione with CCl_4-derived free radicals in the hepatocytes[17,18]. Accordingly, CCl_4-induced hepatotoxicity in rodents was reported to be partially protected by the pretreatment of antioxidants[19].

2. Material And Methods
Experimental animals:

All experiments were performed with adult male Sprague- Dawley rats purchased from Urology & Nephrology Center Mansoura University , Egypt. Rats were housed in polyethylene cages (5 rats/cage) with stainless steel wire tops and were allowed commercial standard diet and water ad-libitum. Rats were housed under standard laboratory conditions (room temperature 22 ± 2^oC, humidity 55 ± 5L, 12 hours light/dark cycle). Then, these rats were divided into 2 groups.

Group (I): Healthy normal rats (n = 10) fed on a standard chow diet with an average body weight of 240 -306 g.

Group (II): Carbon tetrachloride (CCl_4) treated rats (n = 30) weighing (290 - 305 g) were fed on a standard chow diet. The animals were injected intraperitonealy by 50% CCL_4 in corn oil (1.2 ml/ kg b.w.) 3 times a week for 12 weeks.

Samples collection:

Blood, liver and spleen tissues samples were tacked for analysis during rats scarified at 24 hr., 72 hr., one , 4 , 8 and 12 weeks (5 rats/time points). The rats were fasted over night and anesthetized by diethyl ether inhalation (Codex, Carlo Erba, Milan, Italy)[20].

Biochemical Study:

(i) Determination of Serum Transaminase Activities: Glutamic pyruvate transaminase (GPT);alanine aminotransferase (ALT); and Glutamic oxaloacetate transaminase (GOT); aspartate aminotransferase (AST). Activities were assayed in serum samples by the method of Reitman and Frankel [21], using a commercially available assay kit (Egyptian American Company for Laboratory Services, Egypt).

(ii) Manual platelet count of whole blood:
The method was recommended in preference to that using diluent of 1% aqueous solution of ammonium oxalate in which the red cells were lysed[22].

(iii) Antioxidant enzymes:
Superoxide dismutase activity; Reduced glutathione and Catalase activity was determined in liver homogenates by the methods of Nishikimi et al.[23]; Beutler et al.[24] and Bergmeyer [25], respectively .

(iv) Liver fibrosis markers:
(a) Determination of hepatic hydroxyproline content in liver: The content of hepatic hydroxyproline was determined by using the modified method of Laitinen[26] and Woessner[27].

(b) Determination of serum collagenase activity: The method is a modified form of that reported by Mandl et al.[28] where in collagenase is incubated for 5 hrs with collagen. The extent of collagen breakdown was determined by using Moore and Stein[29], colorimetric ninhydrin method. The liberated amino acids were expressed as micromoles of leucine per 100 ml serum.

(vi) Determination of DNA content in liver:The determination of DNA in the liver tissue residues was based on the reaction between deoxyribose and diphenylamine. DNA content was determined in the nucleic acid extract using the diphenylamine procedure described by Disch and Schwartez[30].

Immunological Study:
(i) Indirect immunofluorescence study: The detection and semi-quantitation of autoantibodies aid in the diagnosis of autoimmune diseases. The Kallested HEp-2 kit (BIO-RAD) was used to detect autoantibodies to nuclear (ANA), {mitochondrial (AMA) = liver/Kidney micosomal (LKM)} and smooth muscle (SMA) antigens. Anti-nuclear antibodies (ANA), anti-mitochondrial antibodies (AMA) anti-smooth muscle antibodies (SMA), and anti-liver/Kidney micosomal antibodies (LKM) were investigated by Indirect Immunofluorescence (IFL) on HEp-2 cells[31].

(ii) Isolation of lymphocytes from spleen: Lymphocytes were isolated from spleen of Sprague-Dawley rats according to the method of Weaver and Cross[32].

(iii) Viability test: The viability of lymphocytes was checked by Trypan blue exclusion according to the method of MacLimans et al.[33].

(iv) Detection of autoantibodies: To detect the presence of autoantibodies in the serum of treated rats, lymphocytoxicity assay was carried out according to the method of Colley et al.[34].

(E) Histochemical study: Formalin fixed tissues were processed routinely, embedded in paraffin wax and 4 µm sections were cut. The sections were stained with Haematoxylin & Eosin stain[35] and fibrosis stages were demonstrated by using special collagen stain Masson's trichrome stain[36].

3. Results

All intoxicated animals developed liver injury within 24 hours following CCl₄ injection to rats of CCl₄ group. The obtained results were after studies of biochemical, immunological and histochemical parameters over 12 weeks.

Biochemical study:

(i) Serum transaminase activities:

The relations between ALT and AST mean value and time was shown in Table (1). A very highly significant ($p < 0.001$) increase in the mean value of ALT and AST were observed at times from 24 hrs until 12 weeks as compared to non-toxicated rat group.

(ii) Manual platelets count of whole blood:

Table (1), display the platelets count (1000/µL) in blood of non-toxicated and different intoxicated male Sprague-Dawley rat groups. The data shows a very highly significant ($p < 0.001$) decrease in the mean count of platelets began during the 72 hours in CCl₄-induced rats as compared to that of non-toxicated group.

Table (1): ALT&AST activities and platelets count in non-toxicated and CCl₄-induced liver injury of male Sprague-Dawley rats(M± SD).

Time of intoxication	ALT (IU/L)	AST (IU/L)	Platelets (1000/µL)
Control	37.2±8.3	73.1±6.2	1062.2±103
Basal	38.4±9.1	71.6±10.9	1058.4±111
24 hours	379±14***	890±18***	1105.2±70
72 hours	204±65***	526.6±22***	895.6±14***
One week	367±17***	1154±61***	823.4±27***
4 weeks	309±50***	754.2±71***	720.4±55***
8 weeks	337±30***	768.6±62***	579.6±66***
12 weeks	386±14***	902.4±25***	495.8±26***

(*) Significant ($P < 0.05$), (**) highly significant ($P < 0.01$) and
(***) very highly significant ($P < 0.001$) when compared to control rats.

(iii) Antioxidant enzymes:

Table (2), represents the antioxidant enzymes in liver of non-toxicated and CCl₄ intoxicated male Sprague-Dawley groups. The mean value of hepatic SOD, CAT activity and GSH content in the homogenate liver samples obtained from CCl₄-intoxicated group were significantly high ($p < 0.001$), decreased at 72 hrs as compared to that of non-toxicated group.

Table (2): Antioxidant enzymes in non-toxicated and CCl₄-induced liver injury of male Sprague-Dawley rats (M± SD).

Time of intoxication	SOD (U/mg protein)	GSH (nmol/mg protein)	CAT (kU/mg protein)
Control	2876.3±84.3	19.6±0.7	2.16±0.06
Basal	2887.7±84.3	19.5±0.8	2.17±0.05
24 hours	2700.8±168.3	19.3±0.01	2.22±0.013
72 hours	2198.1±83.9***	14.8±0.48***	1.42±0.013***
one week	1005.9±64.1***	11.65±1.2***	1.03±0.01***
4 weeks	835±185.1***	8.73±0.5***	0.46±0.01***
8 weeks	814.4±55.8***	7.83±0.3***	0.318±0.013***
12 weeks	238.4±95.1***	6.53±0.54***	0.091±0.009***

(*) Significant ($P < 0.05$),   (**) highly significant ($P < 0.01$)
(***) very highly significant ($P < 0.001$) when compared to control rats.

(iv) Liver fibrosis markers and DNA content:

Table (3) Liver fibrosis markers and DNA content in non-toxicated and CCl$_4$- intoxicated male Sprague-Dawley rat groups. The resulted data showed that there were a very highly significant (p< 0.001) increase in the concentration of hepatic

hydroxyproline and collagenase activity at 72 hours. While, there was a very highly significant (p< 0.001) decrease in the content of hepatic DNA in rats of CCl$_4$-intoxicated group as compared to control group at times from 72 hrs until 12 weeks.

Table (3): Liver fibrosis markers and DNA content in non-toxicated and CCl$_4$-induced liver injury of male Sprague-Dawley rats (M± SD).

Time of intoxication	Hydroxyproline (µg/ml)	Collagenase (Units)	DNA content (µg/10^6 cells)
Control	1.12±0.14	0.04382±0.008	0.044±0.009
Basal	1.15±0.12	0.04481±0.007	0.045±0.008
24 hours	1.17±0.03	0.04663±0.003	0.040±0.001
72 hours	1.92±0.31***	0.05716±0.002***	0.020±0.001***
one week	2.73±0.02***	0.05867±0.002***	0.019±0.001***
4 weeks	2.82±0.04***	0.09381±0.001***	0.017±0.002***
8 weeks	3.14±0.08***	0.14411±0.003***	0.004±0.001***
12 weeks	3.22±0.03***	0.15478±0.003***	0.003±0.001***

(*) Significant (P < 0.05), (**) highly significant (P < 0.01)
(***) very highly significant (P < 0.001) when compared to control rats.

Immunological study:

(i) Indirect immunofluorescence study:

The result of fluorescence microscopic investigation of substrate slides stained by Evans Blue, displayed that, there was no detection of autoantibodies in the serum[+1 (-ve results)] of all rats of intoxicated and non-toxicated rat groups at 24, 72 hours, 1, 4, 8 and 12 weeks, where there was no specific patterns of apple-green fluorescence are observed on any part of the substrate (Fig. 1A). The positive control slides of autoantibodies relevant to liver autoimmune serology were showed in Figs.(1B-D). The serum was considered positive reaction for ANA, AMA, ASMA and LKM autoantibody, however apple-green fluorescence were noted as in

nucleus membrane (ANA +ve) (Fig. 1B), actin in the microfilaments (ASMA +ve) (Fig. 1C) and numerous cytoplasmic speckles in a fibrous network appearing mainly in the cytoplasm of the cells (AMA and LKM +ve) (Fig. 1D).

(ii) Splenic lymphocytes count:

There was no significant change in the lymphocyte count of intoxicated rats and that of the non-toxicated rats. In the other hand, the microscopic investigation of heamocytometer slide displayed that splenic lymphocytes were not stained by trypan blue, so the viability percentage was 100% in all samples of both intoxicated and non-toxicated rat groups in all examination times from 24 hrs until 12 weeks.

Fig.(1A): Fluorescence photograph of human epithelial (HEp-2) cell lines. There is no specific patterns of apple-green fluorescence is observed on any part of the substrate. The serum is considered negative reaction for ANA, AMA, ASMA and LKM autoantibody (Evans Blue stain, X40).

Fig.(1B): Fluorescence photograph of human epithelial (HEp-2) cell lines. Anti-nuclear antibodies ANA ( ) with apple-green fluorescence are characterized by homogenous and peripheral nuclear staining. The serum is considered positive reaction for ANA autoantibody. (Evans Blue stain, X40).
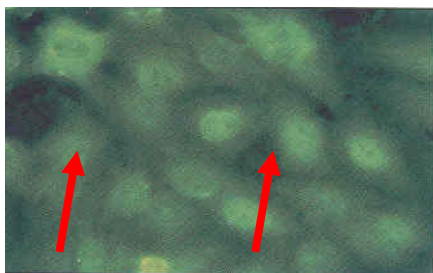
Fig.(1C): Fluorescence photograph of human epithelial (HEp-2) cell lines. Anti-smooth muscle antibodies ASMA ( ) with apple-green fluorescence are shown as a cotton-like diaphanous appearance and reacting with actin in the microfilaments. The serum is considered positive reaction for ASMA autoantibody. (Evans Blue stain, X40).
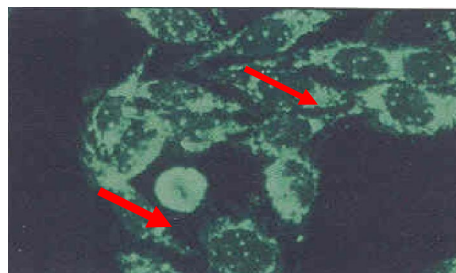
Fig.(1D): Fluorescence photograph of human epithelial (HEp-2) cell lines. The AMA and LKM patterns ( ) with apple-green fluorescence are identified by numerous cytoplasmic speckles in a fibrous network appearing mainly in the cytoplasm of the cells (Evans Blue stain, X40).

(iii) Detection of autoantibodies:

Fig. 2(A) illustrate the microscopic observation showed that there was no reaction occurred between serum autoantibodies and isolated splenic lymphocytes in both intoxicated and non-toxicated rat groups in all examination times from 24 hrs until 12 weeks. Where the lymphocyte cells were live and did not accept the stain of trypan blue. In the other hand the positive control of reaction between serum autoantibodies and isolated splenic lymphocytes of another rat was indicated in Fig.(2B), where the lymphocyte cells were died and accept the stain of trypan blue.
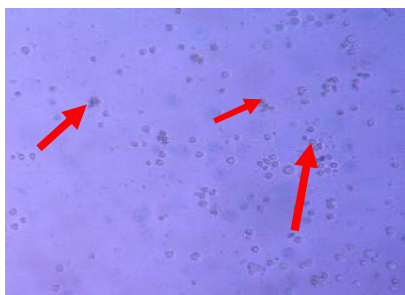
Fig. (2A): Light photograph of rat spleen lymphocytes ( ). The lymphocytes were viable and did not accept trypan blue stain. The serum is considered negative reaction for autoantibody (Trypan Blue stain, X40).
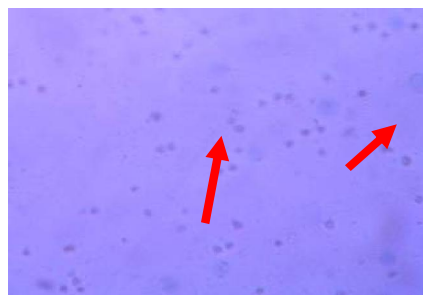
Fig. (2B): Light photograph of rat spleen lymphocytes ( ). The lymphocytes were died and accept Trypan blue stain. The serum is considered positive reaction for autoantibody. (X40).

Histochemical study:

(i) Liver pathology:

Light microscopy investigation showed that, there was no pathological change observed in hepatic tissues slides of control and at basal time rats in CCl$_4$ group stained by (Haematoxylin and Eosin) (Fig.3).

(ii) Haematoxylin and eosin stain:

The haematoxylin eosin stains the cytoplasm with red colour; nuclei with blue colour and show the steatosis and lymphocyte infiltration in stained tissue.

Fig.(4-A1) illustrates that, the pathology of hepatic tissues stained by haematoxylin and eosin in CCl$_4$ injected group at 24 hrs. Where, liver biopsy showed that, hepatocytes in the centrilobular areas present degenerative changes; mild macrovesicular fatty change, and scattered leucocytes infiltrations were also evident in some hepatocytes. Weak leucocytes infiltrations in some hepatocytes and mild steatosis were observed at 72 hours (Fig. 4-B1). As clarified in Figs. (4-C1&D1), there is moderate extensive steatosis; moderate lymphocyte infiltration; and foamy degeneration of hepatocytes at one and four weeks. Moreover, a severe inflammation and severe steatosis were noted at 8 and 12 weeks (Fig. 4E1&6F1) as compared to that of non toxicated group.

Fig.(3): Light photograph of hematoxylin-eosin stained liver section from non-toxicated S-D rat of control group.

Fig.(4): Light photograph of hematoxylin-eosin stained liver sections from CCl4-intoxicated rats at different times (series A1-F1). Symbols ( ) denoted to lymphocytes inflammatory cells and (S) is the steatosis.
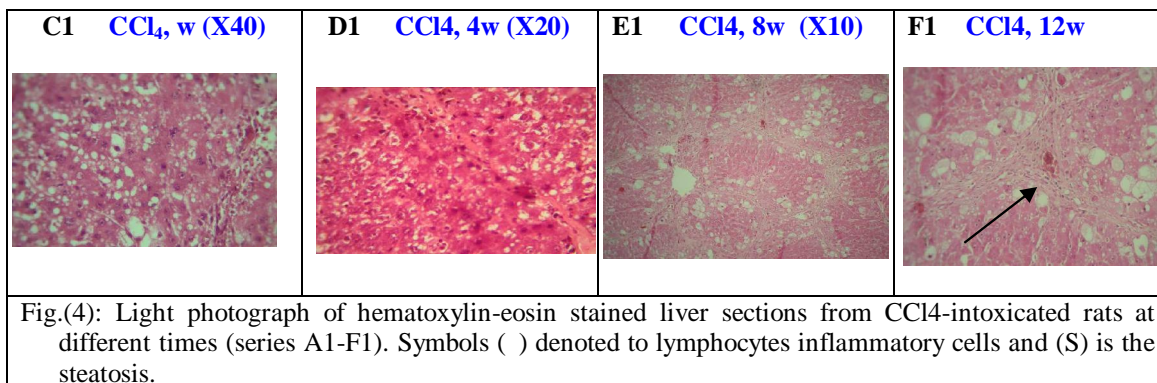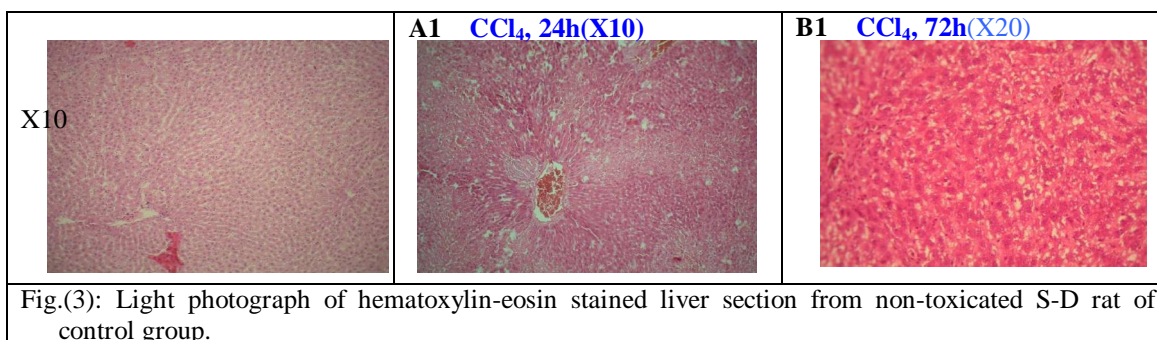
(iii) Masson's trichrome stain:

The Masson᾽s trichrome stain the nuclei with black colour, the cytoplasm, keratin, muscle fibers and intrcellular fibers with red colour and collagen (fiberous tissue), basement membrane and mesangium with blue colour. This stain is special for collagen and shows the degree of fibrosis in stained section.

Light microscopy investigation showed that, there was no pathological change observed in hepatic tissues slides of control and at basal time rats in CCl$_4$ group stained by Masson᾽s trichrome **(Fig.5).**

As shown from **Fig. (5-A2),** there was no fibrosis investigated in the CCl$_4$-intoxicated models of hepatic tissues stained by masson's trichrome at 24 hours. **Figs. (6B2-7D2)** demonstrates that, the degree of fibrosis at 72 hours, one week and 4 weeks are a weak pericellular fibrosis (a few collagen fibrils extended from the central vein and portal tract. While, in **Figs(7-E2&F2),** the degree of fibrosis at 8 and 12 weeks are incomplete cirrhosis (collagen fibrils extended into and encomposed the whole lobule as compared to non-toxicated groups

Fig.(5): Light photograph of Masson`s trichrome stained liver section from non-toxicated rat of control group.

Fig.(6): Light photograph of liver sections stained by Masson`s trichrome for collagen from CCl4-intoxicated S-D rats at different times (series A2-C2). Symbols ( ) denoted to lymphocytes inflammatory cells, (S) is the steatosis and (F) show the fibrosis.

Fig.(7F2): Light photograph of liver sections stained by Masson`s trichrome for collagen from CCl4-intoxicated S-D rats at different times (series D2-F2). Symbols ( ) denoted to lymphocytes inflammatory cells, (S) is the steatosis and (F) show the fibrosis.

(D) Correlation between biochemical and histopathological studies:

Data obtained from parameters of biochemical and histopathological studies indicated that there was a correlation or parallism between two studies in the CCl4-intoxicated group. Whereas a directly correlation in each of ALT and AST activities; hydroxyproline concentration; collagenase activity; steatosis; inflammation; necrosis and fibrosis were demonstrated. In addition, antioxidant enzymes activities; platelets count and DNA content were correlated inversely with the previous parameters. All these data confirmed the pathological evaluation as hepatic injury in the CCl4 experimental model over 12 weeks.

(E) Fibrosis index biomarker:

From data obtained from fibrosis marker such as hydroxyproline concentration and collagenase activity and data obtained from DNA content we distinguished new fibrosis index biomarker by making new equation like

$$\text{Fibrosis index} = \frac{(\text{hydroxyproline content} / \text{collagenase activity})}{\text{DNA content}} \ (\mu g/ml/ \text{Units}/ \mu g/10^6 \text{ cells})$$

After comparing between data obtained from this equation and fibrosis stages obtained from histochemical study **Table (4).** We found that, there was a positive correlation between them, so from this new equation we can determine the fibrosis stage in the liver without making liver histochemical investigation.

Table (4): The stages of the liver fibrosis as histological evaluation and the corresponding rang of fibrosis index value as biochemical parameters

Stages of fibrosis	Fibrosis Index ($\mu g/ml/$ Units$/ \mu g/10^6$ cells)
S0	(500 - 700)
S1	(1000 - 2500)
S2	(2500 - 4500)
S3	(4500 - 7000)
S4	> 7000

Hydr./Coll./DNA is the fibrosis index of ratio hepatic hydroxyproline concentration: serum collagenase activity: hepatic DNA content
Correlation between fibrosis index biomarker and fibrosis score in CCl₄ group:

A correlation was made between fibrosis index biomarker and fibrosis score evaluated by histochemical study in CCl₄-induced liver injury group. Using simple linear regression analysis, a positive correlation was observed between fibrosis index and fibrosis score **(r= 0.90, Tab.5).**

Table (5): Fibrosis index in non-toxicated and CCl₄-induced liver injury of male Sprague-Dawley rats

Time	F. scores	Fibrosis Index (µg/ml/ Units/ µg/10^6 cells)
Control	0	601.8±9.5
Basal	0	595.8±8
24 hours	0	627.2±6
72 hours	1	1679.4±15
week	1	2449±17
4 weeks	1	1768.2±12
8 weeks	3	5447.2±16
12 weeks	3	6934.5±18

Results are represented as mean value of five rats in each time ± SD

4. Discussion:

The CCl₄ produces an experimental liver damage, which histologically resembles viral hepatitis. The chronic liver damage induced by carbon tetrachloride in rats produces liver fibrosis and biochemical and histological patterns that resemble human liver cirrhosis[37]. Liver injuries induced by CCl₄ are the distinct symptom of xenobiotic-incduced hepatotoxicity and commonly used models for the screening of anti-hepatotoxic and/or hepatoprotective activities of drugs[38].

The rats of the present study injected intraperitonealy by 50% CCL₄ in corn oil (1.2 ml/kg of body weight) 3 times a week for 12 weeks. All injected rats exhibited liver injury criteria, at 24 hrs which are in agreement with the findings obtained by **Theocharis et al.**[39]; **Ko and Lim**[40].

Hepatotoxic agents such as CCl₄, causes hepatic damage with a marked elevation in serum levels of aminotransferases enzymes (AST and ALT) because these enzymes are cytoplasmic in location and are released into the blood after cellular damage[40]. In agreement with this investigation, our results showed that a significant increase in the activities of ALT, AST. **William et al.**[57] described the cause of increase in activities of these enzymes in plasma to be due to hepatocellular damage by hepatotoxic agents used in this study. A concentration gradient, which is dependent on normal cellular metabolism for its maintenance, exists for enzymes between the hepatocytes and the sinusoidal space. On damage to the process of cellular energy production, permeability of the hepatocyte membrane increases

and cytosolic isoenzymes of the aminotransferases (ALT and AST) spill into the sinusoids and then the peripheral blood. Permeability of mitochondrial membranes may also increase and mitochondrial isoenzymes are then released as well .

This study demonstrated that platelets counts were significantly decreased in blood circulation of CCl₄ group at 72 hrs as compared to non-toxicated rats . This data agrees with an earlier work by **Eipel et al.**[41] who reported that platelets were decreased in rat model of systemic endotoximia.

Platelets, on the other hand, arise from giant precursor cells (megakaryocytes) that reside and mature within the bone marrow, undergoing eventual cellular dissolution as they give rise to hundreds of individual platelets. **Brass**[56] proposed that protein content in toxicated liver decreased so megakaryocyte proteins decreased also, as well as the formation of megakaryocytes cells in bone marrow and differentiated into mature platelets also decreased.

The present study showed that CCl₄, produced marked oxidative impact as evidenced by the significant decreased in the hepatic Superoxide dismutase, catalase activity, and glutathione content . Indeed the results presented confirm the previous works. **Ko and Lim**[40] **and Liu et al.**[42] showed that inverse correlations between antioxidant enzymes and pathology scores and / or lipid pero-oxidation have been found in rats with CCl₄-induced cirrhosis**.** From these results it can be concluded that, cellular antioxidant enzymes failed to resist the excesses of oxidative stress inside hepatocyte cells at 72 hrs in CCl₄ injected rats.

From the present study; it has been found that hepatic hydroxyproline concentration was very significantly increased in the hepatic of toxicated rats with fibrosis than that of untoxicated group. **Tanabe et al.**[43] reported that the concentration of L-hydroxyproline in the liver of female mice increased rapidly during the weeks (8-11) of *Schistosoma mansonai* infestation. Similarly, increased concentration of hydroxyproline in liver was also reported by others[44-46].

The present study showed that, the levels of collagenase in sera of toxicated rats was significantly increased compared with the level in sera of subjects of the untoxicated control group. These results agree with the results of **Maruysma et al.**[47] who reported that, the activities of the enzymes that can degrade the extracellular (ECM) matrix were increased with fibrosis. However, hepatic collagenase activities against collagens type I and IV were diminished once liver cirrhosis was established[48, 49].

Apoptotic cell death is a process frequently occurring in toxin-induced liver injury, depending on

the dosage and rout of toxin administration, on the time of experimentation and on the assay used for apoptosis detection [50].

In the our study, we detected apoptotic process, using DNA content assay where DNA content increase with increasing cell division and decreased with increasing cell death. DNA content of homogenate liver samples obtained from CCl_4 intoxicated rats was very highly significantly decreased at 72 hrs as respect to non-toxicated group. Our results agree with **Shi et al.**[58], how demonstrated that apoptosis in hepatocytes was found as early feature of toxicated liver injury.

This work was designed to assess the parallism between immunological, biochemical and histochemical studies. Therefore, we determined the prevalence of (NOSA) in hepatotoxic rat groups induced by CCl_4. The titers of (NOSA) were assessed by indirect immunofluorescence (IFL). In addition, the possible reaction between serum alloantibodies and isolated splenic lymphocytes of the rat were also examined.

The present study demonstrates that there is no prevalence of (NOSA) in the serum of toxicated rats and there is no significant change between toxicated and non-toxicated rats in the titer of autoantibodies (titer 1:40). This observation indicates that CCl_4 has no immunogenic effect on toxicated rats over 12 weeks. Where the basis of the immunogenicity may lies in the form of antigenic recognitions. These results are comparable with **Lohse et al.**[51,52] who reported that experimental autoimmune hepatitis could not be induced in Lewis rats. In addition to the previous **Smialowicz et al.**[53] demonstrated that hepatotoxic agents is not immunotoxic in the rats at dosages that produce overt hepatotoxicity. Furthermore, there was no difference in the antibody response to sheep red blood cells in another set of rats dosed at 40,80or 160 mg/kg/day CCl_4.

The obtained results described immunoreactivity of expected induced autoantibodies with allo-antigen (splenic lymphocytes) of the same rat at different time's intervals, using *in vitro* lymphocytotoxicity assay. These results indicate that there no *in vitro* reactivity occurred between serum autoantibodies and isolated splenic lymphocytes in both CCl4-intoxicated and non-toxicated groups over 12 weeks. These observations indicate the absence of hepatitis autoantibodies from the serum of toxicated rat groups.

Interestingly, the current results showed that CCl_4 molecule failed to stimulate immune system of rats to secreate autoantibodies. This result is in agreement with the results of **Bahia-Oliveira et al.**[54] **and Hirsch et al.**[55] who reported that

nonimmunized rats did not develop significant levels of hepatitis autoantibodies.

The histological results showed that the normal structure of lobules was destroyed and pseudolobules formed, steatosis and inflammation were noted after 24 hrs of CCl_4-induced liver injury but fibrosis resulted at 72 hrs and complete cirrohsis did not occurred over 12 weeks in rats exposed to CCl_4. These results are differ than obtained by **Weng et al.**[46] who found that hepatic fibrosis stage was obtained at the fourth week after intraperitoneal injection of CCl_4 (dissolved in olive oil with a proportion of 4:6) at 0.3 mL/kg of body weight, for 2 consecutive days a week for 16 weeks.

In the current study, a significant positive correlation was found between fibrosis index and fibrosis score in CCl_4 (r= 0.90). This good correlation demonstrates that, we can determine the fibrosis stage in the liver by using the new fibrosis index biomarker without making liver histochemical investigation. Therefore, this new fibrosis index biomarker may be used as a useful biomarker in the diagnosis and follow up liver diseases patients.

In conclusion, we showed that a significant positive correlation and association of hepatic concentration of hdroxyproline, activity of collagenase and (ALT and AST released from hepatocytes) with the severe hepatocyte necrosis, inflammation and fibrosis induced by CCl_4 toxicity. Moreover the activity of antioxidant enzymes (SOD, catalase and GSH content), platelets count and DNA content are correlated inversely with hepatic fibrogenesis in toxicated rats (59). Cytological accumulation of T-lymphocytes in the tissue sections was observed at times paralleled with the observation of biochemical and histochemical markers. Finally, a parallismal study was demonstrated between biochemical, immunological and histochemical parameters of liver injury induced rats by CCl_4.

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Application of JASMINUM OFFICINALE in poems by Nezami Ganjavi

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Abstract: Jasminum officinale (Common Jasminum officinale) or (Poet's Jasminum officinale) is a species of Jasminum officinale, in the family Oleaceae. Nez mi-ye Ganjavi (1141 to 1209), or Nez mi, whose formal name was Ni m ad-D n Ab Mu ammad Ily s ibn-Y suf ibn-Zak ibn-Mu'ayyad, is considered the greatest romantic epic poet in Persian language, who brought a colloquial and realistic style to the Persian epic. Jasminum officinale has been used at 58 poetries lines that at 23 lines used this plant in Metaphor and at 15 lines used in Simile. Jasmine has been used for Metaphor for Tear (in 1 line), Face (in 7 lines), Women (in 1 line), White color (in 3 lines), His Book (in 1 line), Love (in 3 lines) and White hair (in 1 line). Jasmine has been used for Simile for White face (in 1 line), Eyebrow (in 1 line), White body (in 1 line), Water spring (in 1 line), With silver (in 1 line), Milk (in 1 line), Face (in 1 line), Expensive carpet (in 1 line), Hair (in 1 line) and Nail (in 1 line).
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Key Words: Simile, Metaphor, Jasmine, Jasminum officinale, poems, Nezami Ganjavi

rulers of the region as was custom of that time for great poets, but avoided court life. Nezami was a master of the Masnavi style (double-rhymed verses). He wrote poetical works; the main one is the Panj Ganj (Five Jewels) "Quinary", also known by the Persian pronunciation of the same word in Arabic, Khamse. The Quinary (Five Treasures-Panj Ganj) includes the five Persian books of Nezami with title Makhzan al-Asrar "The Storehouse of Mysteries", the ethico-philosophical poems of about 2,250 Persian distichs was dedicated to Fakhr al-Din Bahramshah, the ruler of Erzinjan. The story deals with such esoteric subjects as philosophy and theology. Khusraw o Shirin "Khosrow and Shirin", A story of pre-Islamic Persian origin which is found in the great epico-historical poems of Shahnameh and is based on a true story that was further romanticized by Persian poets. Layli o Majnun "Layla and Majnun", A story of Arabic origin which was later absorbed and embellished by the Persians. The poem of 4,600 distichs was dedicated, in 1192, to Abu al-Muzaffar Shirvanshah, who claimed descent from the Sassanid King, whose exploits are reflected in Nezami's "Seven Beauties"(Haft Paykar). Eskandar-nameh "The Book of Alexander", The Romance of Alexander the Great" contains 10,500 distichs. There are differences of opinion on whether this was Nezami's last epic or the Haft Paykar. The names of its dedicatees are uncertain but the ruler of Ahar, Nosart al-Din Bishkin b. Mohammad has been mentioned. Haft Paykar "The Seven Beauties", A story pre-Islamic of Persian origin, it was dedicated to the ruler of Maragha, 'Ala' Al-Din korp Arslan. It is the story of Bahram V, the Sassanid king, who is

1. Introduction
Jasminum officinale

Jasminum officinale (Common Jasmine) or (Poet's Jasmine) is a species of jasmine, in the family Oleaceae. Jasminum officinale is also used as an essential oil in aromatherapy. It is specifically used in dermatology as either an antiseptic or anti-inflammatory agent (Rapini et al., 2007). Jasmine absolute is known as the 'King of Oils', and its heavy, sweet scent is loved by most people. The flowers release their perfume at dusk, so flowers are picked at night and a tiny amount of oil is obtained by solvent extraction. The result is a very expensive oil, but it can be used in low concentrations so it is not that uneconomic to use it in products. The aroma of Jasmine is described as calming and soothing without being soporific, and is indicated for depression and stress - as well as some respiratory conditions. It is indicated for sensitive skin conditions too. But mostly Jasmine has a reputation as an aphrodisiac and used for all kinds of sexual problems. Safety: This oil can cause irritation in some people if used too frequently or in high concentrations, so use with caution, preferably in low concentrations (Wikipedia, 2011).

Nezami Ganjavi

Nez mi-ye Ganjavi (1141 to 1209), or Nez mi, whose formal name was Ni m ad-D n Ab Mu ammad Ily s ibn-Y suf ibn-Zak ibn-Mu'ayyad, is considered the greatest romantic epic poet in Persian literature, who brought a colloquial and realistic style to the Persian epic. Nezami is best known for his five long narrative poems, which have been preserved. He dedicated his poems to various

Metaphor for Women

سمن، نازک و خوار، محکم بود

که مردانگی در زمان کم بود

شرف نامه، وحید دستگردی، ۱۳۸۱: ۳۹۶

Metaphor for White color

قبا تنگ آید از سروش سمن را

درم وایس دهد چشم سمن را

خسرو شیرین، وحید دستگردی، ۱۳۷۸: ۲۷۸

چو زلف شب از حلقه خبری

سمن ریخت بر طاق نیلوفری

شرف نامه، وحید دستگردی، ۱۳۸۱: ۳۰۷

Metaphor for His Book

چه فرمودهٔ باغی آراستن

سمن گفتن و سرو پیراستن

اقبال نامه، وحید دستگردی، ۱۳۷۸: ۱۷

Metaphor for Love

بر راهگذر گلخندی از بام

دادی ز سمن به سرو پیغام

لیلی و مجنون، وحید دستگردی، ۱۳۸۱: ۱۰۹

بر ره دل شاخ سمن کاشته

خار نوک مژه برداشته

مخزن الاسرار، وحید دستگردی، ۱۳۸۱: ۶۴

Metaphor for White hair

born to Yazdegerd after twenty years of childlessness and supplication to Ahura Mazda for a child. The Haft Paykar is a romanticized biography of the Sasanian Persian empire ruler Bahram Gur (Wikipedia, 2010).

Plant have been used for Simile and Metaphor in poems (Mosazadeh-Sayadmahaleh and Bibalani, 2010;Mosazadeh-Sayadmahaleh et al., 2010;Mosazadeh-Sayadmahaleh et al., 2011a;Mosazadeh-Sayadmahaleh et al., 2011b;Mosazadeh-Sayadmahaleh et al., 2011c;Mosazadeh-Sayadmahaleh et al., 2011d), we study Simile and Metaphor application of Jasmine in Nezami Ganjavi poems in this paper.

Results and Discussion
Roles of Jasmine in Nezami Ganjavi poems

Nezami Ganjavi has used Jasmine as Simile and Metaphor separately such as:

Metaphor for Tear

زان چشمه یم کز سمن رست

نسرین ورقی که داشت می شست

لیلی و مجنون، وحید دستگردی، ۱۳۸۱: ۱۱۰

Metaphor for Face

سمن را از بنفشه طرف بربست

رطب ها را به زخم استخوان خست

خسرو شیرین، وحید دستگردی، ۱۳۷۸: ۲۶۴

پس او در غلامان و کنیزان

ز نرگس بر سمن سیلاب ریزان

خسرو شیرین، وحید دستگردی، ۱۳۷۸: ۴۲۲

لیلی سمن خزان ندیده

مجنون سمن خزان رسیده

لیلی و مجنون، وحید دستگردی، ۱۳۸۱: ۸۳

سمن بر بنشه کین کرده بود

گل سرخ را ز ردی آزرده بود

اقبال نامه، وحید دستگردی، ۱۳۷۸: ۱۶۵

Simile for White face

چو سروی که پیدا کند در چمن

ز گیسو بنشه ز عارض سمن

شرف نامه، وحید دستگردی، ۱۳۸۱: ۸۶

Simile for Expensive carpet

بر او چادری از رخام سفید

چو برگ سمن بر سر سنگ بید

شرف نامه، وحید دستگردی، ۱۳۸۱: ۴۰۷

Simile for White body

زاد سروی بد آن خرامانی

چون سمن بر بساط سامانی

هفت پیکر، وحید دستگردی، ۱۳۸۴: ۲۸۷

Simile for Hair

شسته رویان چو روی گل شستند

چون سمن بر پرند گل رستند

هفت پیکر، وحید دستگردی، ۱۳۸۴: ۲۷۲

Simile for Water spring

مغز از سر سپید بگشاد

موی چو سمن به باد برداد

لیلی و مجنون، وحید دستگردی، ۱۳۸۱: ۲۵۰

Simile for Nail

چشم ای یافت پاک چون خورشید

چون سمن صافی و چو سیم سپید

هفت پیکر، وحید دستگردی، ۱۳۸۴: ۲۸۴

Simile for White silver

ناخن سیمین سمن مسیح فام

برده ز شب ناخنه شب تام

مخزن الاسرار، وحید دستگردی، ۱۳۸۱: ۵۸

Conclusion

Jasminum officinale has been used at 58 poetries lines that at 23 lines used this plant in Metaphor and at 15 lines used in Simile. Jasmine has been used for Metaphor for Tear (in 1 line), Face (in 7 lines), Women (in 1 line), White color (in 3 lines), His Book (in 1 line), Love (in 3 lines) and White hair (in 1 line). Jasmine has been used for Simile for White face (in 1 line), Eyebrow (in 1 line), White body (in 1 line), Water spring (in 1 line), With silver (in 1 line), Milk (in 1 line), Face (in 1 line), Expensive carpet (in 1 line), Hair (in 1 line) and Nail (in 1 line).

ز کنجش زمین گشته بر دوخته

سمن سیم و خیری زر اندوخته

شرف نامه، وحید دستگردی، ۱۳۸۱: ۶۷

Simile for Milk

چون لاله دهن به شیری شست

چون برگ سمن به شیر می رست

لیلی و مجنون، وحید دستگردی، ۱۳۸۱: ۷۴

Simile for Face

(Iranian) century (study on Manochehri Damghani, Nezami Ganjavi and Hafez Shirazi poets)" that have been worked in 2010.

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3. Mosazadeh-Sayadmahaleh F, Esmaeilzadeh-Estakhrbijar Y, and Bibalani G H (2011a). Application of Judas tree (Cercis siliquastrum) in poems by Hafez International Journal of Academic Research 3 (1): 1000.
4. Mosazadeh-Sayadmahaleh F, Esmaeilzadeh-Estakhrbijar Y, and Bibalani G H (2011b). Roles of Cypress in poems by Hafez International Journal of Academic Research 3 (1): 322.
5. Mosazadeh-Sayadmahaleh F, Esmaeilzadeh-Estakhrbijar Y, and Bibalani G H (2011c). Simile and Metaphor of Daffodil (Narcissus spp.) in poems by Hafez International Journal of Academic Research 3 (1): 671.
6. Mosazadeh-Sayadmahaleh F, Esmaeilzadeh-Estakhrbijar Y, and Bibalani G H (2011d). Study on Application of Viola odorata in poems by Hafez International Journal of Academic Research 3 (1): 994.
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Roles of Dog Rose in poems by Manochehri Damghani

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Abstract: Rosa canina (Dog Rose) is a variable scrambling rose species native to Europe, northwest Africa and western Asia. It is a deciduous shrub normally ranging in height from 1-5 m, though sometimes it can scramble higher into the crowns of taller trees. Abu Najm Ahmad ibn Ahmad ibn Qaus Manuchehri, Also known as Manuchehri Damghani, was a royal poet of the 11th century in Persia. Dog Rose has been used at 14 poetry lines that at 3 lines used this plant in Metaphor and at 3 lines used in Simile. Dog Rose has been used for Metaphor for Musk Seller (in 1 line) , Silvery blindfolded (in 1 line) and Silvery ear (in 1 line). Dog Rose has been used for Simile for Canopy nail (in 1 line), Musk Seller (in 1 line) and Fragrant Crystal Cord (in 1 line).
[Fatemeh Mosazadeh-Sayadmahaleh, Ghassem Habibi Bibalani. Roles of Dog Rose in poems by Manochehri Damghani. Journal of American Science 2011;7(5):596-598]. (ISSN: 1545-1003). http://www.americanscience.org.

Key Words: Simile, Metaphor, Dog Rose, poems, Manochehri Damghani

Introduction
Rosa canina

Rosa canina (Dog Rose) is a variable scrambling rose species native to Europe, northwest Africa and western Asia (figure 1). It is a deciduous shrub normally ranging in height from 1-5 m, though sometimes it can scramble higher into the crowns of taller trees. Its stems are covered with small, sharp, hooked prickles, which aid it in climbing (Graham and Primavesi, 1993). The leaves are pinnate, with 5-7 leaflets. The flowers are usually pale pink, but can vary between a deep pink and white. They are 4-6 cm diameter with five petals, and mature into an oval 1.5-2 cm red-orange fruit, or hip (Wikipedia, 2010b).

Figure 1: Rosa canina (Dog Rose). (Wikipedia, 2010b)

The botanic name is derived from the common names 'dog rose' or similar in several European languages. It is sometimes considered that the word 'dog' has a disparaging meaning in this context, indicating 'worthless' (by comparison with cultivated garden roses,(Vedel and Lange, 1960). However it also known that it was used in the eighteenth and nineteenth centuries to treat the bite of rabid dogs, hence the name "dog rose" may result from this. It is also possible that the name derives from "dag," a shortening of "dagger," in reference to the long thorns of the plant (Blamey and Grey-Wilson, 1989;Täckholm, 1922).

Classification of Rosa canina is (USDA, 2010):

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Magnoliopsida* – Dicotyledons
Subclass	*Rosidae*
Order	*Rosales*
Family	*Rosaceae* – Rose family
Genus	*Rosa* L. – rose
Species	*Rosa canina* L. – dog rose

Other old folk names include rose briar (also spelt brier), briar rose, dogberry, wet briar, wild briar, witches' briar, and briar hip (Kirk, 1985).

In Turkish, its name is ku burnu, which translates as "bird nose." In Azeri, its name is itburunu, which translates as "dog nose." In Russian, its name is (translate: 'shipovnik'), which translates as "thorn bearer." (EncyclopediaofLife, 2010)

Manuchehri Damghani

Abu Najm Ahmad ibn Ahmad ibn Qaus Manuchehri, Also known as Manuchehri Damghani, was a royal poet of the 11th century in Persia.

He was from Damghan in Iran and he is said to invent the form of musammat in Persian poetry and has the best ones too. He traveled to Tabarestan and was admitted to the court of King Manuchihr of Ziyarid dynasty and that's where he got his pen name. He later was a royal poet in the court of Sultan Shihab ud-Dawlah Mas'udI of Ghazni son of Mahmud of Ghazna.

He has left behind a divan. His works were extensively studied by A. de Biberstein-Kazimirski in 1886. He died in 1040 CE (Wikipedia, 2010a).

Plants had been used by poetries as Simile and Metaphor in their poets (Mosazadeh-Sayadmahaleh and Bibalani, 2010;Mosazadeh-Sayadmahaleh et al., 2010; Mosazadeh-Sayadmahaleh et al., 2011a; Mosazadeh-Sayadmahaleh et al., 2011b; Mosazadeh-Sayadmahaleh et al., 2011c; Mosazadeh-Sayadmahaleh et al., 2011d;Zomorodi, 2008).

Results and Discussion
Roles of Dog Rose in Manuchehri poems
Metaphor to Musk Seller

منوچهری دامغانی، وسیر سیاقی، ۱۳۸۱:۱۸۱

Metaphor to Silvery blindfolded and Silvery ear

منوچهری دامغانی، وسیر سیاقی، ۱۳۸۱:۳۶

Simile to Canopy nail

منوچهری دامغانی، وسیر سیاقی، ۱۳۸۱:۱

Simile to Musk Seller

منوچهری دامغانی، وسیر سیاقی، ۱۳۸۱:۴۸

Simile to Fragrant Crystal Cord

منوچهری دامغانی، وسیر سیاقی، ۱۳۸۱:۱۳۶

Conclusion
Dog Rose has been used at 14 poetry lines that at 3 lines used this plant in Metaphor and at 3 lines used in Simile. Dog Rose has been used for Metaphor for Musk Seller (in 1 line) , Silvery blindfolded (in 1 line) and Silvery ear (in 1 line). Dog Rose has been used for Simile for Canopy nail (in 1 line), Musk Seller (in 1 line) and Fragrant Crystal Cord (in 1 line).

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Security Performance Analysis and Enhancement of Authentication Protocol in Wireless Mobile Networks

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Abstract: Due to the rapid growth of wireless technology and wireless services, a detailed look at the issue of security is required. Mobile networks are protected by using authentication security mechanisms. The authentication protocol incurs overheads on the transmission process. These overheads affect the mobile network performance such as delay, bandwidth allocation efficiency and throughput. The main aim of this research is to improve authentication mechanism in mobile networks. In the proposed protocol, AKA has been enhanced by generating temporary key to enable visitor location register (VLR/SGSN) to authenticate mobile station (MS) without intervention of HLR/AuC. Therefore, the bottleneck at the authentication centre is avoided by reducing the number of messages between mobile and authentication centre. A fluid mobility model is used to investigate the performance of signaling traffic and load transaction messages between mobile databases, such as Home Location Register (HLR) and Visitor Location Register (VLR), for both the current protocol and the proposed protocol. The simulation results show that the authentication delay and current load transaction messages between entities and bandwidth are minimized as compared with the current protocol. Therefore, the performance and authentication delay time have been improved significantly. To validate the simulation results in this research work, the results have been compared and analyzed with the analytical results.
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1. Introduction

Authentication is used to provide security services in wireless mobile networks, it is considered as an initial process to authorize a mobile terminal for communication through secret credentials (AL-Saraireh and Yousef, 2006). The authentication process provides a reasonable level of security, but it overloads the network with significant signalling traffic and increases the call setup time (AL-Saraireh and Yousef, 2006).

There are different approaches done to enhance UMTS authentication mechanisms, there are sets of approaches being discussed in Europe (Putz et al., 1998). The 1st scheme is proposed by Royal Holloway College. This protocol is a symmetric scheme, it works with a challenge response mechanism and it is offers a mutual authentication of the user and the network operator as well as confidentiality about the user identity towards the network operator. In general the mechanism consists of five messages, which are exchanged between the user, the network operator and the service provider. If the user has already logged on at the network operator who possesses a temporary identity, two of the five messages are dropped and the service provider is not involved. The 2nd scheme is proposed by Siemens. It is an asymmetric protocol. This protocol requires five messages, which are exchanged between the user, the network operator and a certificate server storing certified copies of the necessary public keys. Only three messages are required for this without a certificate server being involved. The 3rd scheme is proposed by KPN. It is a variant of the station-to-station (STS) protocol and similar to protocol that was developed by Siemens as far as the message flow and the mechanism of key exchange is concerned. The 4th scheme is proposed by Siegen University. This protocol is based on asymmetrical, certified based algorithms. By making use of Time Variant Parameters, digital signatures supply the authentication of the communicating partners.

The UMTS AKA protocol has the problem of the bandwidth consumption between SN and HN. It is attractive to choose a suitable length (L) value for AV in the third generation mobile networks. So, many techniques are developed to minimize the authentication signalling cost and network bandwidth consumption by selecting dynamic length (L) for an authentication vector (AL-Saraireh and Yousef, 2006), (AL-Saraireh and Yousef, 2007), (AL-Saraireh, 2011) and (3GPP, 2008). But with this improvement there is still bandwidth consumption (AL-Saraireh, 2011).

The technique of Lin and Chen basically estimated the number of authentication requests in current visited network based on the number in the previous visited network. Whereas the method of

AL-Saraireh and Yousef, estimated the number of authentication requests in current visited network based on the history of mobile movements and the arrival rate for events (AL-Saraireh and Yousef, 2007).

Juang and Wu proposed an efficient 3GPP AKA with robust user privacy. A temporary key to authenticate MS and prevent the location privacy attack is used. In this proposed protocol, the VLR initiates the authentication process by sending a random number to the MS without using any MAC (Juang and Wu, 2007). Therefore denial of services (DoS) attack is possible, additionally; the proposed protocol has seven steps.

A new UMTS AKA protocol called EAKAP is proposed in (Farhat et al., 2009). The EAKAP combines identification stage and AKA stage of UMTS AKA protocol. The problem in EAKAP is that the size of messages between MS, VLR/SGSN and HLR/AuC is increased. Therefore; the consumption of bandwidth is occurred. Subscriber identity/location confidential and non-repudiation services are solved by (Min-Shiang et al., 2010), the proposed scheme integrates symmetric and public key cryptosystem. An Enhancement for UMTS AKA protocol is proposed by Harn and Hsin used hash chaining technique instead of using AVs (Huang and Li, 2005).

Huang and Li (2005) proposed an extension of UMTS AKA protocol, called UMTS X-AKA, to overcome some of problems of UMTS AKA protocol. The UMTS X-AKA protocol used timestamp to manage re-freshness of the messages. A time synchronization infrastructure is required to use timestamp. So time-sync structure of the network has no security feature.

Daeyoung etal., proposed a privacy protecting UMTS AKA protocol is providing perfect forward secrecy. The proposed protocol used timestamp as X-AKA and used EC-based Diffie-Hellman key agreement protocol (Adi et al., 2007); therefore; the authentication time and setup time is increased.

Adi et al., proposed a technique for public key image authentication using fussy computations for El-Gamal authentication technique (Daeyoung et al., 2007), the security was enhanced while more computation overhead was incurred.

The current mechanism of security authentication in 3G system is known as AKA protocol. In this mechanism a secret key (K), and cryptographic algorithms are shared between MS and HN (AL-Saraireh and Yousef, 2006) and (Zhang and Fang, 2005).

AKA protocol has many weaknesses such as, the transmission between the HN and SN is usually expensive, the authentication vectors (AVs) consume network bandwidth for each transmission from authentication centre to SN (Lin and Chen, 2005), the storage space overhead occurs in SN, and bottleneck at HN, the HN is responsible for generating authentication vectors upon receipt of requests from all SN.

In this paper the UMTS AKA illustrates in section 2. In section 3, the UMTS authentication protocol is analysed. The efficient and secure AKA scheme is described in section 4. Section 5 presents security performance analysis for the proposed protocol. Simulation results, comparison and discussion between the UMTS AKA protocol and proposed protocol are presented in section 6. In section 7, the statistical test and validation is presented. The paper is concluded in section 8.

2. UMTS Authentication Protocol

The current mechanism of security authentication in 3G system is known as AKA protocol. In this mechanism a secret key (K), and cryptographic algorithms - f_1, f_1^*, f_2, f_3, f_4, f_5 and f_5^* - are shared between MS and HN (AL-Saraireh and Yousef, 2006) and (Huang et al., 2009).

There are two phases in AKA protocol, the first phase is the generation and distribution authentication vectors from the HN to the SN, and the second phase is the authentication and key agreement procedure between the MS and the SN (AL-saraireh and Yousef, 2007) and (Zhang and Fang, 2005). An overview of UMTS AKA is given in figure 1 (AL-Saraireh, 2011).
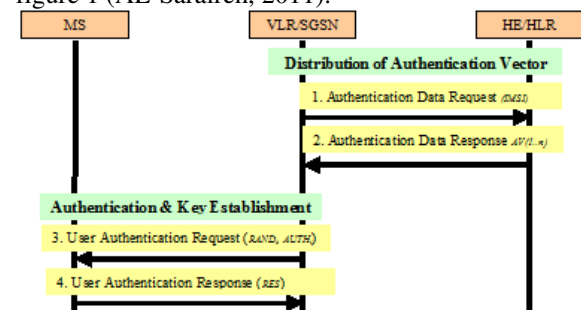
Figure 1. The Authentications and key agreement protocol.

Mobile station (**MS**) sends authentication request to the **SN**, which includes International Mobile Subscriber Identity **(IMSI)**. **SN** passes this authentication request to **HN**. **HN** sends authentication data response to **SN**, which include authentication vector (**AV**). Each authentication vector has five components: random number (**RAND**), expected response (**XRES**), cipher key (**CK**), integrity key (**IK**) and authentication token (**AUTN**). The authentication vectors are ordered by

the sequence number SQN_{HLR}. The authentication vector is generated according to the following steps (AL-Saraireh, 2011) and (Li et al., 2009):

    i. **HN** set **SQN** to **SQN_{HN}** and generates **RAND**.

    ii. **HN** computes the following values: **XRES**, **CK**, **IK**, **AK,** and **MAC**

    iii. **HN** assembles the authentication token **AUTN = (SQN $\oplus$ AK‖AMF‖MAC)** and the authentication vector (**RAND,XRES, CK, IK, AUTN**)

    iv. **HN** increments **SQN_{HLR}** by 1.

SN is receiving response from **HN** and then storing **AV**. The **SN** selects the ith authentication vector **AV(i)**, and sends (**RAND (i), AUTN(i)**) to **MS**. Each authentication vector is efficient for one authentication process (AL-Saraireh, 2011).

MS is receiving **RAND** and **AUTN** from **SN**. **MS** computes and retrieves the anonymity key **AK**, **SQN,** expected message authentication code **XMAC**. The **MS** compares **XMAC** with **MAC** which is included in **AUTN**. If they are different, then **MS** sends failure message to the **SN**. Otherwise, **MS** checks that the received **SQN** is in the correct range. If the **SQN** is not in the correct range, then **MS** sends failure message to the **SN**. Otherwise, if the **SQN** in correct range, the **MS** computes **RES** and sends it to **SN**. Lately, **MS** computes **CK** and **IK.**

SN is receiving authentication response from **MS**. **SN** compares the received **RES** with **XRES** in authentication vector. If **RES** is matching **XRES**, then authentications is successfully completed and select the **CK** and **IK** from authentication vector. If **RES** is unequal **XRES**, **SN** sends authentication failure to the **HN**.

3. Analysis Of UMTS Authentication Protocol

In this research work, a fluid mobility model, as in (AL-saraireh and Yousef, 2006), (Mohan and Jain, 1994) and (Skehill and McGrath, 2004) is used to investigate and analyse the performance of signalling traffic, load, and bandwidth that are generated by UMTS authentication protocols, and the delay in the call setup time (AL-Saraireh and Yousef, 2006).

Different mobility models used to describe aggregate and individual user movement behaviour such as Fluid Mobility model, Gravity model, Gaussian model, Random Walk model, and Markov model.

The fluid flow model is suitable for this research study because it is characterizes aggregate movement behaviour as the flow of a fluid. Fluid flow model describes the mobility in terms of the average number of users crossing the boundary of a registration area. Fluid-flow model is more suitable for users with high mobility, infrequent speed, and direction changes.

The fluid mobility model has the following parameters (AL-Saraireh and Yousef, 2006):

    i. User who is carrying mobile station (**MS**) is moving at an average velocity **v**;

    ii. Direction of **MS** movement is uniformly distributed over **[0, 2π]**;

    iii. Mobile users are uniformly populated with the density **ρ** within the registration area;

    iv. **L** is perimeter length Registration area (**RA**) boundary.

The rate of registration area crossing **R,** and the average number of active mobile crossing the registration area, is given by (AL-Saraireh and Yousef, 2006) and (Mohan and Jain, 1994):

$$R_{\mathrm{Re}\,gistration,RA} = \frac{\rho.v.L}{\pi} \qquad (1)$$

The signalling traffic for registration, origination, and termination of calls was calculated by using equation (1). Mobile traffic of the network depends on the **MS** user's movement. Table 1 summarises assumptions, which are made to perform numerical analysis (AL-Saraireh and Yousef, 2006) and (Porta et al., 1996).

Table 1. Assumption parameters.

Parameter	Value
Total registration area (RA)	128
Square registration area size	$(8.65km)^2$= 74.8225 km^2
Border length L	32.45 km
Mean density of mobile ρ	328 /km^2
Total of MS	3.5 million
Average call origination rate	2/hr/user
Average call termination rate	2/hr/user
Average speed of user who is carrying mobile, v	5.95 km/hr

The rate of deregistration area crossing R is equivalent to the rate of registration (AL-Saraireh and Yousef, 2006).

$$R_{Registration,RA} = R_{Deregistration,RA} \qquad (2)$$

The total number of authentication request messages per second that arrive at the HLR/HN is [(AL-Saraireh and Yousef, 2006):

$$R_{Registration,HLR} = R_{registration,RA} * Total\ number\ of\ RA \qquad (3)$$

The total number of authentication requests due to call origination per serving network (SN) is equivalent to the total number of authentications due to call termination per serving network. The total number of authentication requests due to call

origination per serving network ($R_{Call\ orignation\ /\ SN}$) is calculated as follows (AL-Saraireh and Yousef, 2006):

$$R_{call\ Origination\ /\ SN} = Call\quad Rate\quad Per\,User$$

$$= Average\,Call\,Origination\,Rate * Total\,of\,MS \quad (4)$$

The number of calls origination per registration area ($R_{Call\ orignation\ /\ RA}$) is calculated as (AL-Saraireh and Yousef, 2006):

$$R_{Call\quad orignation\quad /\,RA} =$$

$$\frac{R_{Call\quad orignation\quad /\,SN}}{Total\quad registarti\quad on\quad Area}) \quad (5)$$

The number of calls terminating per registration area ($R_{Call\ Termination\,/\,RA}$) is equivalent to the number of call originations per registration area, $R_{Call\ Termination\,/\,RA}$ (AL-Saraireh and Yousef, 2006).

The security performance for the current UMTS authentication and key agreement protocol was analyzed by (AL-Saraireh and Yousef, 2006) and the results are summarized as follows:

Table 2 summarizes the total authentication requests per VLR/SN and HLR/HN for each type of activity, as computed by (AL-Saraireh and Yousef, 2006).

Table 2: Total authentication requests per second (s) for VLR and HLR.

Activity	VLR/s	HLR/s	Total/s
Registration	5.60	716.80	722.40
Call Termination	15.19	1944.40	1959.59
Call Origination	15.19	1944.40	1959.59
Total/ Network	35.98	4605.60	4641.58

The signalling messages flow for each activity: registration, call origination, and call termination was summarised in (AL-Saraireh and Yousef, 2006), as shown in table 3.

Table 3: Signalling messages per authentication request for each activity.

Activity	AuC	HLR	VLR	Old VLR	Total
Reg.	2	4	5	1	12
Call Term.	2	4	5	0	11
Call Orig.	2	4	5	0	11
Total	6	12	15	1	

The total signalling traffic and load transaction messages between mobile databases (VLR/SN and HLR/HN) was computed by [1] as shown in table 4, based on the results from table 2 and table 3.

Table 4: Total signalling traffic and load transaction messages/s for each activity in UMTS

Activity	AuC	HLR	VLR	Old VLR	Total
Regist.	1433.60	2867.20	28.01	5.60	4334.41
Call Term.	3888.80	7777.60	75.95	0	11742.35
Call Orig.	3888.80	7777.60	75.95	0	11742.35
Total	9211.20	18422.40	179.91	5.60	

As shown in table 4, the relationships between the velocity of movement of users and the total authentication requests per VLR/SN and HLR/HN for the UMTS authentication process is directly proportional, and the relationship between the registration area and total authentication requests per VLR/SN and HLR/HN for the UMTS registration process is directly proportional. Table 5 has the authentication parameters that were used to compute the bandwidth for each activity (AL-Saraireh and Yousef, 2006).

Table 5: Authentication parameters.

Parameter	Length (bits)
IMSI	128
Key K	128
Random Challenge RAND	128
Sequence Number SQN	48
Anonymity Key AK	48
Authentication Management Field AMF	16
Message Authentication Code MAC	64
Cipher Key CK	128
Integrity Key IK	128
Authentication Response RES	32
Authentication token AUTN	128
Authentication vector AV as one record	544
Standard number of record in authentication vector	5
Location Area Identifier LAI	40
Service Request	8

The authentication delay is the time between the MS sends an authentication request until the MS receive the authentication response. Al-Saraireh and Yousef were assumed that the authentication time delay is T_{auth} and the time delay to access the VLR/SN database is the same as to access the HLR/HN database, and they let this time to be T_{DB} and the time between MS and VLR/SN is $T_{MS \leftrightarrow VLR\,/\,SNh}$. The authentication delay was computed by (AL-Saraireh and Yousef, 2006) as follows:

$$T_{Auth} = 4 * T_{DB} + 3 * T_{MS \leftrightarrow VLR\,/\,SN} \quad (6)$$

Table 6 summarises the bandwidth consumed between the MS and VLR/SN and between databases, as computed by (AL-Saraireh and Yousef, 2006).

Table 6: Bandwidth Consumptions between entities for AKA protocol.

Activity	Bandwidth between MS and VLR/MSC (Bytes/S)	Bandwidth between Databases(Bytes/S)	Total
Registration	324.80	2531.20	28560
Call Orig./Term.	881.02	6865.88	7746.90
Total/ Network	1205.82	9397.08	10602.90

4. The Proposed Efficient Authentication Protocol (E-AKA)

E-AKA is used to eliminate the security weakness involved with UMTS AKA. E-AKA is considered as a secure and an efficient authentication scheme. In the E-AKA scheme VLR/SN has the capability to authenticate the user without intervention of HLR/HN.

The E-AKA uses a new key generation functions called fx to generate the temporary key (TK). The fx function produces a 128 bits or higher bits to provide high level of security. In the proposed protocol, the SN is able to authenticate the MS after the initial authentication has been performed. The proposed authentication protocol contains two operation modes for initial and subsequent authentication. The first mode is registration and distribution of authentication information (Initial Authentication) and temporary key (TK) from the HLR/HN to the VLR/SN. The second mode is the authentication and key agreement procedure (Subsequent authentication) performed between the MS and the VLR/SN.

Figure 2 and 3 describe authentication mechanism for the proposed protocol. The authentication procedure is described as follow:

Step 1: Authentication Request Message: When MS needs authentication to network, to access or to use the network services, the initial authentication is carried out as follow:

1.1 **MS** generates random number **(Rand$_{MS}$)**,
1.2 **MS** computes the Message Authentication Code **MAC$_{MS}$= f$_1$(K, Rand$_{MS}$)**,
1.3 **MS** sends **IMS, Rand$_{MS}$** and **MAC$_{MS}$** as authentication request to **VLR/SN**.

Step 2: Authentication Request Message: **VLR/SN** passes this authentication request to **HLR/HN**.

Step 3: Authentication Response Message: Receiving the authentication request and then verification procedure is performed by **HLR/HN**. A response message is generated. The following operations are carried by **HLR/HN**:

3.1 Compares and computes expected message authentication code for mobile station **(XMAC$_{MS}$)** to verify the received message.

$XMAC_{MS}=f_1(K, Rand_{MS})$
$XMAC_{MS} ?= MAC_{Ms}$

If mismatching occurs then the registration will fail otherwise it will execute the next steps.

3.2 Generates **SQN$_{HLR}$** and **RAND$_{HLR}$**.
3.3 Computes expected response **XRES$_{HLR}$ = f$_2$(K,RAND$_{HLR}$)**, Anonymity Key **AK$_{HLR}$ = f$_5$(K,RAND$_{HLR}$)**, Message Authentication Code **MAC$_{HLR}$ = f$_1$(K,SQN‖RAND$_{HLR}$‖MAF)**, where **MAF** is Message Authentication Field and authentication token **AUTN$_{HLR}$ = (SQN ⊕ AK$_{HLR}$‖AMF‖MAC$_{HLR}$)** where ⊕ is exclusive OR operation.
3.4 Computes temporary key **TK = f$_x$(K,RAND$_{HLR}$)**.
3.5 Sets response messages and sends it to **VLR/SGSN**, including one authentication vector **AV**. This **AV** consists of four components: **RAND$_{HLR}$, XRES$_{HLR}$, TK** and **AUTN$_{HLR}$**.

$$AV = RAND_{HLR}‖ XRES_{HLR}‖TK‖ AUTN_{HLR}$$

Step 4: Authentication Response Message: Receiving the response message from **HLR/HN**, **VLR/SN** will invoke the authentication to the **MS**. **VLR/SN** will achieve the following:

4.1 Stores the **TK, AUTN$_{HLR}$** and generates **Rand$_{VLR}$**.
4.2 Computes **MAC$_{VLR}$=f$_1$(TK, MAC$_{HLR}$‖Rand$_{VLR}$)** where the **MAC$_{HLR}$** retrieved from **AUTN$_{HLR}$** which stored in previous step.
4.3 Computes **AUTN$_{VLR}$ = (SQN$_{HLR}$ ⊕ AK$_{HLR}$‖AMF‖MAC$_{VLR}$)**
4.4 **VLR/SN** sends **AUTH$_{VLR}$, Rand$_{VLR}$** and **Rand$_{HLR}$** to **MS**

Step 5: Authentication Response Message: When **MS** receives the messages, the **MS** will achive the following:

5.1 Computes **TK=f$_x$(K, Rand$_{HLR}$)**.
5.2 Verifies that the received sequence number **SQN** is in the correct range. If the **MS** considers the sequence number to be not in the correct range, it sends synchronization failure back to the **VLR/SN** including an appropriate parameter, and abandons the procedure.
5.3 Computes **XMAC** for **HLR** and **VLR**.

XMAC$_{HLR}$ = f$_1$(K, AK$_{MS}$ ⊕ (SQN$_{HLR}$ ⊕ AK$_{HLR}$)‖Rand$_{HLR}$‖ AMF) where **Rand$_{HLR}$** and **AMF** are retrieved from **AUTN$_{VLR}$**
XMAC$_{VLR}$ = f$_1$(TK, XMAC$_{HLR}$‖Rand$_{VLR}$). If **XMAC$_{VLR}$** is equal **XMAC$_{VLR}$** then **HLR/HN** and **VLR/SN** are valid,

5.4 Computes an **XRES = f$_2$(TK, Rand$_{VLR}$)**
5.5 Sends **XRES** to **VLR/SN**. While, the **MS** computes an integrity key as **IK = f$_3$(TK, Rand$_{VLR}$)** and a cipher key as **CK = f$_4$(TK, Rand$_{VLR}$)** to realize securely communication with **VLR/SN** subsequently.

Step 6: Authentication Response Message: **VLR/SN** receives the messages from **MS** and verifies whether **RES** is identical to the **XRES**. If it is true, the whole authentication is successfully completed. If it is false, the authentication is failed.

After the initial authentication, both the **VLR/SN** and **MS** obtain the authentication result from the **HLR/HN** and share some secret information. Here, the **VLR/SN** caches some authentication information, which can be used in subsequent authentication without intervention of **HLR/HN**.

After initial authentication, the **VLR/SN** has the ability to authenticate the **MS** in subsequent authentication. If the **MS** remains in the same **VLR/SN** and requests services, then the user should ask for subsequent authentication. **MS** similarly generates an authentication request message, which should contain the information shared between the **MS** and **VLR/SN**; the **VLR/SN** uses this information to authenticate the **MS**. **VLR/SN** authenticates **MS** by using temporary key **TK**.

As mentioned above, the **VLR/SN** has cached information needed to authenticate **MS**. After authenticating the **MS**, the **VLR/SN** sends a response message containing the authentication result to the **MS**. The **MS** receives the response message and learns whether the authentication was successful or not. The subsequent authentication is described as follows:

Step 1: Authentication Request Message: **MS** sends authentication request to **VLR/SN**

Step 2: Authentication Request Message: When **VLR/SN** receives the request message, **VLR/SN** will do the following:

2.1 Generates **Rand$_{VLR}$**

2.2 Computes authenticate token **AUTN = SQN $\oplus$ AK ||AMF ||MAC**

Where AK = $f_5(TK,RAND)$, and **MAC = $f_1(TK,SQN||RAND||MAF)$.**

2.3 Sends **AUTN** and **RAND** to **MS**.

Step 3: Authentication Response Message: When **MS** receives the response message, **MS** will achieve the following:

3.1 Computes and retrieves the **AK = f_5 (TK, Rand)**, **SQN =((SQN $\oplus$ AK) $\oplus$ AK)**, and **XMAC = f_1 (SQN, RAND, AMF)**

3.2 Compares **XMAC** with **MAC** which is included in **AUTN**. If **XMAC** is not equal to **MAC** then **MS** sends failure message to the **VLR/SN**, else if **XMAC** is equal **MAC** then **MS** checks that the received **SQN** is in the correct range i.e. **SQN > SQN$_{MS}$**. If **SQN** is not in the correct range then **MS** sends failure message to the **VLR/SN**, else if

it is in the correct range, then **MS** computes the Response **RES = f_2 (TK, RAND)**, and **CK = f_3 (TK, Rand)**. After that, it sends **RES** to **VLR/SN.**

Step 4: Authentication Response Message: **VLR/SN** receives the messages from **MS** and verifies whether **RES** is identical to the **XRES**. If it is true, the whole authentication is successfully completed. If it is false, the authentication is failed.
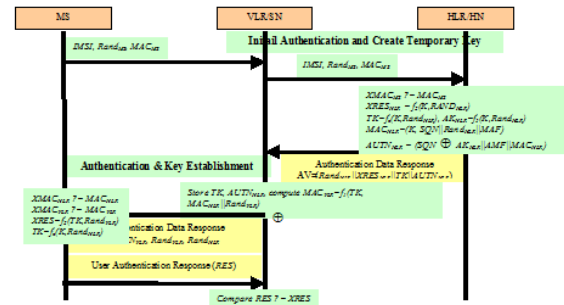
Figure 2. Registration and distribution of authentication information (Initial Authentication) in EAKA
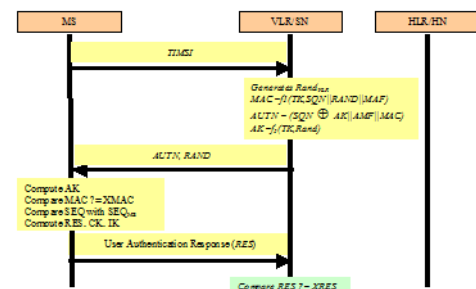
Figure 3. Subsequent authentications in EAKA

5. Analysis of the Proposed Protocol

Figure 4 illustrates the signalling messages flow for registration activity in the proposed protocol. The signalling messages flow for call origination and termination (i.e., subsequent authentication) is represented in figure 5.

The total signalling traffic and load transaction messages between the mobile database (VLR/SN and HLR/HN) are shown in table 8, and are calculated from the values in tables 2 and 7. The rate of registration area crossing R is calculated by using equation (1):

$$R_{registration,RA} = \frac{328 * 5.95 * 32.45}{1hr * 60\min * 60\sec * \pi} = 5.60/\sec$$

By using equation (2), the rate of deregistration area crossing R is equivalent to the rate of registration.

$$R_{Deregistration, RA} = 5.60 / \sec$$

The total number of authentication request messages per second that arrive at the HLR by using equation (3)

$$R_{registration, HLR} = 5.60 * 128 = 716.8 / \sec$$

The total number of authentication requests due to call origination per serving network (SN) is equivalent to the total number of authentications due to call termination per serving network. The total number of authentication requests due to call origination per serving network ($R_{Call\ orignation / SN}$) is calculated by using equation (4) as follows:

$$R_{call\ Origination / SN} = \frac{2 * 3.5 million}{1 hr * 60 \min * 60 \sec} = 1944.4 / s$$

The total number of calls terminated $R_{Call\ termination / SN} = 1944.4 / s$.

By using equation (5), the number of calls origination per registration area ($R_{Call\ orignation / RA}$) is:

$$R_{Call\ orignation / RA} = \frac{1944.4}{128} = 15.19 / s$$

The number of calls terminating per registration area ($R_{Call\ Termination / RA}$) is equivalent to the number of call originations per registration area, $R_{Call\ Termination / RA} = 15.19 / s$.

From figures 4 and 5, the signalling messages per authentication for each activity registration, call origination, and call termination is summarised table 7. The total signalling traffic and load transaction messages between the mobile database (VLR/SN and HLR/HN) are shown in table 8, and are calculated from the values in tables 2 and 7.
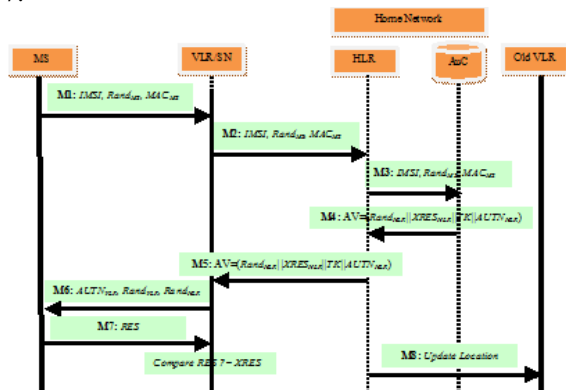
Figure 4. Signalling messages flow for the E-AKA protocol (Registration, initial Authentication).
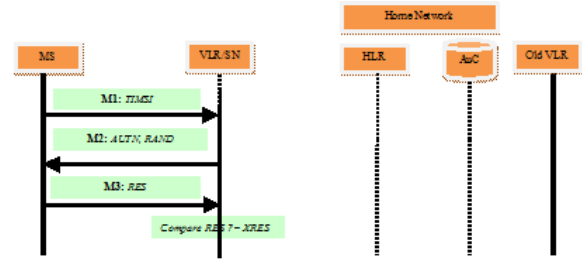
Figure 5. Signalling messages flow for the E-AKA protocol (Subsequent Authentication).

Table 7. Signalling messages per authentication request in the proposed protocol.

Activity	AuC	HLR	VLR	Old VLR	Total
Reg.	2	4	5	1	12
Call Term.	0	0	3	0	3
Call Orig.	0	0	3	0	3
Total	2	4	11	1	

Table 8. Total signalling traffic and load transaction messages per second for each activity in the

Activity	AuC	HLR	VLR	Old VLR	Total
Regist.	1433.60	2867.20	28.01	5.60	4334.41
Call Term.	0	0	45.57	0	45.57
Call Orig.	0	0	45.57	0	45.57
Total	1433.60	2867.20	119.20	5.60	

For registration and distribution of authentication (i.e., initial authentication), the authentication delay for the proposed protocol $T_{Initial\ Auth}$ is computed as follows:

$$T_{Initial\ Auth} = 4 * T_{DB} + 3 * T_{MS \leftrightarrow VLR / SN} \qquad (7)$$

While for subsequent Authentication, the authentication delay for proposed protocol $T_{Subsequent\ Auth}$ is:

$$T_{Subsequent\ Auth} = 3 * T_{MS \leftrightarrow VLR / SN} \qquad (8)$$

The average of authentication delay for proposed protocol $T_{Avgl\ Auth}$ is:

$$T_{Avg\ Auth} = \frac{(T_{Initial\ Auth} + T_{Subsequent\ Auth})}{2} \qquad (9)$$

In initial authentication to compute the bandwidth, there are seven messages to authenticate MS, three of them between the MS and VLR/SN, and the other four are between databases. For subsequent authentication, there are three messages between MS and VLR/SN.

For Initial authentication, the size of these messages between MS and VLR/SN can be computed as follows:

(i) M1 is the first message which contains the following parameters: IMSI/*TMSI,Service request, and LAI*. The length of message 1 is computed as follow:

$$Length(M1) = Length(IMSI/TMSI) +$$

$$Length(Service\ Request) +$$

$$Length(LAI) + Length(Rand_{MS}) +$$

$$Length(MAC_{MS}) \qquad (10)$$

$$Length(M1) = 128 + 8 + 40 + 128 + 64 = 368\ bits$$

(ii) M6 is the sixth message which contains the parameters: $AUTN_{VLR}$, $Rand_{VLR}$, $Rand_{HLR}$, the length of message six is:

$$Length(M6) = Length(AUTN_{VLR}) + Length(Rand_{VLR}) + Length(Rand_{HLR}) \ldots (11)$$

$$Length(M6) = 128 + 128 + 128 = 384\ bits$$

(iii) M7 is the seventh message between **MS** and **VLR/SN** which contains only *RES*. The length of M7 is:

$$Length(M7) = Length(RES) = 32 bits \quad (12)$$

The total size of authentication messages between MS and VLR/SN is calculated as follows:

$$Length\ (MS \xleftrightarrow{messages} VLR/SN) =$$

$$Length\ (M1) + Length\ (M6) +$$

$$Length\ (M7) \qquad (13)$$

$$= 368 + 384 + 32 = 784\ bits = 98\ bytes$$

The size of messages between databases for initial authentication is computed as following:

(i) M2 is the second message which contains the following parameters: IMSI/*TMSI,Service request, LAI, Rand_{MS}*, and *MAC_{MS}*).

$$Length(M2) = Length(M1) = 368\ bits \qquad (14)$$

(ii) M3 is the third message, which contains the same parameters as M1 and M2.

$$Length\ (M3) = Length\ (M2)$$

$$= Length\ (M1) = 368\ bits \qquad (15)$$

(iii) M4 is the fourth message, which contains only one *AV*.

$$Length(M4) = Length(AV) =$$

$$Length(Rand_{HLR}) + Length(XRES_{HLR}) +$$

$$Length(TK) + Length(AUTN_{HLR}) \qquad (16)$$

$$= 128 + 32 + +128 + 128 = 416\ bits$$

(iv) M5 is the fifth message, which contains parameter same as M4.

$$Length(M5) = Length(M4) = 416\ bits \qquad (17)$$

The total size of authentication messages between databases is:

$$Length(VLR/SN \xleftrightarrow{messages} HLR/HN$$

$$+ HLR/HN \xleftrightarrow{messages} AuC/HN) =$$

$$Length(M2) + Length(M3) +$$

$$Length(M4) + Length(M4) \qquad (18)$$

$$= 368 + 368 + 416 + 416 = 1568\ bits = 196\ bytes$$

The total size of messages in the initial authentication process is:

$$Length(InitialAuth) = 98 + 196 = 294\ bytes$$

For subsequent authentication, the size of these messages between *MS* and *VLR/SN* can be computed as follows:

(i) M1 is the first message which contains the following parameters: IMSI/*TMSI,Service request, LAI, Rand_{MS}*, and *MAC_{MS}*). The length of M1 is:

$$Length(M1) = Length(IMSI/TMSI) +$$

$$Length(Service\ Request) + Length(LAI) \qquad (19)$$

$$Length(M1) = 128 + 8 + 40 = 176\ bits$$

(ii) M2 is the second message includes *AUTN* and *Rand*. The length of M2 is:

$$Length(M2) = Length(AUTN) + Length(Rand) \qquad (20)$$

$$Length(M2) = 128 + 128 = 256\ bits$$

(iii) M3 is the third message includes *RES*. The length of M3 is:

$$Length(M3) = Length(RES) = 32\ bits \quad .(21)$$

The total size of messages in the subsequent authentication process is:

$$Length\ (Subsequent\ Auth) = Length\ (M1) +$$

$$Length\ (M2) + Length\ (M3) \qquad (22)$$

$$= 176 + 256 + 32 = 464\ bits = 58\ bytes.$$

The average total size of messages in proposed authentication protocol is:

$$Length(Avg.Auth) =$$

$$\frac{Length(InitialAuth) + Length(SubsequentAuth)}{2} \qquad (23)$$

$$= \frac{294 + 58}{2} = 176\ bytes$$

As shown in table 2, for registration activity there are 5.60 authentication requests and for origination/termination call activity there are 15.19 authentication requests. Table 9 summarises the bandwidth used between the MS and VLR/SN, and between databases.

Table 9. Bandwidth that is used between entities for proposed protocol.

Activity	Bandwidth between MS and VLR/MSC (Bytes/S)	Bandwidth between Databases(Bytes/S)	Total
Registration	548.80	1097.60	1846.40
Call Orig./Term.	881.02	0	881.02
Total/ Network	1429.82	1097.60	2527.12

6. Simulation Results and Discussion

To analyze signalling traffic performance, load transaction messages and bandwidth, the simulation study has been carried out. Different simulation scenarios are carried out by using different mobility rates. The software that has been used to simulate the current and proposed authentication protocol is network simulator (NS-2). NS-2 is an object-oriented, discrete event driven network simulator developed at UC Berkely.

In the proposed protocol, the signalling messages are reduced between the mobile network entities. Tables 10, 11, 12, and 13 illustrate the differences between current UMTS authentication protocol and the proposed protocol. The current protocol needs 12 messages between mobile network entities to perform registration or 11 messages for call origination/termination, but proposed protocol needs only 12 messages to perform registration or 3 messages for call origination/termination.

The results show that the authentication delay and current load transaction messages between entities and bandwidth are minimised when compared with the current protocol, as illustrated in figures 6, 7, 8, and 9. Therefore, the performance and the authentication delay time have been improved significantly. As shown in table 12, the percentage of improvement is more than 67.55%. From equations 6, 7, 8, and 9, where it is assumed that TDB = 1ms, the proposed protocol has less delay than the current UMTS protocol as shown in figure 6.

Table 10. Compare signalling messages between current and proposed authentication protocol.

Activity	Current Protocol				Proposed Protocol			
	AuC	HLR	VLR	Old VLR	AuC	HLR	VLR	Old VLR
Registration	2	4	5	1	2	4	5	1
Call Term./Orig	2	4	5	0	0	0	3	0

Table 11. Compare total signalling traffic and load messages per second between entities for each activity.

Activity	Current Protocol				Proposed Protocol			
	AuC	HLR	VLR	Old VLR	AuC	HLR	VLR	Old VLR
Regist.	1433.60	2867.20	28.01	5.60	1433.60	2867.20	28.01	5.60
Call Term./Orig	3888.80	7777.60	75.95	0	0	0	45.57	0

Table 12. Compare total signalling traffic and load messages per second between entities.

Entity	Current Protocol	Proposed Protocol	% improvement
AuC	9211.20	1433.60	84.44
HLR	18422.40	2867.20	84.44
VLR	179.91	119.15	33.77
Average of Improvement %			67.55

Table 13: Compare the bandwidth for each activity between database and VLR/MSC.

	Bandwidth Between MS and VLR and Between Data Bases					
	Current Protocol			Proposed Protocol		
Activity	VLR	Database	Total	VLR	Database	Total
Registration	324.80	2531.20	2856.00	548.80	1097.60	1646.40
Call Term./Orig	881.02	6865.88	7746.90	8281.02	0	881.02
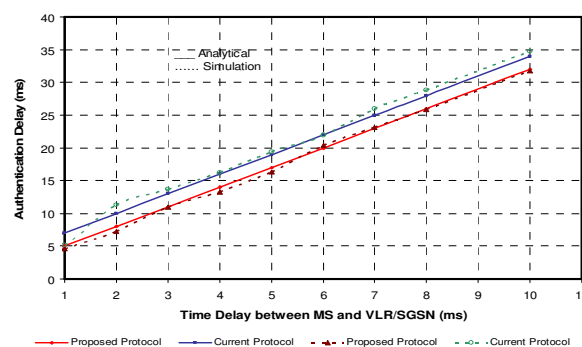
Figure 6. Authentication delay when $T_{DB} = 1ms$
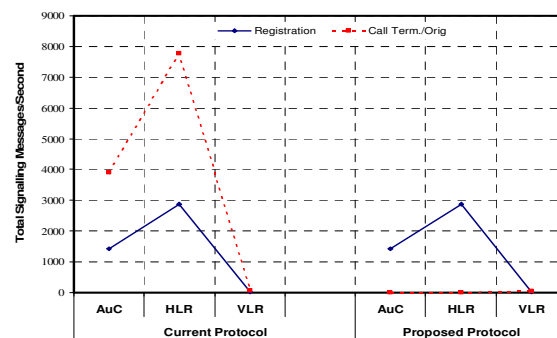
Figure 7. Load transaction messages per second between entities.
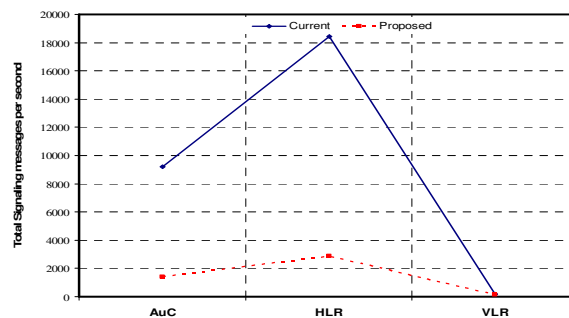
Figure 8. Total signalling messages/second for all activity in current and proposed protocol.
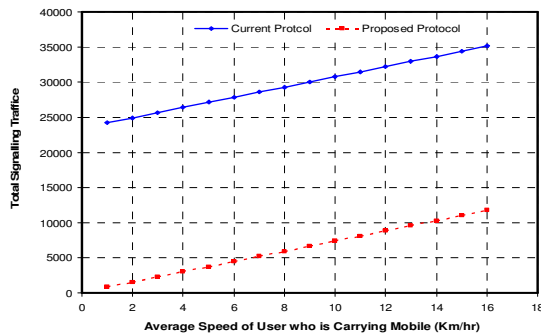
Figure 9. Network signalling traffic with different mobility rate.
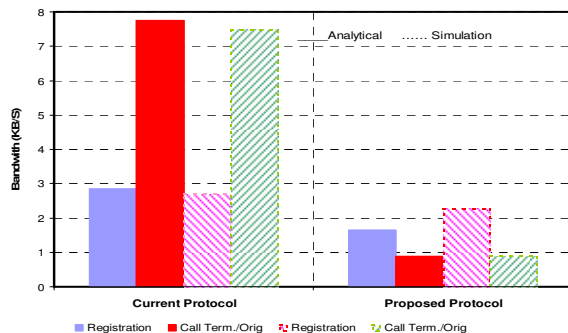
Figure 10. Comparing the bandwidth for each activity between current and proposed protocol.
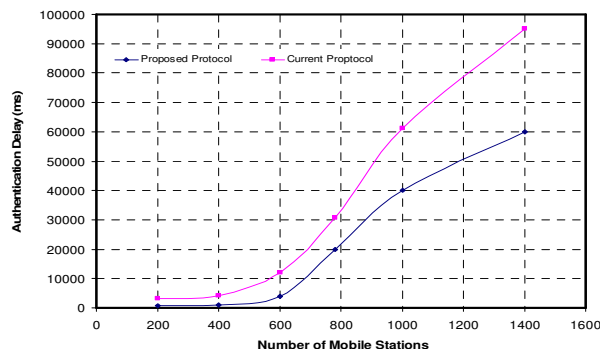
Figure 11. Authentication delay when the number of MS increased (simulation results).

7. Statistical Tests And Validation

The analysis of variance (ANOVA) method was used to compare the difference current and proposed protocol, and between analytical and simulation results, whether significant or insignificant.

For analytical results, the average authentication delay for the proposed protocol is (15.80) and current protocol is (17.80), by using the T-test showed a significant difference at (0.05) level of significance. For simulation results, the average authentication delay for the proposed protocol is (15.60), while the average of the current protocol is (18.14), by using the T-test showed a significant difference at (0.05) level of significance.

For the proposed protocol, when comparing the

average authentication delay between the analytical results (15.80) and the simulation results (15.60), an insignificant difference was found. That was based on the statistical test, which was done using an independent T-test at (0.05) level of significance. When comparing the average authentication delay between the analytical results (17.80) and the simulation results (18.14) for current protocol, an insignificant difference was found. That was based on the statistical test, which was done using an independent T-test at (0.05) level of significance.

For analytical results, the average bandwidth for the proposed protocol is (1.26) and for the current protocol is (5.30), by using the T-test showed a significant difference at (0.05) level of significance. When compare the average bandwidth for the proposed protocol (1.59) with the average of the current protocol (5.09) for the simulation results, by using the T-test showed a significant difference at (0.05) level of significance.

For the current protocol, when comparing the average bandwidth between the analytical results (5.30) and the simulation results (5.09), an insignificant difference was found. That was based on the statistical test, which was done using an independent T-test at (0.05) level of significance. When comparing the average bandwidth between the analytical results (1.26) and the simulation results (1.59) for the proposed protocol, an insignificant difference was found. That was based on the statistical test, which was done using an independent T-test at (0.05) level of significance.

It can be concluded from the above analysis of the authentication delay and bandwidth consumption that there are very little differences between the simulation and analytical results, and there is an enhancement from the current protocol.

8. Conclusion

In this research work, the UMTS authentication and key agreement protocol, and the signalling traffic that is generated by registration, call termination, and call origination, have been investigated and analysed. There has also been an analysis of the bandwidth that is used between MS and VLR, and between database registers. The proposed authentication protocol has improved the performance of authentication by reducing the authentication times, setup time and data sizes. In addition, the proposed authentication mechanism has less signalling traffic, and consequently the bottleneck at authentication centres is avoided by reducing the number of messages between mobiles and authentication centres.

The proposed authentication for UMTS has been generated with the aim of not only keeping the complexity of this function as low as possible, but also keeping a high level of security and efficiency for the bandwidth used.

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Antimicrobial activity of Curcumin upon pathogenic microorganisms during manufacture and storage of a novel style cheese 'Karishcum''.

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Abstract: A survey study was made to evaluate the level of microbial contamination of 35 samples of Karish cheese retailed in Cairo area in compare with the Egyptian standard (ES-1008-2000). Survey results indicated that the brand cheese showed the highest quality, while the street & shop made and vend cheese samples showed the higher the ACC and the worst mycological quality, as reached >10^3 cfu/g for each of mold and yeast counts. So, 57% of Karish cheese samples would not be accepted due to the high mycological counts. Coliform group and *Escherichia coli* as fecal indicator contamination were detected in 57 and 25.7 % of the retailed Karish cheese samples, in averages of ~10^3 cfu/g of the Coliform counts, respectively. However, *Staphylococcus aureus, Bacillus cereus and Listeria monocytogenes* were isolated from 17, 8.5 and 2.8 % of the total Kariesh samples, respectively, but any was isolated from the brand cheese. A novel style of Karish cheese was made by adding *Curcuma. Longa* (Curcumin or Turmeric) at a rate of 0.3% (w/v), to obtain a new dairy product "Karishcum". A primary experiment was done to determine the correct percentage of Curcumin addition to cheese milk to get good taste and long shelf-life. A panel test was carried out to determined organoleptic properties of "Karishcum". The behavior of pathogenic bacteria in artificially contaminated during cold storage period at 7°C+1,for 14days, revealed that addition of aqueous Curcumin extract (0.3%) achived a reduction of bacterial counts obout one log of *Salmonella typhimrium*, tow log of *Pseudomonas aurogenosa* and *E.coli0157:H7*, respectively. Meanwhile each *of S.aureus, B.cereus* and *L.monocytogenes* were vanished at the end of the cold storage period (14 days).
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Keywords: Antimicrobial; Curcumin ; microorganisms; Karishcum

1. Introduction

Development of bacterial resistance to the available antibiotics and increasing popularity of traditional medicine has led researchers to investigate the antibacterial compounds in plants. *Curcuma longa* is a medicinal plant that botanically is related to *Zigberiaceas* family, (Chattopadhyay et al, 2004). Turmeric powder, derived from the rhizome of *Curcuma. longa*, is commonly used as a spice, food preservative, and food coloring agent, (Aggarwall et al,2007.,Di Mario et al 2007.,Menon and Sudheer,2007).It also has a long history of therapeutic use ,(chattopadhyay et al ,2004). Curcumin is an oil soluble pigment, (Stan kovic, 2004), according to (Kurien et al., 2007), Curcumin has extremely limited water solubility, and however the water solubility of Curcumin could be increased from 0.6 ug/ml, to 7.4 ug/ml, (12 fold increase) by the use of heat. It is also soluble in ethanol and acetone,(Joe et al, 2004). The chemical structure of Curcumin is well known. Curcumin have a wide spectrum of biological actions such as anti-inflammatory, (Puntihavathi et al.,2000) ,Siddiqui et al., 2006), antioxidant , (Mohammadi et al., 2005).,Menon and sudheer 2007).), anticancer.,(Lotempio et al .,2005) ,antidiabetic .,(Aggarwal et al .,2007)),

antiallergic, (Suzuki et al.,2005),antiviral , (Si et al.,2007), antiprotozoal,(Reddy et al., 2005), and antifungal activities ,(Chatopadhyay et al .,2005).It contains a mixture of powerful antioxidant phytonutrients known as Curcuminoids and inhibits cancer at initiation, promotion and progression stages of tumor development. It is a strong anti-oxidant which supports colon health, exerts neuroprotective activity and helps to maintain a healthy cardiovascular system, (Luthra et al., 2001).

A recent trend in cheese manufacture is production of nature flavored cheese made in short time with highly nutritive value and good microbiological quality as for human consumption, (Abou-Zeid., 1992, Hussein., 2004 and Foad et al., 2006). Therefore, the present study was conducted to use *Curcuma. Longa* in the preparation of new style Karish cheese named (Karishcum), based on traditional Egyptian Karish cheese. In Karishcum, the shelf life potential, panel test, pH values and growth & survival of some food borne pathogens is a target of this study either in fresh cheese or during storage especially after the survey was done. This study also supports the increasing interest in the utilization of medicinal plants for production of novel styles of food products for the beneficial of consumer's health and wealth.

2. Materials and methods

Material :

1-Samples:

35 of Karish samples were collected from great Cairo governorate, in sterilized plastics pages, and kept in refrigerator for microbiological analysis .

1.Pathogenic bacterial strains source :

Escherichia coli 0157:H7, Bacillus cereus, Listeria monocytogenes, Staphylococcus aureus and *Salmonella typhimurium as reference* and test strains were obtained from the Central Public Health Laboratories; (Ministry of Health).These strains were maintained and propagated in tryptone soya broth and agar until use.

2- Curcumin powder: Curcumin was purchased from retail spice-Cairo market.

3-Milk: Fresh bufflo's skim milk was obtained from the herd of faculty of Agriculture, Cairo University.

Methods:

1-Culture preparation (test strains):

The test pathogenic strains were routinely transferred into brain heart infusion broth (oxoid), incubated at 37°C for 24 hr. After sufficient growth, turbidity was observed; the cultures were diluted in saline solutions to an appropriate inoculum size, by diluting the strain suspension equivalent to the turbidity standard No.1 of the McFarland nephelometer scale (McFarland, 1907).

2-The diluted Curcumin: The solution was prepared according to Murad (1998).Aqueous extract prepared from Curcumin powder by boiling of 10% (w/v) . Then Left for sedimentation.

3-Antimicrobial activity of Curcuma Longa in nutrient agar medium: Was done according to Barry (1986).Using an agar diffusion method (disk assay) used as a qualitative method.

4-Karishcum cheese making:

 Karish cheese was prepared according to Fahmi (1960) and modified with addition of Curcuma Longa powder as follows: The bulk milk was divided into three parts:

Cheese analysis:

Cheese samples were taken aseptically freshly and after 2, 3, 5, 7, and 14 days of storage periods. Samples were evaluated for their organoleptical properties, pH values were measured as well as microbiological properties.

Organoleptic properties:

Organoleptic properties of cheese samples were evaluated according to EL-Koussy,(1966) when fresh ,48hr ,72hr, 5,7,14 days of refrigerated storage by ten expert panelists of members of Dairy Science and Technology, Department ,National Research Center.

pH values:

pH values was measured by direct inserting the combined electrode(digital pH model Hanna, 4817) into well-mixed samples.

Microbiological analysis:

Cheese samples (25/g) was homogenized for 1 /min with 225/ml of sterile solution (2% w/v) of sodium citrate. Methods of microbiological analysis were followed according to, APHA (1992) for: Total bacterial count on plate count agar (Oxoid),total coliform on Violet Red Bile agar (Oxoid),Mould and yeast on acidified Potato Dextrose agar(Oxoid),*Staphylococcus aureus* on Baird Parker medium (Oxoid),*E.Coli o157:H7* was determined on Sorbitol MaConkey agar(Oxoid), *Bacillus cerues* was enumerated on Manitol Egg Yolk Polymyxin agar (Oxoid) following the surface plate method and incubated at 37°C for 18-24hr ,Holbrook&Andreson, (1980),*Salmonella Typhimurium* was enumerated by surface plating technique on Salmonella Sgidella agar (Ox0id),*Listeria monocytogenes* was enumerated on Oxford Selective agar base (Oxoid) supplemented with listeria selective supplement using surface plating technique, plates were incubated at 32°C for 48hr,Curtis et al (1989), and *Lactic Acid Bacteria* (LAB) on Elliker Medium according to ,Elliker et al (1956).

BulkMilk

Part 1: **Without addition of neither of Curcuma Longa nor pathogenic bacterial strains as control for panel test.**

Part 2: **With pathogenic bacterial strains without addition of Curcuma Longa powder as control for testing the growth inhibition with Curcuma Longa powder (the initial count for each pathogenic strain was ~10^6 cfu/ml/milk).**

Part 3: **With addition of Curcuma Longa powder and the pathogenic bacterial Strains**

3. Results and Discussion

Microbiological quality of Karish cheese in Cairo governorate:

Thirty five samples were collected from great Cairo governor as follows (15 street vended, 10 milk shops and 10 branded samples). Results as shown in Table (1) for aerobic colony bacterial counts (ACC) and molds and yeasts counts (M/YC) revealed that there were wide differences between the cheese's sources, since

the brand cheese showed the highest quality. While the street and shop made and vend cheese samples showed the higher the ACC and the worst mycological quality, as reached $>10^3$ cfu/g for each of mold and yeast counts. So, 57% of Karish cheese samples would not be accepted due to the high mycological counts, exceeded 10 cfu/g mold or 400 cfu/g yeast, according to the Egyptian Standard ES 1008-2000, as shown in Table (4)

In this respect, similar results were obtained for ACC and MYC by Abou Dawood et al., (2005), but higher than that found by El Ghaish (2004) and Tawfek et al., (1988).Coliform group and *Escherichia coli* as fecal indicator contamination were detected in 57 and 25.7 % of the retailed Karish cheese samples, in averages of ~10^3 cfu/g of the Coliform counts, respectively as shown in Table (2) .Also, *Salmonella spp* , was only detected in 6.6 % of the street vend. According to the Egyptian Standard (ES 1008-2000) ,there were 57 and 25.7 % of the samples would not accepted due to the high counts of Coliform and the presence of *E.coli* , respectively ,as shown in Table (4).

In this respect ,similar results were obtained by(Abou Dawood et al, 2005) for the Coliform counts in Karish samples higher than the Egyptian standard ,but these counts were less than that reported by Moussa et al.(1984) and (Kaldes, 1997) and higher than those found by (Ahmed ,1988) and (El Ghaish ,2004).controversially , *Salmonella spp.* was detected in 2.7 of the samples contradict the results

obtained by (Tawfek et al.,1988) and (El Ghaish ,2004) who did not found these bacteria in any of Karish cheese samples, and they attributed that to the low pH values of Karish cheese.

However, *Staphylococcus aureus , Bacillus cereus and Listeria monocytogenes* were isolated from 17, 8.5 and 2.8 % of the total Kariesh samples, respectively, but any was isolated from the brand cheese as shown in Tables (3) .Hence, street and shop made/ vend cheese samples would pay much attention to that variety in particular from the side of hygienic quality . Furthermore and legally, the presence of these pathogens in 17 % of the total Kariesh samples make them microbiologically not accepted according to the ES 1008-2000 ,(as shown in Table ,4). Results obtained by Abou Dawood et al.(2005) reveal much higher incidence and counts for *S. aureus* than that found in the current study, as they found this bacterium in all of the Kariesh samples .These counts were less than those found by Naguib et al.(1986) and Kaldes (1997) but higher than those reported by El Ghaish (2004). Generally, this indicate how is the inferior quality and hazardous food as Karish cheese as an etiology for foodborne illness for Cairo locals. So there is a great need for rising up, developing and spreading the hygienic knowledge, attention and control measures where Karish cheese is made, handled and served for the public health good and particularly when exportation is attempted.

Table (1): Microbiological quality of Karish cheese samples collected from central Cairo area.

	Aerobic colony Count Cfu/g			Mould count Cfu/g			Yeast count Cfu/g		
	min	max	avrg	min	max	avrg	min	max	avrg
15(street vend)	$5x10^6$	$2x10^9$	$4x10^8$	10^3	$5x10^7$	$5x10^4$	10^3	10^6	$2x10^5$
10 (milk shops)	10^6	$7x10^8$	$5x10^7$	10^3	10^5	10^4	10^5	10^6	$3x10^4$
10 (branded)	10^6	$5x10^7$	10^7	0	10^2	$2x10$	0	$3x10$	$3x10$
Total 35 samples	10^6	$2x10^9$	$4x10^7$	0	$5x10^7$	$5x10^3$	0	10^6	$5x10^3$

Table (2): The Gram negative indicator and pathogenic bacteria of Karish cheese samples collected from central Cairo area.

No of samples/ Source	Coliform Cfu/g				*E. coli*	*Salmonella*
	min	max	avrg	%	%	%
15(street vend)	0	10^7	10^4	73	40	6.6
10 (milk shops)	0	10^6	10^3	60	30	0
10(branded)	0	$3x10$	$3x10$	20	0	0
Total 35 samples	0	10^7	10^3	57	25.7	2.8

Table (3): The Gram positive indicator for pathogenic bacteria in Karish cheese samples collected from central Cairo area.

No of samples/ Source	S.aureus Cfu/g				B. cereus Cfu/g				L.monocyt.
	min	max	avrg	%	min	max	avrg	%	%
15(street vend)	0	$3x10^3$	5x10	27	0	10^2	3x10	20	6.6
10 (milk shops)	0	10^2	3x10	20	0	0	0	0	0
10 (branded)	0	0	0	0	0	0	0	0	0
Total 35 samples	0	$3x10^3$	3x10	17	0	10^2	3x10	8.5	2.8

Table (4): the microbiological quality of the central Cairo retailed Karish cheese due to the specification of the Egyptian Standard* ES-1008-2000

No of samples/ source	% fit in& out(parameters) to ES 1008/2000						% total	
	Mold %	Yeast %	Coliform %	E.coli %	L.monocyt. %	Other Pathogenic Bacteria %	Fit in	Fit out
15(street)	53.3	86.6	73	40	6.6	27	13.4	86.6
10(shops)	50	70	60	30	0	20	30	70
10(brand)	0	0	20	0	0	0	80	20
Total 35	37	57	57	25.7	2.8	17	37	63

 * ES 1008/2000, cheese sample should be free from *E. coli, Listeria monocytogenes* and other pathogens and counts should not exceed 10 cfu/g for each of molds and Coliform and 400 cfu/g for yeast

Table (5): Water Curcumin concentrations effect on different pathogenic bacteria

Curcumin concentrations / test bacteria	Inhibition zones in mm*			
Water boiled Curcumin concentrations w/v	0.2%	0.3%	0.6%	0.8%
S. aureus	6	7	9	9
E. coli	6	7	9	9
B.cereus	-	-	7	8
Salmonella	6	6	7	8
Pseudomonas	6	6	9	9
Listeria monocytogens	-	-	-	-
Water not heated Curcumin concentrations w/v	0.2%	0.4%	0.6%	0.8%
S. aureus	-	-	6	6
E. coli	-	6	6	6
B.cereus	-	6	6	7
Salmonella	-	6	6	6
Pseudomonas	6	6	7	8
Listeria monocytogens	-	-	-	-

 * Before test the well diameter 5mm, + =6, ++ = 7, +++ = 8, ++++ = 9 mm

The inhibition zones as, antibacterial activity, of Curcuma Longa at different concentrations (0.2, 0.3, 0.6 and 0.8 %) are presented in Table (5). Results reveal that curcuma Longa extracts, boiled and not heat treated water suspensions, showed a relatively antibacterial activity, inhibition zones, against some of the tested strains of pathogenic bacteria. The boiled water curcuma extracts showed the higher the activity than the not heated Curcumin extracts, 2 to 3 folds, though the obtained results were in consent with the findings by, Stankovic (2004).
 The most susceptible bacteria were in order *pseudomonas*, *E. coli*, *Salmonella*, *S. aureus* and *B. cereus*. Results reveal also that the increase the

Curcumin concentration levels, 0.2 to 0.8%, the wider the inhibition zones, 6 to 9 mm, and consequently this mean the higher the bacterial growth suppression.
Generally,from the obtained results Curcumin showed a wide spectra of antibacterial activity against Gram negative and positive bacteria and were in concomitant with those reported by, Tajbakhsh et al (2008), who reported that Curcumin was effective against *S. aureus and Pseudomonas aeruginosa.* Also, the great antibacterial activity of Curcuma Longa against *Bacillus spp., B. subtitles* in particular was reported by Naz et al (2010).

Organolyptic evaluation:

Results obtained by the panelists revealed that Karish cheese with Curcumin (Karishcum) gave the highest score comparing with panel Karish cheese (control) over all storage period, table (6). During cold storage period the flavor and taste of Karishcum cheese samples were not markedly changed, while the flavored and taste of the control cheese samples was slightly got changed after 14 days ,(sour taste& flavor). Therefore, it could be concluded that preparing Karish cheese with Curcumin enhanced its organoleptic properties, flavor and taste in particular and announced an appreciation by the panelists. Also, Karishcum showed better keeping quality and longer shelf-life more than plane Karish cheese (control).Abou-Zeid (1992) reported similar findings for the enhancement of organoleptic properties of Domiati cheese containing Parsley or rocket. Also the current results are similar to those obtained by Murad, (1998) who used some natural essential oils, and successfully applied these natural products to get better sensory characteristics and to elongate shelf-life of yoghurt.

Total Bacterial count, Lactic acid Count, Coliform counts, Mould &yeast count and PH values of "Karishcum" cheese during manufacture and cold storage period at 7±1°C. :

Data presented in Table (7) showed that, total bacterial count were ranged from 6.93/Log Bacterial Count when fresh to 2.3/LBC at the end of storage period for control cheese. Meanwhile in the fresh cheese treated with Curcumin gave a count of 5.4/ LBC and not detected at the end of storage period Table (7). Mould & yeast, were not detected in both cheese samples wither made with Curcuma Longa until the end of cold storage period or without it until 7 days of cold storage at level of 2.3/LBC, and reached to 3.6/LBC, after 10 days cold storage period and undetectable at the end of the storage period. Coliform bacteria count was not detected for both cheese samples when fresh and at the end of cold storage period, Table (7).

These results may be due to the pasteurization of milk used for manufacture of both cheese samples, and could be also due to the lower levels of pH values measured during storage of cheese. Lactic acid bacteria count, table (7), was within normal counts when fresh and during storage period for both cheese samples and slightly lower in cheese made with Curcumin at the end of storage period. These results may be attributed to the antimicrobial activity of Curcumin against the test strains of pathogenic and non pathogenic bacteria. The results of pH values were the same for both cheese samples when fresh or at the end of cold storage period, table (7). These results are in agreement with those obtained with Murad (1998), El-Kholy(2007),Tajbakash etal(2008),Sara Burt(2004) and Shagufta etal(2010),who found the same findings during their researchers about pathogenic and non pathogenic bacteria during their studies on soft cheese.

Table (6) Average of organoleptic properties of Karish cheese made with Curcumin (Karishcum) during cold storage at 7±1°C for 14 days.

Treatment	Storage period/days	Body& Texture	Color& Appearance	Flavor	Total
C	Fresh	17.7	24.9	44.5	87.1
K		18.0	26.0	46.0	90.0
C	7 Days	15.3	21.9	41.4	78.6
K		17.9	26.5	45.9	90.3
C	14 Days	15.0	20.0	41.5	76.5
K		17.5	26.1	44.5	88.1

C= Control Karish cheese.   K=Karish cheese made with Curcumin.

Table(7) total Bacterial count, Lactic acid Count,Coliform counts,Mould&yeast count and PH values of "Karishcum"cheese during manufacture and cold storage period at 7±1°C.

Storage period/days	Total Bacterial count		Lactic acid bacteria		Cliform group		Mould&Yeast		PH values	
	C	T	C	T	C	T	C	T	C	T
0	6.93	5. 40	6.60	7.00	ND	ND	-ve	-ve	4.60	4.40
3	6.80	5.70	7.25	7.50	ND	ND	-ve	-ve	4.40	4.41
5	5.69	5.20	6.84	7.60	ND	ND	-ve	-ve	4.00	3.80
7	5.30	3.80	5.20	6.10	ND	ND	2.30	-ve	3.80	3.80
10	5.21	3.20	4.90	4.70	ND	ND	3.60	-ve	3.80	3.80
14	2.30	ND	4.70	4.50	ND	ND	-ve	-ve	3.60	3.60

C=control   T=cheese treatment with Curcuma Longa   -ve=negativeAll numbers= are Log counts   ND=not detected

Antibacterial activity of Curcuma Longa (Turmeric) In Karish cheese during manufacture and cold storage period:

The behavior of pathogenic bacteria in artificially contaminated Karish cheese made with added of Curcumin(Karishcum) during cold storage period at 7°C+1 for 14 days, individually, are shown in table (8). The obtained results revealed that addition of aqueous Curcumin extract (0.3%) achived a reduction of bacterial counts obout one log of *Salmonella typhimrium*. two log of *Pesudomonas aurogenosa and E.coli0157:H7*, respectively.Meanwhile each of ,S.aureus, B.cereus and L. monocytogenes were vanished at the end of cold storage period (14 days). This in respect with control cheese during the same period of cold storage period. The current results were in concomation with those obtained by Murad,(1998), reported that some natural aqueous extracts had antimicrobial activity upon wide variety of yeasts (*Kiuyveromyces morxianus, klu.latis, Candida lipotica, C.utilis, Hanenula anomola,Asperagillus niger, Asp. Ochroceus* and *Asp fumigates),* and bacteria (*Bacillus polymexa , B. thuringinesis* and *B. subtilis*).Ahmed and Ebraheim (2010) designed a study to evaluate the addition of some edible plants including Cayenne, green pepper, parsley and dill to Karish cheese. Cayenne and green pepper extracts showed highest activity followed by dill and parsley against *S.aureus*. Addition of Cayenne or green pepper to Karish cheese during manufacture reveled that both plants were able to reduce *S. aureus* population to undetectable level within the first and second days of storage. In addition, Sara Burt (2004) she study the antibacterial activity of essential oils (EOs) against *Listeria monocytogenes*, *Salmonella typhimurium*, *Escherichia coli* O157:H7, *Shigella dysenteria*, *Bacillus cereus* and *Staphylococcus aureus* at levels between 0.2 and 10 μl ml^{-1}. Gram-negative organisms are slightly less susceptible than gram-positive bacteria. A number of EO components has been identified as effective antibacterials, e.g. carvacrol, thymol, eugenol, perillaldehyde, cinnamaldehyde and cinnamic acid, having minimum inhibitory concentrations (MICs) of 0.05–5 μl ml^{-1} in vitro. A higher concentration is needed to achieve the same effect in foods. Studies with fresh meat, meat products, fish, milk, dairy products, vegetables, fruit and cooked rice have shown that the concentration needed to achieve a significant antibacterial effect is around 0.5–20 μl g^{-1} in foods.

Table (8). Viability of pathogenic bacteria in Karishcum cheese during cold storage period

Storage-period/days	Ps. arugenosa		E.coli O157:H7		S.aureus		B.cereus		Sal. typhimrium		L. monocytogenes	
	C	T	C	T	C	T	C	T	C	T	C	T
0	5.82	5.21	5.15	4.99	5.77	4.60	5.64	5.00	5.21	3.39	6.00	5.10
3	4.93	4.10	4.81	4.99	4.47	4.00	4.90	3.50	4.51	3.00	4.95	4.10
5	4.48	3.78	4.34	4.00	3.40	2.60	4.35	3.30	4.31	3.70	4.50	3.20
7	4.20	3.10	4.00	3.10	2.40	2.00	4.00	3.17	4.10	3.40	3.80	2.50
10	3.50	2.60	3.23	2.85	2.15	1.50	3.31	2.90	3.28	2.70	3.50	-ve
14	3.28	1.21	3.10	1.00	2.15	-ve	3.00	-ve	3.15	2.10	2.50	-ve

C=control　　　Cheese treatment with Curcuma Longa　　- ve=negative　　All numbers= are Log counts

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Impact of basic skills in decision-making among graduate literacy courses Gil Malek village to the literacy education of disadvantaged

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Abstract: It is essential that formal literacy curriculum with their books to see a series of training. Basic life skills training that are known. These skills are very high in this study between the two halves of four classes in two classes and skills training conducted by this group with the control group trained in skills s decision is evaluated. According to a study conducted by trained personnel decisions and analysis are high compared to others. With this training so we can develop the basic skills of life in more and more for our literacy education.
[Zahra Habibi Bibalani. Impact of basic skills in decision-making among graduate literacy courses Gil Malek village to the literacy education of disadvantaged. Journal of American Science 2011;7(5):619-621]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: basic skill; decision-making; literacy; education

1. Introduction:

Literacy is required to be equipped with skills that they can use appropriate and positive behaviors in relation to current issues of life, that they are reasonable to meet life's problems. The skills training program as the above is done in the literacy courses during those many cases taught. In this research an item, the "Decision" and examines the impact of this training in literacy behaviors trained with other literacy are studied.

2. Methods:
Geographic location:

This research has been studied in Gilmelk village (Figure 1). This village is one of villages of Vajargah town and part of Roudsae District, Gilan province, Iran. It is a village on Alborz Mountain that is lush and beautiful area, with simple and studious people. Job of people in this village is Animal husbandry, tea and citrus farming.
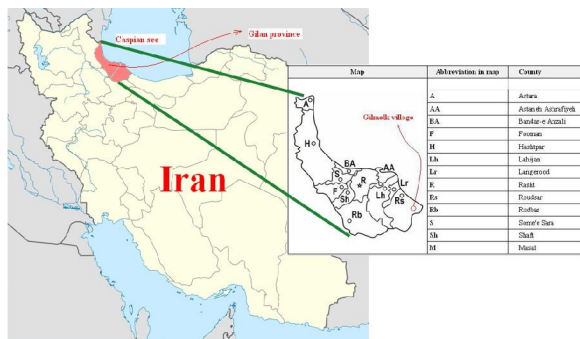
Figure 1: Gilmelk village on map of Iran

Enable people with high physical stamina that have educated and the wise development children. In this village 3 km tarmac road to the Vajargah linked. The village has 75 households are living in it and about in last three years, the rural adult learners campaign at different levels have been established with the support of the Adult learners Movement Kelachay city by the researcher. This research has been studied in these adult learners.

Operational Definition

Life skills: According to World Health Organization definition of life skills include the ability to do positive and constructive behaviors that allow individuals to be able to tackle the problems of everyday.

Statistical Society:

In between this Literacy Gillmolk Village property was done in graduate courses literacy movement involved. Total literacy of each period was 9, the first and second half of 2010 and conducted two classes each term. That a class at any point in teaching a class into other life skills training not conducted.

Here because one witness and one of the two groups have been teaching the research methods of the type of comparison is Ali.

Goals:

Identify different ways of making decisions and these decisions.
- Learning about the consequences of decisions and effective choices.
- Practice the difficult decisions taken.

- Efficient use decisions on various issues

- Resistance training on the pressures for change will enter a decision.

Because of the necessity of research: This section contains seven lessons are. The first few lessons in different ways and steps in decision making, deciding how the results of this review, and analyze the consequences of the choices in the decision-making is done explains. This lesson provides exercises in which the tough decisions and predict the consequences of different decisions are practiced. By comparing two groups of trained and untrained can contact the education level of skills and realized the new expansion. Alth is here to express that learning in this tutorial is only to score but rather the actual behavior must be seen to be a real learning to know.

Materials and equipment needed: Distributed sheets - boards - Gypsum - marker - Cardboard - Scissors - Banana - Adhesive - punch - Big Onion - a sheet of paper bills parcel number 0.4

Research methods:

In this section, the core activities in each session includes action so that the contents of each activity pattern is presented.

Hints about planning: using markers on a number of envelopes to write 4. The following objects put into envelopes:

1: a banana leaf and buying ice cream for classmates

2: How many numbers does a heavy plaster inside the envelope

3: Onion

4: Banknotes

Tightly in the pocket and we punch. Program is designed that way so that participants in the emotional straw men and personal issues those speak. Working in the field should be provided if participants do so with peace of mind and feelings and opinions to provide personal issues.

1 - Ask the group that day, for example, how decisions are taken? What time is sleep?

2 - The topic reminded participants that all people in the small decisions every day and are the least important. These envelopes need to understand that when we decide how big and important, we can finally reach a good decision

3 - Four envelopes on the table or the floor in order to put together

4 - Ask the three volunteers and three envelopes are to choose and the rest are spectators and fans try to force them to choose that particular parcel.

5 - ask how the candidates envelopes to choose the desired topic shows that none of these volunteers, a reference to the contents of this packet will not notice and without it chose.

6 - ask them to lay down on the envelopes and envelope you like to re-elect

7 - After identifying let back into the pocket without seeing if you are willing to open their pocket change.

8 - audiences will want someone volunteers to remove the remaining parcel?

9 - stuffs the reason for changing them and ask them.

No envelope was a soft banana inside because it was curious why people decide to do. But that leaves a positive outcome of a fine is considered a negative outcome.

Implications for the parcel if the in 2 or 3 or 4 can be written. A sheet giving the group their opinion about outcome, we ask each of the envelopes trained many learners in the table above and write outcomes than by untrained learners is extremely low and almost 27 percent noted that aspects of the work being trained in the literacy percentage is nearly 74 percent.

Positive outcome	Negative consequences
....	....
....	....
....	....
....	....
....	....
....	....
....	....
....	....
....	....
....	

3. Conclusion:

After several times following the consultation exercise and the issue and exchange of experience and reach for it a sum the group with the untrained group and compared the results with regard to their literacy following is obtained:

- In decision-making: Information, time, consequences, misinformation, risks are important

- Against pressure groups have more trained personnel strength.
 - Possible negative consequences for people who are inside the envelopes are better trained

- Val effective decisions: values, aspirations friends parents Lucky media, religion and culture could be that both groups possess.

Comment:

Such training with the expansion and increased job skills in decision-making and practice in this area can be more able to face making eye literacy raise.

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Roles of Boxwood in poems by Manochehri Damghani

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Abstract: Buxus sempervirens (Common Box or European Box; also as Boxwood) is a flowering plant in the genus Buxus, native to western and southern Europe, northwest Africa, and southwest Asia, from southern England south to northern Morocco, and east through the northern Mediterranean region to Turkey. Abu Najm Ahmad ibn Ahmad ibn Qaus Manuchehri, Also known as Manuchehri Damghani, was a royal poet of the 11th century in Persia. Boxwood has been used at 7 poetry lines that at 1 line used this plant in Metaphor and at 3 lines used in Simile. Boxwood has been used for Metaphor for Long hair (in 1 line). Boxwood has been used for Simile for Good hair (in 1 line), Khatoun Hair (in 1 line), Green Color (in 1 line).
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Key Words: Simile, Metaphor, Boxwood, poems, Manochehri Damghani

1. Introduction
Buxus sempervirens

Buxus sempervirens (Common Box or European Box; also as Boxwood) is a flowering plant in the genus Buxus (figure 1), native to western and southern Europe, northwest Africa, and southwest Asia, from southern England south to northern Morocco, and east through the northern Mediterranean region to Turkey. Buxus colchica of western Caucasus and B. hyrcana of northern Iran and eastern Caucasus are commonly treated as synonyms of B. sempervirens.

Classification of Buxus sempervirens is (USDA, 2010):

Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Order	Buxales
Family	Buxaceae
Genus	Buxus
Species	Buxus sempervirens – Boxwood

Figure 1: Buxus sempervirens (Boxwood). (Wikipedia, 2010b)

Manuchehri Damghani

Abu Najm Ahmad ibn Ahmad ibn Qaus Manuchehri, Also known as Manuchehri Damghani, was a royal poet of the 11th century in Persia.

He was from Damghan in Iran and he is said to invent the form of musammat in Persian poetry and has the best ones too. He traveled to Tabarestan and was admitted to the court of King Manuchihr of Ziyarid dynasty and that's where he got his pen name. He later was a royal poet in the court of Sultan Shihab ud-Dawlah Mas'udI of Ghazni son of Mahmud of Ghazna.

He has left behind a divan. His works were extensively studied by A. de Biberstein-Kazimirski in 1886. He died in 1040 CE (Wikipedia, 2010a).

Plants had been used by poetries as Simile and Metaphor in their poets (Mosazadeh-Sayadmahaleh and Bibalani, 2010;Mosazadeh-Sayadmahaleh et al., 2010;Mosazadeh-Sayadmahaleh et al., 2011a;Mosazadeh-Sayadmahaleh et al., 2011b;Mosazadeh-Sayadmahaleh et al., 2011c;Mosazadeh-Sayadmahaleh et al., 2011d;Zomorodi, 2008).

2. Results and Discussion

Roles of Boxwood in Manuchehri poems
Metaphor to long hair

درع پش، آتش جبین، کنید سرین و آتش کف

مشک دم، عنبر خوی و شمشاد موی و سرو یال

منوچهری دامغانی، دبیر سیاقی، ۱۳۸۱: ۲۱۲

Simile to Good hair

شمشاد نگر بدان نکوزلفی

گلنار نگر بدان نکوچهری

منوچهری دامغانی، دبیر سیاقی، ۱۳۸۱: ۱۱۷

Simile to Khatoun Hair

شمشاد به توی زلک خاتون شد

گلنار به رنگ توزی و پرنون شد

منوچهری دامغانی، دبیر سیاقی، ۱۳۸۱: ۱۷۱

Simile to Green Color

گلنار چو مریخ و گل زرد چو ماه

شمشاد چو زنگار و می لعل چو زنگ

منوچهری دامغانی، دبیر سیاقی، ۱۳۸۱: ۱۷۲

3. Conclusion

Boxwood has been used at 7 poetry lines that at 1 line used this plant in Metaphor and at 3 lines used in Simile. Boxwood has been used for Metaphor for Long hair (in 1 line). Boxwood has been used for Simile for Good hair (in 1 line), Khatoun Hair (in 1 line),Green Color (in 1 line).

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5/3/2011

Credits for Rural Women in third world

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Abstract: One of the other roles that financial credits and women financial empowering play among women is that creating their sense of equality against men. Women especially at rural societies and undeveloped countries compared with men are kept powerless from many aspects and often are not considered equal against men. For example while they do more duties compared to men, but they don't receive equal wage which men receive. Thus if they are financed in order to participate in development freely and deliberately, so they don't fill weakness and their spirit of equality with men would increased. On the other hand inside one active and successful woman, there are great sources of energy and power to progress. She has capacity to do constant job during the day and also she has capability to do favorite activity alongside working and she can create great evolution in economic and social life at village, if credits provided for her.

Introduction

After Islamic revolution, although exploitation systems haven't changed lot, but developing agriculture processes on women's roles weren't affectless. in cultivating, time consuming productions (e.g. rice and tobacco) women's production roles, has remained significant and even at farms that has changed their usage to business purposes and products cash productions , women workforce is used as a cheap workforce source (as laborer). But in cultivating productions (e.g. wheat) because of using agriculture machinery in capitalist exploitation systems, we have faced with decreasing in using women workforce (same source).

Preparing seed and preparing them for transferring to storage, were done by women. Transplanting (most important stage in cultivating rice) and weeding were done by them, completely. And finally we should remark, their roles in cultivating wheat, before land reforms. Land reform (1962) was a breaking factor for traditional capitalism relations, and it was facilitator way for renewing agriculture and making investment relations at agriculture section. Although no land was considered for women (indeed by this, major proportions of agriculture workforces was deprived from having production instruments that they work on) but, it has affected on women's roles in agriculture activity. (Banihashem, 1999)

By the way, lord-vassal relation was broken approximately, and peasant's production relation and capitalist exploitation systems were established. In peasant production, (at fertile lands) farmer's wife had to work on family land with other family members .at peasants lands; women were working out of their family farms. In capitalist exploitation systems, women workforce was considered as cheap workforce at farms. Generally, land reforms caused those women workforce is used as secondary (balali, 2005).

Now, because independent peasant exploitation systems, women workforce is used as gratis family labors that this caused, real value of women roles being unknown in surplus economic productions of peasants family . Generally, nowadays, in minor agriculture, women role and activity is necessary.

Women activities in agriculture are more than their capacities. Because, it doesn't decrease from her home duties and consequently, and by analogy with pure housekeeper, they bear more labors. Indeed, it should be considered more importance for rural women who take part in agriculture activities and surplus economic productions, because not only they are participant in workforce market, but they play very important role in renewing economic of family (Lahsaeezade 2000).

Credits and its importance

Credits beside technology and skills of technical production, is complementary for each other. In order to invested credits being effective in productive activities and gain acceptable efficiency, suitable technology in that productions or activity should be provided accordant to economic and societal conditions of villagers. So from the development perspective, not only credits are used but they call it as credit program. credit program isn't just receiving and paying money but this program contains several stages in order that finally, exploiter and farmer stand in one inclusive program in this

process, And educational needs , marketing services and production distribution, input and credit supply and loan be considered.

Among purposes of credit programs, it can mention to increasing efficiency in activity, job, stabilizing occupation which faced financial crisis, increasing level of income and exploiters life's level, empowering villagers and novice exploiters and also breaking deprivation cycle at society and rural families.(Rahmani 2001).

So if credits, is used as a coherent and inclusive program framework and is considered base on need , power and reinforcing its proficiency level, so we can access to aforementioned purposes and also we can prepare suitable technology of production and activity with demanded credit. Finally, production and service efficiency will place at acceptable level. This systematic approach can save exploiter from deprivation and poverty cycle. conducted researches at countries like Pakistan , India and Iran showed that invested credits for productive activities was suitable if it is used with suitable technology . So credits wouldn't be effective if it is provided for exploiter exclusively and without considering his/her skill needs (Amiri, 2000).

Its result is that, exploiter can't access to desirable condition of production efficiency at first. Secondly, he would incapable for loan repayment. Third, his activity doesn't contain consistency. Fourth, remarkable part of provided credits would exit from production cycle due to exploiter's incapability and lack of skill in exploiter. His technical and occupation skill would improve, if credit is being provided for exploiter as a credit program. and he knows and can applies loan properly and well timed for production and activity, so condition of production and level of income, level of life and it would improve (Rahmani, 2001).

If we suppose "development" as a process that whole society and social system are moving toward establishing better society and more humane in it , so base on it , preparing subsistence , honorable life , human esteem and dignity would be among most important aims of development . nowadays , about development and sustainable development , natural sources and physical capitals aren't very important and modern development theories rely on human but yet activating human capabilities itself needs investing on human resources too . Because it has proven that capable, wise, healthy and forethoughtful man, is factor of development and expansion. in one research that conducted in 192 countries , revealed that physical capital 16% , natural sources 20% and human resources 64% , share wealth averagely but we need

capital and investment to foster creativity and detecting talents . (Chabokru and etal, 2005)

Now that we mentioned importance of investing on development process, we pay to varying women's financial empowerment role, as half of active population of village in the development and sustainable development. Role of credits and credits institutions of women in improving society can be summarized as following:

One of important goals and basic principle of development is, creating esteem and dignity for all human beings. Financing women through credit sources can be basic step toward sustainable development and in that way; rural women grow as single-minded human and with confidence so they can feel esteem and dignity in themselves and in society. Public belief is that one success rural women, have high confidence practically and this feature creates sense of faith and belief in inner power and sense of ability to access intended goals in her. These kinds of women are not algebraic manner and believe that establishing future life and decisions making are at their own hands. women who have high confidence , have discarded one cultural deterrent factor (i.e. belief in fate) that prevent sustainable development and actively strive to establish better future (Rahimi 2001) .

Conclusion and discussion:

Women largely are active at micro exploiter units and they work at larger units as form of salaried employee or receive wage.

They have not desirable conventional condition about their accessing to productive factors and sources, because of some customs and common traditions and also common norms. their limitation to access to field, bank facilities, education services, education-applied science, mechanization, modern technology and formal associations has kept their direct and independent access to production services and decision to use production sources and factors at minimum level. Women's literate proportion is less than rural men and urban men so we can explore main reason at cultural beliefs, dominant social conditions on rural society, low education scope for girls and women and lack of training importance for them (Fami, 2001).

Fortunately in two recent decades considerable efforts have been done to eradicate illiteracy that it was more remarkable about rural women so that percent of rural women literacy from 17.3% on 1355 increased to 62.4% on 1996. But 37.6% of rural women remained illiterate yet (Statistical center of Iran 2006).

At northern part of our country that rice cultivation is common, because of high workload,

gender work dividing is so that women do more than 60% of production of rice, or in Gorgan, and women's proportion of harvesting cotton is reported 66%. in spite of those subjects , at Mazandaran , at most being surveyed villages , women have relative control on affaires but they haven't right to make decision and interfere in agriculture affaires and affaires of village . In many villages right of decision making about number of children belongs to men (planning and research institute of agricultural economics 1997).

But consider that aforementioned subjects, based on researches that has conducted at north of Iran that in these regions women have more active contribution from social, economic and cultural perspective.
Point that true about most of villages of Iran is that more active women economic contribution that leads to more income for family, cause that women be at higher rank for family decision making (Same source, 1997)

In spite of that, by conducted researches , rural women's roles has been surveyed very low , but another study has shown that at villages of Iran , women, especially elder , has specific dignity and have important roles at decision making .
Women Corporation would increase in decision making. (Planning and research institute of agricultural economics 1997).
Supplying credits and analyzing credits approaches cause opportunity to activate poor men's working power , establishing field for sustainable production and income , prevent usurers and pre shoppers of agriculture productions to plunder poor rural men and finally empowering poor people especially women who can work but were deprived to have capital and work tools , and extension accordance to their activities such as needs assessment , identifying target group , organizing poor people , giving needed specialized and public training and … have important role on effectiveness and make effective activities of these credits .

Woroniuk and Schalkwyk (1998) at their conducted research believe that now, micro credits, micro finance sources and small business units are most effective mechanism to decrease poverty.
Plitt and others, conducted research as they called it "do credits programs, can empower women "? Results showed that corporation at credits programs helps empowering women. Goetz Sengupta (2003), presented negative image of credits effects on empowering women. They concluded that most women have minimum control on their loans. And when repayment period is short, this shortage of control has devastating effects on women welfare. Hashemi and others (2004) found that joining to

Gramin Bank, has meaningful positive effects on controlling women, and helps to family income.
Ellen and her colleagues (2009) used approach called it "credits and education at Bolivia, Ghana, Honduras, Mali and Thailand". This approach looks for empowering women through financial services with education. In this approach, women get familiar with importance of credits through education and extension and also familiar with ways to access it through establishing different groups.
Shahnaj and chaudhury(2009) in research as "credits and its role on empowering women " concluded that there is meaningful relation between attending in credits programs and empowering women , at economical dimensions .Ruhal amin and others (2010) found that those who joined credit funds had more ability rather than those who didn't. Jameela (2010) presented that credit programs has shown lot of affects on empowering women so that has increased their social, politic and economic ability. Thus it is obvious that credits programs and its educational and empowering programs can be affective on social, humane and economic development or rural society, if it be associated with proper and gradual practices and base on reciprocal communications principles and apply opinion of local society. Maybe the main challenges that threaten credits associations , is lack of necessary emphasizes on social dimensions and on reinforcing their basics , that practically cause that this social foundations lose its efficiency soon and practically changed to unsuccessful institution .

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5/3/2011

Determination of the dominant families in Ilkhji region, Eastern Azerbaijan province (Northwest of Iran)

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Abstract: Systematic Knowledge or plant taxonomy is one of the very old and important branches of botany. By gathering plants, we can recognize rare species of plants or those which are facing extinction, so that we can find some ways to prevent them from destruction. In this research, all plants were gathered from Ilkhji area which is located in East Azerbaijan province. Ilkhji region is located in 25 km south west of Tabriz and the geographic coordinates 45.59 to 12 and 46.3 eastern longitudes and 37.55 to 37.57 north latitude. Plant samples from Yal, Khaselar, Kordlar and Chaman areas as well, were obtained during winter of year 2008 to fall year 2009. Standard method was followed with regard to collection of plant materials, drying, mounting, preparation and preservation of plant specimens' .All the plant samples were pressed according to standard guides. If the plant samples were too long, then they were cut from several areas, so the sample contained the complete plant. At the next stage, samples were stick to the herbarium Cardboards and then were identified using floras, keys, illustrations and explanations which are available for different sources of plant Species. Dominant plant families consist of: Asteraceae (30 species), Brassicaceae (23 species), Fabaceae (21 species), Poaceae (21 species) Boraginaceae (16 species) and Lamiaceae (16 species).

Key words: herbarium, systematic, flora.

Introduction

Plant systematic science provide tools to make a list of plants, the methods of identification, name and ordering, however, can be the basic knowledge for the biological science. Identification of a plant, introduces a specific way to determine the natural condition of that and bring about an introduction to recognize the relationship between different species. Collecting plants or endangered plants likely helps to improve methods to save them and also revealers their far relationships with the well-known species. In sum, dominant species greatly affect both physical and biological conditions, and it makes sense to use them to examine community condition. The behavior of a dominant species and its relationship to other species are not necessarily constant, however. A dominant species can be highly competitive in a core habitat or able to tolerate stress in a peripheral habitat (Wisheu and Keddy 1992). Substantial information about both abiotic and biotic properties of a plant community is conveyed simply by identifying the dominant species (as in Clements 1916, Whittaker 1965). Through their architecture, physiology, growth, and phonology, dominant plants determine overall community structure, such as biomass and canopy strata (Richards 1996) and ecosystem engineering (Malmer *et al.* 2003); soil properties (Bardgett *et al.* 1999); ways of succession (Fastie 1995); ecosystem properties, such as nutrient cycling

(Allison and Vitousek 2004) and fire regimes (Taylor 2000); micro-habitats for subordinate species (Grime 1998); and even hydrological conditions (Simberloff and Von Holle 1999). Dominant plants can exert strong influence by their abundance, height, shade, root and rhizome biomass, or chemistry (e.g., allelopathy). Iran, has a diversity of plant varieties which because of the specific geographic locations, great number of them are not known, therefore, the identification and name these plants is of a great importance.

2. Materials and Methods

All the plant samples in this research were gathered from Ilkhji area which is located in East Azerbaijan province. Ilkhji area is located in 25 km south west of Tabriz and the geographic coordinates 45.59 to 12 and 46.3 Eastern longitudes and 37.55 to 37.57 North latitude. Plant samples from Yal, Khaselar, Kordlar and Chaman areas as well, were obtained during winter of year 2008 to fall in the year 2009. Standard method was followed with regard to collection of plant materials, drying, mounting, preparation and preservation of plant specimens (Shrestha and Dhillion, 2003). All the plant samples were pressed according to standard guides. If the plant samples were too long, then they were cut from several areas, so the sample contained the complete plant. At the next stage, samples were stick to the herbarium

cardboards and they were identified using floras, keys, illustrations and explanations which are available for different sources of plant Species. Finally dominant plants were separated and introduced.

RESULTS
Result of survey show that Dominant plant families consist of: Asteraceae (30 species), Brassicaceae (23 species), Fabaceae (21 species), Poaceae (21 species) Boraginaceae (16 species) and Lamiaceae (16 species). Results showed as Tables 1.

Table1. Dominant plants in Ilkhji region

Family	Genus	Species	Growth habite
Brassicaceae	Alyssum	A.bracteatum	Hemicriptophite
	Alyssum	A.dasycarpum	Hemicriptophite
	Alyssum	A.longistylum	Hemicriptophite
	Alyssum	A.linifolium	Hemicriptophite
	Alyssum	A.minus	Hemicriptophite
	Capsella	C.bursa-pastoris	Therophite
	Cardaria	C.draba	Hemicriptophite
	Choriospora	Ch.tenella	Therophite
	Conringia	C.perfoliata	Therophite
	Descurainia	D.sophia	Hemicriptophite
	Erysimum	E.aitchisonii	Hemicriptophite
	Erysimum	E.crassipes	Hemicriptophite
	Erysimum	E.cuspidatum	Hemicriptophite
	Erysimum	E.deifolium	Hemicriptophite
	Erysimum	E.filifolium	Hemicriptophite
	Lepidium	L.perfoliatum	Hemicriptophite
	Malcolmia	M.africana	Therophite
	Malcolmia	M.iberica	Therophite
	Raphanus	M.raphanistrum	Therophite
	Strigmostemum	S.sulphureum	Hemicriptophite
	Sisymberium	S.loeselii	Hemicriptophite
	Thlaspi	T.arvense	Therophite

	Thlaspi	T.umbellatum	Therophite
Papilionaceae	Alhaji	A.camelo	Hemicriptophite
	Astragalus	A.askius	Hemicriptophite
	Astragalus	A.chrysostachys	Hemicriptophite
	Astragalus	A.effuses	Hemicriptophite
	Astragalus	A.holopsilus	Hemicriptophite
	Astragalus	A.oroboides	Therophite
	Astragalus	A.globiflorus	Therophite
	Coronilla	C.balansae	Therophite
	Coronilla	C.varial	Therophite
	Hedysarum	H.formosum	Therophite
	Lotus	L.corniculatus	Hemicriptophite
	Medicago	M.sativa	Hemicriptophite
	Melilotus	M.officinalis	Therophite
	Onobrychis	O.cornuta	Therophite
	Trifolium	T.canescens	Therophite
	Trifolium	T.clusii	Therophite
	Trifolium	T.repens	Therophite
	Trigonella	T.aurantiaca	Therophite
	Trigonella	T.coerulescens	Hemicriptophite
	Trigonella	T.monantha	Hemicriptophite
	Trigonella	T.monspeliaca	Hemicriptophite
Boraginaceae	Alkanna	A.orientalis	Hemicriptophite
	Alkanna	A.brateosa	Hemicriptophite
	Anchusa	A.italica	Hemicriptophite
	Asperugo	A.procumbens	Therophite
	Heliotropium	H.brevilimbe	Therophite

	Heliotropium	H.swtanense	Hemicriptophite
	Heterocaryum	H.szovitsianum	Therophite
	Lappula	L.sinaica	Therophite
	Lithospermum	L.arvense	Hemicriptophite
	Moltkia	M.coerulea	Camephite
	Moltkia	M.grpsacea	Hemicriptophite
	Nonnea	N.caspica	Camephite
	Nonnea	N.persica	Camephite
	Onosma	O.kotschyi Boiss	Camephite
	Rochelia	R.disperma	Camephite
	Rochelia	R.persica	Camephite
Lamiaceae	Marrubium	M.vulgare	Geophite
	Mentha	M.longifolia	Hemicriptophite
	Nepeta	N.meyeri	Hemicriptophite
	Nepeta	N.persica	Hemicriptophite
	Nepeta	N.racemosa	Hemicriptophite
	Phlomis	Ph.olivieri	Hemicriptophite
	Salvia	S.nemorasa	Hemicriptophite
	Salvia	S.sahendica	Hemicriptophite
	Salvia	S.spinosal	Hemicriptophite
	Salvia	S.virgata	Hemicriptophite
	Stachys	S.inflata	Hemicriptophite
	Stachys	S.lavandifolia	Hemicriptophite
	Stachys	S.turcomanica	Hemicriptophite
	Thymus	T.cotschyanus	Geophite
	Thymus	T.pubescens	Geophite
	Ziziphora	Z.tenuior	Therophite

Asteraceae	Achillea	A.millefolium	Hemicriptophite
	Achillea	A.vermicularis	Hemicriptophite
	Acroptilon	A.repens	Hemicriptophite
	Anthemis	A.hyalina	Therophite
	Calendula	C.persica	Therophite
	Carthamus	C.oxyacantha	Therophite
	Centaurea	C.depressa	Hemicriptophite
	Centaurea	C.pulchella	Hemicriptophite
	Centaurea	C.virgata	Hemicriptophite
	Cichorium	C.intybus	Hemicriptophite
	Cirsium	C.arvense	Hemicriptophite
	Cirsium	C.congestum	Hemicriptophite
	Cnicus	C.benedictus	Therophite
	Cosinia	C.rhaphiostega	Camephite
	Crepis	C.foetida	Hemicriptophite
	Crupina	C.crupinastrum	Therophite
	Echinops	E.cephalotes	Therophite
	Helichrysum	H.araxinum	Hemicriptophite
	Helichrysum	H.rubicundum	Hemicriptophite
	Heteropappus	H.altaicus	Hemicriptophite
	Kolepinia	K.teniuisima	Therophite
	Lactuca	L.scarioloides	Therophite
	Lasiogon	L.muscoides	Therophite
	Onopordon	O.leptolepis	Hemicriptophite
	Senecio	S.vernalis	Therophite
	Sonchus	S.oleraceus	Hemicriptophite
	Taraxacum	T.vulgare	Therophite

	Tragopogon	T.buphthalmoides	Therophite
	Tragopogon	T.caricifolium	Therophite
	Tragopogon	T.graminifolius	Hemicriptophite
	Xanthium	X.spinosum	Hemicriptophite
Poaceae	Aegillops	A.tauschii	Therophite
	Agropyron	A.longe- aristatum	Hemicriptophite
	Alopecurus	A.arandinaceus	Hemicriptophite
	Bromus	B.danthonia	Therophite
	Bromus	B.tectorum	Therophite
	Cynodon	C.dactylis	Therophite
	Dactylis	D.glomerata L.	Therophite
	Echinochloa	E.crus – galli	Therophite
	Eremopyrum	E.confusum	Therophite
	Eremopyrum	E.distans	Therophite
	Halopyrum	H.muaronatum	Hemicriptophite
	Hordeum	H.glaucum	Therophite
	Lolium	L.persicum	Therophite
	Phleum	Ph.paniculatum	Therophite
	Phleum	Ph.pretense	Hemicriptophite
	Phragmites	Ph.communis	Hemicriptophite
	Poa	P.bulbosa	Hemicriptophite
	Setaria	S.viridis	Therophite
	Stipa	S.pulcherrima	Hemicriptophite
	Taeniatheriun	T.crinitum	Therophite
	Trachynia	T.distachya	Therophite

Conclusion

In this research dominant plants were detected. They were consisting of these families: Asteraceae, Brassicaceae, Fabaceae, Poaceae, Boraginaceae and Polygonaceae. Determining the condition of a plant community is increasingly important as vegetation responds to anthropogenic stress, exotic species invasions, abiotic disturbances, and new management approaches (e.g., Godefroid and Koedam 2003, Abella and Covington 2004). Through their architecture, physiology, growth, and phenology, dominant plants determine overall community structure, such as biomass and canopy strata (Richards 1996) and ecosystem engineering (Malmer et al. 2003); A dominant species can be highly competitive in a core habitat or able to tolerate stress in a peripheral habitat (Wisheu and Keddy 1992). It can make up a majority of stems in a plot or less than the majority. Species richness can also vary with different dominants (Denslow and Hughes 2004). A particular species can vary in its dominance or dominate wherever it occurs (Lavoie et al. 2003). A few authors characterize dominant plants in relation to the number of co-occurring species. Some of scientists call those that coexist with many species, such as alpine tundra sedges, "conservative dominants." (Theodose and Bowman 1997)In contrast, some of them (Hodgson et al. 1998) described abundant plants of speciespoor assemblages as "aggressive dominants." Invasive or transformer species (Richardson et al. 2000), such as Phalaris arundinacea (reed canarygrass) and Typha x glauca (hybrid cattail), behave in this way, tending to exclude other species and create monotypic stands (Galatowitsch et al. 1999). While not quantitative, these distinctions begin to address the different roles and behaviors of dominant species. The presence or abundance of invasive species has also been suggested as an indicator of wetland quality. However, (Denslow and Hughes 2004) note that complex community interactions can allow a blurring of the distinction between native and exotic dominants, as native dominants become management issues and exotic dominants do not always decrease species diversity.

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Adult education in developing countries

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Abstract: Adult illiteracy feeds the state's unemployment, its welfare rolls, and the correctional institutions. Adult illiteracy severely hinders the life chances of young children, undermines school reform, and limits the opportunities for postsecondary education. Despite landmark reforms in public schools, too many Kentuckians continue to drop out of school, thereby perpetuating the chronic problem of adult illiteracy. in developed countries, adult education is a form of informal education for people above 24 years is presented. In fact, a means of expanding knowledge, skills and abilities of adults. In these countries, adult education helps adults to variable conditions of political, social, economic and cultural adjustment, and pay to fix their shortcomings. Concept of adult education in revolutionary countries, is a combination of these two concepts. Changes in these countries due to social, political and cultural revolution, resulting from, literacy and continuing education necessary to find because of the revolution, there is cultural poverty on the other hand the implementation of development plans and the need for skilled personnel are expert. General adult education system based on economic conditions - social and cultural community is different and each specific goals will follow. General objectives of adult education and literacy in two categories is divided into professional education.
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Keywords: adult education, developing countries

Introduction:

Too many young Kentucky parents are unable to read and lack the basic literacy necessary to provide the necessary stimulating, supportive family environments for young children. It is known that children's literacy levels are strongly linked to the educational level of their parents and that children of parents who are unemployed and have not completed high school are five times more likely to drop out. only the negative consequences are obvious: getting more education often means leaving one's family and community for jobs and opportunities for advancement somewhere else. The future of Kentucky depends on uplifting the quality of life and economy of all of Kentucky. The social and economic costs of neglect of large parts of the state will drag down the rest of the state and seriously hinder its capacity to compete in the global economy. The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Adult who is able to recognize their needs. He is who knows what will. Refers to individual adults in their lives cross and understand their responsibilities and has accepted the role is social. Adult learners are often those that distinguish each other and have many different targets at the same time and will follow a common challenge to fulfill the goals of building self motivation vectors as educational materials to learn and use the forge.
Several definitions of adult education has been done:
Adult Education is a⌉ in the following examples are given of them. conscious effort by public institutions or voluntary organizations to promote community awareness comes action.

- adult education teaching is typically specific age group above the legal age⌉ limits as formal and informal, voluntary and at different levels of time, place
- Adult Education is a process in which people who⌉ and education is presented. somehow been cut course they consciously to change or advance their skills in information and do organized activities.
- Adult education includes all formal and informal training and volunteer after⌉ school, which by experienced educators and aware of the system.

Educational materials on adult education with daily life, needs, goals, aspirations and past experiences of adults and their relationship helps to results learned in life and career are used.

Adult learners have a different approach to learning. By the time you reach adulthood, you're most likely responsible for your own success and you're perfectly capable of making your own decisions once you have the information you need.

Adults learn best when learning is focused on them, not the teacher. This is called andragogy, the process of helping adults learn.

Malcolm Knowles, a pioneer in the study of adult learning, observed that adults learn best when:

1.   They understand why something is important to know or do.
2.   They have the freedom to learn in their own way.
3.   Learning is experiential
4.   The time is right for them to learn.
5.   The process is positive and encouraging.

Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture.

Adults in agriculture use a number of sources to gain new information that can be used to help them solve problems. Persons employed in agriculture utilize newspapers, magazines, newsletters, radio, television, government publications, internet, and meetings to gather information which can be directly utilized in their business activities. In many communities, the agriculture teacher is the primary source of agricultural information.

Successful adult education programs develop and utilize an Agricultural Education Program Advisory Committee to assess the informational needs of adults in the community. Agriculture teachers should utilize the expertise and communications link, which an effective advisory committee provides. Specifically, the advisory committee should be asked to provide advice regarding planning, conducting, and evaluating the adult education program in agriculture. Adult education programs in agriculture should emphasize practical application of the information presented. Topics and information included in adult programs should be provided which fulfills needs of the local community. Providing information which

cannot be applied to solve a local problem or address a local issue will generally be viewed as frivolous and over time will result in decreased interest (i.e. participation) in the adult education program.

Characteristics of adult education:
flexibility in time:
In the past, usually one of the obstacles in the way of learning and development of adult education was being inflexible and time courses were programs. But now most countries have to consider that the speed limit of time and learning ability and facilities must be adults. Flexibility in time means that not only should the time classes and programs for adults is appropriate, but necessary facilities should be provided for independent study.

Flexibility in the location:
One of the aspects of flexible space is that individuals can, regardless of their residence to the study and advancing their knowledge and skills pay. For example, adults in remote villages should like people who live in the city use of educational programs. After flexibility in other places is that the issue of specificity of location is not considered primarily educational.

Flexibility in age:
Educational opportunities for certain age should not use it for all regardless of their age, is possible. In fact, educational programs must use people of different ages to prepare.

Flexibility in admission:
No adult should not only be deprived of education because of the necessary conditions for admission in the class does. Of course this is not such a person without academic records to participate in university classes is accepted, Adoption order is that the adults in educational programs at different levels, according to the possibility of using the opportunity that is provided must be based on the experience and knowledge and their knowledge is.

To combine education and job responsibilities:
Adults should be able to work during that time engaged in training classes take them. In other words, their presence in the class should be considered part of their work. This means that low-literate or illiterate working people who are allowed to work an hour of your daily spending surpassed participation in educational programs.

Conclusion:
Additional material for the next stage of learning often means to be expected when developing your

learning skills Learners to increase awareness and enjoyment of reading and studying to operate.

To improve the quality of life, learning materials should reinforce the skills they acquired previous. This material should have access to information and provide new technology. should also have to make learning more fun. Additional materials should provide opportunities for literacy skills to read and to strengthen their cognitive awareness.

Track materials (continued) which increased literacy skills and knowledge gained is also effective in enriching learning environment for learners are important. Participatory materials to ensure the participation of learners in the learning process and codification are included out of class activities, dialogue, role playing, etc.

In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.

Learning activities such as activities outside the classroom, dialogue, role playing and ... Another type of content is presented. Duties are placed on the learner, a resource for developing knowledge, skills and insights he considered.

Curriculum content only from the training provided to learners or not, but put together their learning through activities that can inform or does, skills and attitude to achieve. In this case, apart from learning that the assays taught learners directly to sustainable and effective learning occurs in his.

Another way of providing content that is educational activities outside the learning environment possible for learning more and better enables adult learners. For example, hits, field trip experiences for learners or transfer is provided, develop knowledge, insight and skills they will.

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning

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Traditional Degrees and online degrees in distance education

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Abstract: Distances between teachers and students are bridged with an array of familiar technology as well as new information age equipment. What sets today's distance education efforts apart from previous efforts is the possibility of an interactive capacity that provides learner and teacher with needed feedback, including the opportunity to dialogue, clarify, or assess. Advances in digital compression technology may greatly expand the number of channels that can be sent over any transmission medium, doubling or even tripling channel capacity. Technologies for learning at a distance are also enlarging our definition of how students learn, where they learn, and who teaches them. No one technology is best for all situations and applications. The base of available information technology resources is increasing with dramatic speed. Much has been learned about connecting various forms of technology into systems, so that the ability to link systems is growing. Most distance learning systems are hybrids, combining several technologies, such as satellite, ITFS, microwave, cable, fiber optic, and computer connections. Technology transports information, not people.

Keywords: Online Degrees, Traditional Degrees, distance education

Introduction:

Considering the position and role of education in the third millennium on the basis of ICT is also a serious approach to the topic with the knowledge community centered on learning and general trends of technological tools to enjoy much of the information and Find the appropriate place in the information society Third Millennium That actually can be a global community and is without limit is undeniable-and-run. Guidance and therefore move in the direction of society should be education and technology for comprehensive pandemic done. Considering the above definitions and with the knowledge and attitudes towards the third millennium and the desirability and some weaknesses in the achievement of certain standards and dynamic structures in order to achieve a knowledge based society, there is. In the present circumstances to provide our information infrastructure development and integration inevitably link the elements and tools that they are as indicators of technology education and technology education will be remembered. In the new context of combining these two indicators comes to training facilities and a variety of tools that will provide guidance and development in information will be very effective.

In other words, the country still in the feasibility assessment and appropriate to make public the necessary training for operation and application of scientific principles and technological tools is has been done and why certain movements and sometimes non-normative point will not be able node an unlock.

The conditions and according to the capacity of developing countries and training facilities required a knowledge-based society feels is felt. If all processes in technology education and technology optimization and standardization of the Hungarian education should go, and appropriate channels that the best option in this area could benefit from state universities is capabilities.

According to the information in the development of any society should take half of the world to progress until the necessary coordination and synchronization global developments so as to accept the design structure of a knowledge-based society have a special place for the University and respect the role of education and technology was In designing a model with global standards of dynamism and flexibility at first be necessary to select a sample that the facilities and communications needed for this purpose provide action and then determine optimal cognitive deficiencies than Hammett and weaknesses push.

No doubt the experiences of implementing these standards and to develop troubleshooting information using technological tools would be much more economical. That if we develop a range of information from a city university level and conduct more successful we'll be more acceptable was. Because the utilization and application tools and step up the information they've been successful. Therefore the most important first step needed to coordinate and synchronize technology education and educational technology standards and capability in the high user acceptability of the world is also enjoyed.

Distance education is a method of education in which the learner is physically separated from the teacher and the institution sponsoring the instruction. It may be used on its own, or in conjunction with other forms of education, including face-to-face instruction. In any distance education process there must be a teacher, one or more students, and a course or curriculum that the teacher is capable of teaching and the student is trying to learn. The contract between teacher and learner, whether in a traditional classroom or distance education, requires that the student be taught, assessed, given guidance and, where appropriate, prepared for examinations that may or may not be conducted by the institution. This must be accomplished by two-way communication. Learning may be undertaken either individually or in groups; in either case, it is accomplished in the physical absence of the teacher in distance education. Where distance teaching materials are provided to learners, they are structured in ways that facilitate learning at a distance.

The Cons of Online Degree Programs

1. Credits and Accreditation

Remember that not all online institutions are accredited or have the required accreditation. Some online degree credits are transferable and some are not – It is important to find the level of accreditation that the online institution provides – Regionally or nationally accreditation. There are however, those online institutions which are considered to be on the par with established traditional education systems.

2. Suitability

It's best not to idealize online programs and what they   offer. Studying from home may sound great, but not everyone has the right environment at home for academic study. For some people, specially designed campuses are ideal to get away from the distractions of the home and to immerse yourself in study.

3. No face-to-face human interaction

Online degree programs and online courses have their advantages, but they lack human interaction. These prevent the normal interactions between students and teachers, relegating any queries to the message boards and forums.

Only video interaction may be possible with online degree programs and its exact use and frequency vary from institution to institution, while the actual classes are given via archived modules. For those who prefer human interaction, online degree program may not be the best option.

4. Independent study isn't good for all

Online degree study may require better comprehensive skills than traditional education. In traditional classroom environment, it may be easier to understand instructional material because of the human proximity and the option to ask questions and get immediate sympathetic answers.

Are Online Degrees Worth Anything? Are Online Degrees Credible?

Many people consider online degrees as not worthwhile proposition. They think online degrees are a waste of time and money; further, they feel such degrees are not recognized anywhere.

Well, it is quite natural to have apprehensions about something that you do not know about. In fact, when online courses were newly launched, they were widely unaccepted by many corporations and campus based educational institutions. However, the situation has now changed.

Online degrees are gaining popularity. Further, such degrees are being offered and widely accepted. As per a recent survey conducted by Distance Education and Training Council, more than 71% of corporations consider online degrees as 'more valuable' and worthwhile than the traditional one.

How can one understand the value of an online degree?

Though, surveys mark online degrees with certain amount of credibility, how does one make sure the value attached?

Merits of online degrees:

1. **Ease of Access:** The course material and instructions can be accessed by a student from anywhere across the globe. This can be done via an internet connection. This provides greater freedom to

students and working professionals to study the course material.

2. **Genuine interactivity:** Online courses provide students with a high level of interactivity. How? Since the students are far apart geographically, they have more time to ponder over the facts and get back with logical reasoning and viewpoint. This is not so in case of traditional classes.

3. **Dissemination of information:** Online courses have the advantage of reaching out to larger masses as compared to traditional studies. Further, additions and amendments can easily and more quickly be disseminated to students.

4. **Documentation**: The best part of online courses is every material, discussion, presentation and interaction is electronically documented. Thus, a student can refer to such documents anytime, anywhere.

Perhaps, the only demerit of online degree is the kind of infrastructure it requires. An online course requires a sound IT infrastructure that can support the smooth functioning of online class rooms.

Earn a Degree Online: Why Get a Degree Online?

These days, one can get a degree without going to college. Online education is the latest concept that has taken the world of education by storm.

Though online education is still in its initial stages in many parts of the world, it becomes a great option, particularly in the western world, and has certain advantages over traditional education, which makes it so popular.

Online education is not just advantageous to the teachers, but has its advantages for the students too. While teachers can make decent money by teaching online, students can also get online degrees in a simple manner.

This article addresses the first questions asked about online degrees – Why Earn an Online Degree?

Why get a degree online?

The first question asked naturally is – Why an Online degree and not the traditional degree?

Both ways are good as long as you look for an accredited online degree.

An online degree in absolutely not less Qualitative – There is no difference between the value of a traditional degree and an online degree given that – You will check very carefully the accreditation of the online educational institution before taking a degree program online.

If you are wondering whether you should get an online degree, you would be surprised to know that many people have no other choice but to opt for an online degree.

There are several reasons why one needs to get an online degree, but the most common are:

- In many cases, people need extra degrees to pursue a career in a profession that they are interested in.
- Many people do not continue their education for a number of reasons, and by the time they are ready to pursue their education, they are working or even have a family. An online education makes life simpler for people like them.

Conclusion:
Emergence and development of information societies is the consequences of industrialization. Despite the diversity of information in various forms of media in local, national and international, access, exchange and use of various information easier than last time is. Information society, a member of your buddies know that open information system in terms of geographical location and the last 25 years, organizational development, are limited. Distance learning faster than other forms of training has been. Growth factor in the economic interests of this type of educational approach, flexibility and remove the distance can be named. The methods of distance education, required for building physical education is not providing services. Teachers and trainers in this method - compared with traditional methods - and have more opportunities to more people than are being trained. In this type of teaching style of each person in each academic field, and each job can be arbitrary in time and space, trained without having to leave the house for work or business is education. This method requires that students are dispersed over long distances provides. Distance learning advantages of distance education in comparison with traditional education, the need for physical locations

and training programs limited to no specific time period. In this type of teaching style, learning for life without possibility of spatial and temporal constraints for each individual there. In distance education, problems related to lack of qualified teachers and appropriate educational environment - as it posed in the traditional method of M is - is resolved. In this way the use of advanced features in digital libraries and search the various sites during the study, time and cost savings are.

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5/5/2011

Prevalence and etiology of subclinical mastitis in Buffalo of the Tabriz region, Iran

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Abstract: To investigate the period prevalence, etiology and some epidemiological features of subclinical mastitis in buffaloes from the Tabriz region, milk samples from 51 lactating buffaloes were aseptically collected for bacterial and California mastitis test and somatic cell counte. An association was observed between the occurrence of subclinical mastitis and lactation number of buffaloes. The periodic prevalence rate of SCM was 27.36%. *Staphylococci* were the most prevalent bacteria, representing 48.55% of the isolates. Coagulase-negative staphylococci (CNS) (36.18%), was the most prevalent species followed by *staphylococcus aurous* (14%). *Lactobacillus, Corynebacterium bovis* and *Bacillus subtilis* was the subsequent bacterial groups in importance according with the distribution among flocks representing 14%, 8% and 7% of the isolates. Coagulase-negative Staphylococci were the most prevailing isolates from samples that showed positve CMT results.
[Rahim Beheshti, Behrad Eshratkhah, Jalal Shayegh, Jamshid Giasi Ghalehkandi, Vahid Dianat, Kambiz Valiei. Prevalence and etiology of subclinical mastitis in Buffalo of the Tabriz region, Iran. Journal of American Science 2011;7(5):642-645]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords*: Subclinical mastitis; buffalo; etiology; prevalence

1. Introduction

Mastitis, which is a complex and costly inflammation of the mammary gland, is among the most important diseases in dairy herds (Beheshti et al., 2010). Mastitis occurs in clinical and subclinical form in buffaloes (Sharma and Sindhu., 2007). Although clinical cases of mastitis are a source of loss, more important economically is subclinical mastitis due its higher prevalence and associated decrease in milk production (Las Heras et al, 1999). The prevalence of this form of disease is 15-40 times more than clinical form and therefore causes high economic losses (Sharif et al., 2007).

Bansal et al., (1995) reported that subclinical mastitis was found in 23.93% of buffaloes and 11.32% of buffalo's udder quarters. Few researchers have studied the incidence and the consequences of the subclinical form of the disease. The importance of subclinical mastitis as a limiting factor in milk production in cows is well documented (Al-Majali et al., 2003). Subclinical mastitis has also adverse effects on the hygienic quality and physicochemical properties of milk (Hamed et al., 1993).

The processing of such milk results in substandard and sub-optimal output of finished fermented products like yogurt and cheese (Sharif et al., 2007). The purpose of present study was to determine the prevalence and etiology of mastitis in Azarbaijan buffaloes.

2. Materials and methods

2.1. Flocks and survey design

Milk samples from 51 buffaloes, selected by stratified random sampling, located in flocks in Tabriz province in northwest of Iran. Within each flock buffaloes were randomly selected and sampled. Identity, Lactation parity and Days in milk were recorded. Abnormalities on the udder were recorded.

2.2. Milk sampling and bacteriological procedures

Samples were collected between November 2010 until March of 2011. Udders and mammary secretions were examined for macroscopic signs of abnormality. Milk samples (20 ml) were taken aseptically, prior to the morning milking, from each mammary gland after cleaning the teat end with cotton soaked in 70% ethyl alcohol and previous discard of the first three streams of milk. Samples were kept at 4 C during transportation to the laboratory for bacteriological analysis which was carried out 2 h after collection.

All milk samples requiring bacterial culture were mixed well and a standard loopful (0.01 ml) from each milk sample was inoculated on the surface of blood agar containing 5% of washed sheep red blood cells and MacConkey agar plates. All plates were incubated aerobically at 37 ℃ and examined for growth at 24 h. If there was no growth, the plates were reincubated and the final assessment was made at 48 h. The presence of six or more bacterial

colonies of the same type on the medium was considered to be significant and the samples was recorded as positive. Bacteria were identified by using colony morphology, hemolytic pattern on blood agar media and further microscopic examination (Gram staining), standard biochemical methods (catalase, haemolysis, coagulase test with rabbit plasma) described by Quinn et al., (1994).

2.3. Somatic cell count

The California Mastitis Test (CMT) was applied to all samples collected using the method of Schalm et al (1971). According to the reactions obtained, the results were classified as: `negative', `traces', 1, 2 and 3, recorded as –, ±, +, ++ and +++, respectively.

2.4. Case definition

Mammary glands which had no detectable abnormalities, but had positive CMT and were bacteriologically positive.

2.5. Statistical analysis

All statistical analysis was performed using SPSS software (version 16). The somatic cell counts were analyzed by ANOVA with animal parturition data and parity.

3. Results

3.1. Period prevalence of subclinical mastitis

During the study period, 201 milk sample were collected from 51 buffaloes. Positive CMT and SCC results were recorded from 70 and 92 (34.82 and 45.77%, represently) milk samples. Of all the milk samples examined, bacteria were isolated from 173 (86.07%) quarters . Of the 70 CMT positive and the 173 bacteriologically positive milk samples, 55 sample were both CMT and bacteriologically positive (Table 1). The specificity and sensitivity of CMT test in detecting subclinical mastitis were 31.79%; and 46.43%, respectively (Table 1). The value of demonstrated poor agreement between the CMT results and culture test.

Table 1: The relationship between bacteriological and CMT results of milk sample

		Bacteriology		Total
		+	-	
CMT	+	55	15	70
	-	118	13	131
Total		173	28	201

specificity: 31.79%; sensitivity: 46.43%; proportion positive by CMT: 34.82%; proportion positive by culture: 65.17%.

According to the definition of subclinical mastitis, there were 55 (27.36%) quarters affected during the lactation period.
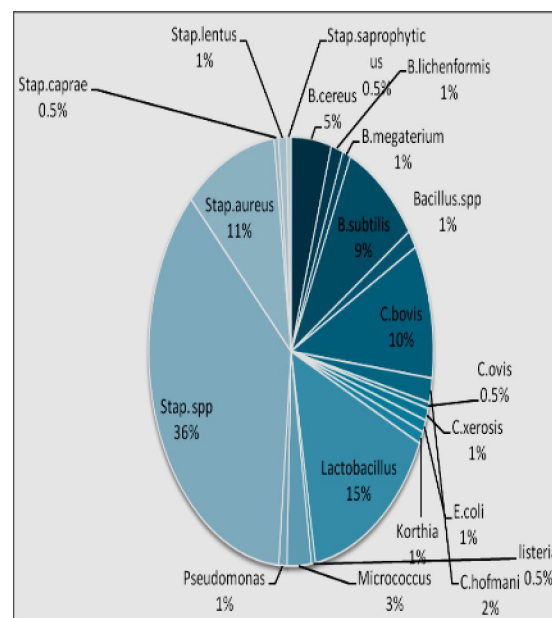
Figure 1: Bacteria isolates

3.2. Effect of lactation stage

The buffaloes in their 3th to 4th month of lactation stage were more susceptible (37.94%) to subclinical mastitis, followed by 1st to two month (31.02%), 5th to 6th month (10.34%), and 7th month of lactation stage (6.89%) (Figure. 3).
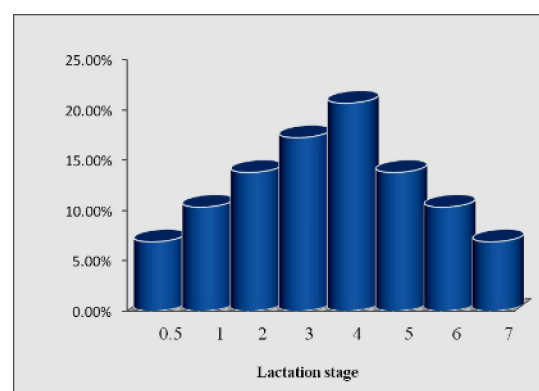
Figure 2. Lactation-stage prevalence of subclinical mastitis

3.3. Bacterial isolates

Distributions of microbial isolates responsible for subclinical udder infection were: coagulase negative staphylococci (38% of isolates); Stap.aurous (14%); Lactobacillus (14%); *Corynehbacterium bovis*

(8%); *B.subtilis* (7%); *E.coli, Pseudomonas, B.cereus, Micrococcus* whichever (3%) and *Listeria, C.xerosis, B.licheniformis, Bacillus.Spp, Korthia, Stap.lentus, Stap.saprophyticus* whichever (1%) (Figure. 4).
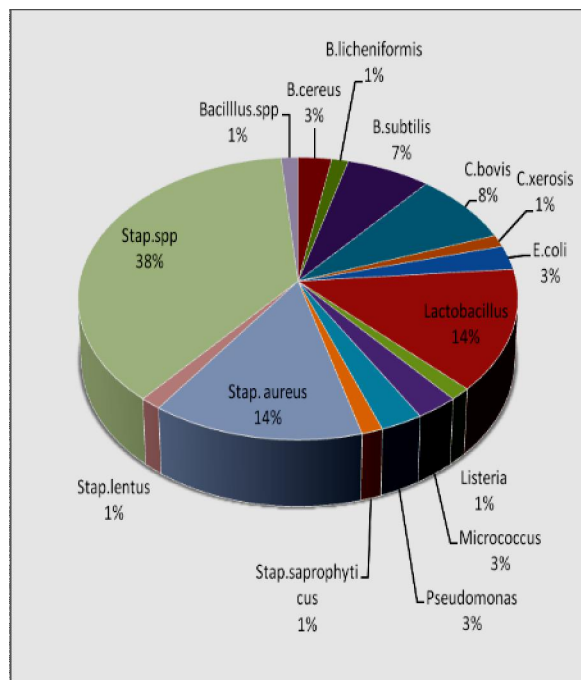
Figure 3. Bacterial isolates associated with a positive CMT
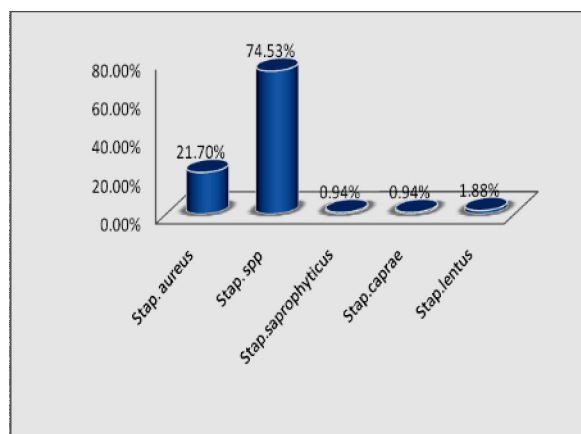
Figure 4. Percentages of species identified from subclinical staphylococcal intramammary infection in buffalo

4. Discussions

Buffalo mastitis is an important disease of this animal, with serious financial consequences (Taraphder *et al.* 2006). In India, the economic loss due to subclinical mastitis was Rs.4,831. Joshi and

gokhale reported that the prevalence of subclinical mastitis ranged from 20.72% to 61.73 (Joshi and Gokhale, 2006).

In previous studies, it has been repeatedly confirmed that the teat is the portal of entry of the causal agents (Portolano et al, 2007). In our study, CMT test showed 34.82% subclinical mastitis that it lower than bacteriological culture (45.77%). These finding are in close relation with earlier reports of Dhakal (2006), Ozenc *et al* (2008) and Karimuribo *et al.,* (2006). In this study *Staphylococcus* spp. was predominant mastitogenic organisms (48.6%). Kumar and Sharma (2002) also reported the similar prevalence of Staphylococcus spp (48.94%).

Banerjee (2002) and Sharma and sindhu (2007) observed a higher and lower (54.85% and 38.46%, respectively) incidence of Staphylococcus spp. The prevalence of Coagulase negative staphylococci (CNS) was 38.02% that it was statistically more than coagulase positive ones.

As previously reported , CNS are the predominant bacteria causing subclinical mastitis (Kiossis et al, 2007). CNS are common isolates from the respiratory tract, the teat skin, the teat-end as well as from milk (McDougall et al, 2002). In other animals, CNS isolations have been associated with elevated somatic cell count and milk yield reduction, increases in concentrations of NAGase, albumin and salt is the consequence of destruction of glandular elements of mammary gland (Gougoulis et al, 2007; Maisi et al, 1987). In these cases, 14% of isolates was S.aurous.

Intramammary infections caused by *S. aurous* warrant special attention because this bacterium is responsible for both acute clinical mastitis (gangrenous mastitis) and subclinical mastitis (Contreras et al, 2007). The prevalence of C.pyogenes observed was 8%. Lalrintluanga *et al* (2003) has reported the lower prevalence of C.pyogenes (5.2%).

The results demonstrated that quarter-wise incidence of subclinical mastitis was higher in early lactation phase that it may be due to due to physiological stress of high milk yield and alterations in homeostasis (Rassol et al. 1985). Ronie and Munsterhjelm (1974) reported that The disease occurred most frequently in the 2nd to 3rd month (23.6% of the cases), or 1st week (22.5%) of lactation.

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1/5/2011

Determination of most important part of yield components by Path Analysis in Corn

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Abstract: In order to study of direct and indirect effects of yield components on corn yield for find the most important effective part on yield, an experiment in researching filed of Lahijan Islamic Azad University in 2009 was conducted. This experiment in Split plot format based on Randomized complete block design with two factors, main factor consist of different amounts of nitrogen fertilizer (50, 100, 150 and 200 kg/ha) and sub factor consist of rows spacing (30, 40 and 50 cm) in three replications was performed. In this experiment, Single cross 704 cultivar was used and path analysis for determination of most important part of yield under these treatments was conduced. Determination of most important part of yield can use in agronomical and corrective managements. Results were showed that corn yield had significant correlation with ear length, rows in ear, plant height and ear per plant (r 0.58). Among yield components, ear length was most determinative and most effective trait among other traits on yield, ear length increases had a positive effect on yield increasing and also indirectly affect yield from way of rows per ear and 1000 grain weight.
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Keywords: path analysis; yield components; Yield function; corn

1. Introduction

Corn (Zea mays L.) is one of the important cereal crops in the world and Iran after wheat and rice (Alvi et al., 2003; Gerpacio and Pingali, 2007). Nitrogen, a plant nutrient is required by plants in comparatively larger amounts than other elements. Nitrogen is essential component of many compounds of plant, such as chlorophyll, nucleotides, proteins, alkaloids, enzymes, hormones and vitamins (Marschner, 1995). Nitrogen deficiency generally results in stunted growth, chlorotic leaves because lack of N limits the synthesis of proteins and chlorophyll. This leads to poor assimilate formation and results in premature flowering and shortening of the growth cycle. The presence of N in excess promotes development of the above ground organs with relatively poor root growth. Synthesis of proteins and formation of new tissues are stimulated, resulting in abundant dark green (high chlorophyll) tissues of soft consistency. This increases the risk of lodging and reduces the plants resistance to harsh climatic conditions and to foliar diseases (Lincoln and Edvardo, 2006). Nitrogen (N) fertilizer use has played a significant role in increase of crop yield (Modhej et al., 2008). Improved cultural practices can play an important role in augmenting yield of corn crop. For an optimal yield, the nitrogen supply must be available according to the needs of the plant.

Suitable plants densities for optimum leaf growth by controlling water, fertilizer and chemical inputs is essential for improving the growth variables responsible for high yield. Optimum plant spacing ensures the plants to grow properly both in their aerial and underground parts through different utilization of solar radiation and nutrients. When the plant density exceeds an optimum level, competition among plants for light above ground or for nutrients below the ground become severe, consequently the plant growth slows down and the grain yield decreases (Hasanuzzaman et al., 2009). Yield can be increased with increased plant density up to a maximum for some corn genotypes grown under a set of particular environmental management conditions and declines when plant density is increased further (Tollenaar et al., 1994). Sezer and Yanbeyi (1997) demonstrated that ear characteristics were negatively affected by increases in plant densities, although plant height, ear height and grain yield increased with increases in plant densities. Grain yield is a complex feature that is affected by many of physiological process (Gozubenli and Konuskan, 2010). Grain yield in cereals obtains from two main parts hence the number of grain per area unit and single grain weight. Also, the number of grains itself is result of number of grain per panicle and number of ear per area unit (Ahmadi et al., 2008). Saorre and Stafer (1999) and Evans (1993), introduce number of grain as most important determinative factor in yield. Also, often observed that one independent variable moreover direct effect on dependent variable, indirectly affect that from way of other independent variable or variables. Therefore recognition of trait or traits that directly and indirectly affect on yield and determination of essence and amount of those effects

is necessary (Tourchi and Rezaei, 1996). At many studies, from correlation coefficient used for explain of yield components effect on production. Foundation of this analysis is ontogenetic relations between yield components. This case specially is true for cereals, because yield components successively occurs in this group of plants and often during plant development reparative pattern was occurred (Rezai and Soltani, 1983). Ahmadi and et all (2008), in Zagros and Kohdasht cultivars determine the number of spikelets in panicle as the most important determinative part of number of grain per panicle. Thay also found that in Kohdasht cultivar, the number of grain per plant at different planting times in compare with average of grain weight for determination of grain had further importance. In this research use of path analysis with goal of determination the more important part in corn yield under plant spacings and different amounts of fertilizer, which can be useful for other studies.

2. Material and Methods

This experiment was conducted in researching filed of Lahijan Islamic Azad University in Guilan province (north Iran), with 37°11' N latitude and 50°0' E longitude and 20 m above sea level in 2009, in Split plot format based on Randomized complete block design with three replications. In this experiment, Single cross 704 cultivar was used and treatments was include of different amounts of nitrogen fertilizer as the main factor in 4 levels (n_1=50, n_2=100, n_3=150 and n_4=200 kg/ha) and 3 spacing between rows (d_1=30, d_2=40 and d_3=50 cm) as the sub factor. Favorable Irrigation and weeding during growth period was carried out. At the end of period, from each plot 10 plant selected and number of rows per ear, number of ear per plant, 1000 grain weight, grain yield, straw yield, harvest index, plant height and ear length were studied. Analysis of path coefficient was carried out with use of sample correlation coefficient and similar method with Gebeyou and et al (1982) method. In this research, grain yield was assume as the function of ear length, rows per ear and 1000 grain weight that those were affected by other traits too (figure1).

Each of these traits had direct effect on yield that is same standard regression coefficient and has indirect effect from way of other traits that is productive of this coefficient at correlation of these traits. Calculation was carried out with SAS software and for calculate of path coefficients from method of

regression with word STB was used (Ahmadi et al., 2006; Rezai and Soltani, 2003). Yield function of grain yield and straw yield obtained by STATISCA software.
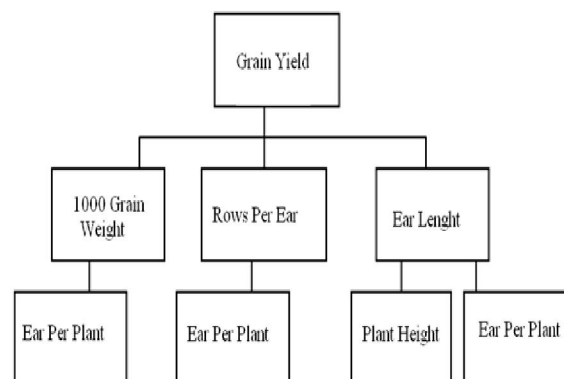
Figure 1. Diagram of effective traits in grain yield

3. Results and Discussions

Results showed that grain yield in corn had significant correlation with ear length, rows per ear, plant height and ear per plant (r 0.58) that most correlation with ear length and then with rows per ear were observed (table1).

The results of path analysis showed that, ear length was the more effective trait on yield (0.95**) that moreover direct effect, indirectly was effective from way of rows per ear and 1000 grain weight. But influence of 1000 grain weight on yield was very little (Table 2). Devi et al, (2001) reported that ear length, number of seed rows ear-I, number of seeds row and 100-seed weight positively influenced the yield directly and also indirectly through several components.

Plant height was trait which had most effect on ear length (0.59) and ear per plant was trait that affect on rows per ear and 1000 grain weight (respectively 0.34 and -0.06). According to obtained results must be effort to provide the condition than ears length without any limitation increases until extremity optimum yield was obtained (Alvi et al., 2003; Khayatnezhad et al., 2010; Mohan et al., 2002; Nemati et al., 2007; Sadek et al., 2006)

Table 1. Correlation of studied traits in corn

	Rows per ear	Ear per plant	1000 grain weight	Plant hieght	Ear lenght
Yield	0.80^{**}	0.58^{*}	0.40^{ns}	0.68^{*}	0.96^{**}
Rows per ear		0.34^{ns}	0.41^{ns}	0.39^{ns}	0.74^{**}
Ear per plant			-0.06^{ns}	0.64^{*}	0.60^{*}
1ooo grain yield				0.36^{ns}	0.39^{ns}
Plant height					0.73^{**}

** and * respectively significant in 1% and 5% area; ns: none significant

Table 2. Coefficients of path analysis for direct and indirect effects of ear length, rows per ear and 1000 grain weight on corn yield

Path analysis coefficients	yield
Effect of ear length	
Direct effect of ear length	0.81^{**}
Indirect effect of ear length from way of rows per ear	0.14
Indirect effect of ear length from way of 1000 grain weight	0.0003
Effect of rows per ear	
Direct effect of rows per ear	0.14
Indirect effect of rows from way of 1000 grain weight	0.0003
Effect of 1000 grain weight	
Direct effect of 1000 grain weight	0.0007

** and * respectively significant in 1% and 5% area

Relation between amounts of used nitrogen fertilizer and row spacing levels and their effect on grain yield is shown in Figure 2.
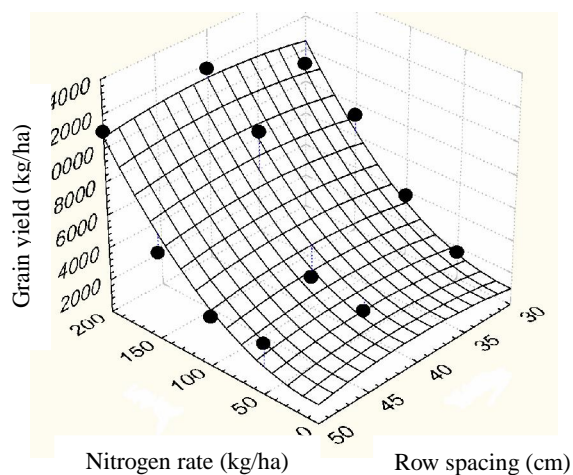
Figure 2. The effect of nitrogen fertilizer and row spacing on grain yield.

With attention to this figure, with increase of nitrogen fertilizer amounts and row spacing levels, grain yield increases. Optimum nitrogen consumption by use of n_4 level case to highest grain yield. Ozkan (2007) reported that the highest grain yield was obtained at 200 kg/ha nitrogen fertilizer. Increasing plant density up to a certain level case to grain yield increases. due to create an optimum condition for light reception, water and nutrient consumption and less competition in d_2 level, photosynthesis rate is high and as a result with more transition of photosynthetic matters for grains formation, yield of grains increases and less or most of this level case to grain yield decreases. Gozubenli and Konuskan (2010) reported same result with this experiment. Yield function of grain yield obtained by following relationship:

Grain yield = $66215.83 - 123.367 \times X - 2195.5 \times Y + 0.414 \times X^2 + 1.243 \times X \times Y + 21.688 \times Y^2$

Relation between amounts of used nitrogen fertilizer and row spacing levels and their effect on straw yield is shown in Figure 3.
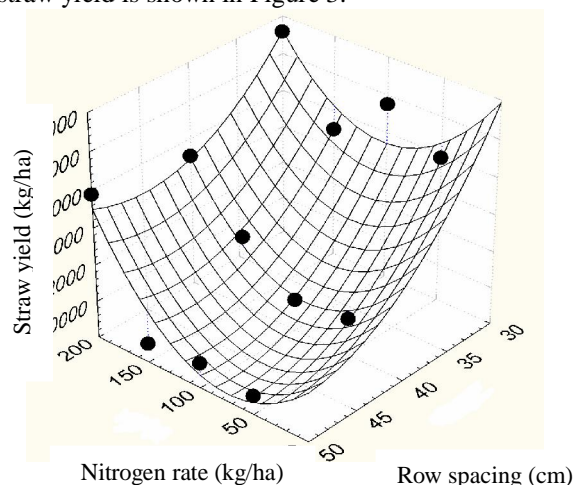
Figure 3. The effect of nitrogen fertilizer and row spacing on straw yield.

With attention to Figure 3 that show Relation between amounts of used nitrogen fertilizer and row spacing levels and their effect on straw yield, with increase of nitrogen fertilizer amounts and decrease of row spacing levels, straw yield increases. Nitrogen increasing photosynthesis rate with increase of green pigment of plant and promotes rapid growth and increases plant leaf size and height. In this experiment Increase of nitrogen fertilizer up to 200 kg/ha case to straw yield increases. The highest straw yield was obtained of n4 level. Izadi and Emam (2010) same result were reported. In this experiment decrease of row spacing and increase of plant density in d1 level case to straw yield increases. Some researchers reported that taller plants with lower stem diameter were obtained at higher plant densities as a consequence of interplant competitions (Devi et al., 2001; Izadi and Emam, 2010; Ozkan, 2007) Due to more competition for light in d1 level plant height and leaf area increases that case to straw yield increases. Amano and Salazer (1989) same result were reported.Yield function of straw yield obtained by following relationship:

Straw yield = $-8282.5 - 1.82 \times X + 490.75 \times Y + 0.246 \times X^2 + 0.001 \times X \times Y - 6.037 \times Y^2$

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Some pharmacokinetic aspects of tulathromycin in Fresian cattle calves

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ABSTRACT: Pharmacokinetics of tulathromycin was studied after single dose intravenous, intramuscular and subcutaneous administration. Six apparently healthy Fresian cattle calves were used in a crossover design with 15-day washout period. After intravenous injection of tulathromycin, the half-lives of distribution and elimination ($t_{0.5(\ )}$ and $t_{0.5(\ )}$), volume of distribution at steady state (Vd_{ss}), mean residence time (MRT) and total body clearance (Cl_B) were 0.166 h., 48.348 h., 4.252 L kg^{-1}., 69.645 h. and 0.061 L $kg^{-1} h^{-1}$., respectively. Following intramuscular and subcutaneous administration of tulathromycin, the maximum concentration (C_{max}) 0.330 and 0.309 ug ml^{-1} were achieved at a maximum times (t_{max}) 1.118 and 1.234 h., respectively. The mean values for absorption and elimination half-lives ($t_{0.5(ab)}$ and $t_{0.5(el)}$) and MRT were 0.135 and 0.155 h., 68.929 and 65.874 h., 99.562 and 95.165 h., respectively. The intramuscular and subcutaneous bioavailabilities were 82.8 and 71.85%, respectively. The result of *in-vitro* protein-binding study indicated that 38.86 % of tulathromycin was bound to calve's serum proteins. [M.A. TOHAMY, A.A.M. EL-GENDY and Taha A. Attia. Journal of American Science 2011;7(5):651-655]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: pharmacokinetic; tulathromycin; Fresian; cattle; calves

1. INTRODUCTION

Macrolide antibiotics, which are active agents against *Gram-positive* bacteria, are frequently used as veterinary drugs in food-producing animals. They target the bacterial ribosome and inhibit bacterial protein biosynthesis **(Leal et al., 2001)**. Macrolide antibiotics are antibacterial agents used as veterinary drugs in food-producing animals with either a curative or prophylactic aim **(Codony et al., 2002)**.

Tulathromycin is a recently introduced, long acting semi-synthetic macrolide, prescribed for respiratory infections **(Pikkemaat et al., 2009)**, with a large volume of distribution **(Nowakowski et al., 2004)**, a long elimination half-life **(Benchaoui et al., 2004)** and a high concentration in lung tissue after intramuscular injection in cattle and swine **(Galer et al., 2004)**. Tulathromycin is presently approved in European countries and the USA for the treatment of bacterial respiratory diseases in cattle and swine **(Scheuch et al., 2007; Venner et al., 2007)**.

The aim of this study is to investigate the serum concentrations and some pharmacokinetic parameters of tulathromycin after single intravenous (IV), intramuscular (IM) and subcutaneous (SC) administration in Fresian cattle calves. In addition, to estimate intramuscular and subcutaneous systemic bioavailabilities of tulathromycin.

2. MATERIALS AND METHODS
2.1. MATERIALS

2.1.1. Drug

Tulathromycin 100 mg ml^{-1} was supplied as an injectable solution (Draxxin®) by animal health division Pfizer Company, Cairo, Egypt.

2.1.2. **Animals**

Six apparently healthy, male and female Fresian cattle calves (3-9 months old and mean body weight of 98-123 kg) were used. Animals were obtained from the Animal Farm, Faculty of Veterinary Medicine, Beni-Suef University, kept in hygienic stall under good hygienic condition and fed milk, barseem and tibin with free access to water.

2.2. METHODS:
2.2.1. Experimental protocol

All calves were administered 2.5 mg kg^{-1} tulathromycin **(Schunicht et al., 2007, Venner et al., 2007; Angen et al., 2008; Young et al., 2010)** by intravenous, intramuscular and subcutaneous route with a 2 weeks washout period between each route of administration. Blood samples were collected via vein puncture from jugular vein before and 0.083, 0.167, 0.25, 0.5, 1, 2, 4, 6, 8, 10, 12, 24, 48, 72, 96 and 120 hours post-administration. Blood samples were left to clot then centrifuged at 3000 revolution per minute for 15 minutes to obtain clear serum that was kept frozen at -20 °C until assayed.

2.2.2. Drug bioassay

Samples were assayed by microbiological assay according to the method of **Arret et al. (1971)** using *Micrococcus luteus* (ATCC 9341) as a test organism. The determination of antibiotic concentration is commonly carried out by microbiological assays, but they are often lengthy and lack the specificity and precision required for regulatory purposes **(Leal et al., 2001)**. Standard tulathromycin concentrations of 0.156, 0.3125, 0.625, 1.25, 2.5, 5 and 10 ug ml^{-1} were prepared in antibiotic-free calf serum and phosphate buffer saline (pH 8). The minimal detectable limit for the assay method was 0.156 ug ml^{-1}. Semi-logarithmic plots of the inhibition zone diameter versus standard tulathromycin concentrations in serum and phosphate buffer were linear with typical correlation coefficient of 0.998 (for the standard curve). The difference of inhibition zone diameter between the solutions of the drug in serum and buffer was used to calculate the *in-vitro* protein binding tendency of tulathromycin according to **Craig and Suh (1991)** by the following equation:

Protein binding % = Zone of inhibition in buffer-Zone of inhibition in serum x 100
Zone of inhibition in buffer

2.2.3.Pharmacokinetic analysis

Serum concentrations of tulathromycin for each individual calf after IV, IM and SC administrations were subjected to a compartmental analysis using a nonlinear least-squares regression analysis with the help of a computerized curve-stripping program (R Strip; Micromath Scientific Software, Salt Lake City, UT, USA). For IV, IM and SC data, the appropriate pharmacokinetic model was determined by visual examination of individual concentration-time curves and by application of Akaike's Information Criterion (AIC) **(Yamaoka et al., 1978)**. Following IV injection, the serum concentration-time relationship was best estimated as a two-compartment open model system **(Baggot, 1978)** according to the following bi-exponential equation: $C_p = Ae^{-\alpha t} + Be^{-\beta t}$, where C_p is the concentration of drug in the serum at time t; A is the intercept of the distribution phase with the concentration axis expressed as ug ml^{-1}; B is the intercept of the elimination phase with the concentration axis expressed as ug ml^{-1}; α is the distribution rate constant expressed in units of reciprocal time (h^{-1}); β is the elimination rate constant expressed in units of reciprocal time (h^{-1}); and e is the natural logarithm base.

After IM and SC administration, data was analyzed by adopting a one-compartment open model. This program also calculated non-compartmental parameters using the statistical moment theory **(Gibaldi and Perrier, 1982)**. The C_{max} (maximum serum concentration) and t_{max} (time of maximum serum concentration) were taken directly from the curve. The terminal elimination half-life ($t_{0.5(el)}$) and absorption half-life ($t_{0.5(ab)}$) were calculated as $\ln2/K_{el}$ or $\ln2/K_{ab}$, respectively, where K_{el} and K_{ab} are the elimination and absorption rate constants, respectively. The area under serum concentration-time curve (AUC) and area under the first moment curve (AUMC) were calculated by the method of trapezoids and extrapolation to infinity was performed. The mean residence time (MRT) and mean absorption time (MAT) were calculated as MRT = AUMC/AUC and MAT = $MRT_{i.m} - MRT_{i.v}$. The total body clearance (Cl_B) was calculated as Cl_B = Dose/AUC and the absolute bioavailability (F) as F = $AUC_{i.m}/AUC_{i.v} \cdot 100$. Results were expressed as mean and standard error (S.E). Standard errors were calculated from the mean data according to **Snedecor and Cochran (1976)**.
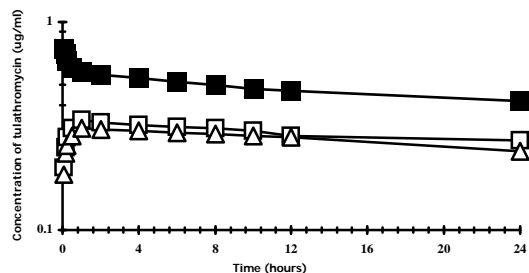
Figure (1): Semi-logarithmic graph depicting the time-concentration of tulathromycin in serum of cattle calves after a single intravenous ( ), intramuscular ( ) and subcutaneous (Δ) injection of 2.5 mg kg^{-1} b.wt.

3. RESULTS

Disposition of tulathromycin in serum after intravenous injection was best fitted by the 2-compartment open pharmacokinetic model (Figure 1). The pharmacokinetic parameters of tulathromycin following a single intravenous, intramuscular and subcutaneous administration of 2.5 mg kg^{-1} b.wt are recorded in table (1). The results of the present study revealed that tulathromycin was rapidly distributed following intravenous injection in calves as indicated by short ($t_{0.5(\alpha)}$) 0.166 h. The elimination half-life ($t_{0.5(\beta)}$) and total body clearance (Cl_B) were 48.348 h and 0.061 L kg^{-1}h^{-1}., respectively. Following intramuscular and subcutaneous administration, the drug was rapidly absorbed with $t_{0.5(ab)}$ of 0.135 and

0.155 h and maximum serum concentrations (C_{max}) of 0.330 and 0.309 ug ml^{-1} were achieved at (t_{max}) of 1.118 and 1.234 h., respectively. The elimination half-lives ($t_{0.5(el)}$) and systemic bioavailabilities were 68.929 and 65.874 h., 82.80 and 71.85 % for tulathromycin given by intramuscular and subcutaneous routes, respectively. The *in-vitro* serum protein-binding tendency was calculated to be 38.86 %.

Table (1): Mean (± SE) kinetic parameters of tulathromycin following a single intravenous (IV), intramuscular (IM) and subcutaneous (SC) administration of 2.5 mg kg^{-1} b.wt in calves (n=6).

Parameter	Unit	IV	Parameter	Unit	IM	SC
C_p^o	ug ml^{-1}	0.825±0.041	C_{max}	ug ml^{-1}	0.330±0.02	0.309±0.06
A	ug ml^{-1}	0.255±0.07	t_{max}	h	1.118±0.10	1.234±0.17
B	ug ml^{-1}	0.570±0.03	K_{ab}	h^{-1}	5.145±0.34	4.464±0.41
	h^{-1}	4.166±0.22	K_{el}	h^{-1}	0.0101±0.006	0.0105±0.004
	h^{-1}	0.014±0.002	$t_{0.5(ab)}$	h	0.135±0.07	0.155±0.04
K_{12}	h^{-1}	1.275±0.06	$t_{0.5(el)}$	h	68.929±4.62	65.874±5.26
K_{21}	h^{-1}	2.884±0.058	AUC	ug ml^{-1} h^{-1}	33.905±2.33	29.423±4.23
K_{el}	h^{-1}	0.021±0.008	AUMC	ug ml^{-1} h^{-2}	3309.2±227.6	2832.8±277.1
$t_{0.5(\ )}$	h	0.166±0.059	MRT	h	99.562±6.88	95.165±7.34
$t_{0.5(\ )}$	h	48.348±2.28	MAT	h	29.917±1.87	25.52±2.64
V_c	L kg^{-1}	3.030±0.14	F	%	82.80±5.67	71.85±6.72
Vd_{ss}	L kg^{-1}	4.252±0.284				
Cl_B	L kg^{-1} h^{-1}	0.061±0.007				
MRT	h	69.645±5.07				
AUC	ug ml^{-1} h^{-1}	40.949±3.06				
AUMC	ug ml^{-1} h^{-2}	2774.0± 215.12				

C_p^o concentration at zero time (immediately after single IV injection); A, B zero-time intercepts of the biphasic disposition curve; , hybrid rate constants representing the slopes of distribution and elimination phases, respectively; k_{12} first-order constant for transfer from central to peripheral compartment; k_{21} first-order constant for transfer from peripheral to central compartment; K_{el} elimination rate constant; $t_{0.5(\ )}$ distribution half-life; $t_{0.5(\ )}$ elimination half-life; MRT mean residence time; AUC_{0-24} area under serum concentration-time curve; AUMC area under moment curve; Vc apparent volume of the central compartment; Vd_{ss} volume of distribution at steady state; Cl_B total body clearance. k_{ab} first-order absorption rate constant; C_{max} maximum serum concentration; t_{max} time to peak serum concentration; $t_{0.5(ab)}$ absorption half-life; $t_{0.5(el)}$ elimination half-life; MAT mean absorption time; F fraction of drug absorbed systemically after IM injection

4.DISCUSSION

Disposition of tulathromycin in calf's serum after intravenous administration was best described by the two-compartment open-pharmacokinetic model. Tulathromycin was rapidly distributed with a short distribution half-life ($t_{0.5(\ )}$) of 0.166 h. Similarly, rapid distribution had been recorded for the tylosin in sheep and goats (0.143 and 0.213 h) (**Taha et al., 1999**). The apparent volume of distribution at steady-state (Vd_{ss}) is an accurate indication of the diffusion of the drug into the body tissues (**Galinsky and Svensson 1995**). The result of this study revealed that tulathromycin was widely distributed to extra-vascular tissues as indicated by larger volumes of distribution at steady-state (Vd_{ss}) 4.252 L kg^{-1}. Tulathromycin is widely distributed and its elimination is extremely slow with half-life 4-6 days (**Benchaoui et al., 2004; Galer et al., 2004; Nowakowski et al., 2004**). The drug was widely distributed with volumes of distribution at equilibrium ranging between 12.7 and 18.2 L kg^{-1} and slowly eliminated with half-life 101-158 h (**Scheuch et al., 2007**).

Serum concentration-time curves describing the disposition of tulathromycin after intramuscular and subcutaneous administration were remarkably similar, as recorded for C_{max}, t_{max}, $t_{0.5(ab)}$ and $t_{0.5(el)}$. In this study, tulathromycin achieved a maximal concentrations (C_{max} 0.330 and 0.309 ug ml^{-1}), relatively close to that reported in foals (0.410 ug ml^{-1}) (**Scheuch et al., 2007**) but lower than that reported in pigs (0.616 ug ml^{-1}) (**Benchaoui et al., 2004**). Differences in kinetic parameters are relatively common and are frequently related to interspecies variation, age, breed, health status of the animals and/or the assay method used (**Haddad et al., 1985**).

Absorption was rapid after intramuscular and subcutaneous administration of the drug as indicated by large absorption rate constant (k_{ab}) 5.145 and 4.464 h^{-1} and short absorption half-life ($t_{0.5(ab)}$) 0.135 and 0.155 h., respectively. Following a single subcutaneous injection, the drug was rapidly absorbed (**Nowakowski et al., 2004**). Tulathromycin was slowly eliminated from the body as evidenced by long elimination half life ($t_{0.5(el)}$) and mean residence time (MRT) 68.929 and 65.874 h., 99.562 and 95.165 h., respectively.

The values of systemic bioavailability of tulathromycin after intramuscular injection 82.80 %, indicated good absorption of the drug from the site of intramuscular injection. The intramuscular systemic bioavailability has been reported to be 87 % in pigs (**Benchaoui et al., 2004**). Tulathromycin after intramuscular administration is rapidly and nearly completely absorbed from the injection site to reach maximal serum concentrations within 1 h (**Benchaoui et al., 2004; Galer et al., 2004; Nowakowski et al., 2004; Scheuch, 2007**). The *in vitro* protein binding tendency of tulathromycin to calve's serum proteins was 38.86 %. For another macrolide antibiotics (clarithromycin and azithromycin) this value ranged from 7-50 % (**Marzo and Dal Bo 1998**).

The minimum inhibitory concentrations (MICs) for tulathromycin against isolated bovine and porcine respiratory pathogens (*Mannheimia haemolytica, Pasteurella multocida, Mycoplasma bovis* and *Mycoplasma hypopneumoniae*) was previously reported to be 0125-0.25 ug ml^{-1} (**Godinho, 2008**). The serum concentration of tulathromycin following intravenous, intramuscular and subcutaneous administration was higher than the MIC for the previously mentioned bacteria. This result indicates that tulathromycin could be used successfully for treatment of such types of bacterial infection in calves.

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Dynamic Optimization of LQ Objective Loss Function: Application in Economic Planning

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Abstract
In this paper, the stochastic dynamic optimization is used to calculate optimal values of liquidity and government budgetary expenditures for the Iran's forth five year development plan (2005-2009). For this purpose, we minimized quadratic variations of inflation rate and the rate of economic growth from their plan target subject to a nonlinear dynamic system. The results show that, the optimal values of the above control variables are greater than those proposed in forth development plan whereas the optimal values are less than the occurred quantities. Based on obtained results, using the optimal macroeconomic policies will improve the rate of economic growth and inflation rate in comparison with their occurred values. [Amir Mansour Tehranchian, Rezvaneh Poorhabib, Nayere Karegar and Masoud Behravesh. Dynamic Optimization of LQ Objective Loss Function: Application in Economic Planning. [Amir Mansour Tehranchian, Rezvaneh Poorhabib, Nayere Karegar and Masoud Behravesh. **Dynamic Optimization of LQ Objective Loss Function: Application in Economic Planning.** Journal of American Science 2011;7(5):656-660]. (ISSN: 1545-1003). http://www.americanscience.org.

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1- Introduction

After the great depression (1929-32), Keynes criticized the fundamentals of classical school in wage-price flexibility, full employment, inherent equilibrium and so unnecessary policy-making decisions. However, according to "all or nothing" demand for money theory; he attempted to justify government intervention in economy to improve economic situations (Hicks, J. R., 1937; Mankiw, Gregory, 1988). After three decades, Friedman (1968) showed how monetary policies lead to incentive output in the short run and inflation in the long run. Due to Friedman's idea that "inflation is anywhere and always a monetary phenomenon", conducting monetary policy got more attention in economic literatures. Peterson and Lerner (1971) pointed out that increasing money supply lead to increase in the capital accumulation and economic growth. In a new classical school framework, unanticipated policies will have real effects, even in a very short period. Some recent developments in macroeconomic theories such as "central bank independence" as well inflation targeting indicate that the role of central banker in monetary control of inflation and economic growth (Cukierman, Alex, 1992; Taylor, John. B, 1993). Thus, until initially of 2000

decade intermediation and policy-making in economy, voided from visionary and tentative battles. However, due to the trade-off between the effects of macroeconomic policies, these policies must be optimal and coordinated. So, on the base of recent development in macroeconomics, determining optimal monetary and fiscal policies as the satisfy macro goals is very important in economic planning. In real world, policy makers in decision-making process should determine the objectives and constraints. Then, he (or she) should choose the alternative that gives the nearest outputs to objectives. For this reason, the application of optimal control theory has been widely developed in economic studies. During the last few decades, Iran's economy has witnessed high inflation and high fluctuations in economic growth. Combating the above problems has been one of the important goals of policy making in Iran. The present paper deals with the quantities determination of optimal monetary and fiscal policies in Iran in order to achieve the goals of the Iran 4th development plan (2005-2009) in terms of economic growth and inflation with minimum disturbance. To do so, using the stochastic dynamic programming, the quadratic deviation of inflation and economic growth are minimized from the 4th plan

targets subject to a Keynesian nonlinear macro econometric system. Using the optimum control algorithm "OPTCON", approximately optimal monetary policy and its effects on the mentioned macroeconomic indexes are determined. The layout of present paper is as following. In the next section, the "OPTCON" algorithm is reviewed. In section 3, the findings are shown. Section 4 concludes the paper with as summary.

2- The "OPTCON" Algorithm

In decision-making process, first, the objectives and constraints should be determined. Then, the alternative that gives the nearest outputs to objectives is chosen as an optimal policy. For this reason, during the last three decades, the application of optimal control theory has been widely developed in economic studies. Hence, the structure of dynamic optimization models is constructed from an objective function (, i.e. functional) and a dynamic nonlinear system of equations as a constraints. The objective function is a quadratic loss function in which penalized on deviation of objective variables from their desired values. The constraints of optimization are determined by the econometric models specified on the base of economic theories. Because of **the nonlinearly of the economic** optimization models, approximate solutions are applied in the studies. For this purpose, some stochastic optimal control algorithms such as: The open-loop feedback (OLF) algorithm derived by Kendrick (1984), the optimal control algorithm for nonlinear model (OPTNL) designed by chow (1981) and the "OPTCON" algorithms developed by Matulka & Neck (1992) are used. Among the algorithms, the "OPTCON" provides the most facilities for economic planning in comparison with the others. In this algorithm a quadratic loss function is minimized subject to a stochastic nonlinear dynamic system. In this intertemporal objective loss function, the policy-maker penalizes on quadratic deviations the vector of control and state variables from their target values. So:

$$L = \frac{1}{2} \begin{bmatrix} X_t - \overline{X_t} \\ U_t - \overline{U_t} \end{bmatrix}' . W_t . \begin{bmatrix} X_t - \overline{X_t} \\ U_t - \overline{U_t} \end{bmatrix} \qquad (1)$$

Where X_t, U_t, $\overline{X_t}$ and $\overline{U_t}$ are vector of state variables, vector of control variables and vector of desired (target) levels of the state and control variables respectively. W_t Denotes the symmetric positive semi definite matrix, so:

$$W_t = \alpha^t . W \qquad ; \qquad t = 1, 2... T \qquad (2)$$

Where α is a discount factor, W denotes a constant value matrix and T denotes the terminal period of the finite planning horizon.

The dynamic stochastic nonlinear system is defined as:

$$X_t = F (X_{t-1}, U_t, \hat{\overline{\theta}}, Z_t) + \varepsilon_t \qquad (3)$$

In this system $\hat{\overline{\theta}}$, Z_t and ε_t are the expected value of the stochastic parameter vector, exogenous variables vector and the matrix of the additive system noise respectively. As inputs of the algorithm, the user has to supply the following: The nonlinear system function, the initial value of the state vector, a tentative path for the control variables, the expected value and the covariance matrix of the stochastic parameter vector, the covariance matrix of the additive system noise, the weight matrices of the objective function, the planning horizon, the desired paths for the state and control variables and a discount rate of the objective function. This algorithm is executable in "GAUSS" programming system. In this paper, the nonlinear system of equations is taken from a macro econometric model based on Keynesian macroeconomic theory. The system of equations contains two group equations: behavioral equations and identities. The behavioral equations include goods and services market and money market from the aggregate demand side. The goods and services market contains private consumption function, private investment function, government total expenditures function, total tax revenues function, imports and non oil exports functions. Hence, regarding Wagner law (Lamartina, S. & Andrea Z, 2008; Afxentiou, P. C. & Apostolos S, 1996) government total expenditures variable was considered endogenous. Also, the model include an exchange rate equation, an interest rate function (a reduced form of money market equilibrium), consumer price function and GDP deflator function. The list of variable is shown in appendix. Table 1 shows the estimated behavioral equations and identities. The stochastic nonlinear system by "3SLS" method was estimated using time series data for the period 1959-2004 (CBI, 2009). So, full covariance matrix of the parameters is available. The software package PC Eviews, version 10 has been used for estimating the system. The purpose is determining the optimal government budgetary expenditures and optimal money stock M3 (total liquidity) in such a way as to satisfy the 4th Iranian development plan goals, i.e., the rate of economic growth and inflation rate. So, the planning horizon is the period from 2005 to 2009. Among the variables whose deviations from the desired values are to be penalized in objective function, two categories are distinguished:

First, the "main variables" are those which are more important in assessing the performance of government. They are the rate of inflation and the rate of GDP growth.

Second, the "minor variables" are those which include the consumer price index and gross domestic product. It was assumed that the desired (or target) values of the main and minor variables are those determined by Iran's 4th development plan (2005-2009).

After several experiments sensitivity analysis, a discount factor $\alpha = 0.25$, the weight 100 for main and 10 for minor objective variables have chosen. Then, in the weight matrix of the objective function, off diagonal elements were all set to zero. In addition, all state variables in the model not mentioned above, got the weight zero. In this paper, the tentative path to state variables is calculated by simulation of the model. Also, projections for the exogenous variables as well as control variable over the optimization horizon were required too. The values of these variables were the same which occurred during the period of 2005-2009.

3- The optimization results

Table 2 shows the values of optimal, 4th plan and occurred control variables. A comparison of the results shows that the optimal values liquidity and government budgetary expenditures are greater than the amounts proposed in 4th plan but less than the occurred quantities. The optimal values of main variables are shown in table 3. Hence, as show, using the optimal macro policies will improve the rate of economic growth and inflation rate in comparison with their occurred values. Based on obtained results, the actual (occurred) inflation rates are bigger than the plan targets, since there was not monetary and fiscal discipline over the period regarding table 2 and table 3. The table results show that under optimal monetary policy, the fluctuation in the rate of inflation and economic growth will be reduced. In fact, optimal monetary policies act as a stabilizing program.

Table 1: The System Equations

Number of Equation	Behavioral
1	CRR=0.54 CRR(-1) + 0.13 YDR + 28 M3R $\bar{R}^2 = 99\%$ t: (4.86) (4.11) (3.1) DW=2.08
2	INVPR=0.91 INVPR(-1) + 0.2 TGEN – 543.19 LTIRR t: (14.46) (2.45) (-0.82) DW=1.93 $\bar{R}^2 = 68\%$
3	TGEN=2420.9 +0.2 GDPN t: (1.39) (36.61) DW=2.03 $\bar{R}^2 = 96\%$
4	NOILEXPR=0.96 NOILEXPR(-1) + 0.34 ERR t: (16.1) (1.51) DW=2.09 $\bar{R}^2 = 87\%$
5	IMPR=0.33 GDPR – 6.03 ERR t: (5.65) (-1.72) DW=1.77 $\bar{R}^2 = 84\%$
6	CPI=0.58 CPI(-1) + 0.00006 M3N + 0.003 ERN t: (9.06) (6.8) (11.72) DW=2.1 $\bar{R}^2 = 99\%$
7	LTIRN=0.94 LTIRN(-1) + 0.000003 GDPR – 0.000003 M3N t: (9.98) (0.91) (-0.62) DW=1.65 $\bar{R}^2 = 94\%$
8	ERN=1.06 ERN(-1) – 0.00013 NX t: (3.63) (2.87) DW=1.19 $\bar{R}^2 = 98\%$
9	TAXRN=45.79 + 0.06 GDPN t: (1.91) (49.17) DW=1.19 $\bar{R}^2 = 98\%$
10	GDPDEF=1.015 CPI t: (17.41) DW=2.19 $\bar{R}^2 = 99\%$
	Identities
11	GDPR= CPR + INVPR + TEGR + EXPR – IMPR
12	TGER=(TGEN * GDPDEF)/100
13	EXPR=OILEXPR+NOILEXPR
14	GRGDPR=((GDPR-GDPR(-1))/GDPR(-1))*100
15	GRCPI=((CPI-CPI(-1))/CPI(-1))*100
16	LTIRR=LTIRN-GRCPI
17	M3R= (M3N/CPI).ERN
18	ERR= (CPIF/CPI) * ERN
19	NX=EXPN- IMPN
20	EXPN= (EXPR*EXPDEF) /100
21	IMPN= (IMPR*IMPDEF) /100
22	TAXPR= (TAXRN/GDPDEF)*100
23	YDR= GDPR- TAXRR

*t, $\bar{R}^2$ and DW are the T statistic, adjusted $\bar{R}^2$ and Durbin Watson statistic respectively.

Table 2. The values of optimal, 4th plan and occurred control variables

Milliard Rial (IRR)

Control variables		2005	2006	2007	2008	2009
M3N	Proposed in the 4th plan	814408	993577	1192293	1406906	1634280
	Optimal	850273	1041724	1279447	1563158	1930937
	Occurred	921019	1284199	1640293	1901366	1974851
GBEN	Proposed in the 4th plan	325055	379204	439974	510167	601214
	Optimal	439502	551511	752221	1036958	1410535
	Occurred	448523	561359	578550	777786	….

Source: Authors Calculations.

Table 3: The Optimization Results

Percentage

Main variables		2005	2006	2007	2008	2009
GRGDPR	Targets	7.1	7.4	7.8	8.4	9.3
	Optimal	10.4	7.3	7.6	8	8.2
	Occurred	6.9	6.6	6.7	2.3	1.9*
GRCPI	Targets	14.6	11.5	9.1	7.9	6.8
	Optimal	16.4	16.5	17	17.2	18.1
	Occurred	10.4	11.9	18.4	25.4	10.8

Source: authors calculations.
* Based on IMF estimation (IMF, 2009).

4- Concluding remark

In this paper the optimal macroeconomic policies were determined to achieve the goals of the 4th five year Iranian plan (2005-2009). This includes economic growth and inflation rate. To do so, an intertemporal quadratic objective loss function was minimized subject to a dynamic nonlinear macro econometric system using statistic optimal control theory. The obtained results show that the optimal values of liquidity government currency as well as capital expenditures are greater than those proposed in forth development plan. Also, the optimal values of the above mentioned control variables are different from these executed during the 4th plan years. The comparison between the effects of the optimal macroeconomic policies on goal variables with these occurred show that using the optimal policies improve the goals in the 4th plan with respect to rate of economic growth and inflation rate. Therefore, in the absent of active tax instrument, there must be "big push" in fiscal and monetary policies in order to achieve macroeconomic goals in Iran. Furthermore, the study shows that the optimum macroeconomic policies could lead to a considerable stabilization of the time path of the rate of economic growth and inflation rate. Based on the obtained results, it is recommended to apply optimal control theory for actual political decisions.

Appendix: List of variables

State (or endogenous) variables:

CPI	Consumer price index
CPR	Private consumption expenditures, real
Demand	Total final demand, real
ERN	Exchange rate, nominal
ERR	Exchange rate, real
EXPN	Total export, nominal
EXPR	Total export, real
GDPR	Gross domestic product, real
GDPDEF	GDP deflator
GBER	Government budgetary expenditure, real
GRCPI	Annual growth rate of CPI (inflation rate)
GRGDPR	Annual growth rate of real GDP
IMPR	Total imports, real
IMPN	Total imports, nominal
INVPR	Private investment, real
LTIRN	Long-term interest rate, nominal
LTIRR	Long-term interest rate, real
M3R	Money stock M3, real
NOILEXPR	Non-oil export, real
NX	Net export, nominal
TAXRN	Government tax revenue, nominal
TAXRR	Government tax revenue, real
GER	Government expenditure, real
YDR	Personal disposable income, real

Non-Control Exogenous variables:

CPIUSA	USA CPI Consumer price index
IMPDEF	Import price level (import deflator)
EXPDEF	Export price level (export deflator)
OILEXPR	Oil exports, real

Control Exogenous variables:

M3N	Money stock M3, nominal
GBEN	Government budgetary expenditures, nominal

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Average stem biomass of ONOBRYCHIS MELANOTRICHA in Shanjan Rangelands, East Azerbaijan, Iran

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Abstract: Plants can be used for animal grazing, in wind erosion control, to reduce water flow rates, and to increase evaporation and transpiration. In the NW of Iran (East Azerbaijan Province), rangelands previously used to animal grazing were changed to agricultural land use; this vegetation is unsuitable vegetation coverage. We studied ONOBRYCHIS MELANOTRICHA to determine its stem biomass characteristics. Data were collected using an accidental sampling methodology (1*1 m). In total, 4 plots were identify and 20 samples were collected for this research. In the minimum, maximum and mean stem biomass for this plant were found to me 2.1, 6.5 and 3 g, respectively.
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Key word: ONOBRYCHIS MELANOTRICHA , Iran, Rangeland, stem Biomass.

1. Introduction

Rangeland ecosystem stabilizing, optimum and continual utilization of the range without studding and knowing the influencing factors on its segments and animal pasturage are of special importance (Bibalani et al., 2011a;Bibalani et al., 2011b;Mozaffarian, 2007;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011). There are different methods of evaluating rangelands and all of them have advantages and disadvantages. Factors such as vegetation species composition, annual production, area coverage, plant density, soil surface coverage, constitution, and presence of succulence plants were used (Bidlock et al., 1999;Mogaaddam, 2001) but estimation of these parameters are time consuming and expensive.

Fresquez (Fresquez et al., 1990) reported an increase in vegetative production and forage quality of Blue Grama (Mata-Gonza´lez et al., 2002). Benton & Wester (Benton and Wester, 1998) reported an increase in Tobosagrass (Hilaria mutica) yield following applications of biosolids at levels of 7, 18, and 34 dry Mg ha-1 in the Chihuahuan Desert. Although dormant season applications of biosolids seem to be more beneficial for plant growth than growing season applications during the year of biosolids application (Benton and Wester, 1998), explanations for this phenomenon have not been documented (Mata-Gonza´lez et al., 2002).

Most evidence is related to its negative effect on aboveground vegetative and reproductive plant biomass (Hutchings and John, 2003;Milchunas and Lauenroth, 1993), changes in the spatial patterning of plant canopies and soil resources (Adler et al., 2001;Bertiller and Coronato, 1994;Callaway, 1995;Schlesinger et al., 1990), the reduction of soil seed banks (Bertiller, 1996;Bertiller, 1998), the decrease in the availability of safe micro sites for plant reestablishment (Bisigato, 2000;Oesterheld and Sala, 1990), and the invasion of woody plants (Milchunas and Lauenroth, 1993;Rodriguez et al., 2007;Schlesinger et al., 1990).

Aboveground defoliation can modify the partitioning of assimilates between belowground and aboveground organs and consequently the root growth of defoliated plants (Belsky, 1986;Richards and Caldwell, 1985;Rodriguez et al., 2007;Snyder and Williams, 203).

In this research we have studied the amount of above ground biomass and occurrence of ONOBRYCHIS MELANOTRICHA (Gharaman, 2003) (Figure 1) at the rangeland area of Shanjan village, Shabestar district, NW Iran. This parameter needs more attention, but it is one of the determining Factors of rangeland ecosystem.

2. MATERIALS AND METHODS:

The research area is part of Shanjan rangeland in Shabestar district with distance about 5 Kilometers from Shabestar city. The terrain in this area is hilly and we carried out the study on a site with a northerly aspect (Bibalani et al., 2011a;Bibalani et al., 2011b) (Figure 1). This region is component of Iran-Turan Flora with elevation between 1700-1850 m (Bibalani et al., 2011b).

Onobrychis, the Sainfoins, are Eurasian perennial herbs of the legume family (Fabaceae). Including doubtfully distinct species and provisionally accepted taxa, about 150 species are presently known. The Flora Europaea lists 23 species of Onobrychis; the main centre of diversity extends from Central Asia to Iran, with 56 species – 27 of which are endemic – in

the latter country alone (Wikipedia, 2011). Onobrychis melanotricha (Table 1, figure 2) (Fabaceae) is an endemic perennial herb in Iran and has two varieties (Karamian et al, 2010).

Figure 1: Part of Shanjan rangeland in Shabestar district, East Azerbaijan province, Iran.

Table 1: Scientific name for ONOBRYCHIS MELANOTRICHA Classification Report (USDA, 2011).

Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Rosidae
Order	Fabales
Family	Fabaceae – Pea family
Genus	Onobrychis Mill. – sainfoin
Species	Onobrychis melanotricha Boiss.

Figure 2. ONOBRYCHIS MELANOTRICHA species

In this research, Stem biomass has been sampled in May and June, 2010. For sampling, we used an accidental sampling methodology (1*1 m plot) in this research and selected 20 (4 plots with 5 sub sample for each of them) samples in total (Xiaoyan et al., 2001) (Figure 3).
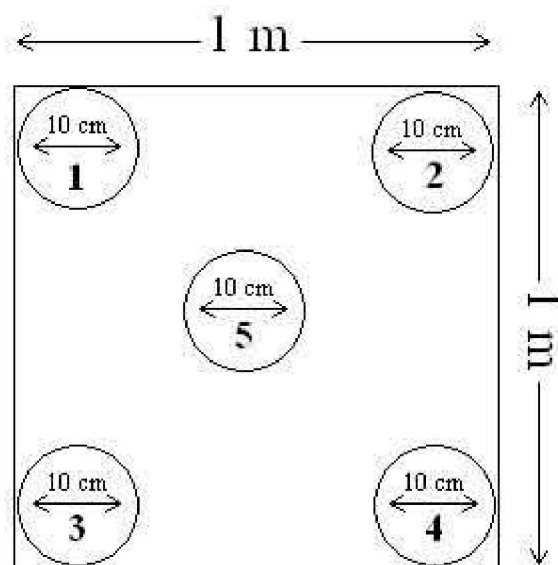
Figure 3. Sampling design in 1*1 m plot (Xiaoyan et al., 2001). 1, 2, 3, 4 and 5 is sub sample in each main sample.

After sapling from studding area, they have been scaled fresh weight of above ground part of plant with sensitive scale then dried by Avon set in 80° c during 24 hours (Xiaoyan et al., 2001) and scaled dried weight separately. This study have been work in Shanjan rangeland at Shabestar district in East Azerbaijan, Iran in summer 2010.

3. RESULTS

Results from this study showed that the maximum, minimum and medium stem biomass of ONOBRYCHIS MELANOTRICHA in the study area were 2.1, 6.5 and 3 g, respectively (Figure 4).
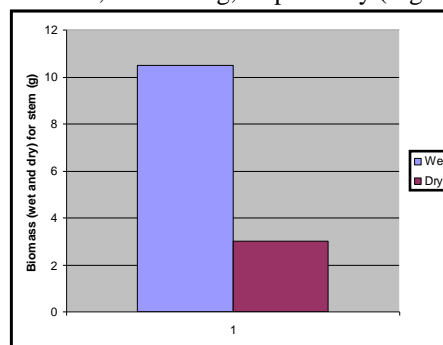
Figure 4. ONOBRYCHIS MELANOTRICHA stem weight (fresh and dried weight).

Stem height ONOBRYCHIS MELANOTRICHA was unsteady from 50 to 200 mm, that average of it is about 120 mm.

4. Conclusion

In total of 4 plots were identified and 20 amples were studied in this research work. From 20 samples about 71.43% of stem weight was lost when samples were dried.

Vegetation species can have an effect on soil chemical and physical properties (Ardekani, 2003). Increasing ONOBRYCHIS MELANOTRICHA species in the study area could cause specific biological qualification, and as this species increasing density of above ground Biomass will increase, and also the amount of Soil protection and stabling will increase specially protection with wind erosion and soil lost with runoff (Bibalani et al., 2011a;Bibalani et al., 2011b;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011). Study on this plant over ground biomass is so much important information especially for medicinal plant. Joudi and Bibalani (Bibalani et al., 2010) have been studied and recognized some medicinal plant of Ilkhji region, Eastern Azerbaijan Province (Northwestern Iran).

In this study we examined the biomass of this plant and results suggest that changes in the above ground cover of this plant affect by grazing or soil compaction with animal at this area as found in other studies (Bibalani, 2011a;Bibalani, 2011b;Bibalani, 2011c;Bibalani et al., 2010;Bibalani et al., 2011a;Bibalani et al., 2011b;Rodriguez et al., 2007;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011) and The difference of wet weight and biomass of this plant would be expected in this area (Bibalani, 2011a;Bibalani, 2011b;Bibalani, 2011c;Bibalani et al., 2010;Bibalani et al., 2011a;Bibalani et al., 2011b;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011).

This study has revealed and quantified the stem biomass of the ONOBRYCHIS MELANOTRICHA in the Shanjan rangelands, the plant has good biomass in this research area and probably also in other areas where the ONOBRYCHIS MELANOTRICHA is growing that need studding separately in another areas. It is a pioneer study, and the results have given estimations of the stem biomass of the ONOBRYCHIS MELANOTRICHA for the first time in Shanjan rangeland. It is needed for studying this and other shrub species in the area and could be used in identifying plants best suited for rangeland ecosystem stability and specifically for stabilizing surface soil layers especially from water and wind erosion.

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Management of environmental degradation of Jeddah coastal zone, Saudi Arabia, using remote sensing and geographic information systems

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Abstract: This study is focused on the environmental degradation of Jeddah Governorate coast. The importance of study area is related to the effect of human factors and their roles in destruction and production of environmental problems in the coastal zone. The study is focused on the problem of land use planning and sustainable touristic development to maintain the marine ecosystem and its natural resources. Also this work is concerned with developing and suggesting strategy to protect the natural resources of the marine environment in relation to the future expansion of population and developmental projects. The study is elaborated using the recent techniques in remote sensing and geographic information system (GIS). TM and ETM landsat images acquired in 1986 and 2003 of the study area were used. Manuscripts and topographic maps of scale of 1: 4000,000 for Jeddah governorate, in addition to data and information obtain from different institutions were also employed. ERDAS Imagine 8.5 software was used for image processing (i.e. Export function, layers tacking, geometric correction.etc.). Results showed that the negative changes in the coast exhibit 84 km as it record a length of 111 km compared to195 km in 2003. This change leads to the depletion of natural environmental marine resources and erosion of the recreational areas at the coast line. Absence of a proper sustainable planning strategy and management for coastal natural resources, cause improper human pressures and disorders in the natural balance of the marine environment. The study has suggested a strategy for sustainable touristic development, represented in building systems and developing laws with continuous work to revise procedures and update the standard limits.
[Amal Bent Yahya Al-Sheikh. Management of environmental degradation of Jeddah coastal zone, Saudi Arabia, using remote sensing and geographic information systems. Journal of American Science 2011;7(5):665-673]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Management; environmental degradation; Jeddah coastal zone; Saudi Arabia

1. Introduction:

Jeddah governorate is considered one of the strategic vital cites in Saudi Arabia because it is located near to the holly Mecca, in addition to its geographic location along the red sea coast and being one of the most important commercial cities in Saudi Arabia (Abu Ouf and EI-Shater, 1991). Jeddah governorate activities and its urban growth are related to their potentials and their growth properties, resulted from its economic and geographic relation with the sea. Jeddah governorate plays an important role in the process of national development as its marine port received about 80 % of the imported resources during the seventies (Al-Sharideh, 199). It also plays a vital role in the transportation of pilgrims and Umrah performers and visitors to and from the holly cities of Mecca and Medina (Al-Ghamdi et. al, 2003). The urban growth is affected by the extension of the sea; hence, its direction is parallel to the coast, usually from south to north. The direction of arrival of the sea breeze shares mainly in directing the land use and interfaces of drawings and buildings (Aleem, A.A. 1989).
Variety of recreational activities along the coast of the Jeddah governorate is one of the important factors for touristic attraction, which qualify it towards the comprehensive concept of touristic sustainable development (Ady et. al., 1995). However, investment projects and misuse of the land lead to the decrease of the recreational areas along the coast line and depletion of marine natural resources (Timothy, D., 1998). Thus, there is an urgent need to conduct research activities to highlight the environmental problems of Jeddah governorate to share in solving the problem on environmental degradation and conserving the marine environment of the governorate (Ahmed and Sultan, 1993).

Study problem & Questions:

The problem of the study is defined by the attempts to answer the following main question;

What are the reality and the possibilities of sustainable tourism development on the sea coast of Jeddah?

This main question will be answered through the following sub questions:
1. What are the negative effects of the indiscriminate tourism development in Jeddah coastal zone?
2. What is the current situation of the coastal environment of Jeddah?

3. What is the change occurred in Jeddah coastal region during the period 1986 – 2003?
4. What are the possibilities of tourism development on the coastal area of Jeddah?

Importance of the study:

The importance and rational of the study can be highlighted through the following axes:

1. Recognizing the current situation of Jeddah governorate coast through modern applications of remote, sensing, geographic information systems and field surveys technologies.
2. Increase of world and Arab interest in touristic sustainable development and planning.
3. Survey and identify the most important problems, which the coastal environment of Jeddah is suffering form.
4. The importance of following a development strategy for sustainable tourism development, preserving the natural resources of the marine environment.

Objectives of the study: the objectives of this study are as follow:

1. Identify the impact of human factors and their role in the destruction and creation of environmental problems of Jeddah marine coast.
2. Suggestions that help to accelerate development and sustainable tourism development to reduce the depletion of natural resources of the marine environment of the study area.
3. Provide as much data as possible for the study area, which may contribute to the sustainable tourism development of strategic plans.
4. Highlight the role of modern technology application areas in sustainable development studies.

2. Methodology:

Digital data driven from landsat satellite images of study area were used, in addition to topographic maps; field surveys and ancillary information were collected (Moore and AI-Rehaili 1989). ERDAS Imagine 8.5 and Arc GIS 9.2 software were used for digital data processing and producing the final layouts.

The study plan:

The study is based on four main axes, namely:

Ø The first axis: general theoretical Axis and deals with the concept of sustainable tourism development and its importance and elements.
Ø The second axis: technical Axis which deals with processing and analyzing satellite images to study and monitor the change in the coastal line during the period 1986 to 2003.
Ø The third axis: deals with defining the human pressures and investment projects and their impact on the marine environment.

Ø The fourth axis: aiming to provide solutions and suggestions which may help in the formulation of a strategy capable of maintaining the balance between sustainable tourism development and marine environment of Jeddah.

Borders of the study area:

Ø **Spatial borders**: The study was done for the northern coast of Jeddah governorate at the areas of (Sharm Abhor, city of lakes, Salman Bay and Dorat Al Arous) (fig.1).
Ø **Temporal borders**: It includes the period between (1986 – 2003), they are the newest and the oldest available LANDSAT satellite imaging dates. Also 2005 which refer to the available IKONOS imaging date.

Data processing:

The digital satellite images have been elaborated using ERDAS Imagine V. 8.5 software, while Arc GIS V.9.2 was utilized for developing digital database of study area (Burrough, 1986 and Tomlin, 1990).
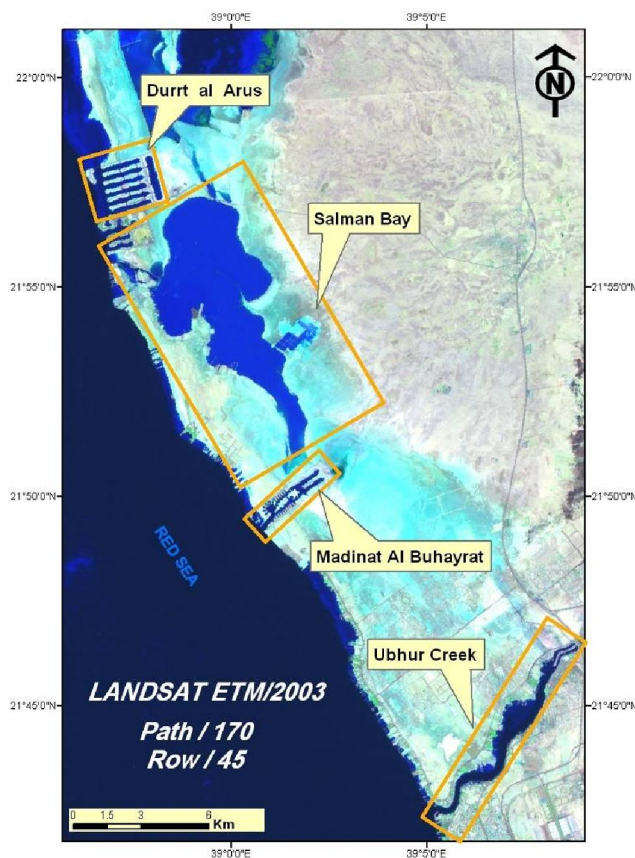
Fig.1. Boundaries of Study area, displayed on Satellite image.

The following steps were taken by the author on the current study;

1. Raw LANDSAT TM and ETM satellite images (Row 45/Path 170) were collected from king Abdul Aziz city for science and Technology (Riyadh city) covering the study area in the period (1986 and 2003) by the American satellite (LANDSAT TM,ETM).

2. The raw satellite data were processed using ERDAS Imagine V.8.5 software via Import / Export function and LAYERSTACK Conditional model (Hussein, I., 1994).

3. Geometric Correction has been elaborated by choosing the projection Type UTM WGS 84 for the zone 38 in order to obtain high accuracy in matching adjacent scenes. More than 30 Ground Control Points were monitored by using GPS in different location within the study on the coast region, as geographical reference for geometric correction (fig.2).

4. The study area was identified on the satellite image using the tool (Area Of Interest-AOI) to subset the study area (Gad, A at.al., 2011).

5. Detecting the changes and defining the areas susceptible to deterioration, on the coastal line during the period 1987 to 2002, was monitored.

Upon finalizing the processing and data analyses, the results were converted (Raster to Vector) for the purpose of are computations and maps reproduction (Nguyen Quec Dinh, 2001 and Pavasovic, 1993).

3. Results of theoretical and practical studies
Study area (Geographical location)

Jeddah city is located in west of Saudi Arabia on the eastern cost of the Red sea (Fig. 5) between latitudes 20° 50´ 57´´ and 22 ° 18´ 35´´ (E) and longitudes 38 55´ 42´´ and 39 ° 25´ 12´´ (N). It belongs administratively to holly Mecca region.
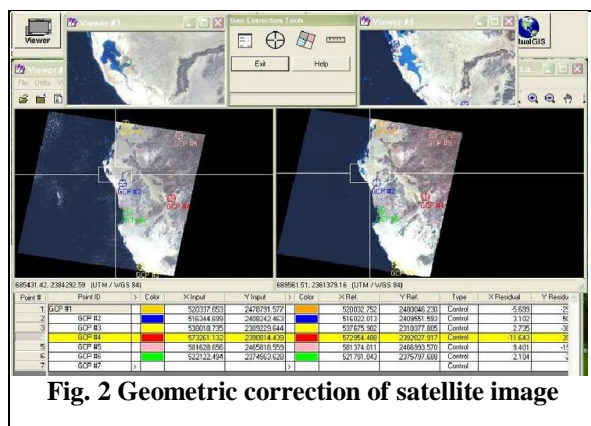
Fig. 2 Geometric correction of satellite image
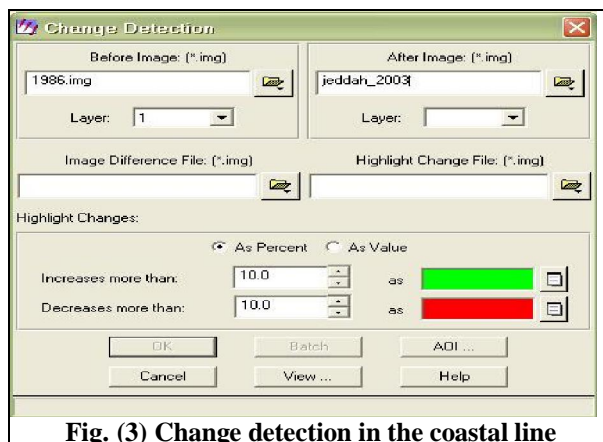
Fig. (3) Change detection in the coastal line
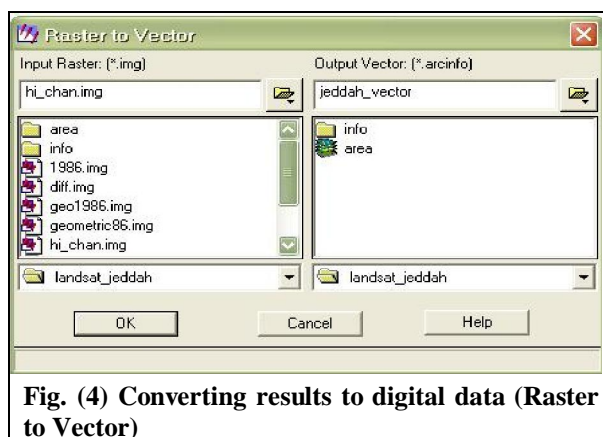
Fig. (4) Converting results to digital data (Raster to Vector)

The geographic location of Jeddah has its impact on the climate; relative humidity is high along the year, especially in summer seasons, where monsoon depressions take place. The temperature is high (+/- 50 ° in the middle of year, where the sun is perpendicular on the land surface at the western region (Behairy et. al. 1985).

Negative impacts of random tourism development

In spite of the economic return, the random unplanned investment and tourism projects caused negative impacts. Such impact may disturb the diversity of the marine ecology, constituting marine herbs, algae, fish eggs, robins and small fish shelters. The main base of actual development resides in the mixture of polices, authorities and techniques that keep the balance of environmental elements. Figure (6) shows the change detection, derived from satellite images, occurred on the coastal zone as a result of marine degradation and filling, especially in the areas of Doret El-Arous and Al-Bohyrat city.
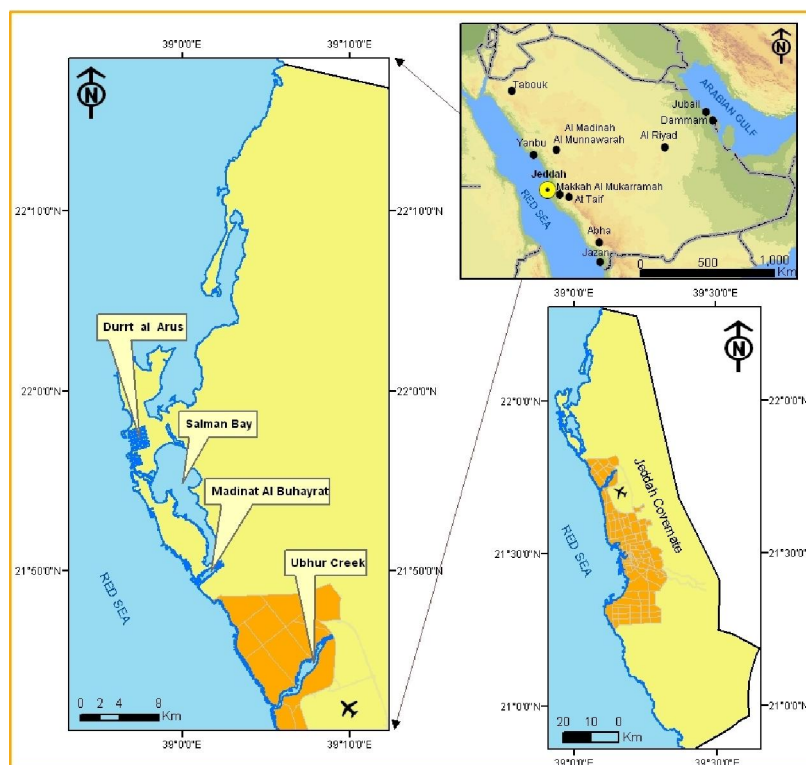
Fig. (5) Geographic location of study area.
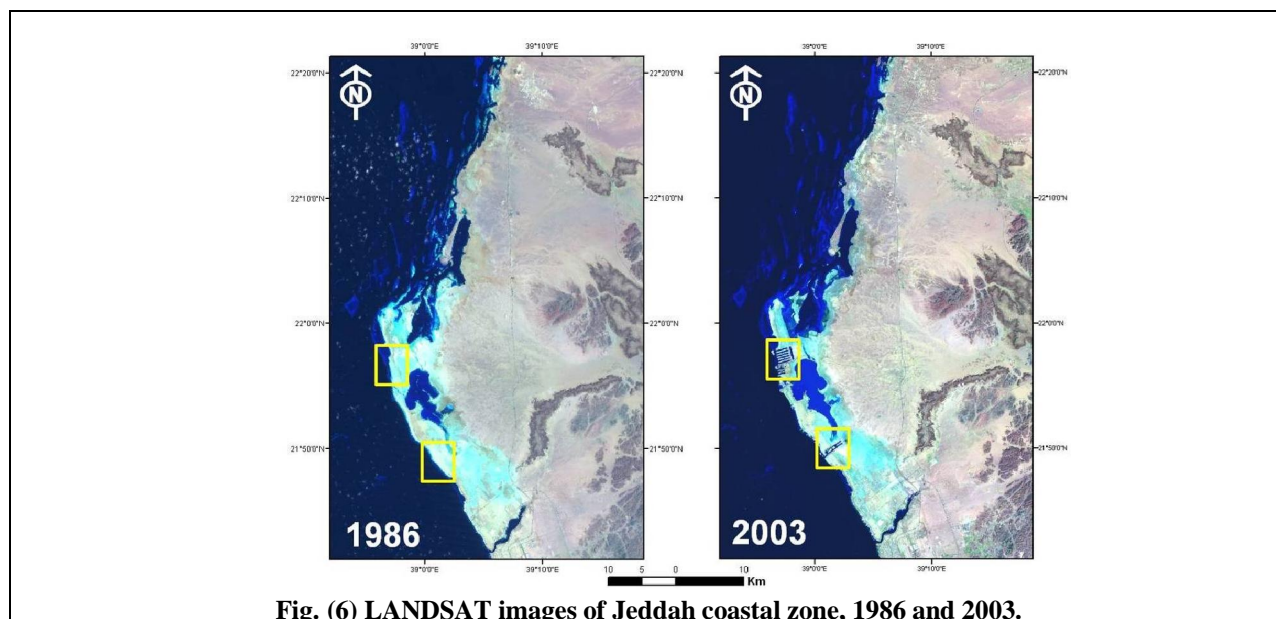
Fig. (6) LANDSAT images of Jeddah coastal zone, 1986 and 2003.

Critical situation of coastal environment

  The study has revealed the changes occurred on the coast during the period 1986 to 2003 regarding the coastal length and areas of erosion and filling. Also, areas of coral reefs and native plants eliminated,

as a result of haphazard tourism projects, were detected.

Coast of Dorat El-Arous and Soliman bay:

  Figure (7) shows that the area was characterized in 1986 by the extension of coral reefs,

diverse marine ecology, and shora trees. Different activities are detected as marine filling (green), erosion processes (Red) and tourism sustainable projects (i.e. hotels, places, homes and resort areas). The area was exposed to extensive ecological deterioration resulted in destruction of coral reefs (Yellow) and elimination of Shora plants (Black) along the coast.

Fig. (7): Erosion and filling processes in Dorat El-Arous and Salman Bay

2- Al-Bohyrat City coast: (fig.8)
      Figure (8) shows the exposure of the coast to extensive erosion which leads to destruction and sweeping of some coastal features (i.e. sapkhas). Moreover, direct and indirect effects on coral reef areas were induced by dust storm and degradation of natural vegetation, thus disturbance of marine environment bio-diversity.
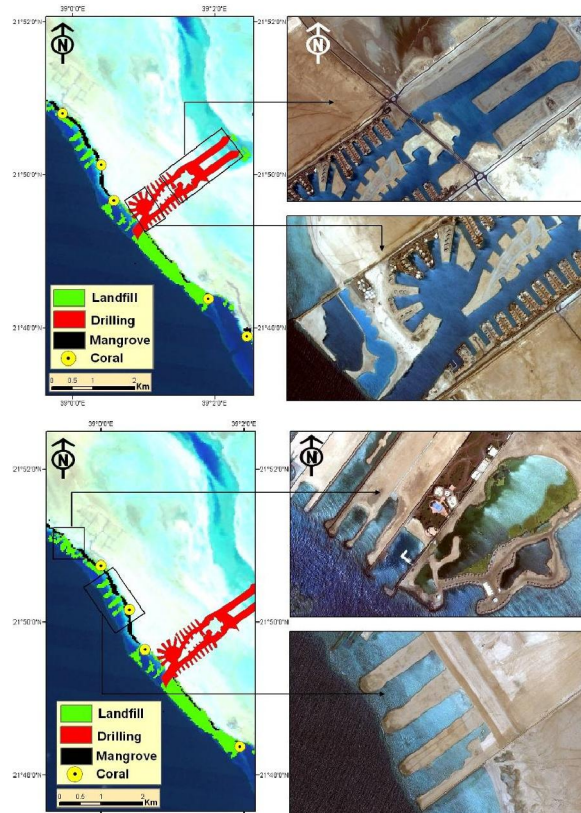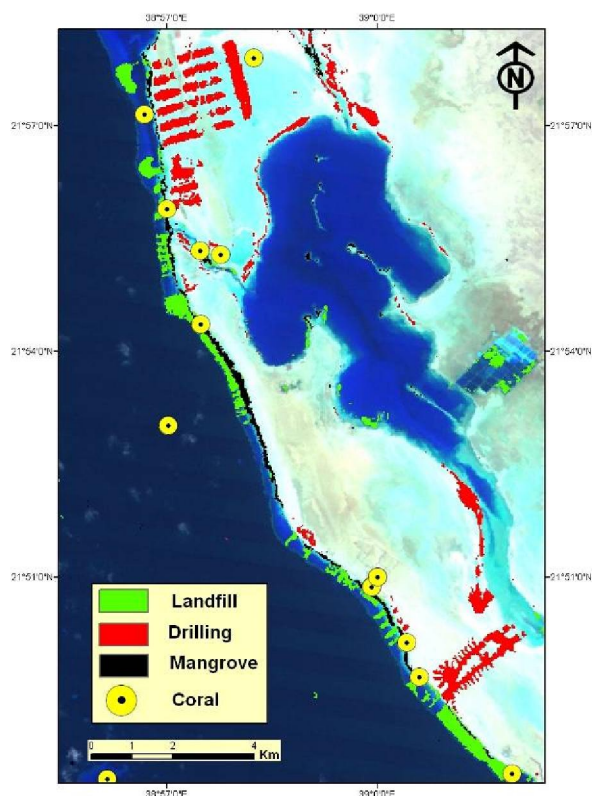
Fig. (8): Erosion and filling processes on Al-Bohyrat coa

3 – Sharm Abhar coast:
      The erosion and filling processes have lead to severe environmental degradation of the marine environment of sharm abhar region. Deterioration and destruction of the coral reefs resulted in disturbing the environmental bio-diversity of plants and animals. (Figs.,9 and 10).
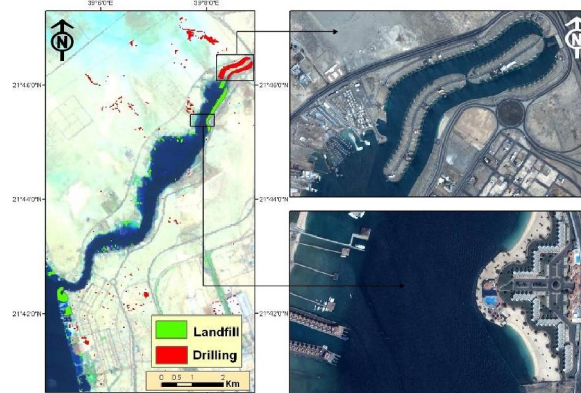
Fig. (9) Erosion and filling processes on Sharm Abhour coast
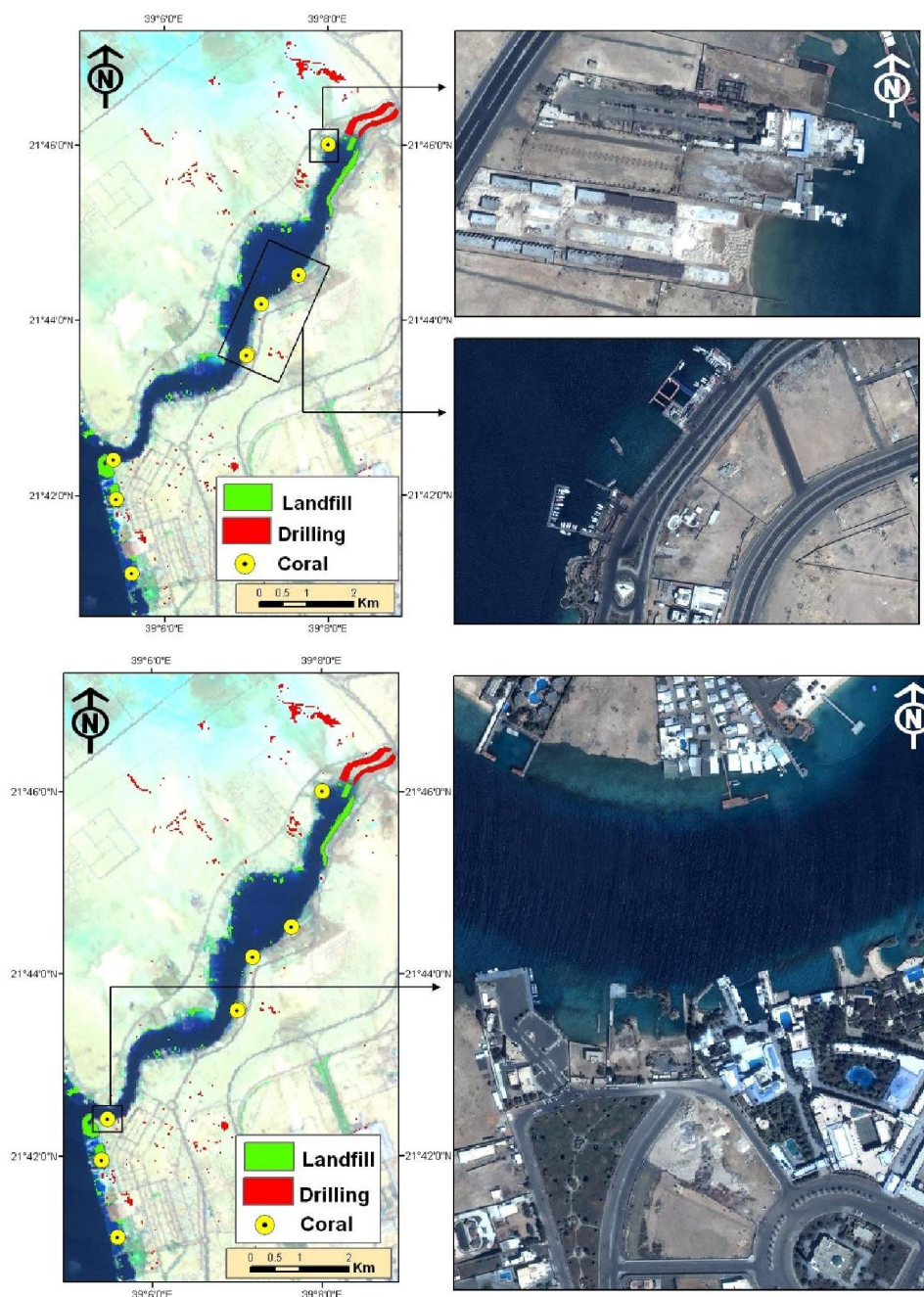
Fig. (10) Erosion and filling processes on Sharm Abhor coast

It is worthwhile to refer to some examples of most important resorts and tourism services, held in the coastal area of sharm abhar and northern cornice. These following project examples had a direct impact on the marine environment of Jeddah as a result of dredging operation and marine debris;
Marina resorts, Ard Al-Saada, Al-Nakhil village, Kristal resort, Laftonein resort

Monitoring the change in the coastal zone 1986-2003:

All satellite images analysis results were converted into digital data to facilitate its usage in change detection and calculating areas of erosion and dredging. Fig.11 shows the change in the coastal line shape, especially in El-Bohyirat City and Dort El-Arous. The blue colour represents the coastal line in 1986, while orange color represents coastal line in 2003.
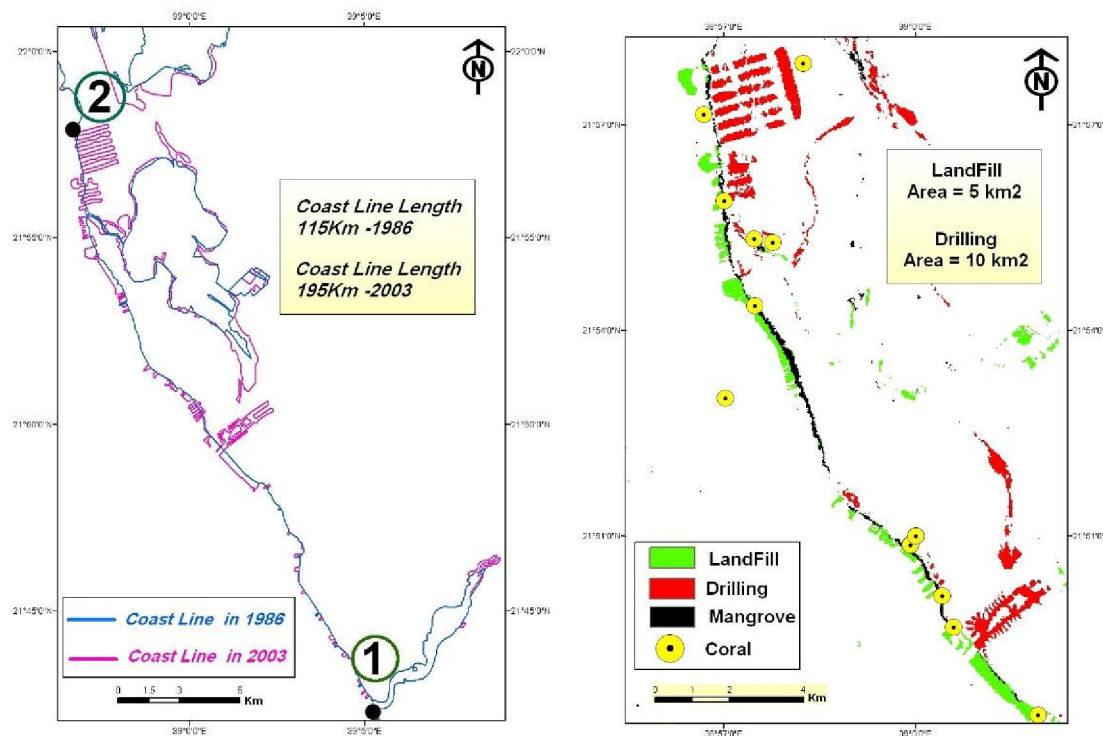
Fig. (11) Computation of changes in the coastal area of Jeddah

It was found that coastal line length in 2003 was 195 km, compared by 111 km in 1986. The change detection revealed that 84 km coastal line length has changed as a result of random projects establishments. Such projects were erected in the absence of required environmental studies. The total dredged area on Jeddah beach amounted 15km^2, out of which 5km^2 represent filling and 10 km^2 represents erosion (table 1).

Table (1) area of dredging and filling and coastal line length (1986-2003)

Length of coastal line 1986	Length of coastal line 2003	Dredging area 1986-2003	Area of landfill 1986-2003	Total area of dredging and landfill 1986-2003
15 km^2	5 km^2	10 km^2	195 km	111 km

In general, the work of dredging and filling of marine coastal line in northern Jeddah city and their harmful impacts due to suspended dust (Fig. 12) cased the deterioration of shoreline plants and coral reefs. Also, pollutants seepage and drainage works have hurt the conditions suitable for marine life

growth. The integration of these negative impacts hit, in its turn, the economic value of the area. The environmental tourism will be seriously affected by these changes of Jeddah coastal zone.

Fig. (12): Dredging and filling in marine coastal line of northern Jeddah city and suspended dust.

Mechanisms and policies for implementing a strategic bases

The most important mechanisms to implement the strategic principles mentioned above can be summarized as follows:

Developing and activating protective mechanisms:
1- Legalizing the system and developing environmental laws, with a continues reviewing and updating the procedures, standards and guide environmental development and protection.
2- Environmental awareness among individuals and authorities.
3- Considering the environmental issues in planning, designing, constructing and operating sustainable developments projects in all sectors, with continuous assessment and evaluation of the environmental impacts.
4- The abundance of information and data on the current status of environments and its expected progress, with continuing the development of monitoring mechanisms, collection, compilation, and representation of information.
5- Environmental management and supporting the central responsible authorities.

Developing a treatment plan
1- Supporting the preventive mechanisms, at the national level, to meet any contingencies as a result of natural disasters and environmental accidents.
2- Application of a sustainable tourism concept, through the creation of lean and friendly environmental tourism with a large financial return.
3- Encouraging tourism enterprises to apply the concept of sustainable tourism through an annual celebration, announcing the names of authorities that succeeded in applying the sustainable environmental concept. Also, placing an adhesive banners on all institution that have applied the concept.

4. Conclusions:
The results and field visits to the study area made to draw the following conclusions:
1- Exposure of the coastal of Jeddah to a severe environmental degradation that has led to destruction of the marine environment of the north.
2- Unsustainable use of marine coastal region interfaces takes place, where environmental measures were not taken into account, disregarding right of future generations in inheriting the marine natural.
3- The study showed a change in the coastal region from 1986 to 2003, as a result of developing unplanned investment and tourism projects.
4- Erosion of most of waterfront areas of the coast as a result of dredging and marine filling.

5- The study showed that the length of the sea coast of the study are of northern corniche in 2003 reached 195 km, while in 1986 was 111 km, recording a difference of 84 km..
6- The study confirmed the absence of regulations, environmental laws and legalizations at the local level and the absence of mechanisms to implement existing regulations.
7- The study showed the importance of applying modern technologies, as effective tools in the studies of sustainable tourism development.

Recommendations:
After shedding the light on the current status of tourism development and its negative effects on the marine environment of the northern coast of cornice of Jeddah, the following recommendations can be pointed out;
1- The responsible authorities should develop and activate policies and strategies to reduce environmental degradation in coastal areas and protect them from erosion and disappearance as a result of random tourism development projects.
2- The official bodies should find mechanisms to implement and enforce regulations and environmental laws to protect what remained of the marine environment and to maintain biological diversity and sustainable use.
3- Studies and researches of the environmental impact assessment should be done by specialists and engineers when planning to set up tourism development projects in the coastal zone.
4- The necessity of activating the coordination between ministries, institutions and land uses relevant departments in order to develop an effective role in protecting the coastal territory and identify suitable areas for each use.
5- The necessity to expand the national system of marine protectorate to maintain the overall biodiversity of different ecosystems.
6- The necessity to support scientific researches and the to establish documentation centers to provide accurate comprehensive environmental information, about current biodiversity situation of coastal areas, for decision makers.
7- Developing the concept of cultural sustainable tourism and holding awareness campaigns to show the importance of this development in the conservation of biodiversity of coastal areas.
8- The need to activate and assesses the environmental control, and inspection of environment when planning tourism development projects in order to maintain the biodiversity of coastal areas.
9- The need to focus on developing scientific progress and modern techniques. It is also

necessary to hold conferences, courses, workshops and to provide accessibility to databases and satellite images for tourism studies and researches.

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Effect of Counseling Sessions on Coping Strategies and Anxiety among Parents of Children with Ambiguous Genitalia

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Abstract: Ambiguous genitalia condition is often an emotionally stressful event for parents. Preparation and ongoing support through counseling sessions could be beneficial to both parents and children and would alleviate some of their shame, isolation and ineffective coping associated with intersexes conditions. The present work aimed to investigate the effect of counseling sessions on coping strategies and anxiety among parents of children with Ambiguous Genitalia. A one-group before-after Quasi-experimental design was used. This study was conducted on parent who coming with their children at pediatric surgery department of Mansoura University Pediatrics' Hospital and Private Center for Pediatric Surgery at Mansoura city. The sample included all parents which their children was diagnosed as ambiguous genitalia (n=30). The revised three interview questionnaires, Socio-demographic data sheet, Taylor's Manifest Anxiety Scale and the Parental Coping Strategy Inventory were administered to compare parent anxiety and coping before and after counseling sessions. The total coping score didn't differ significantly at pre and post intervention session (p>0.05) , a highly statistically significant difference was observed between the pre and post test mean score of anxiety (p<0.001) and the coping strategies domain were not correlated significantly with total anxiety of parents at pre, post Inventory session (p>0.05). It is concluded that administration of counseling sessions for parents of children with ambiguous genitalia is an effective method to alleviate their anxiety. It is recommended that, the counseling should ideally be by those trained in sexual/gender/intersexes matters, as early as possible put the family in touch with a counselors and support group, and counseling should be multi-staged (at birth, and at least again at age two, at school entry, prior to and during pubertal changes, and yearly during adolescence) as well as examining parental coping strategies at different stages of development would be an interesting avenue for future research.
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Key words: Anxiety, coping, ambiguous genitalia.

1. Introduction:

The first question that usually arises after the birth of any newborn is about the gender of the child. This is easily answered in most cases by simple examination of the external genitalia of the baby. Genitalia are ambiguous whenever there is difficulty in attributing gender to a child based on the appearance of the external genitalia [1, 2].The appearance of the external genitalia is a result of complex interaction between genetic and endocrine processes during fetal development [3].

Ambiguous genitalia are a birth defect or birth variation of the sex organs that makes it unclear whether an affected newborn is a girl or boy. In Egypt , disorders of sex development constitute a significant entity among the birth defect list, where their incidence reaches 1 in 3000 live births[4,5].In the realm of sexual taboos in Egypt , the issue of intersexes or those born with ambiguous genitalia is certainly somewhere near the top of the list. The family denies and often keeps secret that their children have this problem that lead to difficulty to detect the prevalence of the problems [6]. The causes

of ambiguous genitalia are 57 percent genetic, 16 percent predispository and 27 percent unknown factors. [7].

The diagnosis of ambiguous genitalia in a newborn infant is an emergency that can be difficult to manage; due to importance of gender assignment particularly in less developed areas of the Arab world with a legacy of tribalism, the situation is more complex socially and psychologically [8,9]. Ambiguous genitalia are a major cause of parental anxiety and can create social problems if not probably managed [10]. The surgical management of children born with ambiguous genitalia has always been difficult, subject to evolving attitudes and techniques and at times controversial [11]. Standard protocols have stressed the need for early diagnosis, gender assignment and appropriate surgery in infancy [12].It is a social emergency in the neonatal period and sex should be assigned as early as possible [13]. Once sex is assigned, surgical treatment should commence in early infancy and completed by school age. The diagnostic approach does not differ significantly in

different centers, but the surgical techniques and the timing of surgery differ [14].

Analyzing the attitude of parents of intersexes children , the preference of rearing as male to female is possibly because of the less social stigma attached to an important male than to sterile female, also male are socially independent , where as female are not[15] .Consequently, issues of trauma inherent for the families of children born with intersexes conditions often go untreated due to silence surrounding intersexuality[16].

The American Academy of pediatrics [17] now recommends that parents avoid naming the child or registering the birth until the sex is determined and that is should be accomplished quickly, within 2-3 days, the assignment of sex is usually followed by recommendations for genital surgery and parents are told that these surgeries are medically necessary .Generally there has been very little support, education, counseling, or therapy offered to the parents, and parents are poorly educated regarding what it might mean to parent of child with an intersexes   condition,   medically   and psychologically[18,19]. Some professionals have suggested that for a parent to refuse genital surgery is akin to child abuse and have recommended using the legal system to force parents to surgically alter their children [20,21]. A family coping with the birth of an ambiguous sex organ of their children is a complex issues that require explaining the nature of the child's condition to family , physical and emotional care of the child as well as emotional and psychosocial support to family[22,23].

Parents must be supported in expressing a full range of emotions regarding their child condition particularly in a culture that is silent on this topic and where sex, sexuality and genitalia are not common topics of discussion [24]. The family is entitled to have time to understand what they are facing, information to make educated decisions, and resources to develop a support network that can nurture them through the range of emotions they will experience [25,26].

As traditional, social, cultural and religious factors related to the Egyptian community have strong influences on the decision of sex rearing, counseling intervention sessions for parents of children with ambiguous genitalia will be helpful in alleviate anxiety feeling and enhance the coping strategies.

Objectives:

Investigate the effect of counseling sessions on coping strategies and anxiety among Parents of children with Ambiguous Genitalia

2. Subjects and Methods
Research Hypotheses:

1- Parents of children with ambiguous genitalia be anxious and use unusual coping methods

2- Counseling session for Parents of children with ambiguous genitalia will induce positive changes regarding anxiety and coping strategies

Research Design:

A one-group before - after Quasi-experimental design was used

Setting:

The study was conducted at Pediatric Surgery Department of Mansoura University Pediatrics' Hospital and Private Center for Pediatric Surgery at Mansoura city.

Sample:

The sample of this study is a convenient sample that included all Parents (30 Parents). All of them were

- Both mother / or father
- Their children not complain form any other disease rather than ambiguous genitalia
- All educational level or occupation
- Both rural and urban dweller
- Their children were diagnosed as ambiguous genitalia
- With or without the history of the same cases

Tools for data collection:

Data was collected by using:

 1- **Socio-demographic data sheet** that involved child age, birth order, number of hospital admission, residence, parent's occupation and education and presence of same case in the family.

 2-**Taylor's Manifest Anxiety Scale**. This scale was used to assess the anxiety symptoms in patients not necessary with generalized anxiety disorder. The Arabic version of this scale was utilized in this study. It consisted of 50 items. It addresses various aspects of anxiety including psychological, somatic or autonomic symptoms. The scale score was 0 for no and 1 for yes, score from 0-16 is considered to be normal, from 17-25 indicates mild anxiety, from 26-36 indicates moderate anxiety, while scores above 36 is indicates severe anxiety [27] .

3-**The Parental Coping Strategy Inventory (PCSI)**. This scale was used to evaluate the used coping strategies for parents. The scale included (68 items) grouped into 12 subscales , namely : learning (9 items) , struggling (4 items) , interaction with patient (6 items) , interaction with spouse (6 items) , interaction with healthy sibling (5 items) , Emotional support (4 items) , (information support (5 items) , Actual support (4 items) , maintaining stability(8

items) , maintaining an optimistic state of mind (6 items) , searching for spiritual meaning (4 items) , increasing religious activities (4 items) [28] .

Procedure:

-A consent to conduct the study was taking from the hospital director, the researcher contacted to the parent to explain the purpose and procedure of the study and determine the available time to demonstrate the educational session.

- Parents were interviewed individually to collect pre-assessment data related to socio-demographic, anxiety and coping scales for 2 weeks twice /week.

- Ten sessions distributed on 8 weeks twice /week , it were provided for each parents individually , each session was from 30 to 45 minutes

- Each session had its own title and objective according to its content.

Session title

The 1st session: Clear the session purpose, gain parent permission to participate, and collect pre-assessment data related to socio-demographic, anxiety and coping scales

The 2nd session: Definition and cause of ambiguous genitalia

The 3rd session: How can accept your child as it is, and how can use this acceptance to liberate from your feeling of shame and embarrassment

The 4th session: Recognize the ways of communication with your child, and identify the language used in each developmental stage The 5th session: Continue to the ways of communication with your child, and identifies the language used in each developmental stage

The 6th session: Continue to the ways of communication with your child, and identifies the language used in each developmental stage

The 7th session: Importance of social support and what the ways of communication about child problem with other

The 8th session: Importance of religious compliance in the individual life, and use it as coping strategies with feeling of anxiety

The 9th session: Recognize the stages of problem solving

The 10th session: Summarize the content of all previous session, and collect post-assessment data related to anxiety and coping scales

- Parent was interviewed individually to collect post-assessment data related to anxiety and coping scales for 2 weeks twice /week.

- Data collection lasted for 12 weeks which started from January to March 2010.

3. Results

Table (1): It is clear from table (1) that, the majority of the children 24(80%) were in the age group more than 6 months, with mean age 43.83. Half of the children were the first birth order 15 (50%). Regarding number of hospital admission, majority of children was admitted to the hospital for less than 5 times 28(93.34%). As regard Positive family history, ambiguous sex was found in about quarter of study sample 8 (26.66%). Regarding parent ,majority of them was secondary education, more than half of parents 20 (66.66%) have no relative relation, and don't know their child problem and the majority (80%) don't know the causes of this problem.

Table (2): Shows that, among coping domains, mean scores of "Searching for spiritual meaning" and" Increasing religious activities" didn't differ significantly at pre and post intervention sessions (p>0.05). However, the rest of coping domain were highly significant differ at pre and post intervention session (p<0.001).

Generally total coping didn't significant differ at pre and post intervention session (p>0.05).

Table (3): Shows that total anxiety score were highly differ significantly at pre and post intervention sessions (p<0.001).

Table (4): shows that, the mean score of total parent coping at pre and post intervention sessions were differ significantly when present or not present of children with ambiguous genitalia within the family (p<0.05). However, mean score of total parent anxiety didn't differ significantly at pre and post intervention sessions when present or not present of children with ambiguous genitalia within the family (p>0.05).

Table (5): This table shows that, coping strategies domain were not correlated significantly with total anxiety score of parent at pre, post educational session
 (p>0.05).

Table (1): Sociodemographic characteristics of children and their parent

Items	No	%
Children:		
Age (months)		
<6	6	20
6+	24	80
Mean±SD	43.83±30.78	
Birth order		
First	15	50
Middle	6	30
Last	9	20
Number of hospital admission		
< 5	28	93.34
5+	2	6.66
Positive family history No	22	73.33
Yes	8	26.66
Parent:		
Residence		
Urban	20	66.66
Rural	10	33.33
Mother occupation Employee	15	50
House wife	15	50
Father occupation Employee	14	46.66
Worker	16	53.33
Parent consongrity No	20	66.66
Yes	10	33.33
Mother educational level		
< secondary	9	29.99
Secondary +	21	70
Father educational level < secondary	5	16.66
Secondary +	25	83.33
Knowing of child problem Don't know	20	66.66
Incomplete true answer	9	30
Complete true answer	1	3.33
Knowing the cause of child problem Don't know	24	80
Incomplete true answer	6	20

Table (2): Mean score of parent coping strategies at pre and post intervention sessions

Coping domain	Pre intervention sessions (No=30) (Mean ±SD)	Post intervention sessions (No=30) (Mean ±SD)	Paired t- test	p-value
Learning	11.30±3.48	25.26±1.92	-23.74	<0.001**
Struggling	7.46±1.79	3.86±2.20	10.06	<0.001**
Interaction with child	8.46±1.87	12.96±2.99	-10.07	<0.001**
Interaction with spouse	8.86±1.79	12.26±2.43	-7.07	<0.001**
Interaction with healthy sibling	3.90±3.37	7.40±5.45	-6.15	<0.001**
Emotional support	5.60±1.92	8.76±2.56	-9.33	<0.001**
Information support	6.03±1.54	10.26±1.70	-12.52	<0.001**
Actual support	3.50±1.10	5.00±1.59	-7.42	<0.001**
Maintaining stability	9.60±2.37	8.33±1.95	2.23	0.03*
Maintaining an optimistic state of mind	9.73±1.61	15.30±1.96	-31.38	<0.001**
Searching for spiritual meaning	5.30±0.95	5.63±0.61	-1.83	0.07
Increasing religious activities	6.06±1.31	6.23±0.62	-0.62	.053
Total	85.83+9.47	121.3+14.76	-17.73	.000

Table (3): Mean score of parent anxiety at pre and post intervention sessions

	Pre intervention sessions (No=30) (Mean ±SD)	Post intervention sessions (No=30) (Mean ±SD)	Paired t- test	p-value (2-tailed)
Total Anxiety score	30.90±6.69	10.93±2.83	15.55	0.001**

Table (4) The relation between parent coping , anxiety and Positive family history

Total Anxiety /Coping	Positive family history		t- test	p-value
	NO (Mean ±SD)	Yes (Mean ±SD)		
Total anxiety score	31.46±7.63	29.38±2.73	.747	.461
Coping domain				
Total Learning	10.45±3.48	13.62±2.32	- 2.373	.025*
Total Struggling	7.90±1.34	6.25±2.37	1.870	.096
Total Interaction with child	7.90±1.77	10.00±1.19	- 3.078	.005*
Total Interaction with spouse	9.13±1.93	8.12±1.12	1.764	.092
Total Interaction with healthy sibling	2.86±2.91	6.75±3.01	- 3.201	.003*
Total Emotional support	5.31±1.96	6.37±1.68	-1.452	.168
Total Information support	5.81±1.70	6.62±.74	-1.281	.211
Actual support	3.31±1.21	4.00±.53	-2.131	.042*
Total Maintaining stability	9.50±2.22	9.87±2.90	-.377	.709
Total Maintaining an optimistic state of mind	9.54±1.71	10.25±1.28	-1.211	.243
Total Searching for spiritual meaning	5.36±1.00	5.12±.83	.600	.553
Total Increasing religious activities	6.27±1.42	5.50±.75	1.913	.068
Total coping score	83.40±9.55	92.50±5.42	-2.530	.017*

Table (5): Correlation between parent coping strategies and anxiety at pre and post intervention sessions

Coping domain	Pre intervention sessions (No=30)		Post intervention sessions (No=30)	
	Pearson Correlation	p-value	Pearson Correlation	p-value
Learning	-.155	412.	.136	. 475
Struggling	.314	. 091	. 251	.180
Interaction with child	.015	. 938	. 064	.735
Interaction with spouse	-.165	.384	. 332	.073
Interaction with healthy sibling	. 087	.649	-.065	. 733
Emotional support	. 096	. 614	. 494**	.006
Information support	.161	. 396	. 404*	.027
Actual support	. 193	. 306	.563**	. 001
Maintaining stability	. 152	.424	.483**	. 007
Maintaining an optimistic state of mind	.424*	.019	. 232	. 217
Searching for spiritual meaning	-.260	.165	-.350	. 058
Increasing religious activities	-.039	. 840	.261	.163
Total	. 152	423.	.384*	. 036

4. Discussion:

Ambiguity of the genitalia in the newborn and children still remains a poorly understood subject that make parent's of the affected children considering this a social stigmata. Therefore parental psychological support should be continuous and must extend to the entire family members, emphasizing the acceptance of the child and using of usual coping with his\her condition [29,30] .

The current study indicated that the mean score of parent's anxiety were highly differ significantly at pre and post counseling session, this may be due to , majority of parents didn't know the nature and cause of the child problem (feeling of uncertainty). The concerns that worried the mothers in this study were related to the possibility of sex change, inadequacy of physical appearance and compromise of physiological functions. The difficulties that they emphasized in relation to

treatment were the high cost of drugs such as hormones and travel to distant hospitals to seek treatment.

This corresponding with the study result which revealed that all mothers described emotional reactions of despair , uncertainty, feeling of disgust, non acceptance, insecurity and disappointment were associated with the initial shock caused by that they had child with ambiguous genitalia [31].

The goal of coping strategies is to strengthen or maintain individual resources, reduce the source of stress or negative emotions and achieve a balance in individual functioning [32]. In this study, among coping domains, mean score of "searching for spiritual meaning" didn't differ at pre and post counseling session, this may be due to all the parents sample were had Islamic religious, that know for most of the people inspit of scientific medical management, they still searching for spiritual meaning and increasing religious activities than usual. This results agrees with the previous study result that, one of the most predictors of emotional adjustment is religion, spirituality is difficult to define because it means different things to different people, spirituality can be defined in various ways: faith in humanity, ethical behavior, concern for others, or interaction in relation to a greater being [33,34]. Also another study found that faith and religious coping methods are the most frequently coping strategies among parents who have children with disabilities. Parents appear to involve themselves with religion to greater extent in more stressful situations than in less stressful moments of their life, certain spiritual strategies [35].

Regarding the rest of coping domain as shown in table (2), the mean score were differ after counseling session compared to before. Concerning learning and struggling coping domains, it was improved at post educational session , this may be due to the parent at pre educational session don't know the natural and cause of their children disease or even how to deal with him. The study result revealed that generally parent understand ambiguous genitalia as a chronic illness, the interactions between the child, the family and their social network are affected, The families of intersexes child face the loss of the normal life that they had prior to the diagnosis including the loss of the future life project [36,37]. A family evaluation regarding the illness should include the significance of the illness for the whole family and understanding the methods of transferring catastrophic myth, taboos and expectations and the family's belief system throughout generations [38,39].

In relation to interaction with child and spouse coping domain, were considered positive and improved by majority of the parent at post session.

Researchers found that mothers who reported that their husbands shared in housework and child-care roles indicated greater marital satisfaction and flexibility in family functioning [40,41, 42] . on the other hand some parent were complaints from fighting with siblings, and the lake of participation of the parents in upbringing or in matters related to the child's treatment such as appointments and meeting with doctors, these higher care giving demands are associated with poorer psychological and physical health state . Mother's also said that they told nothing to their children regarding the pathology and treatment , as they believed the child would not understand the problem, because they did not know how to approach the topic and feared from child's reaction.

Regarding information, emotional, actual support and maintaining stability domain, Parents are frequently bombarded by questions and concerns regarding their child's condition , as well as dealing with societies negative attitude towards individuals who are different . parents who have children with a disability experience greater levels of stress than parents of children without a disability. The extent to which families will experience stress depends on many factors including the child's characteristics, structure of the family, family resources and coping strategies [43,44]. Another studies demonstrated that the parent responsible for the child's treatment generally felt overwhelmed, owing to the redistribution of roles or their strategy of coping with the matter. not knowing how to deal with the difficulties presented by the child's condition, the caregiver may choose to leave decisions and the continuity of therapy under the responsibility of the doctors or the other parent[45,46] .

In relation to the coping domain of maintaining an optimistic state of mind , parents before intervention were have a decreased optimistic view concerning their child condition compared to a high level after educational session, this may be due to parent after intervention be understood the nature and prognosis of their children diseases. This come in contrary with study results which mentioned that the mother's expectations for their child's future were optimistic with respect to research and the medical profession, and the results of the surgery[47,48].

The families abilities to communicate and express their thoughts and feeling is also an important component in health families, open and honest communication involves listening to one another and being sensitive to nonverbal communication being an effective strategy [49]. The current show gender differences in coping, women tend to involve themselves more in the emotional roles of caring for the wellbeing of family members, whereas fathers

assume the provider role. This corresponding with studies on effective coping strategies which emphasized that women tend to use a wider range of coping strategies such as reaching out to people, involvement in religious activities and openly expressing their feelings while Men tend to withdraw, keep their feelings inside, and use more harmful types of strategies[50,51].

The current study illustrated that the mean score of parent anxiety not differ with or without same case of ambiguous genitalia within the family pre and post intervention, this may be due to the strong emotional bond was present between Egyptian family members when one of them had a health problem, they all become anxious regardless present of the same cases previously or not. This is consisted with study result which was indicated that birth of an intersex child can be an emotionally devastating experience for some parents particularly in a culture that is silent on this topic and where sex, sexuality and genitalia are not common topics of discussion [52].While parental coping strategies differ with or without positive family history, this may be due to the parental previous experience will enhance the parental coping strategies in the next experience. This result agrees with the study result which refers to the individual with previous experience using coping strategies directly aimed to problem solving and seeking information that considered more adaptive strategies than those efforts to deny or minimize the situation [53].

5. Conclusion:

Based on the findings of the present study, it can be concluded that: Parents of children with ambiguous genitalia experience a high level of anxiety even when previously present or not present of children with ambiguous genitalia within the family, and counseling sessions will be effective for those parent. A full and honest disclosure is best and counseling must convey strongly to the parents that they are not at fault for the development and the child can have a full, productive and happy life.

6-Recommendation:
- The counseling should ideally be by those trained in sexual/gender/intersexes matters.
- As early as possible put the family in touch with a counselors and support group. It is emphasized that one on one contact with another person having similar experiences can be the most uplifting factor in an alleviating parent's anxiety.
- Counseling should be multi-staged (at birth, and at least again at age two, at school entry, prior to and during pubertal changes, and yearly during adolescence) as well as examining parental coping

strategies at different stages of development would be an interesting avenue for future research.

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Serum Protein Carbonyl Content, Total Thiol and Nitric Oxide in Patients with Rheumatoid Arthritis

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Abstract: Serum protein carbonyl group, total thiol group and nitric oxide were studied in 30 patients with rheumatoid arthritis. Obtained results revealed that, Serum protein carbonyl content and nitric oxide (nitrite and nitrate) were significantly higher in rheumatoid arthritis patients than in the controls. However, total thiol group decreased significantly in rheumatoid arthritis patients than in the controls. In addition, protein carbonyl was negatively correlated with total thiol , while, nitric oxide (nitrite and nitrate) didn't correlate with protein carbonyl or total thiol .The impaired serum antioxidant defence mechanisms as evidenced by decreased total thiol group resulted in increased protein oxidation as indicated by increased protein carbonyl .

1. Introduction

Rheumatoid arthritis (RA) is a chronic autoimmune disorder associated with synovial proliferation and excessive mononuclear infiltration, leading to the development of cartilage and subchondral bone erosions (Pap *et al*, 2000 and Gulden *et al ,* 2005).

Reactive Oxygen Species (ROS) play an important role in the pathogenesis of RA exposing those patients to oxidative stress **(** Nourmohammadi *et al,* 2010 **).**

Oxidative stress is an important mechanism that underlies destructive and proliferative synovitis in RA (Mapp *et al,* 1995 , Hallwell ,1995, Tak *et al* , 2000 and Hitchoon and El-Gabalawy ., 2004)

Proteins are among the main targets of oxidation in the plasma (Dear *et al,* 1997). The action of ROS on proteins results in the formation of carbonyl groups with a relatively long half–life (Levine *et al,* 1990). The structure and activity of oxidized proteins change profoundly when compared with their native forms (Lemarechal *et al,* 2006).

 Although the introduction of carbonyl groups in proteins is taken as a presumptive evidence of oxidative modification , as glycation of proteins may add carbonyl groups onto amino acid residues, assay of carbonyl groups in proteins provides a convenient technique for detecting and quantifying oxidative modification of proteins (Levine *et al,* 1990). Protein thiol groups may scavenge oxidants, thus sparing antioxidants and / or cellular constituents from attack. The measurement of thiol groups in serum provides an indirect reflection of the anti-oxidative defenses   (Lemarechal *et al,* 2006).

Nitric oxide (NO) is a short-lived signaling molecule that plays an important role in a variety of physiologic functions, including the regulation of blood vessel tone, inflammation, mitochondrial functions and apoptosis (Brown ,1999 and Beltrán *et al,* 2000). NO also serves as a potent immunoregulatory factor, and influences the cytoplasmic redox balance through the generation of peroxynitrite ($ONOO^-$) following its reaction with superoxide (O_2^-) (Chung *et al ,* 2001).

NO can also be involved in the production of angiogenic cytokines and the activation of matrix metalloproteases (Leibovich *et al,* 1994). Experimentally induced arthritis can be reversed by NOS inhibitors (Connor *et al,* 1995).

This investigation aimed to measure, serum protein carbonyl group as an evidence of oxidative modification of serum proteins , as well as , total thiol as   an evidence of antioxidant defence mechanism and the free radical NO metabolites (nitrite and nitrate).

2. Materials and Methods
Subjects:

This study was conducted on 30 rheumatoid arthritis patients (24 ♀ and 6 ♂) fulfilling the American Collogue of Rheumatology criteria for the diagnosis of rheumatoid arthritis recruited from the Department of Rheumatology, Sohag University Hospital. Their age ranged from 29 to 50 years with mean ± SD (40.2 ± 6.6). A group of 20 healthy volunteers, recruited from the hospital staff , their age and sex distribution were similar to those of the rheumatoid arthritis group were included in the study as a control group. An informed consent was taken

from all the participants. Venous blood was collected from patients and controls and centrifuged immediately at 3000 r.p.m. for 15 minutes. Sera were stored in aliquots at -80 ċ till analysis.

N.B. The study was carried out in accordance with the guidelines of the ethical committee of Sohag University.

Materials:

Guanidine hydrochloride and 5,5′–Dithio-Bis (2 Nitrobenzoic acid) were purchased from Sigma (St. Louis, MO, USA), N-(1-Naphthyl) ethylenediamine dihydrochloride was from Sigma-Aldrich (Fluka) and other chemicals were form MERK (Darmstadt , Germany) .

All experiments were carried out using the spectrophotometer Biomeriux UV / Vis / Jr 60DT0249, Secoman C E France.

Determination of protein carbonyl levels;

Protein carbonyls are first derivatized with 2, 4 dinitrophenyl-hydrazine (DNPH). Proteins are then trichloroacetic acid (TCA) precipitated and free DNPH is removed by washing the protein pellet. The protein pellet is then dissolved in guanidine hydrochloride (GuHCL) and the absorbance of protein-hydrozone is measured at 370 nm. Protein carbonyls were expressed as nmol / mg protein (Levine *et al,* 1990).

Determination of thiol group:

It is based on thiol / disulfide reaction of thiol and Ellman ' reagent (5, 5′-dithiobisnitrobenzoic acid) (Hu, 1994).

Assay of NO:

Because NO has a very short half life (1–10 seconds) as it reacts with oxygen to form nitrite and nitrate. Nitrite an nitrate (NO_x) was measured using the Griess ' reagent after addition of Vanadium III Chloride to reduce nitrate into nitrite (Mirinda *et al ,* 2001)..

Statistical analysis:

Statistical analysis was performed using prism 3 version 5 www.Graphpad.com.

3. Results:

The clinical and laboratory characters of the patients are represented in table (1).

Table 1 . Clinical and laboratory characters of RA patients.

Clinical and laboratory characters of R A patients (n=30)	Mean ± SD
Age (years)	40.2 ± 6.6
Duration of disease (years)	5.3 ± 3.6
ESR (erythrocyte sedimentation rate , mm / h)	55.7 ± 17.1
CRP (C-reactive protein , mg / dl)	5.1 ± 2.3
Rheumatoid factor (number , %)	24 (80 %)

Serum protein carbonyl content. It was significantly higher in rheumatoid arthritis patients than in the controls (P < 0.001, fig. 1.)
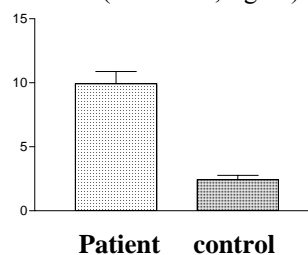
Patient   control

Fig.1. Mean ± SD levels of protein carbonyl in controls and RA patients (nmol / mg protein) .

Total thiol group. It decreased significantly in rheumatoid arthritis patients than in the controls (P < 0.001 , fig. 2.).
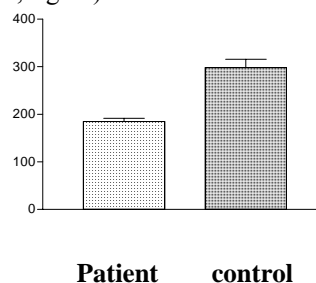
Patient   control

Fig . 2. Mean ± SD levels of total thiol in controls and RA patients (µmol / ml).

Nitric oxide levels ($N0_x$). It increased significantly in rheumatoid arthritis patients than in the controls (P < 0.05 , fig. 3.).
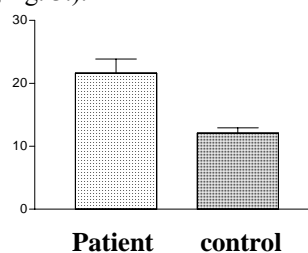
Patient   control

Fig . 3. Mean ± SD levels of NO_x in controls and RA patients (µmol / ml).

4. Discussion

This investigation revealed that protein carbonyl group content and NO_x (nitrite and nitrate) significantly increased in RA patients than in controls. while total thiol were significantly decreased in RA patients than in controls. Our data demonstrated an excessive degree of oxidative stress in patients with RA as evidenced by increased protein carbonyl , increased NO_x and decreased total thiol . Lemarechal *et al,* 2006 and Tutik *et al,* 2010 found elevated levels of protein carbonyls and decreased levels of total thiol group in patients with rheumatoid

arthritis. Decreased thiol concentration showed that RA patients are at considerable risk of tissue oxidant injury because of impaired serum antioxidant defence mechanisms. Thiols participate in several processes ranging from simple electron donation (GSH) and antioxidant catalysis to complex biochemical sensing and antioxidant responses (Winyard *et a ,* 2005).

Carbonylation is an irreversible, non enzymatic modification of proteins. Carbonyl groups are introduced into proteins by a variety of oxidative pathways (Dall-Donne *et al,* 2003). The oxidation of protein can modulate biochemical properties such as enzyme activities, the DNA binding of transcription factors and susceptibility to proteolytic degradation (Garibadli *et al,* 1994 and Renke *et al,* 2000).The usage of protein carbonyl group as biomarker of oxidative stress has some advantages in comparison with the measurement of other oxidation products because of the relative early formation and the relative stability of carbonylated protein (Dall-Donne *et al,* 2003).

NO is an important mediator of diverse physiologic and pathologic processes, including arthritis (Wallace , 2005). NO is synthesized from L-arginine by NO synthases (NOSs) which are; neuronal NOS (nNOS), inducible NOS (iNOS), and endothelial NOS (eNOS) (Bredt, 1999). NO have relatively short half-life (for example 1 to 10 s), which has make it technically difficult to quantify in solution. Instead of directly measuring NO, investigators have estimated NO production by measuring levels of nitrate (NO_3^-) and nitrite (NO_2^-), stable anions derived from the reaction of NO with superoxide. In general, serum levels and urinary excretion of nitrite and nitrate (NO_x) reflect the total production of NO by the body(Green *et al,* 1981and Granger *et al,* 1999).

In the present study NO was found to increase significantly in RA patients , but NO didn't correlate with ESR or CRP. Also NO didn't correlate with total thiol or protein carbonyl group. Farrell et al ,1992, found that patients with RA had higher serum nitrite (not nitrite + nitrate) levels than normal controls. Similarly, Ueki *et al,* 1996 , found that serum nitrite was higher in patients with RA than in normal controls , and that nitrite levels were correlated with C-reactive protein. Also, Choi *et al,* 2003, found increased NO production in RA patients , however , this increase not correlated to parameters of disease activity. NO has been shown to regulate T cell functions under physiological conditions, but overproduction of NO may contribute to T lymphocyte dysfunction. NO-dependent tissue injury has been implicated in a variety of rheumatic diseases, including RA (Nagy *et al,* 2010). The increase in NO production in RA patients may be due

to the increase in NO synthase activity (Mäki-Petäjä *et al,* 2008).

NOS polymorphism has been observed in RA (Gonzalez-Gay *et al,* 2004). iNOS is regulated at the transcriptional level, while eNOS and nNOS are regulated by intracellular Ca2+. Several different cell types are capable of generating NO in the inflamed synovium, including osteoblasts, osteoclasts, macrophages, fibroblasts, neutrophils and endothelial cells (Nagy *et al,* 2007).

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Protective Effect of Nigella Sativa, Linseed and Celery Oils against Testicular Toxicity Induced by Sodium Valproate in Male Rats

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Abstract: The protective effect of nigella sativa, linseed and celery oils against testicular toxicity induced by sodium valproate (SVP) in male rats was studied. The experiment was carried out along 4 weeks on fifty male rats divided into 5 equal groups. Group (1) was kept as normal control (given vehicle), while rats of group (2) were given orally SVP in a dose of 500 mg/kg /day during the last week of experimental period (positive control). The other protected three groups were pretreated by oral administration of nigella sativa, linseed and celery oils each in a dose of 250 mg/kg/day and received SVP in the last week. At the end of experiment, sex organs were obtained for semen analysis, changes in sex organs weight and for lipid peroxidation in testicular tissue and histopathology. Also blood samples were collected for serum testosterone level. Results showed that pretreatment with nigella sativa, linseed and celery oil in SVP-intoxicated rats induced significant increase in the weight of testis, sperm count and motility with a decrease in abnormal sperms. An increase in serum testosterone levels and a decrease in testicular lipid peroxides (MDA) with increase in reduced glutathione were reported in the protected rats. Histopathological examination of the testes of protected rats revealed that these oils caused alleviation of testicular degenerative lesions which seen in valporate-treated rats. In conclusion, nigella sativa, linseed and celery oils produced protective effects against testicular damage induced by SVP. This study recommends that consumption of nigella sativa, linseed or celery oils may be useful as protective agents for patients who suffer from sexual impotency.
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1. Introduction:

It is well known that insufficient vitamins intake can cause deleterious effects on spermatogenesis and production of normal sperm (Mosher and Pratt, 1991). On the other side, sufficient consumption of vitamins and natural antioxidants can protect sperm DNA from oxidative stress and improve male fertility (Jedlinska *et al.*, 2006). Vitamin E was found to exhibit a protective effect on the testis of rats with cadmium induced-toxicity (Yang *et al.* 2006) and on the testis of rabbits with cyhalothrin insecticide induced - testicular damage (Youssef, 2010).

Vegetable oils contain several natural antioxidant constituents. Some of them such as pumpkin oil (Al- Zuhair *et al.,* 1997); celery oil (Momin and Nair, 2002); nigella sativa oil (Shalaby and khater, 2007) and sunflower oil (Di-Benedetto *et al.*, 2010) were reported to possess marked antioxidant activity. In addition, celery oil was found to produce a protective effect against testicular injury induced by sodium valproate in male rats (Hamza and Amin, 2007). Marjoram and grape seed oils were reported to minimize the hazard effects of ethanol toxicity on male fertility in rats (El-Ashmawy *et al.*, 2007). Ginger oil has a protective effect against DNA damage induced by H_2O_2 in the testis and improves

sperm quality and quantity in rats (Khaki *et al.*, 2009).

The present study was done to investigate the protective effect of nigella sativa, linseed and celery oils against testicular injury induced by sodium valproate in rats and their effect on lipid peroxidation in testicular tissues.

2. Materials and Methods:

Vegetable oils:

Nigella sativa, linseed and celery oils were obtained from local market of Agricultural Herbs and Medicinal plants, Cairo, Egypt. These oils were packed in dark brown bottles of 100 ml capacity each. Watery suspension of each tested oils was prepared by suspending 20 ml oil in 100 ml water gradually with the aid of 2 ml Tween 80 (suspending agent) to obtain 20% suspension.

Sodium valproate (Depakin ®):

It is a product of Sanofi-Synthelabo Company, Paris, France. It is dispensed as oral solution packed in brown bottles each containing 40 ml; each 1 ml contains 200 mg of sodium valproate. It is commonly used as an antiepileptic drug. The dose given to the rat was calculated from the human

therapeutic dose according to conversion table of Paget and Barnes, (1964).

Preparation of basal diet:

Basal diet for rats was prepared using AIN 93 according to Reeves *et al.* (1993). It was consisted of 15 % casein, 10% sucrose, 5 % fat, 2% choline chloride, 1% vitamin mixture, 4 % salt mixture and 5% cellulose (fibers). The remainder is corn starch.

Animals:

Mature male rats of Sprague Dawley strain weighing 160 -165 g b.wt. each and 12-14 week old were obtained from the Laboratory Animal Colony, Helwan, Egypt. The rats were kept under controlled hygienic conditions in plastic cages and fed on basal diet for one week before starting the experiment for acclimatization. Water was provided *ad libitum*.

Experiment and grouping of rats:

Fifty mature male rats were randomly allocated into 5 groups, each of 10 animals. Group (1) was given 1 ml distilled water/day (vehicle) and kept as control normal. Rats of the other four groups were given sodium valproate in a dose of 500 mg/kg b.wt./ day during the last week of experiment period (4 weeks) to induce testicular damage according to Hamza and Amin (2007). Rats of group (2) was kept as control positive (without pretreatment), while rats of groups (3), (4) and (5) were pretreated orally with aqueous suspension of nigella sativa, linseed, and celery oils in a dose of 250mg/kg b.wt./day for 4 weeks, respectively. At end of the experiment, blood samples were collected from orbital plexus of eye for estimation of testosterone level in the serum. Semen samples were collected from the cuda epididymis of sacrificed rats and semen was used for estimating the sperm characters. The testes and accessory glands (seminal vesicles and prostate) were carefully dissected out and weighed. The index weight (I.W.) of the organ was calculated by: I.W. = organ weight / body weight $\times$ 100. These organs were then kept in 10% formalin solution pending for histopathological examination.

Determination of serum testosterone:

Testosterone levels were determined using analog method using radioimmunoassay (RIA) kits (Gamma Trade Company, Cairo, Egypt). The method is based upon the competitive binding principal. The unknown or standard samples were incubated with radioactive iodine[125] labeled testosterone in antibody-coated tubes. After incubation, the liquid contents in the tubes were withdrawn and the bound radioactivity was determined using gamma counter according to the method of Wilke and Utley (1987).

Semen analysis:

The progressive motility of sperms was evaluated microscopically within 2–5 minutes of their isolation from the cauda epididymis as described by Bearden and Fluquary (1980). Microscopic examination of seminal smears stained with Eosin Nigrosin stain was carried out to determine the percentages of sperm viability (ratio of alive/dead) and sperm abnormality according to the method described by Yokoi *et al.* (2003).

Estimation of lipid peroxidation:

Lipid peroxides as malondialdehyde (MDA) were measured in the testis spectrophotometrically after the reaction with thiobarbituric acid-reactive substances. Briefly, after ice-water washing of the testis a part was weighed and homogenized in 9 volumes buffered 0.9% saline solution in a homogenizer (Type PT 45/80, Littau, Switzerland) and kept at -70ºC until analyzed for MDA content as nmol /g tissue, according to the method of Placer *et al.* (1966).

Measurement of glutathione:

Reduced glutathione (GSH) content in the testis was measured chemically with specific kits (Biodiagnostic Company, Dokki, Egypt) according to the method described by Sedlack and Lindsay (1968) using Ellman's reagent. This method is based on the reactive cleavage of 5, 5 -dithiobis-(2-nitrobenzoic acid) by sulfohydryl group to yield a yellow colour with maximum absorbance at 412 nm. The content of reduced GSH was calculated as µmol /g tissue.

Histopathological examination:

The testes and accessory glands of rats were taken and fixed in neutral formalin 10 % solution. The fixed specimens were then trimmed, washed and dehydrated in ascending grades of alcohol. These specimens were then stained with Hematoxylen and Eosin and examined microscopically according to Bancroft and Stevens (1990).

Statistical analysis:

All data are expressed as means ± S.E. Statistical analysis was carried using Student't' test according to Snedecor and Cochran (1986).

3. Results

As shown in table (1); oral administration of sodium valproate (500 mg/kg b.wt.) to male rats for 7 days significantly ($P < 0.01$) decreased the weight of testes as compared to the normal control group. Male rats pretreated with nigella sativa oil, linseed oil and celery oil for 4 weeks had a significant ($P < 0.01$) increase in the weight of testes as compared to the positive (sodium valproate-treated) control rats.

Data in table (2) show that sodium valproate when given orally to male rats for 7 days decreased the sperm count, percents of sperm motility and viability and increased the percent of sperm cell abnormalities. The most frequently seen sperm cell abnormalities in rats treated with sodium valporate were detached, double and large size heads and coiled tail as illustrated in Fig. (1). Smears obtained from normal control rats showed normal sperms (Fig. 2) Pretreatment with nigella sativa oil, linseed oil and celery oil to male rats significantly(P < 0. 01) increased sperm cell count, motility and viability as compared to the control positive group.

As shown in table (3), serum testosterone level in rats given orally sodium valproate for 7 days was 3.30 ± 0.03 ng/dL versus to 7.73 ± 0.04 ng/dL in the normal control rats. Pretreatment with nigella sativa, linseed oil and celery oils to male rats for 4 weeks significantly (P < 0. 01)   increased serum testosterone level as compared to the positive control group.

As shown in table (4), oral administration of sodium valproate to male rats for 7 days significantly (P < 0. 01) increased the level of malondialdehyde (MDA) and decreased the content of reduced glutathione (GSH) in testicular tissue as compared to the normal control group. In rats pretreated with nigella sativa oil, linseed oil or celery oil, the level of MDA was decreased and content of GSH was increased in the testis as compared to the positive control rats.

Histopathological examination of the testes of normal rats showed normal histological structure of active mature functioning seminiferous tubules associated with complete spermatogenic series as demonstrated in Fig. (3). Examination of the testes of rats given orally sodium valproate for 7 days revealed marked degeneration and atrophy of most seminiferous tubules with absence of spermatogenic series in tubular lumen as shown in Fig. (4). Microscopic examination of the testes of rats pretreated with nigella sativa, linseed or celery oil for 4weeks revealed normal histological structure of most seminiferous tubules with normal spermatogenic series (Fig. 5 and 6).

Table (1): Effect of some vegetable oils (250 mg/kg/day) on the weight of sexual organs in rats with testicular damage induced by sodium valproate (SVP)

Groups and treatments	Weight of sexual organs (g/100 g b.wt.)		
	Testes	Seminal vesicles	Prostate glands
Normal control (Vehicle)	2.80 ± 0.01	1.82 ± 0.03	0.56 ± 0.01
Positive control (SVP)	1.85 ± 0.02**	1.70 ± 0.02	0.48 ± 0.01
Nigella sativa oil	2.77 ± 0.03**	1.60 ± 0.04	0.45 ± 0.03
Linseed oil	2.74 ± 0.06**	1.65 ± 0.02	0.53 ± 0.02
Celery oil	2.78 ± 0.01**	1.70 ± 0.04	0.49 ± 0.01

Data represent Means ± S.E.

All pretreated groups were compared to the positive control group using Student't' test

** Significant at P < 0. 01   n=10 rats.

Table (2): Effect of some vegetable oils (250 mg/kg/day) on sperm cell characters in rats with testicular damage induced by sodium valproate (SVP)

Groups and treatments	Sperm cell characters			
	Count (10^6/ml)	Motility (%)	Viability (%)	Abnormality (%)
Normal control (Vehicle)	71.67 ± 0.48	80.0 ± 1.6	88.0 ± 0.12	3.67 ± 0.2
Positive control (SVP)	52.20 ± 0.23***	50.0 ± 1.4**	46.0 ± 0.16**	7.76 ± 0.2**
Nigella sativa oil	66.67 ± 0.43***	60.0 ± 2.3**	55.0 ± 0.10**	5.13 ± 0.4
Linseed oil	70.67 ± 0.28***	65.0 ± 1.2**	60.0 ± 0.13**	5.96 ± 0.3
Celery oil	65.00 ± 0.30**	70.0 ± 2.2**	77.0 ± 0.13**	5.24 ± 0.4

Data represent Means ± S.E.

All pretreated groups were compared to the positive control group using Student't' test ** Significant at P < 0. 01

** Significant at P < 0. 001   n=10 rats.

Table (3): Effect of some vegetable oils (250 mg/kg/day) on serum testosterone level in rats with testicular damage induced by sodium valproate (SVP)

Groups and treatments	Testosterone level (ng/dL)
Normal control (Vehicle)	7.73 ± 0.04
Positive control (SVP)	3.30 ± 0.03**
Nigella sativa oil	5.08 ± 0.01**
Linseed oil	7.13 ± 0.04**
Celery oil	6.64 ± 0.08**

Data represent Means ± S.E.
All pretreated groups were compared to the positive control group using Student't' test
** Significant at P < 0. 01   n=10 rats.

Table (4): Effect of some vegetable oils (250 mg/kg/day) on the levels of malondialdehyde (MDA) and reduced glutathione (GSH) in rats with testicular damage induced by sodium valproate (SVP).

Groups and treatments	MDA (nmol /g tissue)	GSH (µmol /g tissue)
Normal control (Vehicle)	5.2 ± 0.3	14.6 ± 0.8
Positive control (SVP)	8.6 ± 0.2**	10.0 ± 0.6**
Nigella sativa oil	4.8 ± 0.1**	13.7 ± 0.2**
Linseed oil	4.9 ± 0.4**	13.5 ± 0.4**
Celery oil	4.4 ± 0.1**	13.2 ± 0.2**

Data represent Means ± S.E.
All pretreated groups were compared to the positive control group using Student't' test
** Significant at P < 0. 01   n=10 rats.
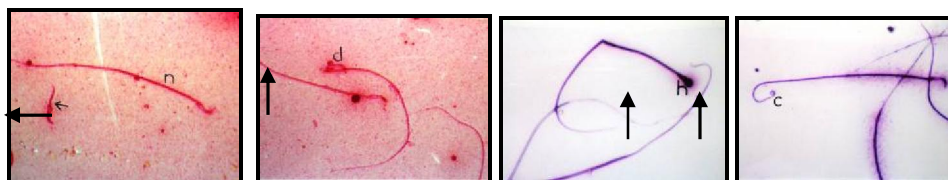
Fig. (1): Seminal smears of rats given sodium valproate showing detached head (A), double head (B), large size head (C) and coiled tail (D) of sperms.   (Eosin Nigrosin stain X 160).
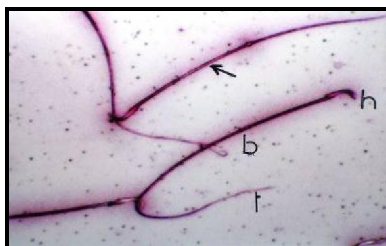
Fig. (2): Seminal smear of a normal control rat showing normal sperm with head (h), body (b) and tail (t). (Eosin Nigrosin stain X 160).
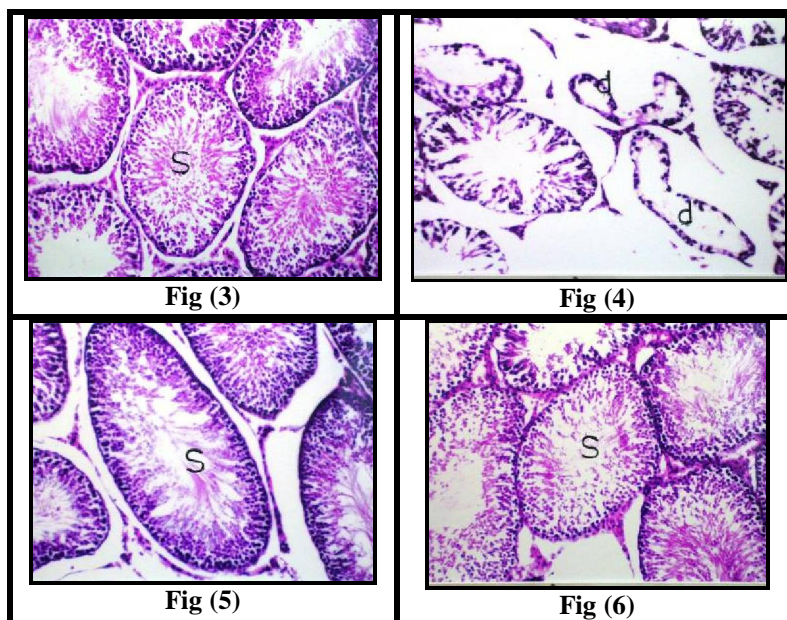
Fig. (3): Testis of normal control rat showing normal histological structure of active mature functioning seminiferous tubules(S) associated with complete spermatogenic series.

Fig. (4): Testis of a rat given sodium valproate showing marked degeneration (d) and atrophy of most seminiferous tubules with absence of spermatogenic series in tubular lumen.

Fig. (5): Testis of a rat pretreated by nigella sativa oil at 250 mg/kg/ day for 4 weeks showing normal histological structure of most seminiferous tubules(S).

Fig. (6): Testis of a rat pretreated by celery oil at 250 mg/ kg/ day for 4 weeks showing normal histological structure of most seminiferous tubules(S).　(H & EX 200)

4. Discussion:

The protective effect of some vegetable oils against testicular injury induced by sodium valproate in male rats was investigated. The results revealed that oral administration of sodium valproate to male rats caused testicular injury characterized by decreased weight of the testis, lowered semen quantity and quality, decreased serum testosterone level. It also caused degenerative changes of most seminiferous tubules with absence of spermatogenic series in tubular lumen. In addition, sodium valproate increased lipid peroxidation and reduced glutathione content in testicular tissue. These effects were similar to those reported by Soliman and Abd Elmguid (1999) and Sveberg et al. (2001) who found that there was a highly significant decrease in testicular weight in rats treated by high dose of sodium valproate. A decrease in plasma testosterone, FSH and LH hormones and a widespread testicular atrophy with histological verified spermatogenic arrest were reported in the treated rats. Hamza and Amin (2007) reported that sodium valproate decreased the relative weight of testes and

epididymis and reduced the sperm quantity and viability in the treated rats. Serum testosterone level was decreased and severe degenerative changes were also seen in the testes following administration of sodium valproate to rats. Vijay *et al*. (2008) found that the intratesticular testosterone level was significantly reduced by administration of sodium valproate to rats. The results of this study correlate to those obtained by Bairy *et al.* (2010) who reported that sodium valproate significantly decreased sperm count and motility and increased, in a dose dependant manner, the percent of abnormal sperms of testes in rats.

Pretreatment of male rats with nigella sativa, linseed and celery oils for 4 weeks produced a protective effect against testicular injury induced by sodium valporate. This effect was manifested by increased weight of the testis, improved semen quality and quantity, elevated serum testosterone level, decreased lipid peroxidation in the testis as well as alleviation of degenerative changes in testes of rats given sodium valproate. The protective effect nigella sativa oil on rat testis, reported herein, was

partially similar to that reported by Ali and Blunden (2003) who concluded that nigella sativa essential oil contains thymoquinone and carvacrol which may be related to its cytoprotective and antioxidant actions in rats. The antioxidant effect of nigella sativa oil was also proved by Abdel-Wahhab and Ali (2005) in aflatoxins- intoxicated rats. Butt and Sultan (2010) concluded that nigella sativa oil contains thymoquinone which has potent antioxidant effect. The mechanism(s) underlying the protective effect of nigella sativa oil on the testis might be due to its direct cytoprotective effect and/ or indirect antioxidant and androgen like activities that reported in this study. Thymoquinone probably has an important role in causing these effects. The antioxidant activity of nigella sativa oil that reported in this study agree with that revealed by Badary *et al.*(2003) who concluded that thymoquinone acts mainly as potent superoxide anion scavenger.

The protective effect of linseed oil against testicular injury in rats given sodium valporate that reported herein was partially similar to that reported by Palmer *et al.* (1980) who isolated two glycosides (linustatin and neolinustatin) from linseed oil meal and suggested that they provide a probable explanation for its protective activity against selenium toxicity in rats. Moreover, Comhaire and Mahmoud (2003) concluded that linseed oil contains alfa-linolenic acid (ALA) that corrects the deficient intake of omega-3 essential fatty acids, which is correlated with impaired sperm motility among subfertile men. In addition, Prasad (2009) concluded that linseed oil is rich in alfa-linolenic acid and suppresses oxygen radical production by white blood cells so induces potent antioxidant activity in rats.

The protective effect of celery oil against testicular damage in rats given sodium valporate ,reported in this study, agree with that obtained by Hamza and Amin(2007) who concluded that pretreatment with *Apium graveolens* (celery) plant extract has effectively alleviated most of the sodium valporate - induced injury on the testis, suggesting a protective role of celery plant. The mechanism(s) underlying the protective effect of celery oil against testicular injury induced by valproate in male rats might be due to the antioxidant effect (Momin and Nair, 2002) and /or androgenic activity (Hamza and Amin, 2007). Because of the antioxidant activity of celery oil it may decrease the oxidative stress in testicular tissue and the damaging effect of free radicals on sperm allowing normal spermatogenesis. Piomboni *et al*. (2008) reported that the natural antioxidants could protect sperm during maturation and migration, leading to improved sperm function. The increased serum testosterone after pretreatment

of male rats with celery oil, reported in this study, might be the reason for its protective effect.

In conclusion, pretreatment with nigella sativa, linseed and celery oil exhibits a protective effect against testicular injury induced by sodium valproate in male rats, so intake of these oils may be beneficial as protective agents for patients who suffer from sexual impotency.

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Docetaxel and gemcitabine in patients with advanced urinary bladder cancer: A Phase II study

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Abstract: The work aimed: To evaluate the efficacy and tolerability of a combination of docetaxel and gemcitabine in patients with locally advanced recurrent, and/or metastatic urinary bladder cancer. **Patients and methods**: An outpatient regimen of gemcitabine and docetaxel combination was tried in thirty-three patients with locally advanced,recurrent,and/or metastatic urinary bladder cancer.Study treatment consisted of gemcitabine1000 mg m^{-2} (days 1+8), and docetaxel 75 mg m^{-2} (day 8) every 21 days for a total of six to nine cycles. **Results:** Among the 33 patients, 17 patients (51.5%) had transitional cell carcinoma, 7patients (21.2%) had squamous cell carcinoma and 9 patients (27.3%) had transitional cell carcinoma with squamous metaplasia. Two patients (6.1%) had complete remission (CR), and 14 patients (42.4%) had partial remission (PR), for an overall response rate of 48.5%. Disease stabilization (SD) occurred in 7 patients (21.2%), while 10 patients (30.3%) had disease progression (PD). Analysis of response rate according to prognostic features known to predict response; Patients with PS 0&1 had an overall response rate of 55.6% (15/27), and patients with PS 2 had an overall response rate of 16.7%(1/6), and this difference was statistically insignificant (P =0.1). As regard to the site of disease, the overall response rate of patients with soft tissue and locally advanced disease was 58.3% (7/12) and 42.9% for patients with visceral metastasis (9/21), and this difference was statistically insignificant (p=0.4). The response rates for patients with risk index of 0, 1, or 2 were100% (2/2), 66.7% (10/15), and25% (4/16), respectively (P = 0.006).With a median follow-up of 10 months (range, 2-20 months), the median survival time was 11 months, the median time to progression was 7 months , 1-year survival rate was 40.3% and1-year progression free survival rate was 28.3%.Both haematologic and non haematologic toxicity were treatable and not severe. **Conclusion:** This schedule of docetaxel and gemcitabine is active and well tolerated as a first-line treatment for locally advanced, recurrent, and metastatic bladder carcinoma. The favourable toxicity profile of this regimen may offer an interesting alternative, particularly in patients with compromised renal function or cardiovascular disease.
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Keywords: Docetaxel, Gemcitabine, Advanced bladder cancer.

1. Introduction

Carcinoma of the bladder(BC)is the fifth most common cancer in adults[1].It is an oncologic problem especially in certain areas in the world[2]. Although many patients have localized disease at diagnosis and are cured with definitive local therapies, about half of them will relapse after radical cystectomy. Local recurrence accounts for about 30% of relapses and distant metastases are more common. Furthermore, a considerable number of patients are already metastatic at the time of diagnosis [3]. The prognosis of patients with advanced or metastatic BC remains poor, with the 5-year survival estimated to be <5% [4]. Systemic combination chemotherapy is the only treatment that may result in long term survival in some patients [5].Platinum-based chemotherapy like the combination of methotrexate, vinblastine, Doxorubicin and cisplatin (M-VAC) and the combination of gemcitabine and cisplatin are considered standard treatments. Although these regimens have an overall response rate ranging from 50% to 70%, disease recurrence has been reported in nearly all patients within the first year. The median survival time is approximately 12–14 months [6]. During the last decade, several new chemotherapeutic agents have shown activity against advanced BC, including taxanes [7]. Studies have indicated that docetaxel and paclitaxel have significant antitumour activity as single agents [8], or when administered in combination with other drugs [9]. Similarly, gemcitabine has a single-agent response rate of approximately 24–50% as both first and second-line therapy [10].

The current Phase II study was conducted to evaluate the efficacy and tolerability of a combination of docetaxel and gemcitabine in locally advanced, recurrent, and/or metastatic urinary bladder cancer.

2. Patients and Methods

Inclusion and exclusion criteria: Patients with locally advanced, recurrent and/or metastatic urinary

bladder cancer were enrolled into this prospective study. The study was conducted from May 2008 to April 2010 at oncology department, Assiut University hospital. Eligible patients were required to have an Eastern Cooperative Oncology Group performance status(ECPOG p.s) of 0 to 2, age 18 years or older; life expectancy of at least 12 weeks, adequate haematological [white blood cell count (WBC) ≥4000 cells/µl, absolute neutrophil count (ANC) ≥2000 cells/µl, platelet≥100.000/ µl, haemoglobin ≥10 g/dl], renal (serum creatinine <1.5 mg/dl, creatinine clearance ≥60 ml/min) and liver functions [bilirubin <1.5fold the upper normal limit (UNL) and AST <2fold the UNL, unless liver metastases were present, in which case <5fold the UNL was allowed. Previous neoadjuvant or adjuvant treatment was allowed as long as there was at least a 6-months treatment-free interval .Patients who had previously been treated with radiotherapy were entered into the study, provided that the course was completed more than 6 weeks before enrollment. Patients aged >75 years were excluded, as were patients with severe chronic obstructive lung disease, known CNS metastases and patients who were pregnant. Furthermore, patients with active infections or other serious underlying medical or mental conditions, which would impair their ability to receive protocol treatment. Informed consent was obtained from all patients before enrolment. Before entering the study, all patients underwent a physical examination, complete blood count (CBC), blood chemistry, chest X-ray, bone scan and abdominal computed tomography (CT) scan. A thoracic CT scan and other specific tests were performed when indicated. Cystoscopic evaluation was performed only when necessary for local recurrence.

Treatment schedule and toxicity monitoring:

Treatment was administered on an outpatient basis. Gemcitabine(1000 mg m^{-2})was administered by an intravenous infusion over 30 min on days 1 and 8,while docetaxel(75 mg m^{-2}) was administered as an intravenous infusion over 1 hour on day 8. Courses of docetaxel and gemcitabine were scheduled to be repeated every 21 days, but were not initiated until the ANC was ≥ 1500/ µL, the platelet count was ≥ 75,000 / µL, and the serum creatinine was < 1.8 mg/dL. Dose modifications of up to 50% of both agents were mandated for febrile neutropenia, or a bleeding episode with a platelet count <40,000 / µL, any platelet nadir< 20,000 / µL, or if Day 8 therapy could not be delivered secondary to neutropenia or thrombocytopenia.

Premedication included dexamethasone, 8 mg orally b.i.d., the day before and four consecutive days following chemotherapy. Antiemetic treatment consisted of intravenous ondansetron in combination with dexamethasone 20 mg on day 1. Prophylactic use of growth factors (G-CSF) was not routinely recommended. However, if grade 4 granulocytopenia or febrile neutropenia was present, prophylactic filgrastim was administered in subsequent cycles. During treatment, renal and liver function tests were carried out before each cycle on day 1, and complete blood count was carried out on days 1 and 8 of each cycle. Complete blood counts were also obtained on day 14 of the first course in order to assess nadir WBC and PLT. Toxicity was assessed with the use of the Common Toxicity Criteria version 3.0 [11]. Patients were treated with at least six cycles of chemotherapy unless there was evidence of disease progression or unacceptable toxicity occurred during treatment. After completing six cycles of treatment, patients were followed up. Patients who were stable after six cycles were considered to have completed protocol therapy and went off treatment. Patients who achieved either a complete or partial response after six cycles were scheduled to receive the same regimen for up to nine full chemotherapy cycles.

Evaluation of response

Response was assessed every two cycles of treatment according to WHO criteria [12]. Follow-up disease evaluation was performed regularly at 3 monthly intervals after treatment completion till death.

Complete response was defined as the complete disappearance of all measurable disease for at least 4 weeks. Partial response was defined as a more than 50% reduction in all measurable disease for at least 4 weeks. Stable disease was defined as a 50% or less reduction of all measurable lesions. Progressive disease was defined as an increase in any lesion or the appearance of new lesions. All responses were confirmed 4 weeks later.

Statistical analysis:

Data were recorded on specialized forms and all statistical tests were performed using SPSS version 16 for windows (SPSS Inc, Chicago, IL, USA) and Microsoft Excell (Realmond, W.A,USA) software. Descriptive analysis (e.g., mean, standard deviation, frequencies, percentage) were calculated and analysis was performed using the student's t-test and Fisher ExactT- Test, P value ≤0.05 was considered significant. Survival was calculated from the day of commencement of chemotherapy to the day of death using the Kaplan–Meier method [13]. Time to tumour progression (TTP) was defined as the time elapsed from the start of treatment to renewed disease progression.

3. Results:
Patients characteristics: table (1)

The study included 39 patients of which only 33 patients were eligible for assessment. Their clinicopathologic characteristics are shown in table (1). There were 24 males (72.7%) and 9 females (27.3%). Their age ranged between 35and 80 years (median; 60 years). Most patients (81.8%, 27/33) had a ECPOG p. s of 0 to 1. A total of 17 patients (51.5%) had transitional cell carcinoma, 7 patients (21.2%) had squamous cell carcinoma and 9 patients (27.3%) had mixed elements of transitional cell carcinoma and squamous metaplasia. Of the 33patients included in the present study, 21(63.6%) had not undergone radical cystectomy because of either locally advanced disease (6 /33; 18.2%), locally advanced disease with distant metastases in the liver, bone, lung (15 /33; 45.5%). The other 12 patients (36.4%) had locally recurrent (6 /33; 18.2%), metastatic disease after radical cystectomy (4/33; 12.1%),or both (2/33;6.1%).The treatment protocol was administered in all cases as first line therapy; however while 21(63.6%) had not previously received any therapeutic manipulation, the remaining patients were exposed to prior surgery, adjuvant/neoadjuvant chemotherapy or radiotherapy to the pelvis.
table (2, 3)

There were 2 patients (6.1%) who had a complete response (CR), and 14 (42.4%) had a partial response (PR), for an overall response rate of 48.5%. Disease stabilization (SD) occurred in 7 patients (21.2%), while the remaining 10 patients (30.3%) had disease progression (PD).

As regards the relation between response rate and pathologic Subtype (table 2, 3) it was found that the overall response rates were higher for patients with transitional cell carcinoma (52.9%, 9/17 patients) compared to those for patients with squamous cell carcinoma (42.9%,3/7patients), or transitional cell carcinoma with squamous metaplasia(44.4%,4/9), however, this difference in response rate was statistically insignificant (P =0.6). Patients with ECPOG p.s of 0&1 had an overall response of 55.6%(15/27), and patients with ECPOG p.s of 2 had an overall response rate of 16.7%(1/6), and this difference was statistically insignificant (P =0.1). As regard the site of disease, the overall response rate of patients with soft tissue and locally advanced disease was 58.3% (7/12) and 42.9% for those with visceral metastasis(9/21),and this difference was statistically insignificant,(p=0.4).As regard the number of disease sites, patients with one site had an overall response of 57.9%(11/19) ,patients with two sites had an overall response of 45.5%(5/11), and those with ≥3site had an overall response of 0%(0/3) ,(p=0.08). Based on Bellmunt et al [14], the ECOG p.s and the presence of visceral

metastases are two pretreatment risk factors. In the current study the number of patients with zero-risk (ECOG p.s 0 and no visceral metastasis), one-risk (ECOG p.s > 0 or visceral metastasis), and two-risk factors (ECOG p.s > 0 and visceral metastasis) was 2 patients (6.1%), 15 patients (45.5%), and 16 patients (48.5%), respectively. The response rate for 0, 1, or 2 risk index were 100% (2/2), 66.7% (10/15), and 25% (4/16), respectively (P = 0.006). Response rates in different patients subgroups are detailed in table (3).

After a median follow-up of 10 months (range, 2–20 months), the median overall survival of all patients was11 months (95% CI = 9.46–12.54 months) and the 1-year survival rate was 40.3% (Figure, 1). The median time to disease progression (TTP) was7 months (95% CI = 3.75–10.25 months) and the 1-year progression free survival rate was 28.3% (Figure,2).

The toxicity pattern was generally tolerable, and no toxic deaths occurred among the 33 patients (table 4)

Toxicity was primarily haematologic with neutropenia being the most prominent. Ten patients experienced grade 3 or 4 granulocytopenia; however, only 2 patients experienced neutropenic fever Also, 3patients had grade 3 anemia. Non haematological toxicities were mild and can be managed.

4. Discussion

Treatment of patients with advanced carcinoma of the urinary bladder is difficult. Advanced age, concomitant diseases, poor performance status, frequent deterioration of renal function, and frequent palliative treatment underscore the need to search for a treatment scheme with a good efficacy/toxicity profile [15]. The dismal long-term outcome with currently available regimens and the finding that at least one-third of patients with inoperable bladder cancer are unfit to receive cisplatin-based chemotherapy has led to the search of new treatment approaches and trials were conducted using platinum-free agents. [15,16,17]. The taxanes are primarily being studied in previously pretreated patients. Incorporation of taxanes as first-line treatment for advanced bladder carcinoma may not only offer an alternative to gemcitabine/cisplatin but may eventually be indicated as a first-line treatment, if equivalence to M-VAC or gemcitabine/cisplatin regimens can be confirmed [18].In addition, they can be administered safely to patients with impaired renal function, a condition frequently associated with bladder carcinoma [19].

Gemcitabine and docetaxel have different cellular targets (DNA synthesis and microtubules, respectively) and act at different phases of the cell cycle (S phase and mitosis, respectively) so

combination therapy could possibly be more effective [20].Antagonism was noted when gemcitabine and taxanes were administered concurrently, while additive effects were seen when gemcitabine preceded or followed taxanes[21,22].

In the present study, the 48.5% overall response were higher than that reported by Dreicer et al. (17%), Manola et al, (23%)and Gitlitz et al, (33.3%) but lower than that of Ardavanis et al, (51.6%), Dumez et al, (53%),and Neri et al, (53.1%)[23,24,25,18,26,27].

The combination of the other taxane; paclitaxel and gemcitabine showed response rates of 40%–60% [28, 29,30]. The variability in the response rates between our study and the other studies is likely due to the variability in drug schedules and also confounding factors among the different patient populations where 48.5% of the patients of this study were of non transitional cell histology.

It has been reported that regimens currently in use have limited efficacy against non–transitional-cell histologies, such as squamous cell tumour. If responses in non–transitional-cell components would be confirmed, this regimen could be particularly useful in the therapy of non-transitional histologies, a common occurrence in Egypt and certain areas of the world [32]. In our study,43.8% of the patients who achieved objective response had squamous cell carcinoma and mixd histology of transitional cell carcinoma with squamous metaplasia .The response of non transitional histology to chemotherapy is confirmed by a study of Khaled et al [31, 32], but with a different regimen of low-dose prolonged infusion gemcitabine and cisplatin where 38% of non transitional cell histology had objective response.Further studies are needed for evaluation of this regimen for non–transitional-cell histologies.

Additional studies have evaluated docetaxel in other combinations in the treatment of bladder cancer. Krege et al [33], assessed the association of docetaxel and ifosfamide after failure of cisplatin-based chemotherapy. This combination showed activity with acceptable tolerability. Another attempt were made to combine 3 or more agents to improve the outcomes obtained with dual therapy, where taxanes have demonstrated synergy when used in combination with a platinum salt. There is a trend in favor of the triplet chemotherapy suggesting different patterns of chemosensitivity and favoring primary bladder carcinoma [34, 35]. Pectasides et al [36], evaluated the three-drug combination of docetaxel

with cisplatin and epirubicin. The response rate was 66.7% and the median overall survival was 14.5 month. Another study of Weekly chemotherapy with docetaxel, gemcitabine and cisplatin, the objective response rate was 65.6% [37].

Critical for optimal management of patients with advanced disease is the use of pretreatment factors to define treatment objectives. In this study, the performance status and the presence of visceral metastasis were insignificant factors affecting the response rate in contrary to the results of the trials conducted by Bajorin et al.[38], Bellmunt et al[39]. and Pliarchopoulou et al [40]who identified performance status and the sites of metastatic disease as major response parameters. However,this result was parallel to the Egyptian study of Khaled et al [32] ,in which the combination of performance status and the presence of visceral metastasis (Memorial Sloan Kettering Risk Index)was the main factor affecting response rate[38].

The toxicity of this regimen was generally acceptable and manageable. The most common toxicity was haematological,mainly granulocytopenia. However, most episodes of granulocytopenia were brief, easily managed and not associated with the clinically significant event of neutropenic fevers occurring only in (6.1%, 2 /33).

Several conclusions can be drawn. First, this schedule of docetaxel and gemcitabine is active and well tolerated as a first-line treatment for advanced/relapsing or metastatic BC. These results, added to the other studies that included docetaxel in their treatment regimens, indicate the interest in this drug for treatment of BC as an alternative to conventional therapeutic regimens. Second, the favourable toxicity profile of this regimen may offer an interesting alternative, particularly in patients with compromised renal function or cardiovascular disease. Patients with advanced BC often have impaired renal function because of advanced age, prior platinum-containing chemotherapy, prior nephrectomy or disease-related hydronephrosis. Third, this regimen was given on an outpatient basis, so decreasing the costs of treatment. Further studies are needed for future comparisons with M-VAC or other gemcitabine or cisplatin-based regimens and to determine more accurately the potential of docetaxel together with investigation of new strategies that will introduce it into three-drug regimens or in combinations without cisplatin.

Table (1): Clinicopathological characteristics of the 33 patients:

		Frequency	Percent
Sex	Male	24	72.7%
	Female	9	27.3%
Age	Mean ± SD	57.12 ± 12.9	
	Median	60	
	Range	35 - 80	
ECPOG ps	0	10	30.3%
	1	17	51.5%
	2	6	18.2%
histopathology	TCC	17	51.5%
	sq.c.c	7	21.2%
	mixed	9	27.3%
tumour at presentation	locally advanced	6	18.2%
	primary with metastasis	15	45.5%
	metastasis after removal of primary tumour	4	12.1%
	local recurrence	6	18.2%
	metastasis and local recurrence	2	6.1%
No. of sites	1	19	57.6%
	2	11	33.3%
	≥3	3	9.1%
Previous treatment	surgery	12	36.4%
	Chemotherapy	9	27.3%
	Radiotherapy	9	27.3%

- ECOG ps:Eastern Cooperative Oncology Group performance status
-sq.c.c: squamous cell carcinoma   -TCC: transitional cell carcinoma   -mixed: transitional cell carcinoma with squamous metaplasia-

Table (2): Response rates of the 33 patients:

		Frequency	Percent
response	CR	2	6.1%
	PR	14	42.4%
	Overall response	16	48.5%
	SD	7	21.2%
	PD	10	30.3%

- CR =Complete response   **-** SD =stationary disease   **-** PR = partial response   -PD =progressive disease

Table (3): Response rates in selected patients subgroups:

		Overall response		P-value*
		No.	%	
Sex	Male(no.=24)	10	41.7%	0.2
	Female (no.=9)	6	66.7%	
ECPOG ps	0&1 (no.=27)	15	55.6%	0.1
	2(no.=6)	1	16.7%	
site of disease	ST/LA(no.=12)	7	58.3%	0.4
	Visceral(no.=21)	9	42.9%	
Risk Index	Risk 0(no.=2)	2	100%	0.006*
	Risk 1(no.=15)	10	66.7%	
	Risk 2(no.=16)	4	25%	
histopathology	TCC(no.=17)	9	52.9%	0.6
	Sq.c.c (no.=7)	3	42.9%	
	Mixed(no.=9)	4	44.4%	
No. of sites	1 (no.=19)	11	57.9%	0.08
	2 (no.=11)	5	45.5%	
	≥3 (no.=3)	0	0%	

*fisher exact test   - pvalue ≤0.05 is significant   - ECOG p.s: Eastern Cooperative Oncology Group performance status
ST/LA: soft tissue and locally advanced disease- -TCC: transitional cell carcinoma
- sq.c.c: squamous cell carcinoma   - mixed: transitional cell carcinoma with squamous metaplasia-

Table (4): toxicity during treatment of the 33 patients:

	Toxicity Grade				
	total	1	2	3	4
	N (%)	N (%)	N (%)	N (%)	N (%)
granulocytopenia	15(45.5%)	0(0%)	5(15.2%)	8(24.2%)	2(6.1%)
thrombocytopenia	5(15.2%)	2(6.1%)	3(9.1%)	0(0%)	0(0%)
anaemia	11(33.3%)	2(6.1%)	6(18.2%)	3(9.1%)	0(0%)
diarrhea	6(18.2%)	3(9.1%)	2(6.1%)	1(3%)	0(0%)
Fluid retention	1(3%)	0(0%)	0(0%)	1((3%))	0(0%)
Nausea&vomiting	14(42.4%)	10(30.3%)	4(12.1%)	0(0)	0(0%)
fatigue	14(42.4%)	3(9.1%)	8(24.2%)	3(9.1%)	0(0%)
stomatitis	17(51.5%)	5(15.2%)	7(21.2)	4(12.1%)	1(3%)
alopecia	19(57.6%)	6(18.2%)	5(15.2%)	8(24.2%)	0(0%)
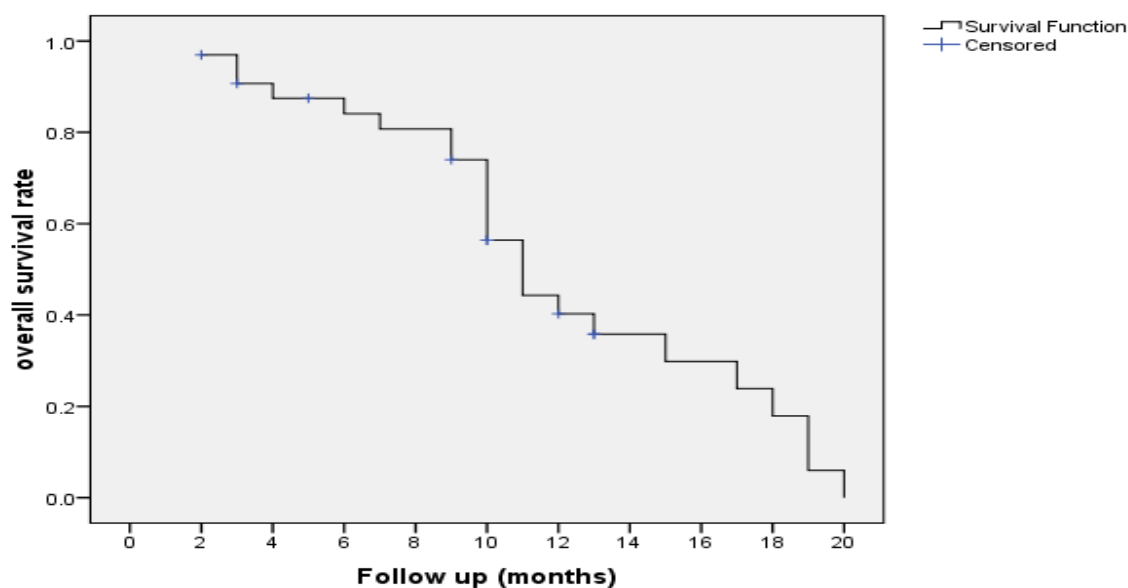
Figure (1): Kaplan–Meier curve for overall survival.
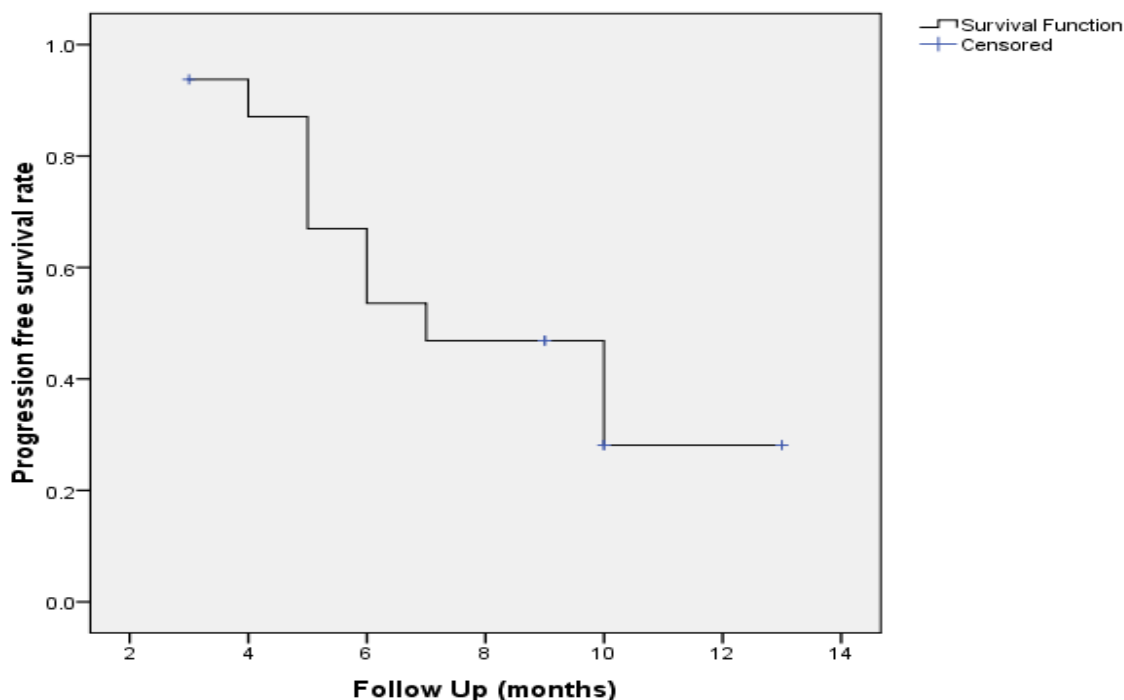
Figure (2): Kaplan–Meier curve for progression free survival.

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Characterization and Reuse of Kiln Rollers Waste in the Manufacture of Ceramic Floor Tiles

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Abstract: Roller kilns used in the production of ceramic tiles are routinely ground to remove traces of contamination. The ground powder is usually discarded as useless waste. In a previous paper [1] the possibility of reusing this powder in refractory making was investigated. The present paper deals with the possibility of adding this powder without any treatment to standard wall tiles composition. XRD and XRF were used to identify the mineralogical and chemical composition of the powder. Powder compacts were prepared by uniaxial pressing at pressures ranging from 30 to 50 MPa. Firing was performed at temperatures ranging from 1200 to 1350°C for soaking periods ranging from 2 to 6 hours. It was proved that among the investigated parameters, firing temperature plays the leading role in assessing sintering characteristics, followed by soaking time. Forming pressure hardly affected sinterability. SEM micrographs were performed under different firing conditions to follow up the morphology of phases appearing. It was proved that adding up to 10% powder to ceramic floor tiles standard mix did not alter its final properties.
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Key words: Kiln Rollers Waste, Ceramic Tiles, Sintering Characteristics, Mechanical Properties, ES Standards

1. Introduction:

In the past four decades roller kilns have become the main firing device in the manufacture of ceramic tiles as well as several other products such as flat dinnerware, small insulating refractories and other ware. They are characterized by their lower cost compared to the conventional tunnel kiln, the possibility of their use in fast firing processes and the uniform temperature distribution across its cross section owing to the reduced area of this section [2]. One of the environmental problems associated with the operation of such kilns is that its rollers need continuous surface grinding owing to the deposition of volatile salts particularly in the cooling zone of the kiln. In tile producing factories, the fine product obtained is produced at a rate of about 0.2 ton per 10^4 m^2 tiles produced [3]. This product represents a health hazard since it is usually stored outdoors in piles. The continuous inhalation of the fine dust generated predisposes to silicosis [4].

In a previous paper, one of the authors of the present paper investigated the chemical and mineralogical analysis of this powder and found it to contain about 74% alumina with a balance of silica and alkali earth oxides. X-ray diffraction analysis showed the powder to consist of corundum, mullite, cordierite and spinel [1]. He found out that such powder could potentially be used in the refractory industry.

In the present paper, the sintering and the mechanical properties of the pressed powder are investigated in view of using it as an additive in the ceramic tiles industry.

2. 2. Experimental
2.1 Raw material:

The raw material used was the product of grinding of ceramic rollers used in kilns for the production of tiles from PRIMA factory at Sadat City (60 km North of Cairo). Its particle size distribution has been previously determined by Ibrahim [1]. The particle size ranged from 40 to 150 μm with a specific surface area of 350 cm^2/g.
He also determined the true density of the powder and found it to be 2.94 g/cm^3.

2.2 Sample preparation:

The as – received powder was dry pressed in a uniaxial hydraulic press under pressures ranging from 30 to 50 MPa in 1" diameter molds (2" molds were used for crushing strength tests and special tile shapes for MOR: 10x40x150 mm). The dry pressed samples were then fired for soaking times ranging from 0 to 6 hours in a muffle kiln at temperatures ranging from 1200 to 1350°C with 50° interval. Four specimens were tested each time and the average value of results calculated each time.

2.3 Tests performed:

The following tests were undergone on the fired specimens:

- The true and bulk density, water absorption and apparent porosity were determined using the hot test piece boiling water method [5].
- Cold crushing strength was tested by subjecting fired cylindrical samples of diameter = length = 2" to compressive loading [6]. The modulus of rupture was determined using the three point bending test [7].
- The Rockwell hardness of fired samples was determined according to ISO 674 – 1988 [8].
- X–Ray diffraction was used to assess the phases formed using Philips type PW 1373 X–Ray diffractometer.
- Scan electron Microscopy was used to follow the microstructure of fired samples. To this aim, a SEM apparatus (SEM; Model JSM-5410) was used.

3. Results and Discussion
3.1 Sintering characteristics:

Fig. 1 shows the effect of applied pressure on the porosity and the bulk density of green pellets. On raising the forming pressure from 30 to 50 MPa, the bulk density increase from about 1.79 g/cm^3 to 1.89 g/cm^3 corresponding to a reduction of porosity from 0.395 to 0.36.
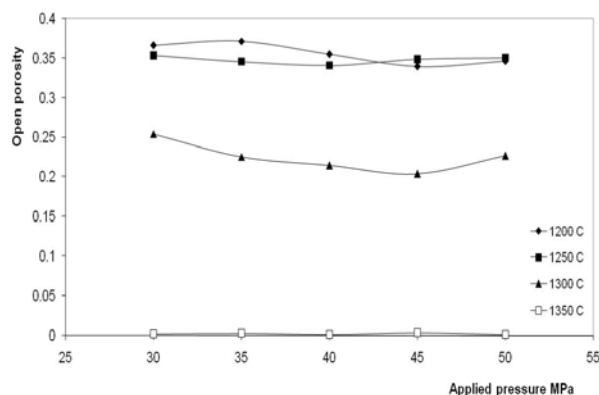
Fig.1: Effect of applied pressure and firing temperature on the minimum open porosity

As firing was performed for soaking periods ranging from 2 to 6 hours, the bulk density increased with firing temperature. Fig.2 shows the variation of bulk density with firing temperature and forming pressure for a soaking time of 2 h. As can be seen from the curve the forming pressure played little role in assessing the values of bulk density reached. This is the reason why it was thought sufficient to fit one single curve for all forming pressures involved. Increasing the firing temperature from 1200 to 1350°C had for effect to increase the bulk density from about 1.8 g/cm^3 to 2.8 g/cm^3. Increasing the soaking time to 6 hours did little to raise these values.

This means that the main factor controlling the variation in bulk density is the firing temperature. This was assessed by using the DATA ANALYSIS module (on EXCEL) to establish the following correlation table.

Table 1: Correlation table for fired density

	Pressure	Temp.	Time	**Density**
Pressure	1			
Temp.	0	1		
Time	0	0	1	
Density	0.029587	0.891457	0.03927	1

This table clearly indicates that the effect of either forming pressure or soaking time on the fired density is insignificant.
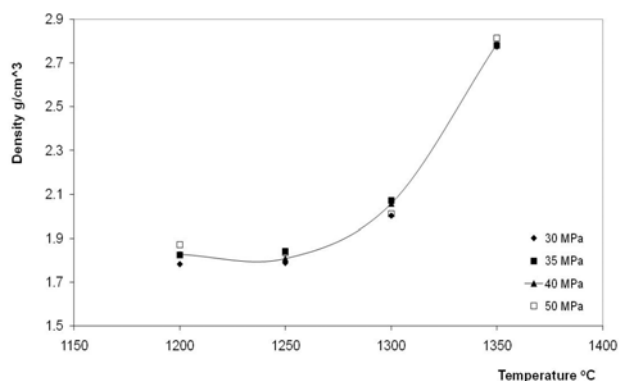
Fig.2: Effect of forming pressure and firing temperature on the bulk density of samples fired for 2 h

The maximum values of bulk density achieved at each firing temperature are plotted in Fig.3 which clearly shows that forming pressure did not affect such values and that below 1300°C there was no sensible densification. On firing at 1350°C there was an appreciable increase in density reaching about 96% of the theoretical density.
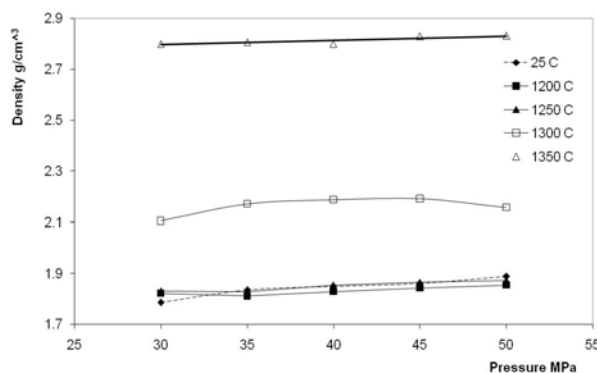
Fig.3: Effect of applied pressure and firing temperature on the maximum density

Fig.4, on the other hand, shows the variation in open, closed and total porosity of samples fired for 3 hours. Actually, all soaking times gave practically the same result. Here also, one curve was fitted through data collected at different forming pressures emphasizing the fact that forming pressure had a negligible effect on variation in porosity. These curves show that open porosity is almost zero on firing at 1350°C. At that temperature the pores are exclusively of the closed type, their level dropping to about 5%.

In line with the decreased porosity, the percent water absorption decreased with firing temperature and was practically unaffected by variations in forming pressure or soaking time. Fig.5 shows the variation of percent water absorption with firing temperature for 3 hours soaking. The values of percent water absorption dropped from about 19% on firing at 1200°C to near zero at 1350°C following closure of open pores.

On the other hand, the linear firing shrinkage was more sensitive to variations in forming pressure and soaking time. As can be seen from Fig.6, the firing shrinkage at 1250°C increased linearly with soaking time as well as increasing with forming pressure. Fig.7 shows the maximum firing shrinkage obtained after 6 hours soaking as function of firing temperature. Forming pressure did not affect the maximum values of shrinkage achieved at each temperature. It will be noticed that unduly high values exceeding 20% were recorded for samples fired at 1350°C. As will be shown later this is due to the formation of a glassy phase causing liquid phase sintering.

Fig.4: Effect of forming pressure and firing temperature on the total porosity of samples soaked for 3 hours
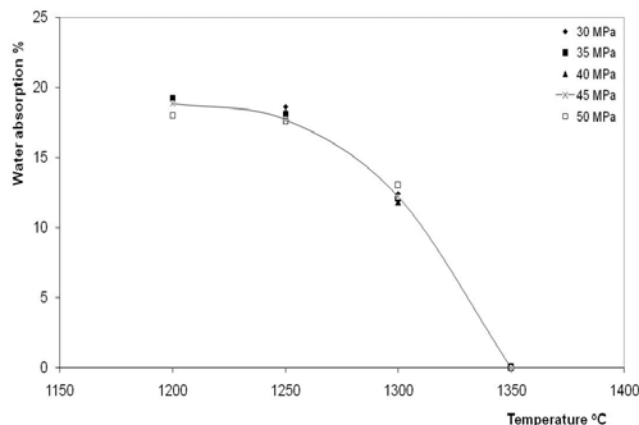
Fig.5: Effect of forming pressure and firing temperature on percent water absorption of samples fired for 3 h.
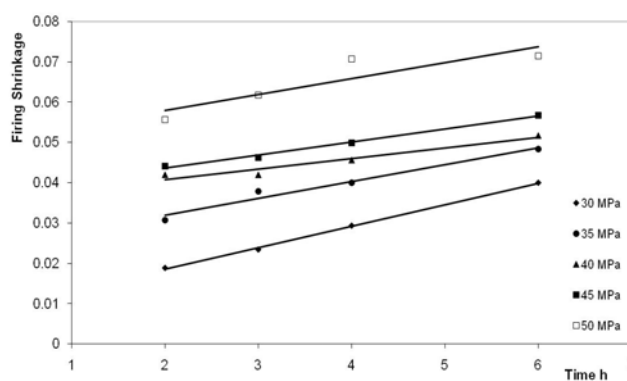
Fig.6: Firing shrinkage as function of time for samples fired at 1250 ^{o}C
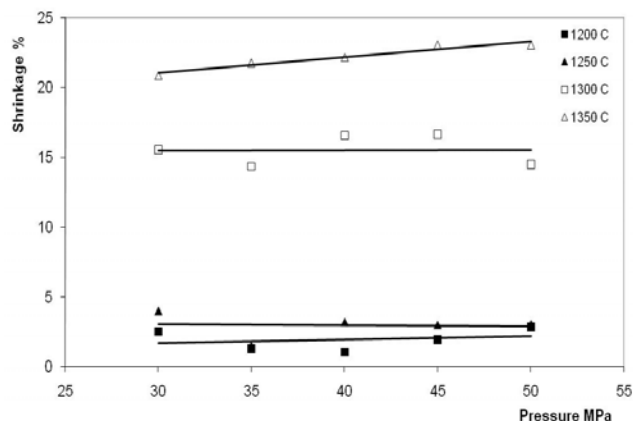
Fig.7: Maximum firing shrinkage as function of forming pressure and firing temperature

3.2 Mechanical properties:
3.2.1 Hardness:
This was determined using Rockwell scale. Fig.8 shows the variation of hardness with forming pressure and soaking time for samples fired at 1250°C. The effect of forming pressure is quite complicated since a maximum value appears at about

40 MPa forming pressure. The maximum values of hardness increase with soaking time from about 15 to 20 MPa. The reason for this behavior can be understood in the light of the dependence of surface hardness on pore formation. It is well known that a higher porosity favors low hardness so that on increasing the forming pressure, one expects hardness values to increase owing to decrease in porosity. However at high forming pressure air escape associated with pressure relief on specimens usually creates micro–cracks which may remain unhealed at relatively low firing temperature. These micro–cracks cause the observed decrease in hardness as the forming pressure exceeds 40 MPa.

Values of Rockwell hardness measured for samples fired at 1300°C attained higher maximum values reaching 65 MPa for samples fired for 6 hours. The results obtained at 1350°C were totally different from those obtained at the other two temperatures. At that temperature the values of hardness roughly increase with increased forming pressure while not showing a regular pattern as for variation with soaking time. The maximum values obtained are on the average lower than those obtained on firing at 1300°C. As will be shown later, this is probably due to the formation of a surface glassy layer which has a lower hardness than the solid material. However hardness constantly increased with forming pressure rather than showing a maximum at a certain forming pressure. This is due to the healing of micro–cracks owing to surface formation of a glassy phase on firing at such high temperature.
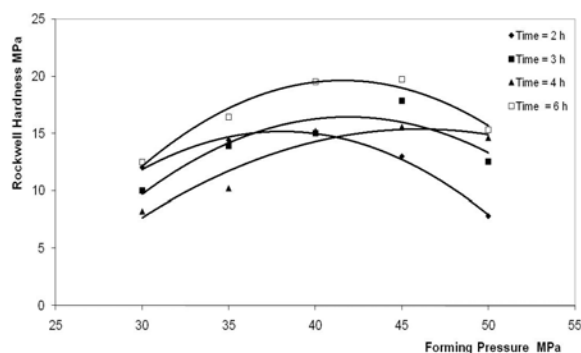
Fig.8: Effect of forming pressure and firing time on Rockwell Hardness for samples fired at 1250 °C

3.2.2 Cold Crushing Strength:

Following previous results of hardness, the cold crushing strength (CCS) was only determined for samples pressed at 40 MPa. Fig.9 shows a linear increase of CCS with both firing temperature and soaking time. The values of CCS ranged from 30 MPa for samples fired at 1250°C for 2 hours to 143 MPa for samples fired at 1350°C for 6 hours.
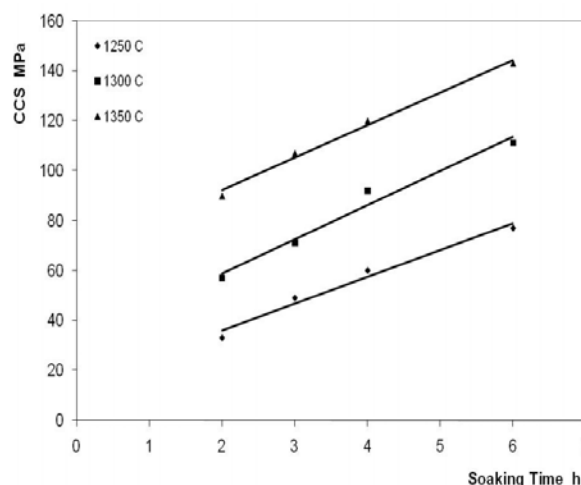
Fig.9: Effect of firing temperature and soaking time on the cold crushing strength of samples at forming pressure 40 MPa

3.2.3 Modulus of Rupture:

Fig.10 shows the results obtained on testing samples for MOR. This figure shows that as firing temperature is increased the MOR of samples highly increases. For example, for samples fired for 6 hours, the value increases from 14 to 63.5 MPa. As for the effect of soaking time, it becomes more apparent at high firing temperatures as evidenced by the increasing slopes of the lines obtained with increasing firing temperature.
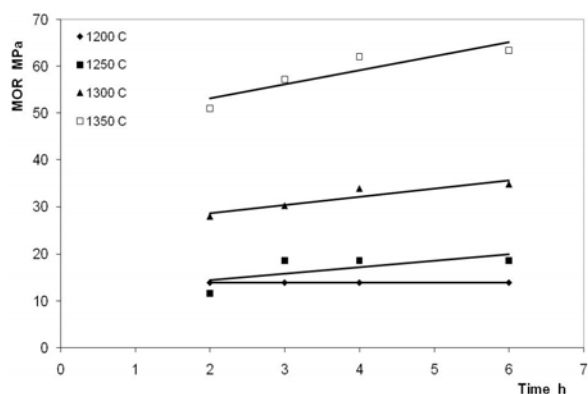
Fig.10: Effect of firing temperature and soaking time on the MOR of samples at forming pressure 40 MPa

3.3 Microstructure:

SEM micrographs and XRD diffractograms have been obtained to follow up the phases appearing on firing and their impact on the physico – mechanical properties discussed earlier.

Since it was earlier established that forming pressure and soaking time do not play a major role in the densification process all chosen specimens were those pressed at 40 MPa and fired for 6 hours.

The XRD pattern for the specimen fired at 1200°C did not differ much from that of raw powder [1]. The main lines were those of corundum and mullite with occasional lines of magnesium aluminate spinel and cordierite. The SEM for such a sample is shown in Fig.11. As can be seen from this photo neat primary mullite crystals appear (dark phase), a slightly lighter dark phase (probably cordierite) with scattered corundum crystals (white phase). In addition there appears an appreciable proportion of porosity. This is in accordance with previous findings (Fig.4). SEM micrographs obtained for samples fired at 1250 and 1300°C did not differ much except for the reduced amount of pores.
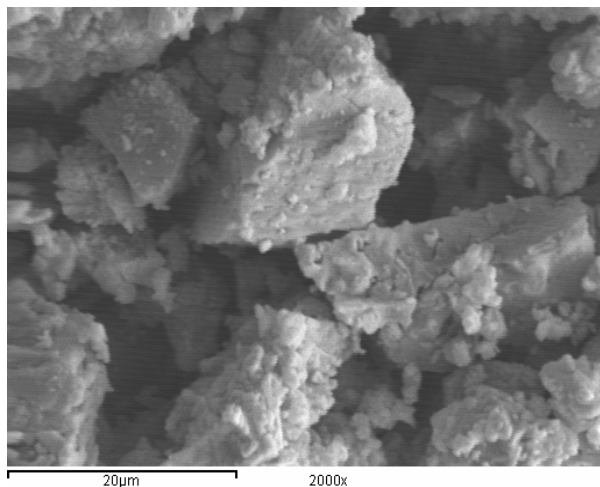
Fig.11: SEM micrograph of specimen fired at 1250 °C

When a specimen fired at 1350°C for 6 hours was XRD investigated, the pattern obtained was totally different from those obtained on firing at lower temperatures. First mullite lines completely disappeared while lines of quartz appeared for the first time. Other phases appearing are mainly cordierite, magnesium aluminate spinel, and soda – lime feldspar with few lines of corundum. The interpretation of such change can be understood in view of the SEM micrograph shown in Fig.12. This micrograph shows two important features: First, there is an almost total elimination of porosity and second, a continuous matrix covers the surface of the sample reminiscent of the presence of a glassy layer. This latter is the cooling product of a liquid phase. The presence of a liquid phase explains the disappearance of primary mullite crystals due their dissolution in the liquid as well as the subsequent precipitation of the silica phase.
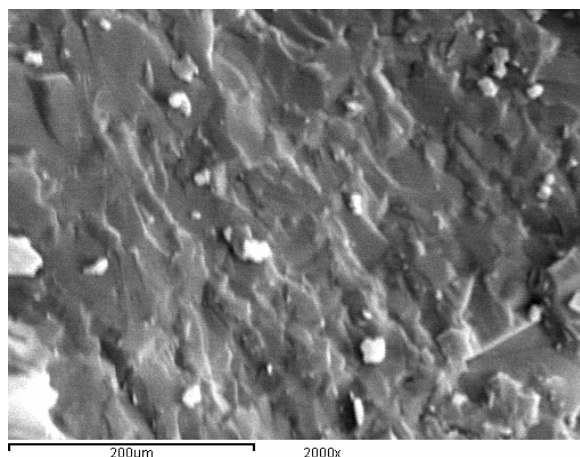
Fig.12: SEM micrograph of specimen fired at 1350 °C

3.4 Application to the ceramic tile industry:

This powder consists mainly of the same oxides present in the final fired ceramic body of wall tiles, namely, SiO_2, Al_2O_3, CaO, Fe_2O_3 and MgO. Although the chemical analysis of fired wall tile bodies differs from that of the powder, it was thought possible to incorporate the powder as filler in small proportions of the tile green body. This trial has been performed in the Prima factory in Sadat City where four tiles were prepared in which the raw roller powder was incorporated. Table (2) shows the body composition.

Table 2: Body composition for wall tiles

Material	Kaolin Clay	Ball Clay	Quartz Sand	Potash Feldspar	Calcium Carbonate	Roller Powder
%	10	30	20	20	10	10

Standard production procedure was followed in the factory and glazed tiles were fired at about 1150°C for a total cycle of 50 minutes**.** These tiles were then tested for percent water absorption and MOR. The following table shows the results.

Table 3: Comparison between actual tiles and Egyptian standard [9]

Property	% W.A.	MOR MPa
Actual tiles	15.5 %	14.5
ES standard	< 17 %	> 12

On the other hand, a common type of floor tiles produced under the brand name "Porcelain tiles" is actually rather a stoneware product. This is since the formal definition of porcelain requires it to have a near zero porosity while stoneware tiles can have

porosities up to 9%. Because of the development of liquid phase, it was thought possible to use the powder pressed at 40 MPa and fired at 1350°C for 2 hours as a cheap type of "porcelain tiles". A comparison between commercial tiles and the actual

bodies was made. These commercial floor tiles are produced by pressing at 40 MPa and firing at 1320°C for 1 hour. The comparison is shown in the following table.

Table 4: Comparison between floor tiles from the mix and commercial tiles [10]

Property	Water Absorption %	Total Porosity	Bulk Density g/cm³	Closed Porosity	Linear Shrinkage %	MOR MPa
Trial tiles	0.6	6 %	2.7	5.3 %	22	52
Commercial tiles [10]	< 3	< 9 %	2.4	5.4 %	< 7	> 35

As can be seen from this comparison, except for the large linear shrinkage displayed by the trial tiles, all other properties are superior in case of trial tiles. Further investigation will be necessary to limit the degree of shrinkage for such type of tiles.

4. Conclusions

Roller kiln grinding powder was obtained from a ceramic tile factory and its physico – mechanical properties determined. The following results were obtained:

- Increasing the forming pressure increased the bulk density of green samples while decreasing their porosities.
- The temperature of firing was practically the sole factor that affected the sintering properties of pressed powder: An increase in firing temperature from 1200 to 1350°C had for effect to raise considerably the bulk density and to decrease the open porosity to almost zero level with consequent decrease in percent water absorption. The effect of variations in forming pressure or time of soaking was insignificant in this respect.
- The percent linear shrinkage was affected by the three variables reaching unduly high values on firing at 1350°C (over 20%), because of the formation of a surface glassy phase.
- The measured values of Rockwell hardness showed a marked increase on raising the firing temperature from 1200 to 1300°C displaying a maximum value at about 40 MPa forming pressure. Values of hardness determined for samples fired at 1350°C showed a decrease below the previous values owing to the formation of a soft surface glassy phase.
- Both cold crushing strength and modulus of rupture increased with increased firing temperature and soaking time.
- It was possible to prepare sample tiles containing 10% powder added to a standard wall tiles mix.

The properties of these tiles were comparable to those of the commercial tiles.

- The properties of tiles fired at 1350°C for 2 hours were comparable to the locally produced "porcelain tiles" except for their higher firing shrinkage.

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Iran's Electricity Renewable Resource Planning

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Abstract: Iran's domestic consumption and production have steadily grown together since 1984 and it is still heavily reliant on traditional thermal energy sources of electricity, with a small fraction being produced by hydroelectric plants. In this regard, the governments in energy sectors would like to investigate in renewable resources. Infrastructure resource planning in long term has an important role in maintaining future demand and also economical and environmental aspects of energy generation and consumption are recent worries about future for the ministry of energy in Iran. This paper surveys on the future infrastructure resource planning and long term demand forecasting for Iran electrical energy sector.

1. Introduction

Energy resources in Iran consist of the third largest oil reserves and the second largest natural gas reserves in the world. Iran is in a constant battle to use its energy resources more effectively in the face of subsidization and the need for technological advances in energy exploration and production. Energy wastage in Iran amounts to six or seven billion dollars (2008). The energy consumption in the country is extraordinarily higher than international standards. Iran recycles 28 percent of its used oil and gas whereas the figure for certain countries stands at 60 percent (IGMC, 2008). Iran paid $84 billion in subsidies for oil, gas and electricity in 2008 (Tavanir14727, 2009). Iran is one of the most energy intensive countries of the world with per capita energy consumption 15 times that of Japan and 10 times that of EU. Also due to huge energy subsidies, Iran is one of the most energy inefficient countries of the world, with the energy intensity three times higher than global average and 2.5 times the Middle Eastern average (Tavanir16641, 2009).

Iran is one of the leading members of OPEC (Organization of Petroleum Exporting Countries) and the Organization of Gas Exporting Countries (GECF). Iran received $47 billion dollars in oil export revenues, which accounts for about 50% of state revenues. Natural gas and oil consumption both account for about half of Iran's domestic energy consumption. With its heavy dependence on oil and gas revenues Iran continues to explore for new sources of natural gas and oil. Recently Iran has focused its energy sector on the exploration of the South Pars offshore natural gas fields in the Persian Gulf (Officialwire, 2008) Iran has become self-sufficient in designing, building and operating dams and power plants and it has won a good number of international bids in competition with foreign firms.

Generation expansion planning (GEP) has historically addressed the problem of selecting the most adequate technology, the expansion size, the sitting, and the schedule for the construction of new plants considering economic criteria while ensuring that installed capacity adequately meets the expected demand growth. (Pereira and Saraiva, 2010)

The major objective of power system planning in regulated power systems is to meet the demand of loads, while maintaining the power system reliability. In this environment, infrastructure expansion planning is frequently organized by ministry of energy due to the low level of existing uncertainties. Besides, planners can achieve the required information for planning. Consequently, planners can design the least cost expansion plan based upon the certain reliability criteria (Dehghan, et al., 2009).

In Power system, GEP include determining capacity that is required for long-term planning horizon, technologies of generation units and construction time interval and location for each unit. GEP problem in restructured and modern power system toward conventional systems is very complex. Generation technologies are classified into two categories (Javadi, et al., 2011):

- Conventional energy (Coal, Oil, Gas, Nuclear, and Hydro)

- Unconventional and Renewable ones (Solar, Wind, Fuel cells, Biomass, Geothermal, Micro gas-turbines, etc).

One of the methods for improving the efficiency is augmenting these units. In large units, Combines Cycle Generation Technology (CCGT) can decrease the costs. The supply of fuel source for combined cycle units is very important. Because of more and greater efficiency, less pollution and low level of equipment depreciation, competitive electricity market has tendency to utilize natural gas (Shahidepour et al., 2005).

One of the most important characteristics of natural gas is their problem of reserving in comparison with other resources of fossil fuel and due to it identity to consume in consumption places and extraction points or special centers connected to gas supplying network which is very high (Hatice et al., 2009).

Based on TDCA's report, within the Middle East, Iran has the most gas resources and has the second rank in the worldwide ranking after Russia. However, producing of natural gas in Iran compared with resources is very less and has got fourth place of worldwide producing after Russia, US and Canada. This producing is only three percent of worldwide gas production (Javadi, et al., 2011).

Thus, natural gas can be one of the foresight potentials in future infrastructure expansion of Iran's energy. Demand for natural gas is expected to become more in coming decades, because of rapid growth of electrical energy generation units based-on natural gas (For example combined cycle units as one model of centralized generation units, or micro gas-turbine as one model of Distributed Generation (DG) units).

The investment decision process changed with the development of competition in the electricity sector since investment on new generation capacity became a commercial and risky activity. This is because investors are more interested in short-term investment return and are less interested in investing on generation capacity requiring large capital efforts and long recovery periods. This activity is also very much influenced by increasing load uncertainties, restructuring policy and market management rules. Apart from that, investors should pay attention to the possible behavior of the other competitors given the interactions existing in this decentralized decision making process. The formulation of such a decision making process should consider a number of issues as the evolution of the demand, market prices, variations of regulatory policies and changes of financial and economic data (Pereira and Saraiva, 2010)

2. Iran's Energy Resources

Power generation capacity of Iranian thermal power plants reached 173 terawatt hours in 2007. Accounting for 17.9 percent of power production in the Middle East and African region. Natural gas has been the main energy in Iran in 2007, comprising over 55 percent of energy needs, while oil and hydroelectricity accounted for 42 and 2 percent respectively. The region's energy needs will increase by 26.8 percent until 2012 (IGMC, 2007).

Iran has the second largest oil reserves in the world, and the third largest exporter of it. According to 2006 estimates Iran produced about five percent of total global crude oil production. They produced 4.2 million barrels per day (670,000 m^3/d) of total liquids and 3.8 million of those barrels were crude oil. Iran plans to invest $100 billion during the next four years in different sections of its oil industry (Javadi and Monsef, 2008). By the end of 2009, Iranian oil R/P ratio was 89.4 years which is the worlds highest. By 2009, Iran had 52 active rigs and 1,853 producing oil wells (IEA, 2009).

Iran possesses abundant fuels from which to generate energy. Since 1913 Iran has been a major oil exporting country. Oil industry output averaged 4 million barrels per day in 2005, compared with the peak output of 6 million barrels per day (950,000 m^3/d) reached in 1974. Following the 1979 revolution, however, the government reduced daily oil production in accordance with an oil conservation policy. Further production declines occurred as result of damage to oil facilities during the war with Iraq. In the early 2000s, industry infrastructure was increasingly inefficient because of technological lags. Few exploratory wells were drilled in 2005. Iranian oil was nationalized in 1953 and thus is owned and operated by the National Iranian Oil Company (NIOC).

Iran held 10.3% of the worlds total proven oil reserves and that figures out to be about 137.6 billion barrels (2.188×1010 m3) of oil reserves at the end of 2009. Oil also is found in northern Iran and in the offshore waters of the Persian Gulf. Nevertheless, in 2005 Iran spent US$4 billion dollars on gasoline imports, mainly because of contraband and inefficient domestic use that result from subsidies. Iran is one of the largest gasoline consumers in the world ranking second behind United States in consumption per car (IranDaily, 2010).

There is a growing recognition that prices must rise faster to curb consumption and ease the burden on the public finances. Cheap energy has encouraged wasteful consumption in Iran, and a brisk business in smuggling petrol into Iraq, Turkey, Pakistan and Afghanistan. Demand has also been supported by rapid increases in car production in

recent years. In the absence of imports, the car industry has developed strongly (albeit from a low base) with output reaching over 1m vehicles in fiscal year 2006/07 (March 21-March 20) (IranDaily, 2007).

The growth in consumption of domestically produced oil has been modest, owing to refining constraints. By contrast, fuel imports rose to 180,000 barrels per day (29,000 m^3/d) in January 2005 from 30,000 barrels per day (4,800 m^3/d) in 2000, and petrol consumption is estimated to have been around 1,800,000 barrels per day (286,000 m^3/d) in 2007 (before rationing), of which about one-third is imported. These imports are proving expensive, costing the government about US$4bn in the first nine months of 2007/08, according to parliamentary source. Nearly 40% of refined oil consumed by Iran is imported from India.

3. Renewable Power Purchasing Agreements

Almost all coal, nuclear, geothermal, solar thermal electric, and waste incineration plants, as well as many natural gas power plants are thermal. Natural gas is frequently combusted in gas turbines as well as boilers. The waste heat from a gas turbine can be used to raise steam, in a combined cycle plant that improves overall efficiency. Power plants burning coal, oil, or natural gas are often referred to collectively as fossil-fuel power plants. Some biomass-fueled thermal power plants have appeared also. Non-nuclear thermal power plants, particularly fossil-fueled plants, which do not use co-generation, are sometimes referred to as conventional power plants (NITC, 2009).

Renewable energy is energy which comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished). In 2008, about 19% of global final energy consumption came from renewable, with 13% coming from traditional biomass, which is mainly used for heating, and 3.2% from hydroelectricity. New renewable (small hydro, modern biomass, wind, solar, geothermal, and bio-fuels) accounted for another 2.7% and are growing very rapidly. The share of renewable in electricity generation is around 18%, with 15% of global electricity coming from hydroelectricity and 3% from new renewable.

Wind power is growing at the rate of 30% annually, with a worldwide installed capacity of 158 gig-watts (GW) in 2009, and is widely used in Europe, Asia, and the United States. At the end of 2009, cumulative global photovoltaic (PV) installations surpassed 21 GW and PV power stations are popular in Germany and Spain. Solar thermal power stations operate in the USA and Spain, and the largest of these is the 354 megawatt (MW) SEGS power plant in the Mojave Desert. The world's largest geothermal power installation is The Geysers in California, with a rated capacity of 750 MW. Brazil has one of the largest renewable energy programs in the world, involving production of ethanol fuel from sugar cane, and ethanol now provides 18% of the country's automotive fuel. Ethanol fuel is also widely available in the USA.

While many renewable energy projects are large-scale, renewable technologies are also suited to rural and remote areas, where energy is often crucial in human development. Globally, an estimated 3 million households get power from small solar PV systems. Micro-hydro systems configured into village-scale or county-scale mini-grids serve many areas. More than 30 million rural households get lighting and cooking from biogas made in household-scale digesters. Biomass cook stoves are used by 160 million households.

Climate change concerns, coupled with high oil prices, peak oil, and increasing government support, are driving increasing renewable energy legislation, incentives and commercialization. New government spending, regulation and policies helped the industry weather the global financial crisis better than many other sectors (Wikipedia, 2011).

Commercial electric utility power stations are most usually constructed on a very large scale and designed for continuous operation. Electric power plants typically use three-phase or individual-phase electrical generators to produce alternating current (AC) electric power at a frequency of 50 Hz or 60 Hz (hertz, which is an AC sine wave per second) depending on its location in the world. Other large companies or institutions may have their own usually smaller power plants to supply heating or electricity to their facilities, especially if heat or steam is created anyway for other purposes. Shipboard steam-driven power plants have been used in various large ships in the past, but these days are used most often in large naval ships. Such shipboard power plants are general lower power capacity than full-size electric company plants, but otherwise have many similarities except that typically the main steam turbines mechanically turn the propulsion propellers, either through reduction gears or directly by the same shaft. The steam power plants in such ships also provide steam to separate smaller turbines driving electric generators to supply electricity in the ship. Shipboard steam power plants can be either conventional or nuclear; shipboard nuclear plants are with very few exceptions only in naval vessels. There have been perhaps about a dozen turbo-electric ships in which a steam-driven turbine drives an electric generator which powers an electric motor for propulsion.

In some industrial, large institutional facilities, or other populated areas, there are combined heat and power (CH&P) plants, often called co-generation plants, which produce both power and heat for facility or district heating or industrial applications.

carrying heat energy by steam or hot water is often only worthwhile within a local area or facility, such as steam distribution for a ship or industrial facility or hot water distribution in a local municipality

Table.1 Installed Generation Capacity

Capacity	Type	Operational
1.1 MW	Biogas	2009
250 MW	Geothermal	2010
467 MW	Solar	2009
250 KW	Solar	2009
28.2 MW	Wind	2008
100.8 MW	Wind	1994
200 KW	Fuel cell	2009
125 KW	Run of the river	1991
90 MW	Hydro	1961
87 MW	Hydro	1962
520 MW	Hydro	1963
45 MW	Hydro	1967
50 MW	Hydro	1970
10 MW	Hydro	1973
2,000 MW	Hydro	1976
151 MW	Hydro	1976
30 MW	Hydro	1984
85 MW	Hydro	1993
2.3 MW	Hydro	1994
2.8 MW	Hydro	1995
520 MW	Hydro	2001
2,000 MW	Hydro	2002
35.1 MW	Hydro	2002
11 MW	Hydro	2004
2,280 MW	Hydro	2005
16.8 MW	Hydro	2005
18 MW	Hydro	2006
13.5 MW	Hydro	2007
100 MW	Hydro	2007
550 KW	Hydro	2008
70 MW	Hydro	2008
47 MW	Hydro	2009
480 MW	Hydro	2009
13 MW	Hydro	2009
1,000 MW	Hydro	2010

Table.2 Expansion Candidates

Capacity	Type	Operational
Out:1040MW	Pumped-storage	2011
Out:1000MW	Pumped-storage	NA
20 MW	Run of the river	NA
5.6 MW	Run of the river	NA
60 MW	Wind	NA
7 MW	CHP	NA
Under Study	Solid waste	2012
48 MW	Hydro	2011
450 MW	Hydro	2012
1,000 MW	Hydro	2012
315 MW	Hydro	2014
2,500 MW	Hydro	2015
1,500 MW	Hydro	2016
1 MW	Hydro	NA
8.4 MW	Hydro	NA
680 KW	Hydro	NA
900 KW	Hydro	NA
227 KW	Hydro	NA
65 KW	Hydro	NA
2.8 MW	Hydro	NA
8.5 MW	Hydro	NA
264 MW	Hydro	NA
466 MW	Hydro	NA
324 MW	Hydro	NA
265 MW	Hydro	NA
930 MW	Hydro	NA
80 MW	Hydro	NA
135 MW	Hydro	NA
33.5 MW	Hydro	NA
240 MW	Hydro	NA
496 MW	Hydro	NA
250 MW	Hydro	NA
292 MW	Hydro	NA
580 MW	Hydro	NA
2,638 MW	Hydro	NA

AC electrical power can be stepped up to very high voltages for long distance transmission with minimal loss of power. Steam and hot water lose energy when piped over substantial distance, so

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Specific Geochemical Parameters and Oil: Source Rock Correlations of Some Oilfields in the North Western Desert, Egypt

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Abstract: Different analytical techniques, including liquid chromatographic separation, gas chromatography and gas chromatography-mass spectrometry were used to characterize the crude oil and extract samples of the source rocks. The samples were collected from different oilfields in North Western Desert Egypt namely: Meleiha, Misaada and Qarun oilfields. In the present work, the mentioned parameters have been used to essentially discuss the relation between the produced oils and their potential source rocks to confirm the indigenous sources for the petroleum generation of the studied oilfields. The results showed that the studied oil samples of Misaada and Qarun oilfields are well correlated with each other, where they are similar in their maturation and source depositional environments and slightly correlated with Meleiha oil. The correlation between source rocks and crude oils show that there is a good correlation between the extract samples of Kharita and Khatatba formations and crude oils from Qarun and Misaada oilfields. While the extract of Bahariya source rocks and Meleiha oil show slight correlation. These evidences indicate that Kharita and Khataba source rocks seem to act as sources and reservoirs for oil generation in the Qarun and Misaada oilfields.

1. Introduction:

The geochemical characteristics of oils are of great interest for petroleum geology. Chemical fingerprinting is the application of chemistry to identify the sources of complex environmental pollutants, including petroleum. This practice has advanced into a science where the original sources of complex mixtures (e.g. crude oil) can often be identified by the relative abundance of some major individual compounds (e.g. n-alkanes) forming a chemical pattern by ratios of specific constituents or by identifying source-specific compounds or markers (e.g. triterpanes) in the environmental sample being investigated. (Peters *et al.*, 2005).

Geochemical correlations of oils and the source rocks extracts are based on the ability to recognize distinct physical and chemical similarities, or differences, between the hydrocarbons in a reservoir and the extractable bitumen plus the residue in the original source rock (Williams, 1974). Oil-source rock correlations are more difficult than oil-oil correlations, due to many problems in their sampling, analyses and/or interpreting the available data. Such interpretations must be confirmed by different parameters, e.g. gross composition of oil and source rock extracts, biomarkers analyses, environmental analysis…..etc. Many parameters for oil-source correlations as, saturates (%), saturates/aromatics, C_{max}, $C_{21}+C_{22}/C_{28}+C_{29}$, carbon preference index (CPI), pristane/phytane, pristane/n-C_{17} and pristane+n-C_{17}/phytane+n-C_{18} ratios were discussed by Welte *et al.* (1975); Alexander *et al.* (1981); Pool and Claypool (1984); Leythaeuser *et al.* (1987) and Philip *et al.* (1989). These parameters depend mostly on the preburial environments of the living organisms, the depositional environments of the organic matter and the diagenetic processes in the source rocks.

Geologic Setting

The Western Desert of Egypt covers an area of 700,000 square kilometers and comprises almost two thirds of the whole area of Egypt (EGPC, 1992). The North Western Desert represents an important part of the unstable shelf of Northern Africa. It has been subjected to different tectonic regimes since the Paleozoic times, which were able to from the construction of many basins, sub-basins, ridges, troughs and platforms. These structural features encourage both Egyptian and foreign oil companies to establish condensed exploration works in this region. The geographic locations of the selected studied oilfields are shown in (Fig. 1). The Western Desert still has a significant hydrocarbon potential as some oil and gas discoveries indicate (Dolson *et al.*, 2001). There are few available literatures concerning the geochemical characterization of crude oils from the Western Desert of Egypt (Taher *et al.*, 1988; Zein El-Din *et al.*, 1990, Halim *et al.*, 1996), and few deal

with the distribution of biomarkers (EL Nady, 1998; Mostafa *et al*., 1998; El- Gayar *et al*., 2002).

Metwalli, and Abd El-Hady (1975) stated that Umbarka Field produces a waxy oil of 44° API, from the Aptian clastics. The Alamein Dolomite acts as a sealing rock for the oil accumulated in this Aptian clastics in that field. They also added that the variation of crude oil-gravities, in the Western Desert, reflects different stages of oil migration and accumulation as well as different oil source rocks in the same and different ages. Zein El Din *et al*. (1990) divided the oils from the North Western Desert into two main groups: The first includes oils from Shushan-Matruh basins, which are thought to be derived from source rocks of terrestrial origin, while the second includes oils of marine origin from Abu Gharadig and Gindi basins. Matbouly (1993) reported that the Jurassic oil in the north Western Desert is derived from terrigenous organic matter. Mostafa et al. (1998) recognized four oil types in the north Western Desert. Oils from Shushan and Matruh basins are characterized by terrestrial waxes inputs, while oils from Abu Gharadig Basin are generated from marine siliciclastic source rocks, and those from Alamein Basin seem to be derived from mixed marine/terrigenous sources. Sharaf and El Nady (2003) recognized that the oils from Alam El Bueib and Bahariya reservoirs are genetically related, multisourced from Khatatba and Alam El Bueib source rocks with minor contribution from Kohla source rocks. El Nady *et al*. (2003) classified the crude oils of the Meleiha oil field into two classes namely, paraffinic and deltaic oils, originated from marine and terrigenous sources, respectively. El Nady (2009) reported that the oils from Khatatba and Alam El Bueib formations are mature, derived from source

rocks containing marine and terrestrial organic matter, respectively. Also, recognized that the source environments and maturity of the oil from Khatatba reservoir is similar to that of the Khatatba source rock extract. The oil from the Alam El Bueib reservoir differs from the extracts of the Alam El Bueib and Kharita formations. El Nady and Harb (2010) revealed close genetic relationship and remarkable similarities in the origin and maturation of the oils and extracts of the Khatatba and Alam El Bueib source rocks of some oilfields in the North Western Desert.

Objectives

The objectives of this work is to utilize biomarkers characteristics together with bulk geochemical parameters to identify and characterize the crude oils and to assess the respective depositional environments and maturation. Also, the authors attempt to assess the correlation between the crude oil samples and the potential source rocks to confirm the indigenous sources for the petroleum generation of some oilfields of the North Western Desert This target was made through out the study in detail of the analytical results for three crude oil samples collected from three oilfields in the North Western Desert (Fig. 1) namely: Meleiha, Misaada and Qarun oilfields, as well as, three extract samples from Baharia, Kharita and Khtataba formations ranging in age from Upper Cretaceous to Middle Jurassic. (Fig. 2), represent the potential source rocks of the studied oilfields. The geologic informations of the crude oils and their reservoirs are summarized in Table (1). The Egyptian General Petroleum Corporation kindly supplied these samples.
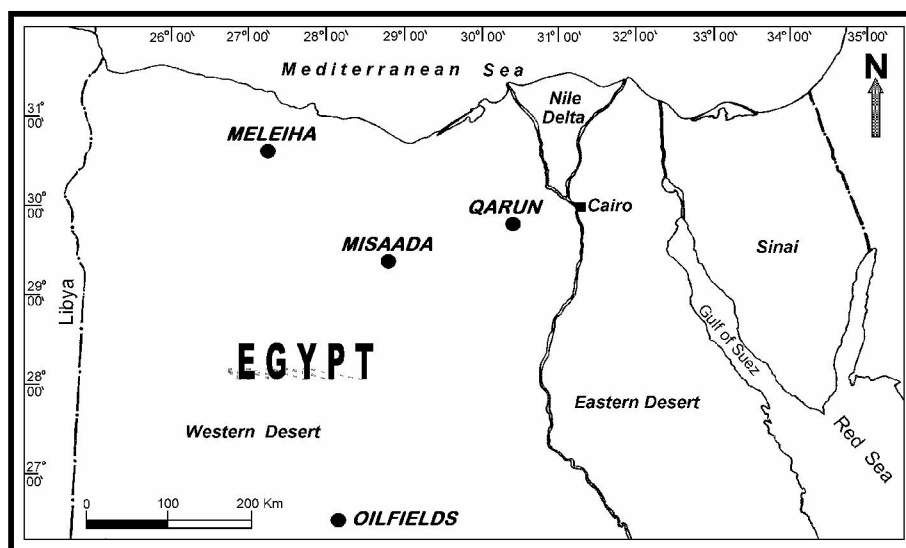
Fig. (1): Location map of the studied oilfields in North Western Desert, Egypt

Fig. (2): Generalized stratigraphic column of the North Western Desert, Egypt (Schumberger, 1995)

Techniques

1. About 200g of rock samples were powdered to 250-mesh size and then extracted with chloroform by using soxhlet extractor.

2. The crude oils and extract samples were separated into saturates, aromatics and resins by column chromatography. The column was packed with 1:1 (by weight) alumina overlying silica gel such that the weight of the sample (asphaltenes free) was about 2% of the combined weight of the packed materials. Successive elution with n-heptane,

toluene and chloroform yielded saturates, aromatics and resins component fractions, respectively. The obtained fractions were freed from solvents by evaporation. The results are expressed as weight percent to the whole oils or extracts.

3. The saturate fractions of oils and extracts were analyzed by gas chromatography using (Perkin Elmer Instrument Model 8700) provided with a flame ionization detector (FID). Oven temperature was programmed for 100 to 320°C at 5°C/min. Gas chromatography-mass spectrometry used a 50m x

0.25mm fused silica capillary column of bonded SE 54 installed with a finnigan MAT TSQ-70 combined gas chromatography/quadrupol mass spectrometer. The column oven was programmed from 100 to 310°C at 4°C/min.
These analyses were carried out in the laboratories of the Egyptian Petroleum Research Institute.

3. Results and Discussion
Specific geochemical parameters

The specific geochemical parameters have been assessed by the aid of gas chromatography and gas chromatographic-mass spectrometric analyses of the saturated fractions. The parameters include normal paraffins, carbon preference index (CPI), pristane/phytane ratios, isoprenoids/n-alkanes ratio (pr/n-C_{17} and ph/n-C_{18}), as well as triterpanes and steranes (Table 1 - Figs. 3 and 5).

N-Paraffins

The mode distribution of n-paraffins is used to shed light on the genetic origin of oils (Tissot and Welte, 1984). It is known that the amorphous sapropelic organic matter characterized by maximum peak concentrations of C_{15}-C_{25}, reflects marine organic sources (Waples, 1985). Further more, the organic matters which were derived from remains of higher vascular plants (terrestrial) are characterized by maximum concentrations of n-paraffins at n-C_{25}-C_{29} (Hunt, 1979; Tissot and Welte, 1984).

The GC/FID chromatogram of the Meleiha crude oil sample is characterized by a monotonically decreasing homologous series of heavy normal alkanes (n-C_{25} to n-C_{30}) and display odd carbon preference at n-C_{15} (Fig. 3A). These data reflect mature oils, originated mainly from non-marine origin mainly terrestrial organic matters, deposited under slightly oxidizing environment (Hunt, 1996) and slightly mixed with inputs from marine source.

The mode of distribution of n-paraffins in the crude oils of Misaada and Qarun oilfields (Fig. 3B and C) show that the maximum abundance is at n-C_{15} to n-C_{25} reflecting marine origin.

Table (1): Geologic informations and geochemical analysis of the studied crude oil samples from oilfields in the North Western Desert, Egypt

	Oilfields		
	Meleiha	Misaada	Qarun
Depth(ft)	9563	11169	17786
Reservoirs	Bahariya Fm.	Kharita Fm.	Khatatba Fm
Age	Up. Cretaceous	L. Cretaceous	M. Jurassic
Lithology	Sandstone	Sandstone	Sandstone
Pristane/phytane	03.00	00.63	02.00
Pristane/n-C17	00.40	00.28	00.10
Phytane/n-C18	00.18	00.47	00.10
CPI	01.04	00.94	01.02
C27 Steranes (%)	16.30	20.77	20.60
C28 Steranes (%)	37.40	39.30	40.43
C29 Steranes (%)	46.30	39.90	38.80
Homohopane index[a]	00.00	00.12	00. 72
Diasteranes index[b]	00.27	00.10	00.14
Gammacerane index[c]	00.00	00.15	00.24
C_{29} 20S/20S+20R[d]	00.56	00.50	00.66
C_{29}/C_{30}[e]	00.57	01.30	00.22
Steranes/hopanes[f]	06.00	07.50	06.00
Ts/Tm[g]	00.00	01.00	00.70

CPI: ∑odd/∑even carbon numbers,
a; Homohopane index: (C_{35} homohopane S + R)/ (C_{31} + C_{32} + C_{33} +C_{34} + C_{35} homohopanes S + R).
b: Diasteranes index: (C_{27} diasteranes S + R)/[(C_{27} diasteranes + R) + C_{29} steranes S + R)].
c: Gammacerane index: gammacerane/(gammacerane + C_{30} hopane).
d: C_{29} 20S/20S+20R steranes ratios
e: C_{29}/C_{30}: C_{29} norhopane/C_{30} hopane,
f: Steranes/hopanes ratio.
g:Ts/Tm: Trisnorhopanes/Trisnorneohopanes ratios.

Carbon Preference Index

Carbon preference index obtained from the distribution of n-alkanes is affected by both source and maturity of crude oils (Tissot and Welte, 1984). The CPI values of the studied crude oils, which are calculated according to Waples formula (1985), are listed in Table (1). It is clear that the oil samples have CPI values close to unity, ranging from (0.94 to1.04) these values indicate mature crude oils.

Pristane/Phytane

Pristane/phytane ratios seem to be useful as correlation parameters, because it is believed to be sensitive to diagenetic conditions. Pr/ph ratios substantially below unity could be taken as indicator of highly reducing depositional environments. Very high pr/ph ratios (more than 3) are associated with terrestrial sediments. Pr/ph ratios ranging between 1 and 3 reflect oxidizing depositional environments (Hunt, 1996). In the present work pr/ph ratio of the oil sample from Meleiha oilfield is 3.0 (Table 1) indicating oxidizing depositional environment of the crude oil. On the other hand, the crude oils from Qarun and Misaada oil fields have pr/ph ratios of 0.63 and 2.00 respectively reflecting that these crude oils were deposited under transitional (reducing–oxidizing) environments. These results indicate good correlation between crude oils from Qarun and Misaada oilfields, with slight correlation to crude oil from Meleiha oilfield.

Isopreniods/n-alkanes

Waples (1985) stated that by increasing maturity, n-alkanes are generated faster than iosprenoids, in contrast to biodegradation. Accordingly Isopreniods/n-alkanes (Pr/n-C_{17} and ph/n-C_{18}) ratios obtained from gas chromatography provide valuable informations on biodegradation, maturation and diagenetic conditions. Pr/n-C_{17} and ph/n-C_{18} ratios of the studied crude oils are given in Table (1) and Fig (3). It is clear that the crude oil samples of Qarun and Misaada oilfields have Pr/n-C_{17} and ph/n-C_{18} ratios 0.28, 0.47 and 0.1, 0.1, respectively reflecting mostly mature and originated mainly from marine organic sources, deposited under reducing environment (Fig. 4). The crude oil of Meleiha oilfield has Pr/n-C_{17} and ph/n-C_{18} of 0.40 and 0.28 indicating mixed organic sources Fig. (4).

Steranes

The steranes distribution of crude oils are given in Table (1), represented in Fig.(5) and peaks identification in Table (2). Meleiha crude oil (Fig. 5A) is characterized by low predominance of C_{27} steranes (20S and 20R   16.3 %, (peaks D and E) and slightly high abundance of C_{28} and C_{29} (20S and 20R

37.40 and   46.30, respectively, (peaks I to P), indicating that the Meleiha oil is believed to be generated from both marine shales and carbonates enriched in marine algae with more contribution from terrestrial organic sources, deposited under saline conditions and oxic setting (Peters and Moldowan, 1993). Furthermore, the distributions of regular steranes $C_{29,}$ C_{27} and C_{28} on the ternary diagram (Fig. 6) reveal also that the Meleiha oil is derived mainly from terrestrial organic sources.

The high concentrations of C_{27} diasteranes (20S) peak (A) and $C_{28,}$ C_{29} diasteranes (20S and 20R, peaks B, C and G, in case of Meleiha oil, indicate input of marine organic source with more contribution from terrestrial organics (Waples and Machihara, 1992). The high diasteranes concentration compared to regular steranes suggest a clay rich source rock, because the clay is required to catalyze the steroids transformation to diasteranes (Peters and Moldowan, 1991)

Misaada and Qarun oils are characterized by slightly lower predominance of C_{27} steranes (20S and 20R, peaks D, E, F   20.77% and   20.60%, respectively) and higher abundance of C_{28} and C_{29} steranes (20S and 20R   39.30, 39.90% and   40.43, 38.90%, respectively, (peaks I to P) indicating inputs from marine organic sources (Waples and Machihara, 1992). Moreover, the distributions of regular steranes $C_{29,}$ C_{27} and C_{28} on the ternary diagram (Fig. 6) reveale also more contribution from marine organic sources.

The diasteranes concentrations compared to regular steranes is low, suggesting a clay rich source rock. The low concentrations of C_{27} diasteranes (20S) peak (A) and $C_{28,}$ C_{29} diasteranes (20S and 20R, peaks B,C and G, Fig. 5B, C) indicate marine organic source (Waples and Machihara, 1992). Also, the presence of C_{30} steranes indicates a marine depositional influence (Moldowan et al., 1985).

Tricyclic Terpanes

Terpanes biomarkers distributions derived from the m/z 191 mass chromatograms are shown in Figure (7) and peaks identification are given in Table 2. The results show that the C_{21}-C_{25} tricyclic terpanes of Meliha oil (A-E, Fig. 7A) appear to be the largest components which may support that the oil of Meleiha oilfield is more mature and sourced mainly from marine carbonate source rocks. At the same time the C_{23}, C_{24} and C_{25} tricyclic terpanes peaks C, D and E are generally of lower values compared with C_{22} indicating that the oil has some inputs from terrestrial organic materials (Hunt, 1996). This confirms the conclusion of steranes biomarkers. The unusual low amounts of C_{30} extended hopanes seem to be associated with mixed organic sources

(Moldowan *et al*., 1985). This phenomenon can be displayed by the low ratio of C_{29}/C_{30} extended hopanes and Ts/Tm ratio (Jones and Philip, 1990; Hunt, 1996).

On the other hand, The C_{30} hopanes are the largest components in the series C_{27}-C_{34} in oil samples from Misaada and Qarun oilfields (Fig. 7B and C). This indicates that the organic materials in these oils were originated mainly from saline and hypersaline environments (Ten Haven *et al*., 1988; Peters and Moldowan, 1993). The extended hopanes are available as paleoenvironmental indicator (Waples and Machihara, 1992). The unusual large amounts of C_{30} hopanes seem to be associated with marine sources (Moldowan *et al*., 1985).
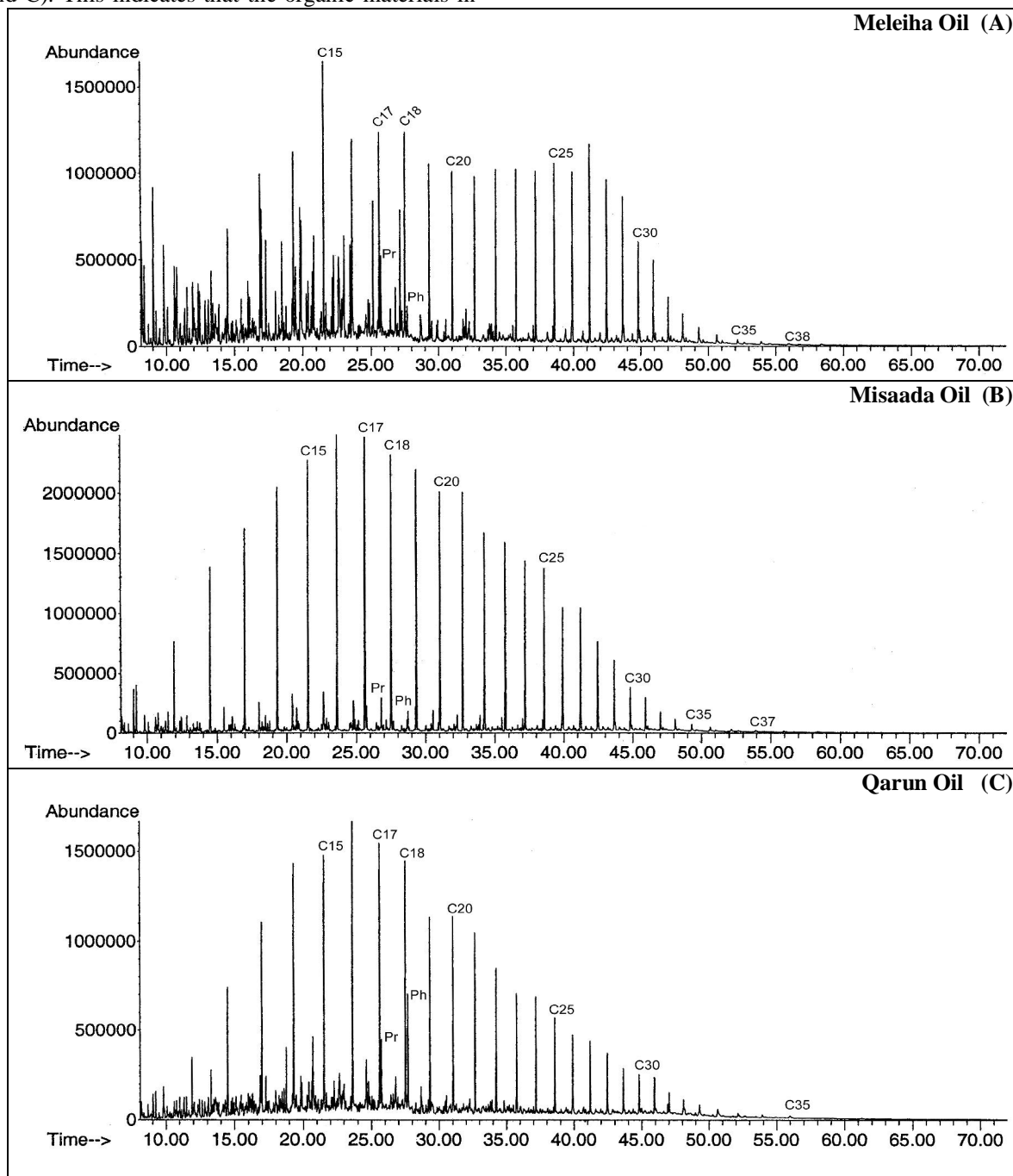
Fig. (3): Gas chromatograms of the saturated hydrocarbons of the studied oil samples
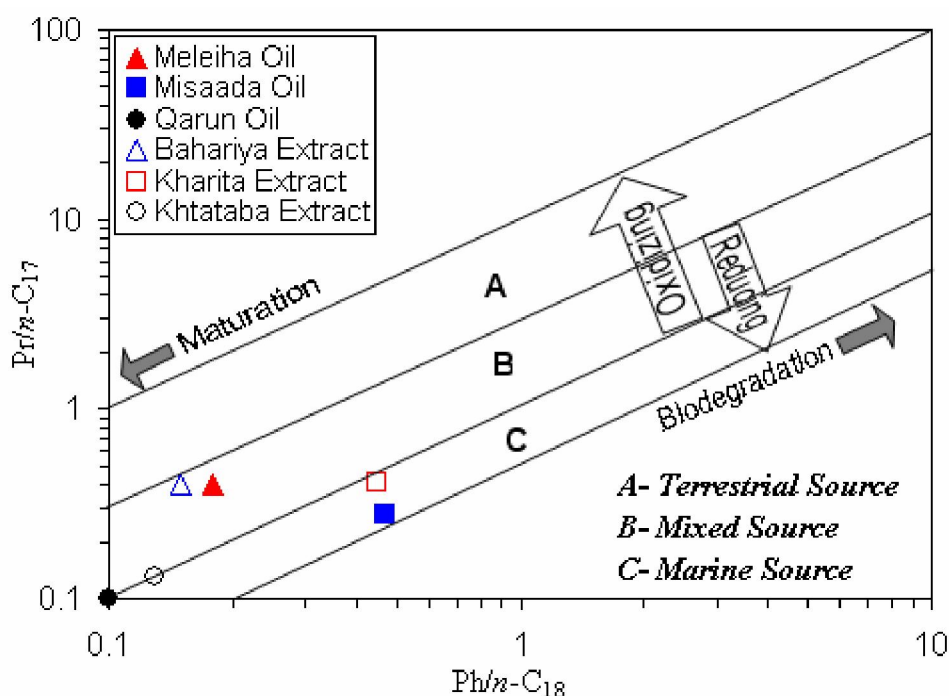
Fig. (4): Plot of Pr/n-C$_{17}$ versus Ph/n-C$_{18}$ (Shanmugam, 1985, modified by Peters et al., 2000), showing oil: source rock correlation of the studied oilfields.

The ratio of Trisnorhopane/ Trisnorneohopane (Ts/Tm) is considered as a facies and depositional environmental parameter of the relevant source rocks. Ts/Tm (1.0) in case of Qarun oil and (0.7) in case of Misaada oil (Table 1) reveal marine organic facies of depositional environment. It is also considered as a maturation parameter due to the greater thermal stability of Ts than its counterpart Tm. The ratio of C$_{29}$/C$_{30}$ hopanes 0.22 and 1.30 again confirm marine organic facies of depositional environment. Ts/Tm and C$_{29}$/C$_{30}$ hopanes ratios for the crude oils are generally consistent with the pristane/phytane and isoprenoids/n-alkanes ratios (Table 1, Fig. 4). The low concentrations of C$_{29}$ norhopane in crude samples (Fig. 7B and C, peak M) confirms that these samples were generated from organic materials rich in carbonates and evaporites (Connan *et al*., 1986).

Because gammacerane is resistant to biodegradation, it tends to be present in a variety of source rocks and oils (Hunt, 1996), but its proportion relative to other triterpanes is particularly high in samples from hypersaline depositional settings (Moldowan *et al*., 1985; Brassel *et al*., 1988; Huang,

2000), therefore the presence of gammacerane (peak R) in oils of Misaada and Qarun oilfields support the interpretation of an anoxic, reducing hypersaline environment.

The distribution of homohopanes 22R+22S in crude oils can be used as an indicator of the associated organic matter type, as it can also be used to evaluate the oxic/anoxic conditions of source during and immediately after deposition of the source sediments (Peters and Moldowan, 1991). The studied crude oils have low concentrations of C$_{31}$-C$_{34}$ homohopanes (20S and 20R) (peaks Q, S to U Fig. 7B and C, Table 2) which are more significant to hypersaline marine oils. The homohopane indices values 0.12 and 0.72 confirm this conclusion.

Bisnorhopanes

Bisnorhopanes are types of pentacyclic triterpanes present in significant concentrations in oil. Bisnorhopanes are observed in Guatemalan evaporites (Connan *et al*., 1986) and frequency reported in other biogenic siliceous rocks of the circum-Pacific region (Katz and Elrood, 1983). It is believed that sediments containing large amounts of bisnorhopane were deposited under anoxic conditions

(Mello *et al*., 1988). The crude oils of Misaada oilfield has relatively higher amounts of C_{28} bisnorhopane (peak L) Fig. (7) indicating more anoxic environment than Qarun and Meleiha oils).

Moretanes

Moretanes are abundant in organic materials of marine origin (Connan *et al*., 1986; Mann *et al*.,

1987). Figure (7) shows that moretanes (peak P) in Misaada and Qarun oils are clearly detectable, indicating marine origin. On the other hand the poorly detectable moretanes in meleiha oil indicates inputs of terrestrial organic matter.
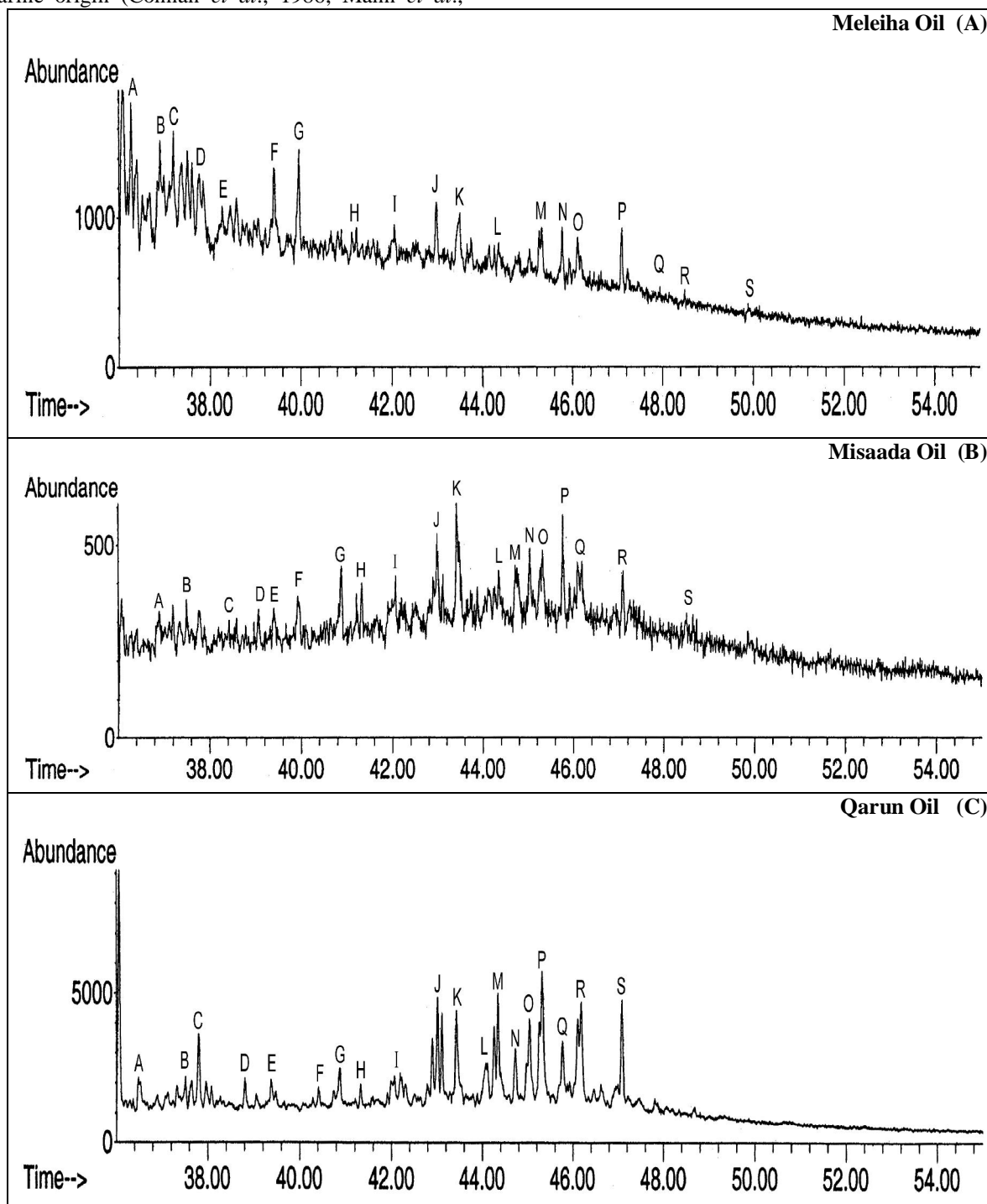
Fig. (5): M/Z 217 steranes in the saturated fractions of the studied oil samples.

Maturation

The maturation of crude oils is controlled by specific geochemical parameters as Carbon preference index (CPI), isoprenoids/n-alkanes ratio (Pr/n-C$_{17}$ and Ph/n-C$_{18}$), the diasteranes index and C$_{29}$ 20S/20S+20R stranes ratio. The CPI values of the studied crude oil samples are close to unity ranging from 0.94 to 1.04 (Table 1) indicating that the studied samples are of high maturity levels (Waples 1985). The isoprenoids/n-alkanes ratios (Pr/n-C$_{17}$ and Ph/n-C$_{18}$) ranging from 0.10 to 0.40 and 0.10 to 0.47,

respectively, reflect both the high maturation levels of these crude oils and slight or no biodegradation effects (Fig. 4). Peters and Moldowan (1993); Petersen *et al.*, (2000) recognized that the maturity level of oils increase with increasing of diasteranes index (> 0.1), and C$_{29}$ 20S/20S+20R (> 0.5). The studied oils have diasteranes index range from 0.10 to 0.27 and C$_{29}$ 20S/20S+20R from 0.56 to 0.66 (Table 1). These data confirm that the oils are characterized by high maturity levels.
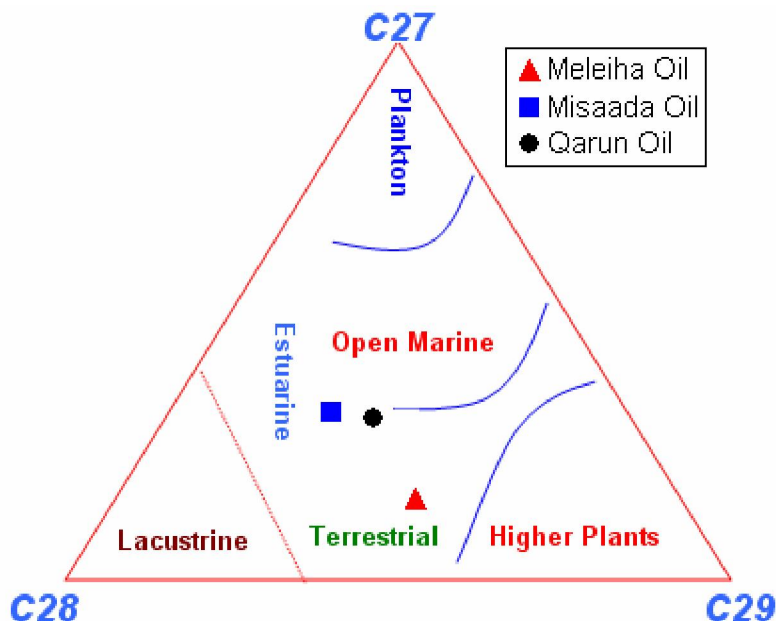
Fig. (6): Distribution of C$_{27}$, C$_{28}$ and C$_{29}$ regular steranes (Huang and Meinschein, 1979), showing organic facies of the studied oils.

Table (2): Peaks Identification of triterpanes (m/z191) and steranes (m/z 217) mass fragmentograms.

	Triterpanes		Steranes
Peaks	**Compounds Name**	**Peaks**	**Compounds Name**
A	C$_{21}$ Tricyclic terpane	A	C$_{27}$ Diasterane (20S)
B	C$_{22}$ Tricyclic terpane	B	C$_{28}$ Diasterane (20S)
C	C$_{23}$ Tricyclic terpane	C	C$_{28}$ Diasterane (20R)
D	C$_{24}$ Tricyclic terpane	D	C$_{27}$ Sterane (20S)
E	C$_{25}$ Tricyclic terpane	E	C$_{27}$ Sterane (20S)
F	(22R)	F	C$_{27}$ Sterane (20R)
G	C$_{24}$ Tricyclic terpane	G	C$_{29}$ Diasterane (20R)
H	C$_{28}$ Tricyclic terpane	H	C$_{29}$ Diasterane (20S)
I	(22R)	I	C$_{28}$ Sterane (20S)
J	C$_{28}$ Tricyclic terpane	J	C$_{28}$ Sterane (20R)
K	(22S)	K	C$_{28}$ Sterane (20S)
L	C$_{28}$ Tricyclic terpane	L	C$_{28}$ Sterane (20R)
M	(22S)	M	C$_{29}$ Sterane (20S)
N	C$_{27}$ Trisnorhopane (Ts)	N	C$_{29}$ Sterane (20R)
O	C$_{27}$ Trisnorneohopane	O	C$_{29}$ Sterane (20S)
P	(Tm)	P	C$_{29}$ Sterane (20R)
Q	C$_{28}$ Bisonorhopans	Q	C$_{30}$ Steranes (20R)

R	C$_{29}$ Norhopanes	R	C$_{30}$ Steranes (20S)
S	C$_{29}$ Normoretane	S	C$_{30}$ Steranes (20R)
T	C$_{30}$ Hopane		
U	C$_{29}$ Moretane		
	C$_{31}$ Homohopane (22R)		
	C$_{30}$ Gammacerance		
	C$_{32}$ Homohopane (22R)		
	C$_{33}$ Homohopane (22R)		
	C$_{34}$ Homohopane (22S)		

Meleiha Oil　(A)

Misaada Oil　(B)

Qarun Oil　(C)
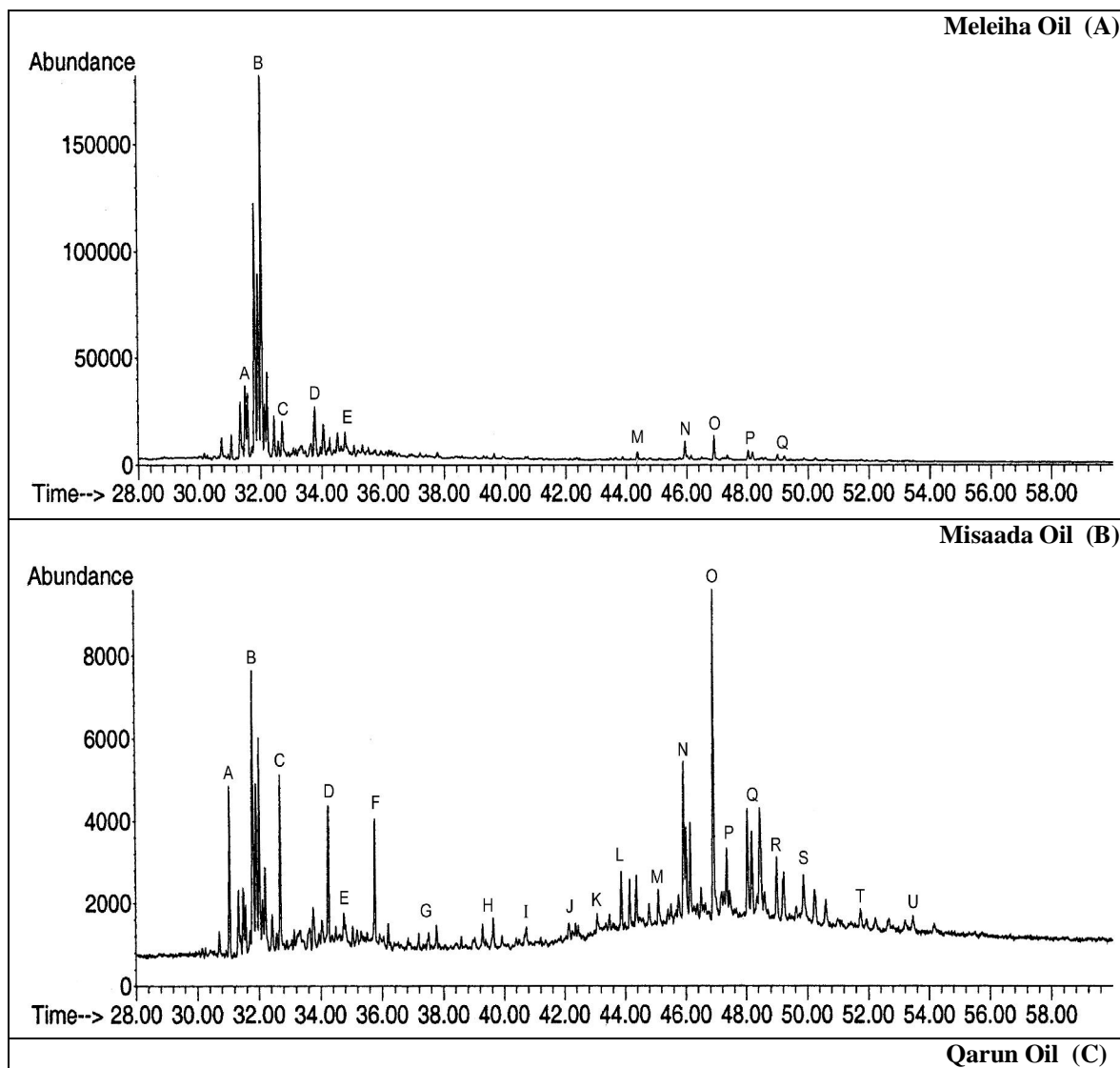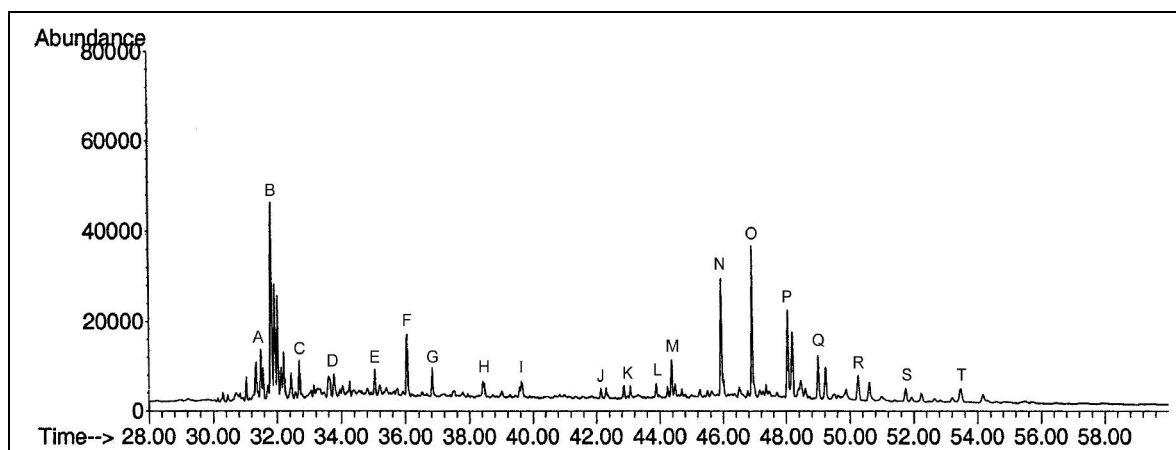
Fig. (7): M/Z 191 terpanes in the saturated hydrocarbons of the studied oil samples

Oil: Source Rocks Correlation

Gross Composition of Oils and Source Rock Extracts

Crude oils and source rock extracts of the studied samples in case of Misaada and Khatatba fields show remarkable similarities in the gross chemical composition, as both have high percent of saturated hydrocarbon contents, exceeding the aromatic and NSO compounds However the oil samples have higher saturates percent (69.56 and 72.15 %) than the extract samples where it is 50.82 and 64.59% respectively revealing that the crude oils appear to be slightly more mature than the extracts. On the other hand, the gross compositions of Meleiha oil and extract of Bahariya source rocks have saturates less than 50% (13.45) and aromatics 22.15% indicating mixed organic sources.

n- alkanes Characteristics

The carbon distribution of crude oils and source rock extracts (Fig. 8) and their normalized composition percent are shown in Table (4). The clear similarities in the molecular distribution between Qarun and Misaada oils and Khataba and Kharita extracts indicate genetic relationships. On the other hand, Meleiha oil and Bahariya source rocks extract seem to be similar and have other genetic origin.

The Shanmugam plot (1985; Fig. 4) of isoprenoid/n-alkanes ratios supports the Previous finding, that oils and extracts of Qarun and Misaada oilfields and extracts of Khtataba and Kharita source rocks are genetically related as they are sourced from marine organic sources and deposited under reducing conditions. The oil and extract samples show degrees of maturation.

Meleiha oil and extract of Bahariya source rocks are genetically related and seem to be sourced from mixed organic sources deposited under transitional conditions (oxidizing – reducing) and of high maturation rate.

Correlation Assessment

The degrees of the correlation between crude oils and the extracted samples have been determined by studying the correlation scores for both oils and extracts. Eight correlation parameters have been studied for this purpose includes, saturates (%), saturates/aromatics ratio, C_{max}, $C_{21}+C_{22}/C_{28}+C_{29}$, CPI, pristane/phytane, pristane/n-C_{17} and pristane+n-C_{17}/phytane+n-C_{18} (Table 3). The score points, which have been allotted to these different mentioned parameters according to Alexander *et al*., (1981) are 5 score points for each, saturates/aromatics ratios and CPI, 10 points for each pristane/n-C_{17} and carbon maximum (C_{max}), 15 points for each saturates (%), $C_{21}+C_{22}/C_{28}+C_{29}$ and pristane/phytane ratio, and 25 point to pristane+n-C_{17}/phytane+n-C_{18}. This is depending on their powers, which reflect the genetic relations between oils and potential source rocks (Welte *et al*., 1975; Alexander *et al*., 1981).

Based on the above correlation parameters, an overall correlation score was obtained for each oil and extract by summing up the contribution from each parameter. The ratio of correlation parameter to the total parameters (parameter match) has been also considered in evaluating the correlation rate. The samples showing a score 50 points and 5/8-parameter match or more, indicate good correlation. Samples with a score 40-50 points and 4/8-parameter match are considered as not correlated (Alexander *et al*., 1981).

We prefer to sugest and use a more logic modified correlation rate as shown in the following table:

Score points	Parameter match	Significance
< 50	< 4/8	Not correlated
50	4/8	Slightly correlated
> 50 <100	> 4/8 < 8/8	correlated
100	8/8	Completely correlated

From the results we conclude that the crude oil from Meleiha oilfield has score point equal to 50 and parameter match 4/8 (Table 5) indicating slightly correlated oil. While the crude oils from Qarun and Misaada oilfields have score points of 80 and 100 and parameters matches 6/8 and 8/8, respectively reflecting correlated and completely correlated oils respectively. On the other hand, the extract sample of Bahariya source rock also is slightly correlated where it has score point 50 and 4/8 parameters match. The extracts of Kharita and Khatatba source rocks having score points of 55 and 60 and parameters match 5/8 and 6/8, respectively indicate correlated extracts.

Therefore, comparing the studied source rocks extracts and the corresponding crude oils it is clear that there is a correlation between the extract samples of Kharita and Khatatba source rocks and crude oils from Qarun and Misaada oilfields. While each of the extract of Bahariya source rocks and Meleiha oil show slight correlation and differ from the other samples. These evidences indicate that Kharita and Khtataba source rocks seem to act as a source and reservoirs for oil generation in the Qarun and Misaada oilfields, while the oil generation of Meleiha oilfield seems to be migrated from Bahariya source rocks.

Conclusions

Biomarker analyses of crude oils Meleiha, Misaada and Qarun oilfields in the North Western Desert suggest the following:

1. Meleiha oil seems to be sourced from mixed organic sources deposited under transitional conditions.
2. The crude oils of Qarun and Misaada oilfields are genetically related and are sourced from marine organic sources and deposited under reducing conditions.
3. Oil: source correlation reflect a good correlation between the extract samples of Kharita and Khatatba source rocks and crude oils from Meleiha and Qarun oilfields
4. The extract of Bahariya source rock show slight correlation with Meleiha oil and differ from the other oil samples.

These evidences indicate that Kharita and Khtataba source rocks seem to act as sources and reservoirs for oil generation in the Qarun and Misaada oilfields. while, the oil generation of Meleiha oilfield seems to be migrated from Bahariya source rocks.

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Table (3): Geochemical parameters of oils and: source rocks extracts of the studied oilfields.

Samples	Sat %	Arom %	Saturates/ Aromatics	NSO %	Cmax	$C_{21}+C_{22}/ C_{28}+C_{29}$	CPI	Pr/ph	Pr/ n-C_{17}	Ph/ n-C_{18}	Pr+n-C_{17}/ ph+n-C_{18}
OILS											
Meleiha	28.58	15.50	1.84	55.92	15	1.10	1.04	3.00	0.40	0.18	1.17
Misaada	69.56	15.23	5.11	15.12	16	2.3	1.02	2.00	0.10	0.10	1.08
Qarun	72.15	18.45	3.91	9.40	16	1.1	0.94	0.63	0.28	0.47	0.90
EXTRACTS											
Bahariya Fm	13.45	22.15	0.64	64.40	15	2.84	2.00	1.41	0.41	0.45	3.33
Kharita Fm.	64.59	30.12	2.14	05.29	16	3.33	0.92	0.42	0.40	0.15	2.84
Khatatba Fm	50.82	22.50	2.26	26.68	16	3.50	0.95	0.60	0.13	0.13	3.50

NSO%: (Asphaltenes + resins) percent; Pr/Ph: Pristane/ Phytane ratio. Pr/n-C_{17}: Pristane/normal alkane ratio. Ph/n-C_{18}: Phytane/ normal alkane ratio. CPI: Carbon preference index = Odd carbon atom/ Even carbon atom.

Table (4): Carbon Number distribution of n-alkanes in the saturated hydrocarbons fractions of crude oils and extract samples of the studied oilfields.

Carbon Number	Meleiha Oil	Qarun Oil	Misaada Oil	Bahariya Extract	Kharita Extract	Khatatba Extract
C_{10}	1.6	0.5	1.0	1.7	1.5	0.62
C_{11}	1.0	0.9	1.8	1.1	1.7	0.93
C_{12}	1.8	2	3.2	1.5	3.3	2.1
C_{13}	2.7	3.0	4.0	2.2	3.9	3.9
C_{14}	3.1	3.9	4.8	3.2	4.7	4.7
C_{15}	4.5	4.0	5.4	4.1	5.1	5.1
C_{16}	3.3	4.5	5.9	3.1	5.8	5.8
C_{17}	3.4	4.2	5.8	3.0	5.2	5.2
C_{18}	3.4	3.9	5.5	2.5	4.9	4.9
C_{19}	2.9	3.5	5.2	2.2	4.6	4.6
C_{20}	2.7	3.1	4.8	2.5	4.2	4.2
C_{21}	2.7	3.0	4.8	2.6	4.2	4.2
C_{22}	2.8	2.3	3.9	2.4	3.5	3.5
C_{23}	2.8	1.9	3.8	2.6	3.6	3.6
C_{24}	2.8	1.8	3.4	2.5	3.4	3.4
C_{25}	2.9	1.5	3.2	2.7	3.1	3.1
C_{26}	2.7	1.3	2.5	2.5	2.4	2.4
C_{27}	3.2	1.2	2.5	3.1	2.5	2.5
C_{28}	2.6	1.0	1.8	2.4	1.8	1.8
C_{29}	2.4	1.0	1.9	2.0	1.8	1.8
C_{30}	1.6	0.7	0.9	1.4	1.2	1.2
C_{31}	1.3	0.6	0.7	1.2	1.0	1.0
C_{32}	0.8	0.4	0.4	0.6	0.6	0.6
C_{33}	0.5	0.3	0.3	0.4	0.5	0.5
C_{34}	0.3	0.2	0.2	0.2	0.3	0.3
C35	0.2	0.1	0.1	0.1	0.2	0.10

Table (5): Oils: source rocks correlation of the studied oilfields in the North Western Desert, Egypt

Samples	Sat % >50	Sat/ Arom >2.00	C_{max} <22	$C_{21}+C_{22}/$ $C_{28}+C_{29}$ >2.00	CPI 1.0+0.1	Pr/ ph 2.0+0.6	Pr/ n-C_{17} 0.7+0.6	Pr+n-C_{17}/ ph+n-C_{18} 1.2+0.6	Score + =5 0=Nil	*P.M	**C. R
OILS											
Meleiha	0	0	++	0	+	0	++	+++++	50	4/8	Slightly correlated
Misaada	+++	+	++	+++	+	+++	++	+++++	100	8/8	completely correlated
Qarun	+++	+	++	0	+	0	++	+++++	70	6/8	Correlated
EXTRACTS											
Bahariya	0	0	++	+++	0	+++	++	0	50	4/8	Slightly correlated
Kharita	+++	+	++	+++	+	0	++	0	55	5/8	correlated
Khatatba	+++	+	++	+++	+	0	++	0	60	6/8	Correlated

*P. M: Parameters matching rate are: > 4/8: not correlated   4/8: Slightly correlated   < 5/8: correlated
8/8: completely correlated

** C. R: Correlation Ratings are: < 50: not correlated   50: slightly correlated   > 50 <: 100 correlated
100: completely correlated
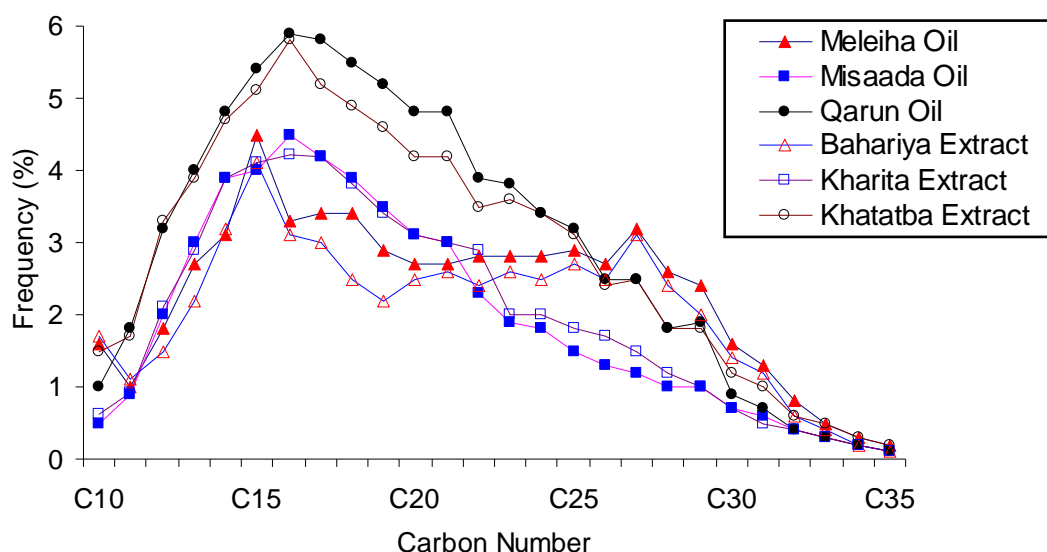
Fig (8). oil: source rock carbon distributions in the studied crude oil and extract samples

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Characterization of El-Fawakhir Serpentine Fibers and Their Use in the Reinforcement of Unsaturated Polyester

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Abstract: Serpentine fibers from the El–Fawakhir area in the Eastern Egyptian desert were obtained from the parent rock and characterized using XRD, XRF, IR and thermal analysis. They were then incorporated into unsaturated polyester (UP) matrix to from slabs. These slabs were tested for thermal conductivity and thermal expansion where their insulation behavior was much better than UP samples containing E type glass fibers. Both composite matrices (UP + Serpentine and glass fibers) exhibited similar values of thermal expansion, decreasing with increased fiber level. Both matrices showed comparable tensile and flexural strengths both increasing with increased fiber fraction; while the elongation was much lower in case of serpentine fibers. AC characteristics (AC resistivity, dielectric constant, dielectric loss and dissipation factor) were also determined for both types of UP matrices at different frequencies ranging from 40 Hz to 1 MHz and temperatures up to 120°C. The results showed similar behavior in both types of matrices although those reinforced with mineral fibers showed lower dissipation losses.
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Key words: unsaturated polyester – serpentine fibers – glass fibers – composite

1. Introduction:

The advantage of composite materials over conventional materials stems largely from their higher specific strength, stiffness and fatigue characteristics, which enables structural design to be more versatile. By definition, composite materials consist of two or more constituents with physically separable phases [1]. However, only when the composite phase materials have notably different physical properties it is recognized as being a composite material. The most common advanced composites are polymer matrix composites. These composites consist of a polymer thermoplastic or thermosetting reinforced by fiber (natural fiber or glass). These materials can be fashioned into a variety of shapes and sizes. They provide great strength and stiffness along with resistance to corrosion. The reason for these being most common is their low cost, high strength and simple manufacturing principles. Due to the low density of the constituents the polymer composites often show excellent specific properties. In composites where the continuous phase consists of unsaturated polyester this latter transfers external loads to the reinforcement, and protects the reinforcement from the environment. If individual fibers are fractured, the matrix will redistribute the load to the surrounding fibers, thus preventing the complete failure of the material. Such composites exhibit a broad range of

mechanical, chemical, thermal and physical properties, depending on the composition of the unsaturated polyester [2]. The commercial use of fiberglass–reinforced unsaturated polyester resins began in 1942, when polyester resin was combined with glass–fiber reinforcement to produce protective housings for radar equipment. Nowadays unsaturated polyester resins fiber composites are used in a wide variety of markets, including construction, marine transportation, industrial, electrical, and sanitary ware.

The use of reinforcing fibers to produce unsaturated polyester composite dramatically improved both tensile and flexural characteristics. The properties that can be obtained depend on the amount and type of reinforcement used. For example, adding 40% (by weight) E – glass fibers to orthopthalic unsaturated polyester raises the tensile strength from 55 MPa to 152 MPa, while the flexural strength increases from 85 MPa to 221 MPa [3].

As for electrical properties, polyester resins are nonconductors, having relatively low dipolar characteristics, and providing high dielectric strength and surface resistivity. At high voltage or high current, however, the cross–linked plastics fail due to carbon arcing or tracking caused by the charring of the polymer surface into a conductive carbonaceous residue [4]. The AC resistivity of isopthalic polyester reinforced with E type glass fibers ranges from 10^{11}

to 10^{13} Ω.m, while the dielectric constant decreases from about 7 to 5 as the frequency increases from 60 Hz to 1 MHz [3]. These composites find extensive use in the insulation of motor windings, encapsulation of electrical components, fabrication of printed circuit boards, high voltage standoff insulators, switch boxes, and miscellaneous equipment used on high–voltage transmission lines [5]. Large electrical equipment, such as high–voltage motors or generators, often operates at elevated temperatures. In such applications, the electrical property of greatest concern is the dissipation factor, especially the dissipation factor versus temperature. Polyester resins can be formulated for a low dissipation factor at elevated temperatures. They can be used as electrical varnishes at continuous use temperatures up to 180°C [3].

2. Experimental
2.1 Raw materials:
The following raw materials were used in the present study:

- Polyester resin of type "Siropol 8339". This is an orthophtalic unsaturated polymer resin manufactured by "Saudi Industrial Resins Limited".
- Mat E – glass fibers "M 706" of surface density 300 gm/cm^2, manufactured by "European Owens–Coring Glass fiber S.A." company.
- Mat mineral fibers from El–Fawakhir area, supplied by "Central Metallurgical Research Institute (CMRDI)", this was characterized using X – ray diffraction, X – ray fluorescence and Scan electron Microscopy.

2.2 Characterization of as – received mineral fibers:
a. X – ray diffraction analysis:
The parent rock hosting mineral fibers from El–Fawakhir area were analyzed by using a "PW 1170 Philips Diffractometer" with Co K_α radiation on randomly oriented specimens. This way, the phases constituting these fibers were disclosed.

b. X – ray fluorescence analysis:
Philips X–ray flouresences (XRF) Spectrometer was applied for determining the chemical composition.

c. IR spectroscopy:
The IR spectra were obtained using FTIR spectrometer (Bruker). For each sample 128 scans were recorded in the 4000–400 cm^{-1} spectral range in the transmittance mode with a resolution of 4 cm^{-1}. The KBr pressed disk technique was used.

d. Thermal analysis:
The thermal analysis for mineral fibers was carried out by using Shimadzu TGA–50H apparatus that displays DTA and TGA behavior at heating rate = 10°C/min in nitrogen atmosphere.

2.3 Preparation of reinforced UP slabs:
1. A coat of mold release wax was applied with a brush or soft cloth to the entire mold surface and its lid; it was allowed to dry thoroughly then was lightly buffed.
2. Glass and mineral fibers were cut with a sharp cutter into rectangular pieces of dimensions (300 × 300) mm.
3. Polyester resin was stirred at room temperature, as mixed with a hardener (1% by weight petanox) as advised by the producer.
4. The entire mold surface was covered with the resin mixture using a brush.
5. A layer of glass fibers or mineral fibers was laid out.
6. Air bubbles were evacuated by pressing with an iron roller, and then both glass fibers and mineral fibers layers were saturated with a resin mixture.
7. Steps 4, to 6 were repeated, with varying percent fibers to produce a sheet of 7 mm thickness.
8. The mold was covered with its lid in order to obtain a regular, smooth sheet surface, and the composite was let to cure at room temperature.

2.4 Determination of fibers ratio in composite samples:
The value of the glass or mineral content in test samples was determined by the burn off test (ash test), which is carried out according to ASTM D 2584 / 08 [6].

2.5 Determination of linear expansion:
The linear expansion was measured by using Shimadzu TMA–50 apparatus. The test samples were heated from room temperature to 250°C in nitrogen atmosphere (Nitrogen flow rate = 30 ml/min), and the change in length ΔL was recorded.

The linear expansion coefficient (α) was calculated according to the equation:

$$\alpha = \frac{1}{L_o} \cdot \frac{\Delta L}{\Delta T} \qquad (1)$$

2.6 Determination of thermal conductivity:

It was not possible to determine the thermal conductivity of mineral fibers because of their fluffy state. It was possible, however, to determine the thermal conductivity of fibers compacted to different bulk densities using the heat flow meter apparatus of type (Stanford Research Systems Model SR630) according to ASTM C 518 / 10 [7].

On the other hand, the thermal conductivity of composite reinforced UP slabs was measured by using (comparative thermal conductivity instrument) according to ASTM C 177 / 10 [8].

2.7 Determination of mechanical properties:
a. Tensile strength:

The tensile strength of reinforced slabs was determined according to ASTM D 638 / 10 [9] using Universal test machine jaws (model 4206, Instron.). Its measuring range is up to 150 KN, and its accuracy is about 0.05% max load. The loading rate was adjusted at 2.5 mm/min.

b. Flexural strength:

The flexural strength of reinforced slabs was determined according to ASTM D 790 / 10 [10] using the same universal testing machine mentioned above with a loading rate of 7 mm/min.

2.8 Determination of electrical properties:

The AC electrical resistance and dielectric properties (dielectric constant, dielectric loss and dissipation factor) were determined for specimens in the form of disks of diameter 10 mm and thickness of 7 mm. These were measured on the temperature range 30 – 120°C and on a frequency range 40 Hz – 1 MHz by a computerized RLC Bridge Model Hioki 3531Z Hitester.

3. Results and Discussion
3.1 Assessment of mineral fibers:
a. Mineralogical composition:

As stated earlier this was accomplished using XRD. Figure (1) shows the pattern obtained. It shows that these fibers are composed of antigorite and actinolite amphiboles $[Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2]$ as well as the related tremolite phase $[Ca_2(Mg)_5Si_8O_{22}(OH)_2]$. Besides are present the following phases: quartz, magnetite and potash feldspar.
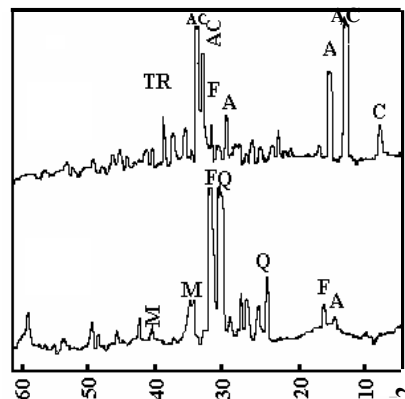
Fig. (1): XRD patterns of parent rock

Where:

AC = Actinolite $[Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2]$ F = Feldspar

TR = Tremolite $[Ca_2Mg_5Si_8O_{22}(OH)_2]$ Q = Quartz

M = Magnetite   A = Antigorite

b. Chemical composition:

As subjected to XRF analysis, the chemical composition of fibers was as shown in the following table.

Table 1: Chemical composition of mineral fibers

Component	Composition (%)
SiO_2	46.4
Al_2O_3	2.64
Fe_2O_3	6.3
$Ti O_2$	0.56
MgO	42.4
CaO	0.63
K_2O, Na_2O	0.090

c. Thermal analysis:

Figure (2) shows the TGA – DTA pattern obtained on heating samples of these fibers in nitrogen atmosphere. It is clear that no appreciable weight loss could be detected at temperatures as high as 580°C.
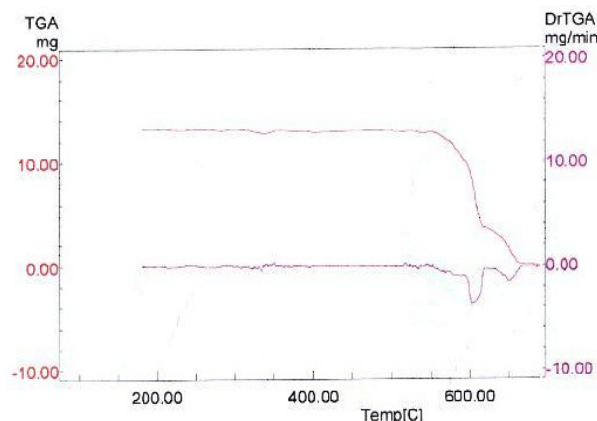
Fig. (2): TGA – DTA pattern of mineral fibers

3.2 Thermal properties:
a. Thermal expansion coefficient:

Figure (3) shows the variation of thermal expansion coefficient for both types of slabs: UP + fiber glass and UP + mineral fibers with increasing volume content. This curve displays the following features: First, the values of α for all samples investigated showed a decrease with increased fiber content. This is probably due to the impeding action of fibers on the natural expansion of the polymer. In this respect the effect of adding mineral fibers is more pronounced than in case of glass fibers, particularly at temperatures above 100°C where adding 10% (by volume) mineral fibers decreases the thermal expansion coefficient to 10% of its original value. This result is of importance in using reinforced UP in applications involving relatively elevated temperatures (such as high–voltage motors or generators).
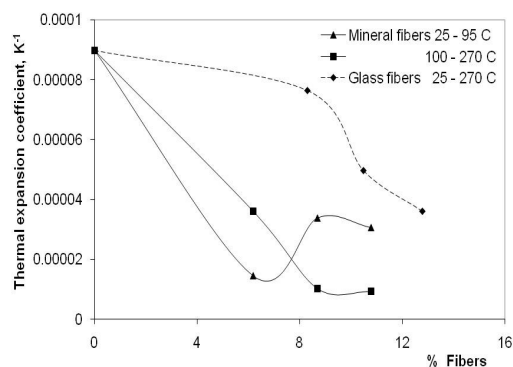
Fig. (3): Effect of volume percent fibers on the thermal expansion coefficient

b. Thermal conductivity:

As can be seen from Figure (4), while the addition of glass fibers favors higher thermal conduction, adding mineral fibers, on the opposite, yields lower values of thermal conductivity. For example, adding about 10% by volume mineral fibers

decreases the thermal conductivity to less than half its original value. This means that polymer lattices reinforced with such fibers will have better thermal insulating properties than the parent matrix.
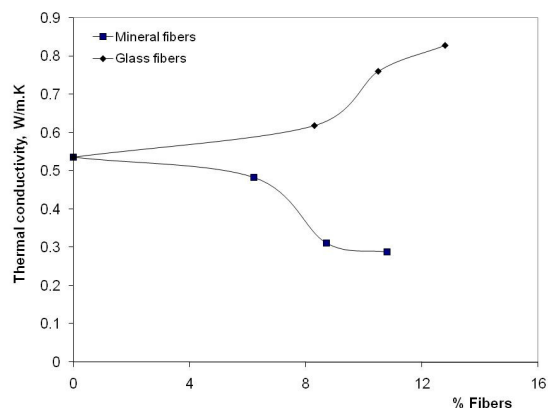
Fig. (4): Effect of volume percent fibers on thermal conductivity

3.3 Mechanical properties:
a. Tensile strength:

The effect of adding either type of fibers on the tensile strength of reinforced UP slabs is shown in Figure (5). As expected an increase in fibers percent will have for effect to increase the tensile strength. This increase however is not considerable and is comparable when either type of fibers is used. For example, adding about 6% (by volume) mineral fibers or about 12% glass fibers will only increase the tensile strength by about 10%.
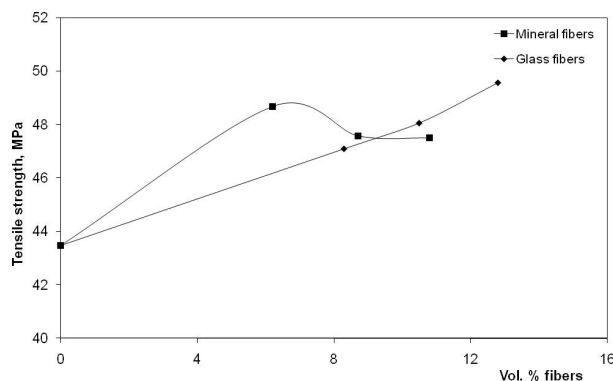
Fig. (5): Effect of volume percent fibers on tensile strength

b. Flexural strength:

The same situation can be followed up in Figure (6) which shows the variation of flexural strength as function of volume percent fibers added. Here also, the increase in strength is not appreciable, reaching a maximum of 12% when 10.8% mineral fibers were added and 19% in case of adding 12.8% glass fibers.

To conclude: Although mechanical strength increases with fiber addition, this increase is limited.
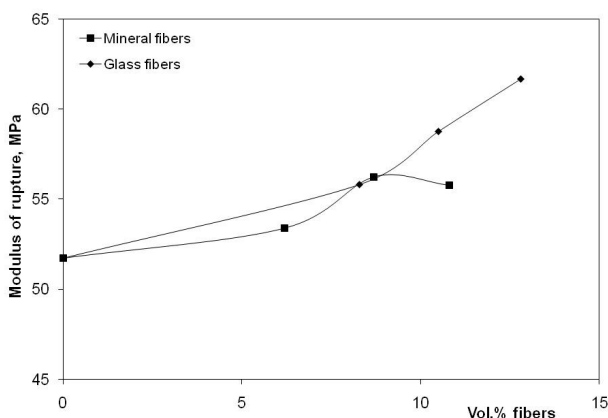
Fig. (6): Effect of volume percent fibers on flexural strength

3.4 Electrical properties:

a. AC resistivity:

Figure (7) shows the effect of adding either type of fibers on the AC resistivity of samples at low frequency (30 Hz) and at 30°C. As can be seen from this figure, there is a slight increase in resistivity following the addition of more than 8% of either type of fibers. At higher temperatures, the effect of adding fibers on increasing resistivity is more pronounced in case of adding glass fibers. The addition of mineral fibers, on the other hand has little effect on resistivity regardless of temperature.

At higher frequencies, the resistivity naturally decreases as can be seen from Figure (8) displaying data at 1 MHz. However, the effect of adding reinforcing fibers is much more pronounced, particularly at higher temperatures. For example at 100°C, adding 8.7% mineral fibers increases resistivity by more than 300%, while it increases on adding 10.5% glass fibers about 12 times.

b. Dielectric constant:

As expected, the dielectric loss decreases with applied frequency until it stabilizes at about 1 kHz. This is due to the fact that at high frequency, the polymeric dipoles don't get enough time to align because of the rapid inversion of the polarity of the electric applied field. Actually, the values of dielectric constant don't vary appreciably over 1 kHz. That is why; the results reported here are those obtained at a frequency of 1 MHz.
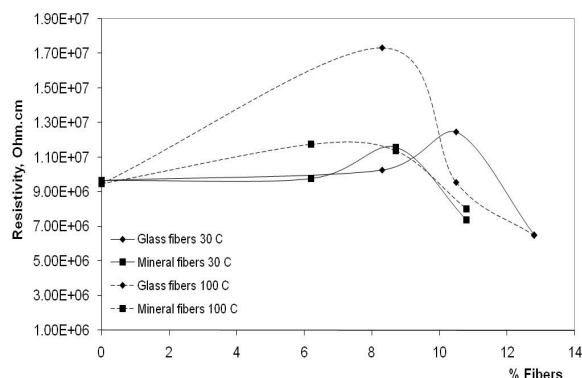
Fig. (7): Effect of volume percent fibers on Resistivity at 60 Hz
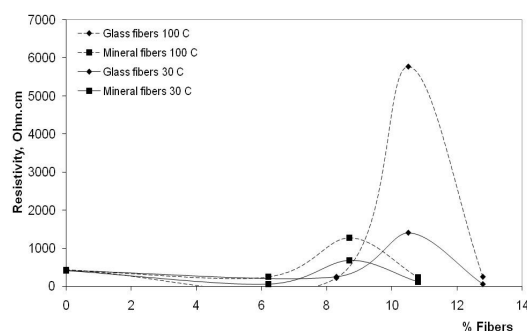
Fig. (8): Effect of volume percent fibers on AC resistivity of samples at 1 MHz and 30°C

As can be seen from Figure (9), depicting the variation of dielectric constant with the addition of fibers, the addition of glass fibers generally increases the values of dielectric constant since fiber glass possesses a higher dielectric constant than UP [11,12] (4.84 for E type fiber glass against 2.56 for UP at 1 MHz). The same trend is followed by mineral fibers although the effect is less pronounced probably because of mineral fibers having a lower dielectric constant than glass fibers. Although the dielectric constant of such fibers could not be determined, it has been reported by Johnson [12] that the dielectric constant of most ceramic raw materials falls in the range 3.3 – 3.8. This figure is higher than that of UP but lower than that of glass fibers. However, following a certain peak value, the values of dielectric constants fall once more for both types of fibers and at all temperatures investigated.

It is also clear from Figure (9) that raising temperature results in a decrease in dielectric constant. In principle, in a polar polymer, an increase in temperature should cause rapid alignment of dipoles resulting in an increase in dielectric constant [13]. It seems therefore that the presence of fibers impedes the alignment of dipoles at higher temperatures resulting in a decrease in the values of dielectric constant.
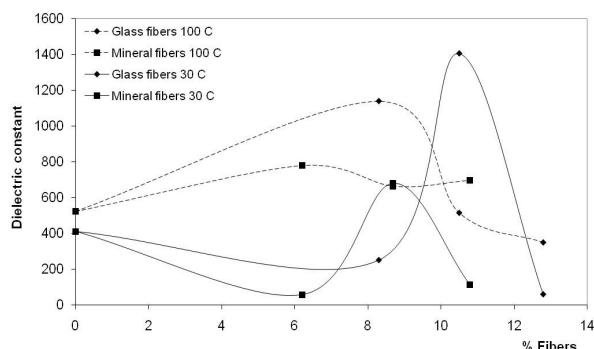
Fig. (9): Effect of volume percent fibers on the dielectric constant at 1 MHz

c. Dielectric loss:

As expected, the dielectric loss decreases with applied frequency since the rapid alternation of electric field polarity decreases dipole alignment thereby decreasing thermal losses associated with the movement of dipoles. As fibers of either type were added to the UP matrix, values of dielectric loss displayed a maximum value as can be seen from Figure (10).

This figure shows that as the percent fibers is raised, the dielectric loss in both types of samples passes through a maximum value at to drop at higher volume fractions. The effect is more observed in case of samples containing glass fibers. The probable interpretation lies in the fact that the fibers present absorb part of the heat generated by losses particularly above the glass transition temperature (About 105°C for UP) [14]. Under such conditions the increased ease in fiber movement absorbs a great part of the energy losses that is transformed in kinetic energy particularly since the specific heat of glass fibers, in particular, is much higher than that of UP: 0.8 – 1 kJ/kg.K, compared to 0.2 – 0.3 kJ/kg.K [15]. This accounts for the decrease in dielectric loss at higher temperatures. On the other hand, the fact that the maximum dielectric loss is much higher in case of samples containing glass fibers than those containing mineral fibers can be also related to the much higher specific heat of the former compared to the latter which will increase its capacity for heat absorption. (Specific heat of serpentine fibers = 0.26 kJ/kg.K).
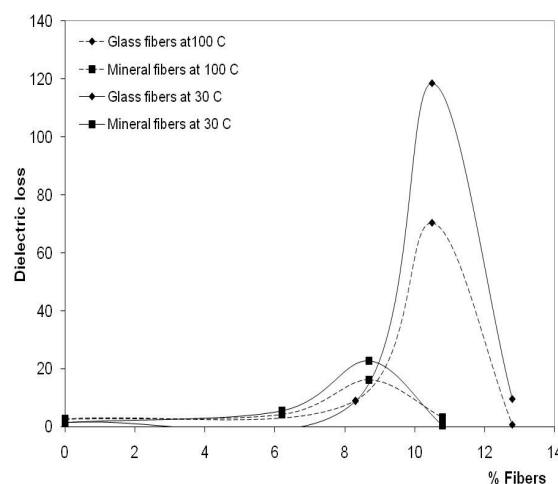
Fig. (10): Effect of volume percent fibers on dielectric loss at 1 MHz

4. Conclusions

Natural mineral fibers from El–Fawakhir region of the serpentine type were used to reinforce slab samples consisting of unsaturated polyester. Samples reinforced by E – glass fibers were also prepared for comparison. Different volume percent of fibers were used in each case. The results were as follows:

(a) Thermal properties:

Samples reinforced with natural fibers showed better dimensional stability on heating than those containing glass fibers by exhibiting much lower expansion coefficients. The mineral fibers samples also displayed much better insulating properties, showing values of thermal conductivity much lower than those of samples reinforce with glass fibers.

(b) Mechanical properties:

No appreciable difference between the two types of reinforcing fibers was noticed as tensile and flexural strengths were investigated. In both cases the mechanical strength steadily increased with increased volume percent of fibers.

(c) Electrical properties:

- At room temperature, there is no much difference in low frequency AC resistivity between both types of samples. At high frequency, however, the resistivity of samples containing glass fibers is much higher than that of samples containing mineral fibers at all temperatures investigated. Nevertheless, the addition of mineral fibers at volume percent of 8.7% raises considerably the AC resistivity of UP samples. It is therefore possible to use UP doped with about 9% mineral fibers in applications involving high frequency electrical insulation at moderate temperatures.

- At frequencies above 1 kHz, the dielectric constant of samples containing glass fibers is higher than that of samples containing mineral fibers at all temperatures. On the average, for all temperatures investigated, the maximum values of dielectric constant in case of samples containing glass fibers was about 50% higher than the corresponding values for samples containing mineral fibers. This means that UP containing glass fibers is a better capacitor than if containing mineral fibers.

- In general, the dielectric loss, at frequencies above 1 kHz, was higher in case of samples containing glass fibers than those containing mineral fibers at all temperatures. The potential use of any UP composite as dielectric rather depends on a compromise between having a high dielectric constant and a low dissipation factor. This latter is defined as the ratio between dielectric loss and dielectric constant. In this respect, it was found that the dissipation factor of samples containing mineral fibers is much lower than that of samples containing glass fibers (Figure 11).
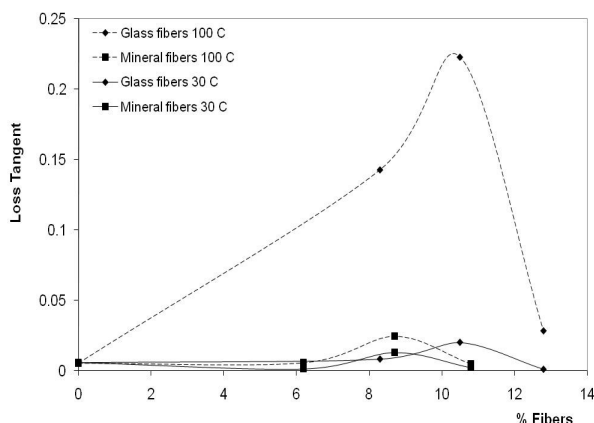
Fig. (11): Effect of volume percent fibers on the dissipation factor at 1 MHz

- UP samples with about 8.7% volume fraction mineral fibers display better dielectric constants than un–reinforced UP and relatively low dielectric loss at frequencies higher than 1 kHz. They can therefore be used as capacitors in moderate to high frequency applications.

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Ginger Administration has a Protective Effect on the Liver of Albino Rats Treated with 6-Mercaptopurine Drug

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Abstract: The leukemia is considered to be one of the most frequent tumors in childhood. The first line of its treatment is 6-mercaptopurine (6-MP). There are many recorded cytotoxic effects for 6-mercaptopurine on tissues such as liver, pancreas and bone marrow. Nowadays the needs for administration of cytotoxic drugs are increased as the incidence of malignancies increases. So we have to search for a safe method that can minimize the side effects of these cytotoxic drugs. The ginger has many benefits as anti-inflammatory and anti-oxidant substance. Some indicated as a protective effect for ginger on the radiotherapy treated rats and also a protection from the hepatotoxic and gonado-toxic drugs were recorded. This work amid to investigate the protective effects of ginger on liver of rats treated by cytotoxic drug (6-mercaptopurine), a drug of choice in maintenance therapy for leukemia in adult and children. Our hope is to minimize the side effects of the cytotoxic drugs with simple and available procedure. *Material* The current study had been carried on 40 white albino rats that divided into four equal groups. Group I: was served as control group. Group II: was given ginger extract only. Group III: was given 6- MP. Group IV: was given 6-MP + ginger extract. The following parameters were examined in all groups: 1- The serum Alanine aminotransferase (ALT), and aspirate aminotransferase (AST). 2- The cell morphology and histo-pathological changes in the liver. *The results* of the present study showed that treatment with 6-MP alone caused marked signs of cellular degeneration and necrosis of the hepatic tissues, significant increase in the serum levels of ALT ($P<0.001$) and AST ($P<0.001$) enzymes when compared with control group. However, the treatment by ginger along with 6-MP showed marked regeneration and improvement in the hepatic tissues and significant decrease in the serum levels of liver enzymes; ALT ($P<0.001$) and AST ($P<0.001$) when compared with 6-MP treated group. *Conclusion:* These findings indicated that ginger has protective effect against 6-MP induced hepatic toxicity.
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Keywords: Ginger, 6-MP, hepatic toxicity.

1. Introduction:

The leukemia is considered to be one of the most frequent tumors in children [1]. The first line of its treatment is 6-mercaptopurine [2]. There are many recorded cytotoxic effect for 6-mercaptopurine on tissues such as liver, pancreas, and bone marrow, and kidney [3,4,5]

6-Mercaptopurine (6-MP) is a purine anti-metabolite widely used in the treatment of acute lymphoblastic leukemia (ALL) [2]. MP is an inactive pro-drug that requires intracellular activation catalyzed by multiple enzymes to exert cytotoxicity. [6,7] Cytotoxic effects of MP are achieved primarily through the incorporation of TGN (thioguanine nucleotides) into RNA and DNA.[8,9] The incorporation of TGN, as deoxy-TGN triphosphate, inhibits the function of several enzymes involved in DNA replication and repair and induces DNA damage.[10,11]

The usual toxic effects of 6- MP are those of bone marrow depression, nausea, vomiting and diarrhea.[12] Animal studies indicated degenerative changes in the intestinal epithelium and liver which were characterized by impaired function, parenchymal necrosis, cirrhosis, jaundice and frequently severe diarrhea.[3,4]

Samuel and John[12] demonstrated that by the histological examination of the liver after 6-MP treatment, there was a pronounced stasis of bile as indicated by numerous bile thrombi. A prominent disruption of the normal hepatic architecture in the form of a complete loss of the hepatic cords is seen. Many individual hepatic cells are swollen by a metachromatic granular cytoplasm. Many of these cells are multinucleated. There is considerable variation in the size and chromatin pattern of the nuclei. Bile pigment is prominent in the Kupffer cell.

Moreover, Cuffari et al.[5] indicated that hepatitis, pancreatitis, and marrow suppression were generally associated with increased 6-MP levels. In addition Dubinsky et al.[13] have demonstrated drug-induced hepatotoxicity in 10–15% of pediatric patients which has been associated with the 6-MP metabolite and 6-methylmercaptopurine ribonucleotide. Other study demonstrated that the levels of 6-MP and its

methylated metabolites are correlated with the degree of hepatotoxicity during 6-MP maintenance therapy.[14]

Ginger has a long tradition of being very effective in alleviating symptoms of gastrointestinal distress and reducing intestinal gas. Reviews such as Borelli et al.[15] of six double-blind, randomized controlled trials with a total of 675 participants, have demonstrated that Ginger can be as effective as over the counter drugs for the control of nausea in pregnant women.

Modern researches have revealed that ginger possesses numerous therapeutic properties including immune boosting, antioxidant effects, [16,17] an ability to inhibit the formation of inflammatory compounds, and direct anti-inflammatory effects.[18]

Moreover, a number of studies demonstrated ginger root's is effective as a painkiller / anti inflammatory and has a benefits for improving osteoarthritis.[19, 20]

Gingerols, which is the main active components in ginger and the responsible for its distinctive flavor, may also inhibit the growth of human colorectal cancer cells [21] although human studies are yet to confirm that.

Moreover, Rhode et al. [22]   results indicated that ginger is a nutraceutical that may have significant therapeutic benefit for ovarian cancer patients as ginger induced cell death in all ovarian cancer cell lines tested.

Jagetia et al.[23]   indicated that the pretreatment of mice with ginger, reduced the severity of radiation sickness and the mortality at all doses. The ginger treatment protected mice from GI syndrome as well as bone marrow syndrome. As the pretreatment with ginger reduced the irradiation dose-dependent elevation in the lipid peroxidation and depletion of glutathione. Moreover, Jagetia et al.[24] reports that ginger has a protective effect in the radiotherapy treated rats as it decreased both the severity of radiation sickness and mortality at all the exposure doses through scavenging OH, O2 and ABTS radicals in a dose-dependent manner in vitro.

There are also a recorded protective effects for ginger extract on the hepatotoxic effects of both carbon tetrachloride and acetaminophen as it improved the elevated serum liver enzymes and the protective effect of the extract was confirmed also by histo-pathological examination of the liver.[25]

The aim of the present study was to determine the extent to which ginger, can be used as protective therapies from chemo-toxic effects of 6-MP on the liver cells and its functions.

2. Material and Methods:
Experimental animal:
40 white adult male albino rats (weight 185-200gm) were housed at 21°C–22°C in a 12 hr/12 hr light/dark cycle, fed standard rat chow, and given free access of water. Rats accommodated to the laboratory conditions for 2 weeks before starting the experiment.

Experimental methodology:
The rats were divided into four groups of 10 rats/each. *Group I:* animals were served as control. *Group II:* animal received oral ginger extract at a daily dose of 200 mg/kg body weight by gavage. *Group III:* rats received 6- MP(manufactred by Wellcome Drugs under brand name Puri-nethol) in a dose of 3.5mg/kg/day for 4 weeks. The maintenance therapeutic dose is 2.5 mg/Kg, during the course; dosage may be increased up to 5 mg/Kg [12]. In the present study we used the average dose (3.5mg/kg) orally. *Groups IV:* the ginger with the same dose at group II was gavaged to rats two hours before 6- MP treatment at a same dose with group III.[26]

At the end of the experimental period (6 weeks), blood samples will be collected from each rat through the retro-ocular puncture. For biochemical analysis, sera were obtained by centrifugation of the blood sample and then they were stored at -20C° until assayed for Alanine aminotransferase (ALT), and aspirate aminotransferase (AST) on the basis of *Gella et al.*[27] Then all studied animals were sacrificed, the livers are excised and will be prepared to histopathological study.

The histopathological preparation:
The liver tissues will be fixed in Bouin's solution for 48 h. Later, they were dehydrated in graded levels of ethanol, cleared in xylene, and embedded in paraffin wax for sectioning. The 5-μm thick sections were cut, mounted on glass slides, and stained with hematoxylin and eosin stain and Masson's trichrome stain for light microscopic analysis[45].

Methods getting aqueous ginger extract:
According to the method of Sakr, [28]   the Rhizomes of Z. officinal were shade, dried at room temperature and were crushed to powder. 125 g of the powder were macerated in 1000 ml of distilled water for 12 h. at room temperature and were then filtered to obtain the final aqueous extract. The concentration of the extract is 24 mg/ml.

Statistical analysis:
All analyses were performed using an SPSS program (version 17.0, SPSS, Inc., Chicago, IL). Differences were analyzed via an ANOVA followed by Tukey's post hoc test. Data are presented as means (±S.D) with significance set at $P < 0.05$

3. Results:
Biochemical analysis:

In the current study it was found that ALT serum level (IU/ml) in control group was 19.9± 1.42 (Mean ± SD).

There were insignificant differences in ALT serum level between the control and ginger treated groups 19.81±1.78 (P>0.05). While, administration of 6-MP significantly increase the ALT serum level 39.27±2.88 when compared with control (P<0.001) and ginger treated group (P<0.001). While administration of ginger along with the 6-MP significantly decrease the levels of ALT 21.47±1.29, when compared with the 6-MP treated group (P<0.001). There were insignificant differences between the ginger+6-MP treated group and both control and ginger treated group (P>0.05) *Table (1); Figure (1).*

The AST serum level (IU/ml) in control group was 41.93± 1.73 (Mean ± SD).There were insignificant differences in AST serum levels between the control and ginger treated groups 43.55±1.96 (P>0.05). While, administration of 6-MP significantly increase the AST serum level 93.43±6.49 when compared with control (P<0.001) and ginger treated group (P<0.001). While administration of ginger along with the 6-MP significantly decrease the levels of AST 47.27±3.66, when compared with the 6-MP treated group (P<0.001). However; There were significant differences in the AST level in ginger+6-MP treated group when compared with both control (p<0.01) and ginger treated group (P<0.05) *Table (2); Figure (2).*

The histopathological examination:

The results of the histopathological study of the livers are going hand in hand with the biochemical results. Light microscopic examination of the transverse sections of livers of the control and ginger treated rats revealed that the livers exhibited normal appearance as it consisted of many hepatic lobules each of which had a central vein and hepatic cords. These hepatic cords were formed by hepatocytes which were irregularly radiating from the central vein towards the periphery and separated from each other by blood sinusoid. The later were lined with Von Kupffer cells which had large fusiform dark nuclei. The hepatocytes are polyhedral in shape with eosinophilic granular cytoplasm and vesicular basophilic nuclei (Fig 3, A &B). Also, the portal tracts in the control and ginger treated rats were similar, both contained normal sizes of portal vein, a branch of hepatic artery and a branch of bile duct (Fig. 4, E &F). A normal fibrous tissue distribution could be seen in the portal tracts in the control and ginger treated rats (Fig.5, I & J).

In contrast, the histopathological finding in 6-MP treated rats showed marked signs of cellular degeneration and necrosis in the centriolobular and mid zonal regions. There were loss of organized hepatic cords; most of the hepatocytes appeared edematous, swollen with irregular cytoplasm and karyolitic or pyknotic nucleoli. Also, some hepatocytes showed cytoplasmic vacuolations. These features with the presence of wide spaces in the sinusoid and in-between the hepatocytes indicated the presence of hydropic degeneration (Fig.3, C).

Moreover, numerous Von kupffer cells were represented with presence of focal necrotic lesion and inflammatory cells infiltration (Fig.3, C1).In addition, there were huge enlargement of a portal vein (Fig. 4, G) with marked deposition of collagen fibers around it. Also the collagen fibers were markedly deposited in the portal tract and within the sinusoids (Fig.5, K) indicating preportal fibrosis.

These features were improved in 6-MP +ginger treated group where most of the hepatocytes appeared similar to the control group except the presence of few cells contained pyknotic nuclei. No wide spaces in between the sinusoids. (Fig.3, D). The portal vein appeared slightly dilated (Fig. 4, H), with few collagen fibers deposition around the portal vein and in the portal tract (Fig. 5, L).

Table (1): Serum levels of ALT (IU/ml) in control, ginger treated, 6-MP treated and ginger + 6-MP treated groups

	control	Ginger treated	6-MP treated	Ginger + 6-MP treated
Mean ±SD	19.9± 1.42	19.81±1.78	39.27±2.88	21.47±1.29
F	237.4			
P	<0.001			
LSD		.093 (p> 0.05)	-19.37 (P<0.001)	-1.57 (p >0.05)
			-19.46 (p 0.001)	-1.66 (P>0.05)
				17.81 (p 0.001)

Figure (1): serum levels of ALT (IU/ml) in control, ginger treated, 6-MP treated and ginger + 6-MP treated groups
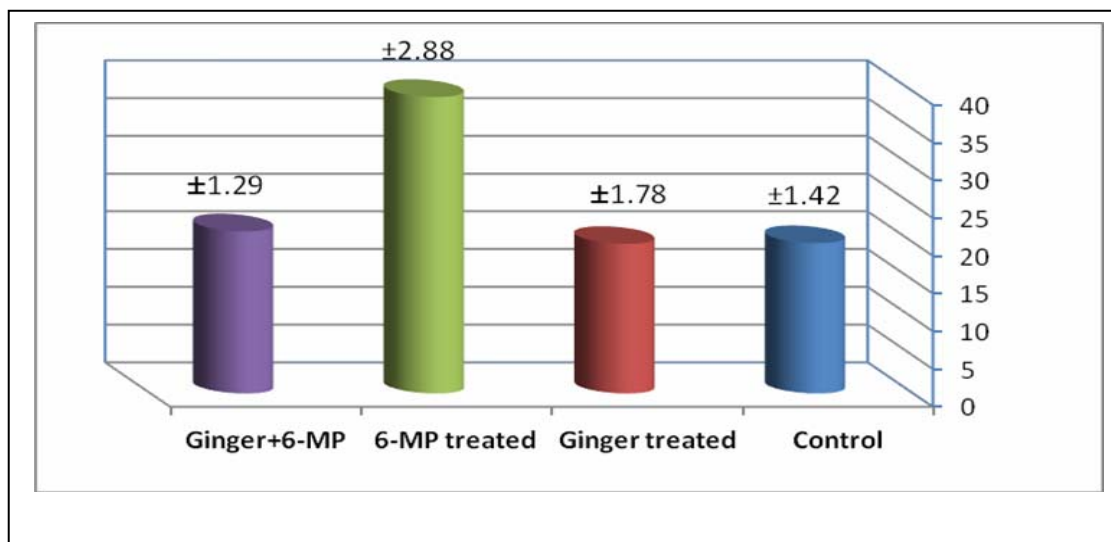
Table (2): Serum levels of AST (IU/ml) in control, ginger treated, 6-MP treated and ginger + 6-MP treated groups

	control	Ginger treated	DOX treated	Ginger + DOX treated
Mean ±SD	41.93± 1.73	43.55±1.96	93.43±6.49	47.27±3.66
F	391.3			
P	<0.001			
LSD		1.62 (p> 0.05)	51.50 (P<0.001)	5.33 (p 0.01)
			49.88 (p 0.001)	3.72 (P<0.001)
				46.16 (p<0.05)

Figure (2): Serum levels of AST (IU/ml) in control, ginger treated, 6-MP treated and ginger + 6-MP treated groups

740
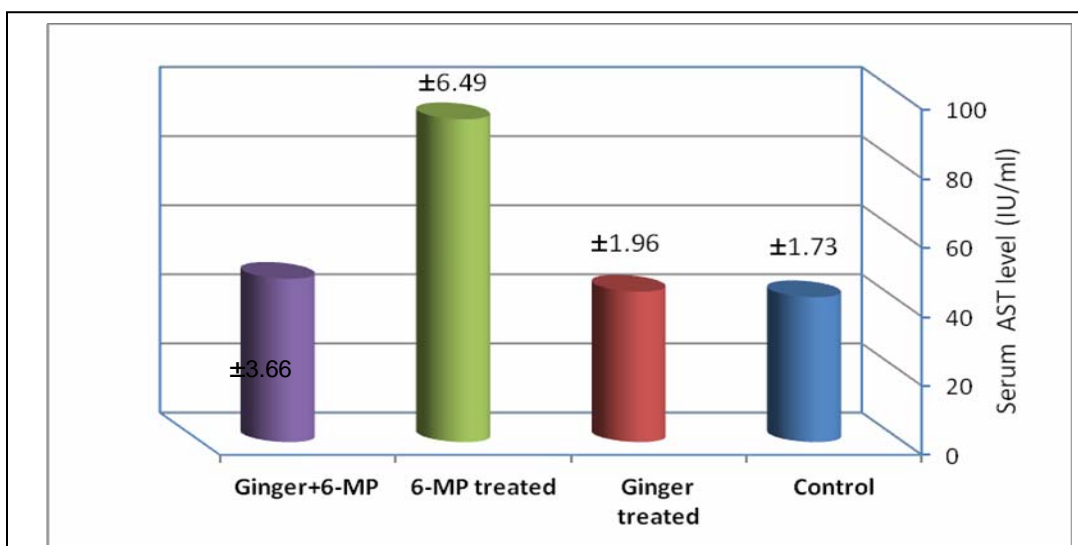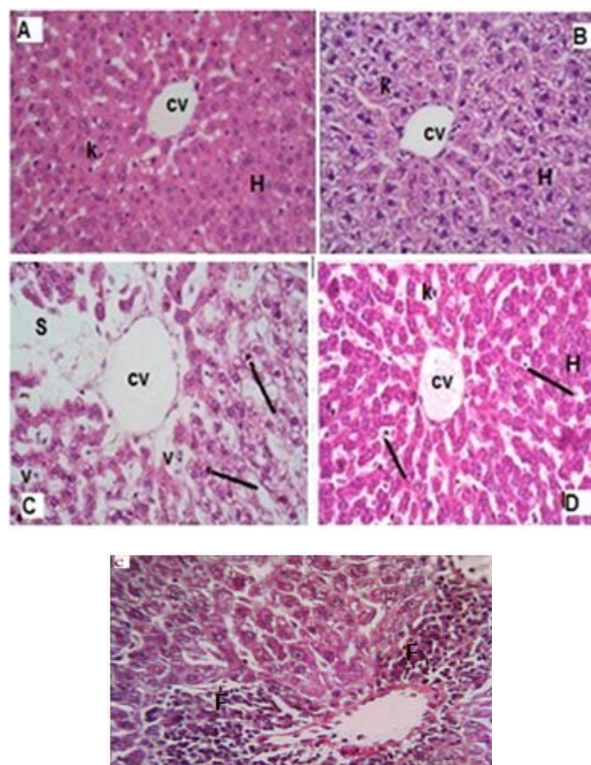
Fig.3. *Photomicrograph of transverse sections of livers showing:*

(**A**)Control and (**B**) ginger treated group show normal appearance of hepatic architecture, normal central vein (cv), hepatocytes (H) and Von kupffer cells (K). (Hx.& E.; X400)

(**C**)&(**C1**) 6MP treated group notice loss of hepatic architecture with presence of wide spaces(S) in-between the hepatic cords, many cells had pyknotic nuclei(/) and others had vacuolated cytoplasm (v) Notice also the presence of cellular inflammatory infiltrations (F). (Hx.& E.;X400)

(**D**) 6MP+ginger treated group the hepatocytes (H) appeared normal except the
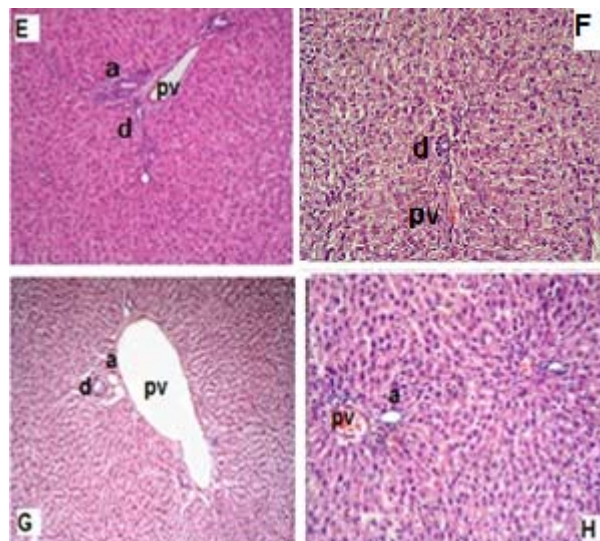
Fig.4*. **Photomicrograph of transverse sections of livers demonstrating the portal tracts in:***

(**E**) Control and (**F**) ginger treated group show normal sizes of portal vein (pv),a branch of hepatic artery (a) and a branch of bile duct (d).   (Hx. & E.; X200)

(**G**) 6-MP treated group notice the presence of irregularly dilated portal vein (pv) a branch of hepatic artery (a) and a branch of bile duct (d).   (Hx. & E.; X200)

(**H**) 6-MP+ginger treated group the portal (pv) appeared similar to the control and ginger treated group (Hx. & E.; X200).
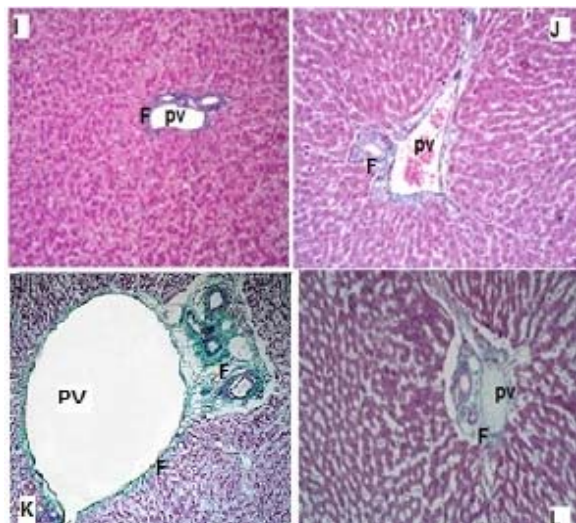
Fig.5. Photomicrograph of transverse sections of livers showing:

(I) Control and **(J)** ginger treated group have normal fibrous tissue (F) distribution around the portal vein (pv) and in the portal tracts

(Masson's trichrome X200).

(K) 6-MP treated group notice the presence of hugely dilated portal vein (pv) and marked deposition of collagen fibers (F) around it. Notice also marked deposition of the fibrous tissue in the portal tract and in-between the hepatic cords (F)   (Masson's trichrome X100).

(L) 6-MP+ginger treated group show few collagen fibers deposition around the portal vein (pv) and in the portal tract (F)

(Masson's trichrome X200).

4. Discussion:

The present study indicated the toxic effect of 6-MP on hepatic tissue and its enzymatic activities. 6-MP was found to cause elevation in serum transaminases (AST, ALT).

That effect was detected by the research of Shorey et al.[29] who concluded that mercaptopurine is generally accepted as potentially hepatotoxic.

The histopathological examination of the liver tissue in the 6-MP treated group revealed marked cytoplasmic vacuolations, deposition of the collagen fibres in the portal tract and within the sinusoids and marked inflammatory cellular infiltration. Bogolipov[30]; Halliwell and Chirico[31] attributed the cytoplamic vaculation to the permeability disorders of the cell membranes caused by excess ROS mediated formation of lipid peroxides. ROS can be generated from the xanthine oxidase (XOD) enzyme which is one of the enzymes that are competing for the initial metabolism of 6-MP.[32]

Moreover, Kumar et al.[33] mentioned that deposition of collagen has lasting consequences on hepatic patterns of blood flow and perfusion of hepatocytes. In the initial stages; fibrosis may develop within or around portal tracts or central vein or may be deposited directly within the sinusoids. Poli and parolia[34] showed the frequent association of the pathogenesis of tissue fibrosis with enhanced lipid peroxidation and deranged antioxidant defence system.

Moreover, the results of the present study confirmed the protective effect of ginger against 6-MP induced liver toxicity, where there was a significant decrease in serum levels of ALT and AST after ginger administration along with 6-MP. In addition, the histopathological features were improved. As ginger administration along with 6-MP improved the dilation of the portal vein, decreased the cellular infiltration and decreased collagen fibres deposition around it and in the portal tract indicating the efficacy of the protective effect of ginger even in the difficult irreversible lesions. These finding goes in line with Kumar et al.[33] who provided a growing evidence for cessation of hepatic injury in some setting can lead to reversal of fibrosis. The best document was regression of fibrosis in treated schistosomal hepatic infection and hereditary hemochromatosis.

Moreover, Sakr et al.[35] found that treating rats with adriamycin and ginger improved the histopathological and biochemical changes induced in the liver by adriamycin. This indicated the effectiveness of ginger in prevention of adriamycin hepato-toxicity.

In addition, Ginger extract was found to have a protective effect on CCl4 and acetaminophen-induced damage as confirmed by histopathological examination of the liver [16]. Siddaraju and Dharmesh [17] reported that ginger-free phenolic and ginger hydrolysed phenolic fractions exhibited free radical scavenging, inhibition of lipid peroxidation, DNA protection and reducing power abilities indicating strong antioxidant properties.

The protective effects of ginger against hepatotoxicity are mainly due to its antioxidant and anti-inflammatory effects. Both water and alcoholic extracts of ginger have been shown to possess potent antioxidant activity on fats and oils and prevent lipid peroxidation, microsomal lipid peroxidation at concentrations greater than 150 mM. In addition zingerone functions as an effective scavenger of superoxide anions as measured by nitro-blue-tetrazolium reduction in a xanthine-xanthine oxidase system [36]. Besides these findings, ginger has antioxidant activity due to its polyphenolic components which have the capacity to be donors of hydrogen

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atoms or electrons and to capture the free radicals so act as radical scavengers [37]. This is due to the presence of zingeberene and oleoresin [38]. The antioxidant effect of ginger were identified in our pervious study on the protective effect of ginger in the gonadal toxicity caused by Doxorubicin (DOX) as administration of ginger along with the DOX caused significant increase in oxidative stress markers; superoxide desmuatase (SOD) and catalase (CAT) serum levels and reduction in the lipid peroxidation marker; malondialdehyde enzyme (MDA) [39]

Also since the mechanism of hepatic injury may be to due inflammatory process, so the hepato-protective activity of ginger may be due to its content of volatile oils, which showed anti-inflammatory, analgesic and immunomodulatory effects. Volatile oil of ginger is capable of inhibiting T lymphocyte dependent immune reactions [40]. Moreover the anti-inflammatory activity of ginger is due to its ingredients as the gingerols and gingerol analogs (shogaols and paradols). Previous reports have documented the ability of these compounds to directly inhibit prostaglandin and leukotriene synthesis [41]. 6 Gingerol, besides having various pharmacological and physiological effects including anti-inflammatory, analgesic, antipyretic and gastroprotective activities, is also reported to have cardiotonic and anti-hepatotoxic activities [42]. The anti-inflammatory effect of ginger identified in the current study as ginger administration along with the 6-MP significantly decreased the cellular infiltration in hepatic tissues.

Another benefit for ginger administration with chemotherapy may be its chemotherapeutic effect that recently demonstrated by the result of Bode[21] and Zeinab [43, 44]. So, further investigation will be needed to study the chemotherapeutic effect of the ginger.

5. Conclusion
The results of the present work indicated an ameliorative effect of ginger extract against liver damage induced by 6-MP. This effect may be due to its potent antioxidant and anti-inflammatory activities.

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The Effect of Job Demands on Work-Family Conflict (W-FC) and Family-Work Conflict (F-WC) among Female Nurses

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ABSTRACT: The present study highlights the significance of job demands as one of the most important work factor on W-FC and F-WC. Nurses working in public hospitals in Shiraz-Iran are the respondents for this study; sample are including of 198 married female nurses. The findings revealed that married female nurses who experience an increase in job demands would result in an increase in W-FC and F-WC. Implications are discussed and recommendations are made regarding future researches in this area.
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Keywords: Work-family conflict (W-FC); Family-work conflict (F-WC); Job demands

1. Introduction

Women's participation in the workforce has increased all around the world. This movement of women into paid work and the rise of dual earner family as the norm have had a significant impact on women's work and family roles (Davidson & Burke, 2004). Woman who are employed have higher combined pressures from outside and inside of the home which both are the most central domains of her life, and each containing its own duties may lead them to experience conflict between work and family demands (Livingston & Judge, 2008; Rexroat & Shehan, 1987). According to Pleck (1977) work and family are two fundamental and interdependent systems for dual-career live that inconsistency in any one system may consequently influence the other one as well. These bidirectional influences of work and family can lead individuals to two types of conflict, namely, work- family conflict (W-FC), family-work conflict (F-WC).

Karimi and Nouri (2009) stated that recently, Iranian society has been experiencing similar socio-demographic changes in the workforce as Western societies. For example, the participation of women in the workplace has increased in Iran. Statistical Bureau of Iran, (2004) reported that 79.5% of Iranians women were employed in 2004, as compared to statistics from 1956 to 1986 which showed that about 9% of women in Iran were employed (Moayedi, 1994). The increase in the number of women in Iran in the formal employment sector may be related with an increase in the number of highly educated women and also the need to enhance family economy due to high cost of living

(Karimi & Nouri, 2009) rather than a change in the traditional way of thought. In Iran despite the participation in the workplace, women are expected to give priority to family responsibilities (Karimi & Nouri, 2009). Therefore, it seems quite logical that, they are more likely to experience conflict with their work obligations and their family responsibilities

Nurses, like other female employees are faced with the demands of work and home responsibilities as their main daily tasks. According to Ministry of Health, nurses in Iran are mainly women. As of 2009, it was reported that 79.5% of Iranian nurses are female (ISNA, 2009). In addition, Adibhajbagheri et al. (2004) has declared that nurses basically have to work in critical situation, that includes dealing with high workloads and time pressures, number of hours worked, shift work, death and life situation, and stressful and demanding responsibilities have been denoted as the major issues in the nature of nurses' job. Nursing is a female-dominated profession practiced under demanding work conditions. Thus, examining W-FC and F-WC in the nursing context is important for both its theoretical and practical implications (Yildirim & Aycan, 2008).

The demand and responsibilities of nurses in both work and family vary in different situations. For example, there will be an increasing job demand for nurses when there is prevalence of contagious diseases. When pressures arise from job demands in a workplace with a lack of flexibility to adapt to change, increasing job demands might result in work interfering with family system because it is unable to adapt to this change. Overall, it appears that

increasing job demand in work system will impact family system. Hence, the present study aimed to consider relationships between job demands and W-FC and F-WC among married female nurses in shiraz-Iran as one of the developing country with specific culture.

2. Job Demands and W-FC and F-WC

Job demands have been shown to influence conflict between work and family (Grzywacz & Marks, 2000; Karimi & Nouri, 2009; Richey-Strickland, 2006; Voydanoff, 2005). Those with high job demands tend to experience higher conflict between work and family domains.

Grzywacz and Marks (2000) examined the correlates of positive and negative spillover between work and family based on an ecological perspective. The results of this study showed that a low level of job demands was associated with a low level of experience of work-family conflict among adult employees in the United States. Karimi and Nouri (2009) examined the effects of work demands on two dimensions of work-to-family interface among Iranian employees. The respondents of study were 250 male employees from two organizations in Iran. The result of this study found a significant positive relationship between job demand and work-to-family conflict. The results also show that respondents with higher work demands also have higher work-to-family conflict.

Montgomery et al. (2006) examined the relationship between job demands and burnout, and the mediational role of work-family interference (WFI). Respondents of the study were 162 Greek doctors. This study focused on the quantitative and emotional job demands. "Quantitative job demands was defined as work overload or work pressure or too much work to do in too little time, while emotional job demands refer to the affective component of work and the degree to which one's work puts one in emotionally stressful situations" (Montgomery et al., 2006, p. 205).The finding by Montgomery et al. 2006 indicated that two types of demands were correlated with WFI. The results showed that when employees experience an increase in job demands (quantitative and emotional demands) they are more likely to experience an increase in W-FI.

Likewise, Richey-Strickland (2006) reported a positive and significant relationship between job demands and work-family conflict among women aged 18 years old and older who were employed fulltime outside the home in the United States. This study recognized that when female workers experience an increase in job demands they are more likely to experience an increase in work-family

conflict. Voydanoff (2005) examined relationships between three types of work demands and work-to-family and family-to-work conflict among the civilian U.S. Data were collected via telephone interviews with 2,155 employed adults living with a family member who were interviewed for the1997 National Study of the Changing Workforce (NSCW). The findings indicated consistent positive relationships between work demands and work-to-family conflict and family-to-work conflict. The results show that when respondents reported an increase in job demands they are more likely to experience an increase in work-family conflict and family-to-work conflict among respondents.

Proost et al. (2010) examined the moderating effect of achievement striving on the relationship between situational variables, and both work-family conflict and work-family facilitation. The respondents of study were 224 employees in the welfare sector. The finding indicated that job demands had a significant positive relationship with work-family conflict. The direction of relationship indicated that employees who reported high job demand are more likely to reported high work-family conflict.

The brief review above indicates that job demand plays a crucial role in W-FC and F-WC among employees. Most of the above mentioned studies have been carried out in Western countries and only few studies have been conducted in a Middle Eastern country, such as Iran (e.g. Karimi and Nouri 2008). The study by Karimi and Nouri (2009) focused on job demand and W-FC among male employees only. Besides, to best of the researcher's knowledge, studies on contributing factors F-WC is still lacking. Online search using database such as e.g. Science Direct, Sage, Emralled, Springer link, Wiley - Blackwell, Irandoc on related studies in Iran and other Middle Eastern countries showed a few studies in the area W-FC. Therefore, this research was conducted to examine the relationships between job demand and W-FC and F-WC among married female nurses in Iran-Shiraz as one of the developing country.

3. Methodology

The main objective of this study is to determine the relationship between job demands and W-FC and F-WC, among married female nurses. This study was conducted in public hospitals in Shiraz, Iran. Shiraz is one of the biggest cities of Iran that is located in the southwest part of Iran. There are many governmental and nongovernmental hospitals in Shiraz. Shiraz is also one of the biggest medical centers in Iran. There are 13 public hospitals in Shiraz and all of them were chosen for the current

study. The population of the study comprised of 647 married female nurses who lived with their husband, have at least one child and a minimum experience of 6 months working in public hospitals of Shiraz, Iran.

The method of data collection used was self-administered questionnaire and the study is correlation in nature. This study used Cochran (1977) method to determine the required sample size. Based on the Cochran's formula, the required sample size for the present study is 248. Nurses working in public hospital are very busy and due to the nature of their work, the response rate may be low. Therefore, the required sample has been increased to 323 in order to have adequate number of respondents for this study. To be representative of all public hospitals in Shiraz, about 50% of the eligible respondents from each hospital were randomly selected. Out of the 323 questionnaires distributed, 61.3% (198 questionnaires) were returned. Thus, the actual sample size of this study was 198.

The respondents were selected by using a simple random sampling method. It is the most commonly used method of selecting a probability sample. Respondents in this study were chosen randomly among name list of the total number of eligible nurses from each 13 public hospitals in Shiraz.

4. Pilot Study

Pilot study is important as they provide guidance and feedback on the adequacy of the questionnaire (Portney & Watkins, 2009). In the current study all instruments were originally in English language. Since, the current study was among Iranian nurses, and their official language is Persian, it was necessary for the questionnaires to be translated into Persian language. Accordingly, before the actual pilot study, the questionnaire was given to Persian expert to ensure that the translation done was accurate and conveys the same meanings as found in the original English instruments. Then the Persian translated questionnaire was again translated to original language. The translation and back translation were conducted by separate translators. Then, the questionnaires in the Persian language were distributed to 30 nurses who fulfill the study criteria. The main objective of this exercise was to identify ambiguities in meaning, misunderstanding of terms, or other inadequacies in the questionnaire. Another objective of the pilot study was to test for the reliability of the instruments. According to Rubin and Babbie (2009) reliability estimate of 0.60 was considered sufficient for basic research. The Cronbach's Alpha for the measures of this study was more than 0.65.

5. Measures

5.1 Work- Family Conflict and Family- Work Conflict

Work- family conflict (W-FC) and Family-work conflict (F-WC) scale developed by Netemeyer, Boles, and McMurrian (1996) which consisted of 10 items was used to measure W-FC and F-WC. Responses were obtained using a seven point Likert type scale where 1=strongly disagree to 7=strongly agree. A sample item from this scale is "The amount of time that my job takes up makes it difficult to fulfill family responsibilities". The scale scores range from 7 to 35 with high score indicating a high level of perceived W-FC and F-WC. The Cronbach's Alpha estimate in the present study for W-FC scale is .88 and for F-WC is .95.

5.2 Job Demands

Job Demands was measured by job demands, decision latitude and decision authority (Karasek Jr, 1979). The job demands measure contains 7 items concerning workload and pressures. Each item was answered with a 5 point Likert scale where 1= never to 5= extremely often. A sample item from this scale is "To what extent does your job requires your working hard". The scale scores range from 7 to 35, with high score means higher level of perceived job demands, while low score means a low level of perceived job demands. The reliability Cronbach's Alpha estimate in the present study is .65.

6. Results of the Study

The respondents' age ranged from 23 years old to 59 (mean=36.50, standard deviation=7.15). Most of the participants (56.1%) are below 36.50 years old. More than half of the respondents (56.1%) have been married for less than 11.68 years. Number of children of respondents was between one to five children and 51.5% of respondents have one child. Moreover, more than half of the respondents (56.6%) have less than 12.49 years job experience.

Respondents score for W-FC ranged from 8 to 35. The mean is equal to 24.36 with standard deviations of 6.51. Score for W-FC was categorized into low, moderate and high W-FC. A large proportion of the respondents were in the high (44.90%) and moderate (42.90%) W-FC. The remaining respondents (12.10%) have low level of W-FC. Respondents score for F-WC ranges from 5 to 35, with mean equal to 17.45 and standard deviations of 7.89. Large proportions (48.0%) of the respondents were in the low category for F-WC. This is followed by 32.3% who were in the moderate category and only 19.7% in high category. Score for

job demand was categorized into moderate job demand (17.70%), and high job demand (82.30%). The respondent's score for job demand were 20 to 35 (mean = 28.89, standard deviations = 3.54).

The first question examines the relationship between job demands and W-FC. The results demonstrated that there was a significant positive relationship between the respondents' job demand and W-FC (r = .243, p .01). The strength of correlation is low. The finding indicates that nurses who experience an increase in job demands would result in an increase in W-FC.

The second question examined the extent of relationships between job demands and F-WC. The finding from Pearson Correlation analyses showed a significant positive relationship between the respondents' job demand and F-WC (r= .168, p< .05). The strength of correlation is low. The findings indicate that higher level of job demands is associated with higher level of F-WC.

7. Discussion

This study aims to determine the influence of job demand on W-FC and F-WC among married female nurses in public hospitals in Shiraz-Iran. The current research established that the respondents with higher level of job demand experienced higher level of W-FC. These findings are in line with the study by Richey-Strickland (2006) who demonstrated that when female workers experience an increase in job demands they are more likely to experience an increase in work-family conflict. Grzywacz and Marks (2000) showed that low level of job demands were associated with a low level of experience of work-family conflict. Voydanoff (2005) and Montgomery et al. (2006) found positive and strong relationships between work demands and work to family conflict. This finding also supports research done by Karimi and Nouri (2009) and Proost et al. (2010) that found workers who experience an increase in job demands are more likely to experience an increase in work-family conflict.

Moreover, the finding indicates that nurses who experience an increase in job demands would result in an increase in F-WC. This direction of relationship is consistent with Voydanoff (2005) who demonstrated that when individuals experience an increase in job demands they are more likely to experience an increase in family-to-work conflict.

Considering the available evidence, it appears that job demand as work related characteristics, has consistently been shown to be the significant factor with W-FC and F-WC. Based on system theory work and family are two central

systems and interdependent domains for dual-career live that conflict in any one system will ripple throughout other system. The finding of current study supported system theory and indicated that increasing job demand in work that lacks flexibility to adopt to change will interfere with family life.

8. Conclusion and Implications

This study concludes that greater daily job demands are linked to increase in daily levels of W-FC and F-WC. These findings implied that in order to reduce the conflict between work and family responsibilities, policy related to work and family, as well as programs aimed at helping working women must address the issues of job demand. Therefore, at work place, employers may need to consider individuals' capacities and time limitations, and allow more flexibility in work schedules in order to reduce job demands experienced by women employees. Besides, some rigid rule practiced within the family system such as traditional thinking (e.g. priority to do the family responsibilities only by women) may need to be reviewed and change so that working women may feel less burdened with daily responsibilities, and consequently can balance demands from work and family systems.

9. Recommendations for Future Study

There are several recommendations and limitations that have been identified throughout this study that may direct future studies. Primarily, having a low response rate and relying on one city for data collection limit the generalizability of the findings. In addition, this study also needs to be replicated with a more heterogeneous population such as other ethnic groups, religions, occupational variations and different cultural values. More studies of this nature should be conducted especially among women in Middle Eastern countries.

This study focused on selected work factor. Future studies should address other variables that are worth examining. For example, coping strategies employed when facing experiences of work-family conflict. Future study should be designed to incorporate all these variables that might give different explanations of work-family conflict. Finally this study used a self-report measure (questionnaire) that entails the problems of common method variance and consistency bias. For less biased findings, future research is suggested to use combine methods for data collection, such as interviews with spouse, family members or colleagues combined with self-report data.

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A Survey on Day Lighting Design Strategies in Schools

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Abstract: Throughout history, daylight has been a primary source of lighting in buildings, supplemented originally with burned fuels and more recently with electrical energy. Before daylight was supplemented or replaced with electric light in the late 19th-century, consideration of good daylight strategies was essential. As we entered the mid-20th-century, electric light supplanted daylight in buildings in many cases. Fortunately, during the last quarter of the 20th-century and early years of this century, architects and designers have recognized the importance and value of introducing natural light into buildings. Daylight can provide a welcome and dynamic contribution to the human experience in buildings and, as demonstrated in recent studies on schools and retail sales environments, can impact human performance. Most people appreciate daylight and also enjoy the outside view that windows provide. Good daylighting design can result in energy savings and can shift peak electrical demand during afternoon hours when daylight availability levels and utility rates are high. Le Corbusier so clearly identified the importance of light in architecture when he expressed the point that, "Architecture is the masterly, correct and magnificent play of volumes brought together in light ..." emphasizing that "...the history of architecture is the history of the struggle for light. This article summarizes the use of daylight in primary schools with focus on goals, climate and weather, sky, conditions, design criteria, and strategies for day lighting design.
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1. Introduction

The impact of daylighting on the performance of school children has been a subject of interest for many years. Before fluorescent lighting became prevalent, it was generally assumed that all school rooms would be daylit as a matter of course. The California Department of Education had a rigorous review process for the architectural design of classrooms to ensure that daylighting standards were met. As a result, California classrooms built in the 1950's and early 1960's remain excellent examples of daylighting practice. The "finger" plan with multiple rows of single classrooms, each with windows on two sides, became a standard for California K-12 campuses.

However, starting in the late 1960's a number of forces came into conflict with the daylit design of classrooms. Engineers, asked to provide air conditioning in classrooms, argued against the use of large expanses of glass and high ceilings.

Construction economists argued that schools could be built more inexpensively on smaller sites if the classrooms could be built back to back or grouped together, without constraints on solar orientation.

Facility managers often contended that windows and skylights were a maintenance and security risk. Educational theorists argued that a more flexible arrangement of classrooms, with open walls between them, would encourage team teaching and creative learning. Others worried that windows might just be a distraction for students. And specifically in California, educational planners, trying to meet the needs of an exploding school age population, required that at least one-third of all new classrooms be portable, so that, if the need arose, they could be moved to new areas with an overpopulation of new students. (Hathaway, 1992)

As a result of these various pressures, the finger plan school was largely abandoned in California, and a vast experimentation in school design was undertaken. Many of the classrooms built since the 1960's have little day lighting. Windows are commonly built with "black glass" that allows a view out, but no useful daylight in. Numerous schools have been built with no windows at all. Similar trends occurred nationally, and internationally, though perhaps without such a dramatic shift in design practice as in California. Concerned about the

trend towards schools, and all types of buildings, without windows, Belinda Collins of the National Bureau of Standards conducted a major literature review on the study of windows in 1974. At that time there was an ongoing debate about the desirability of windows in classrooms. In a compilation of studies on windowless classrooms in 1965, the editor, C.T. Larson, concluded that windowless classrooms should have no adverse effects upon their users. Larson stated, "The educational value of such a view [that windows are necessary for student learning] should be assessed against the cost of installing and maintaining classroom windows" (SenterNovem ,1995)

Collins also quotes from a book on the behavioral aspects of design, which also concluded that windows were not needed in classrooms. "At present the prowindow forces still lack behavioral data in support of their case and argue on the basis of metaphor and supposition, but their arguments must be weighed against statistics…from the windowless schools…reported to have percent greater efficiency in heating and cooling, constant light to prevent eye strain… decibels or more noise reduction, and reduced maintenance costs." (Heschong Mahone Group, 1999) The author went on to claim that the use of completely underground schools provided evidence that claustrophobic reactions were extremely rare. He stated further that, "Opponents [of windowless schools] now take recourse in the need for communion with nature, contact with the outside and stimulus variation, which are more difficult to measure, and whose importance is not readily apparent."

Collins herself found that the research that had been done as of 1974 was suggestive of the importance of windows, but inconclusive: "Much, though not all, of the evidence from the windowless classroom studies is inconclusive, or inadequate, while that from windowless factories is circumstantial, based on hearsay, rather than research. As a result, only tentative conclusions can be drawn about the qualities of windowless spaces that make them somewhat less than desirable."

Since Collins' study, other research on the importance of windows has been done, but primarily in hospitals. The most rigorous studies have been conducted in Europe. One interesting study in Sweden in 1992 looked at the impact of daylight on the behavior of elementary school children. The Swedish researchers followed the health, behavior, and hormone levels of 88 eight year old students in four classrooms over the course of one year. The four classrooms had very different daylight and electric light conditions: two had daylight, two had none; two had warm white (3000K) fluorescent lamps, two had

very cool (5500K) fluorescent lamps. The researchers found significant correlation between patterns of daylight levels, hormone levels, and student behavior, and concluded that windowless classrooms should be avoided Recent, more informal studies in the United States suggesting a relationship between day lighting and enhanced student performance have generated considerable excitement among day lighting advocates.**1** These studies, along with a rising interest in "natural" and "healthy" environments, have contributed to a resurgent interest in day lighting in schools. All three districts that we worked with in this study reported that day lighting in classrooms is currently a concern for their school boards, driven largely by parent activism. However, without credible evidence of relationship between the design of schools and the performance of students within them, classroom design issues remain subject to architectural and educational fads, just as in the past. We hope that this study provides a contribution towards more durable understanding of how the physical environment affects student performance.

2. Goals for Day lighting
In general, design professionals should try to get as much daylight as possible deep into a building while controlling the brightness of surfaces within the users' fields of vision. Review and understand lighting requirements for critical and non-critical task areas. A building's critical load must also be considered as human comfort and energy performance are crucial. (Berkeley University, 2000)

3. Climate and Weather
Building types and site conditions vary widely for different geographic locations and from one climate type to another. For design guidelines, consider four specific climate types, as discussed below.

New Orleans, LA is an example of a hot-humid climate. In locations similar to this, reduction of heat gain is important, therefore solar gain should be controlled. The designer should also control or minimize direct sunlight. Extensive roof overhangs or external shading strategies are desirable. Windows should be sized and located to admit indirect daylight. Buildings should generally be elongated on the eastwest axis to minimize east-west exposure. Hot-arid climate locations like Phoenix, AZ require design strategies that provide relief and protection from intense sunlight. Solar gain and glare, therefore, must be minimized. Strategies that admit indirect light are appropriate on south elevations while larger glass areas may face north. Solar controls should dominate on the east and west. Enclosed courtyard spaces are frequently used in hot-arid locations, especially in the Southwestern US and Northern

Mexico. The temperate climate of locations like Eugene, OR benefit from building forms elongated on the east west axis to maximize south-facing walls. Larger glass areas may be considered, however glare conditions should be carefully studied. Often, solar heat gain needs to be balanced with shading on a seasonal basis. Temperate climates allow greater flexibility in design due to modest temperature and seasonal changes. Greater connections between indoors and outdoors should be considered. Exterior horizontal louvers are effective for creating deep penetration of sunlight on south facades.

Madison, WI is often referenced as an example of a cool/cold climate. This climate type experiences tremendous seasonal changes in temperature, precipitation, and sky conditions. Sensible design combines daylight and passive solar light. Daylight openings should be on the east, south, and west while glass on the north should be minimized. Special effort may be required to control glare and contrast from direct solar gain and bounced daylight, especially in snowy winter conditions. Architects generally attempt to minimize building surface areas due to the temperature extremes. Wind protection is often essential.

4. Sky Conditions

Season of the year, weather, and time of day combine with predictable movement patterns of the sun to create highly variable and dynamic daylighting conditions. Atmospheric and pollution conditions vary depending on season, weather, and time of day. Densely populated urban cities, like Phoenix, have more pollutants than rural cities. Daylighting design is usually based on the dominant sky condition and the micro-climate for the building site. There are three common sky conditions: clear sky, overcast sky, and partly cloudy sky.

The clear sky includes sunshine and is intense and brighter at the horizon than at the zenith, except in the area around the sun. Daylight received within a building is directly dependent upon the sun's position and the atmospheric conditions. Easily used charts, diagrams, and software programs allow study of solar geometry for any geographic location and time of day. The overcast sky is characterized by diffuse and variable levels of light and has dense cloud cover over 90% of the sky. It is generally three times brighter overhead (zenith) than at the horizon. Because direct sun is not present, the brightness of this type of sky depends on sun position. Generally, higher daylight illuminance occurs at higher solar altitudes.

The partly cloudy sky may have cloud cover that ranges from heavy to light and is similar to the clear sky at one moment and the partly cloudy sky the next.

Most designers do not base decisions on the partly cloudy sky because it is constantly changing and therefore, too variable.

5. Design Strategies for Daylighting Systems

As outlined above, the application of daylighting systems is only one constituent of a daylighting strategy. Although a poor selection of systems can spoil the performance of a building with good daylight potential, a sound selection cannot compensate for errors and omissions in previous design stages. To select a system, the designer must understand:

• The function of the window or other opening(s),
• The function of the system, and
• The interplay of the system with other systems.

A reasonable selection of systems should reduce the negative effects of windows and enhance daylight performance without interfering with other desirable effects of windows for all design cases.

Daylighting systems can be categorized by many characteristics. When selecting a system, the designer must be aware of all of its properties. Function and performance parameters have the most pronounced effect on performance, but costs and details related to the skin of the building are also important. As for many decision within the design process there exists no definite procedure how to select a daylighting system. The ultimate criterion is the performance of the overall design solution.
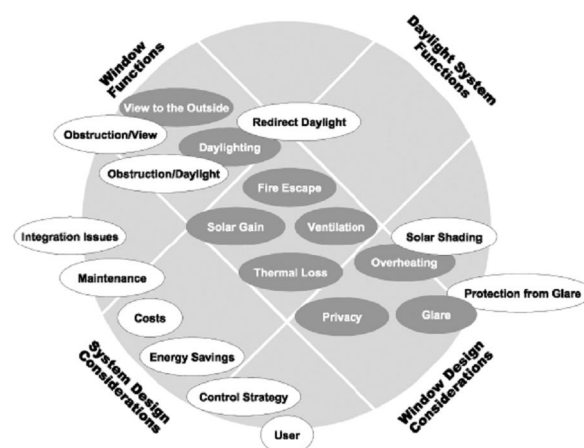
Figure 1: Functions and design considerations of windows and daylighting systems

Windows and rooflights have different roles in a daylighting strategy. The ambience of spaces receiving skylight is completely different from that of spaces receiving sidelight. For example, the design of Le Corbusier's "Le couvent de la Tourette" emphasizes the different nature of skylight and sidelight. In this design, skylight is used only in

spaces that play a significant role in religious life; all secular spaces receive sidelight.

Roof lights are usually not designed for a view to the outside; therefore, obstructing elements such as deep light shafts or non-transparent daylight systems can be applied in rooflight design. The control of glare with such systems is much easier than with sidelighting designs, which must provide occupants with a view to the outside. Solar shading is a crucial issue with rooflighting. One design strategy for rooflighting in sunny hot climates is to use a very small aperture and to apply innovative daylighting systems to distribute the light homogeneously in the space. In classrooms of the Park Ridge Primary School in the sunny but temperate climate of Melbourne in southern Australia, tunnel lights are used to exclude direct sunlight and to distribute skylight to the space.

Shading systems for rooflights, such as sun-protecting mirror elements, prismatic panels and directional selective shading systems using holographic optical elements can be applied to large glazed roof areas in higher latitudes. When situated in the window pane, these systems are protected from dust and require little maintenance. These systems need to be adjusted to the individual application.

6. Daylighting Strategies for Rooms

The aims of room daylighting are to adequately illuminate visual tasks, to create an attractive visual environment, and to save electrical energy. Both the building design scheme and the application of systems play roles in meeting these goals. The performance of a daylighting strategy for rooms depends on:

• Daylight availability on the building envelope which determines the potential to daylight a space;

• Physical and geometrical properties of window(s), and how windows are used to exploit and respond to available daylight

• Physical and geometrical properties of the space.

7. Function of Windows

The old definition of a window as an aperture in an opaque envelope is no longer strictly applicable. Innovations such as fully glazed skeleton structures and double-skin facades defy the scope of this definition. Nevertheless, we will use the term "window" to analyse daylighting strategies. Windows have several functions, which vary depending on the individual design case. One key function of a window is to provide a view to the outside. View plays an important role in an occupant's appraisal of the interior environment even if the exterior environment is not especially attractive. The size and position of windows, window frames, and other elements of the

facade need to be considered carefully in relation to the eye level of building occupants. Daylighting systems can affect the view to the outside. If an outdoor view is a priority in a daylighting design, visual contact with the exterior has to be maintained under all facade operating conditions. Advanced daylight strategies therefore often allocate different functions to different areas of the facade or to different facades. View windows then can be preserved without being compromised by other functions. (Groot, E.H. de, J.S.C. van Putten, 2000)

Daylighting is one of the main functions of windows. The window design determines the distribution of daylight to a space. Windows chosen solely for their architectural design features may perform satisfactorily in many cases. For dwellings and other buildings that have relatively minimal visual requirements, application of advanced daylighting systems is not usually appropriate. Advanced daylighting systems can be useful in cases where:

• Difficult tasks are performed, and a high degree of control over the visual environment is required;

• The building's geometry is complex, e.g., there are heavily obstructed facades or deep rooms;

• Control of thermal loads is required (adjustable solar shading can be an effective Strategy in this case).

Daylighting is inseparably linked to solar gain. In some design cases, added solar gains from daylighting may be welcome; in other cases, heat gain must be controlled. If solar gains are desirable, windows are a good way to provide them. In general, the goal of building design is to reduce cooling loads. There are a number of ways to control solar gains from windows and facades; the simplest method is the direct gain approach, where a shading system simultaneously controls the visual and thermal environments. More advanced techniques, such as collector windows and double-skin facades, allow some degree of separate control over the thermal and visual environments. In passive solar architectural concepts, solar gains are controlled by the orientation and the application of shading systems as a function of the sun's position.

The operability of windows needs to be considered when daylighting systems are selected.

Shading systems located in the window pane do not work properly when the window is open; if daylight-redirecting systems are attached to the window, the window's operation will have an impact on the systems' performance. Operable windows also often serve as fire escapes. The impact of fire balconies on daylight performance needs to be considered.

Glazed areas are an interface between exterior and interior; therefore, windows involve a number of design considerations. Aside from the above-

mentioned primary functions, the following issues are especially important for glazed areas:
• glare
• Privacy/screening of view
• Protection from burglary

8. Design Strategies for Windows

A window system must address the range of a building's exterior conditions to fulfill the range of interior requirements. The placement and sizing of windows are among the most powerful features of architectural design for daylight. Because the design of windows has a decisive effect on the potential daylight and thermal performance of adjacent spaces, it needs to be checked very carefully. The LT (Light-Thermal) method, which was developed for typical climates in the European Union, allows the estimation of energy consumption for heating, lighting, and cooling as a function of glazing ratio. Simple design tools allow a quick evaluation of window design and room geometry.

Windows are almost always exposed to the sky; daylighting systems can adapt windows to changing sky conditions and transmit or reflect daylight as a function of incident angle.

Daylighting systems are primarily used for solar shading, protection from glare, and redirection of daylight. Whether or not daylighting systems are required to support the performance of window systems, and which system or systems is appropriate, are key decisions in the design process. The adjustment of daylighting strategies to specific sources of skylight is an important characteristic of daylighting strategies.

9. Strategies for Skylight

Strategies for diffuse skylight can be designed for either clear or cloudy skies; however, the most significant characteristic of these strategies is how they deal with direct sunlight. Solar shading always is an issue for daylighting except on north-oriented facades (in the northern hemisphere). If solar shading is only of minor importance as a result of orientation and obstructions, a system to protect from glare can be used for solar shading as well.

Solar shading and glare protection are different functions that require individual design consideration. Solar shading is a thermal function that primarily protects from direct sunlight, and glare protection is a visual function that moderates high luminances in the visual field. Systems to protect from glare address not only direct sunlight but skylight and reflected sunlight as well.

10. Strategies for Cloudy Skies

Daylighting strategies designed for diffuse skylight in predominantly cloudy conditions aim to distribute skylight to interior spaces when the direct sun is not present. In this case, windows and roof lights are designed to bring daylight into rooms under cloudy sky conditions, so windows will be relatively large and located high on the walls. Under sunny conditions, these large openings are a weak point, causing overheating and glare. Therefore, systems that provide sun shading and glare protection are an indispensable part of this strategy. Depending on the design strategy, various shading systems that transmit either diffuse skylight or direct sunlight may be applicable in this case. To avoid decreasing daylight levels under overcast sky conditions, moveable systems are usually applied.

Some innovative daylighting systems are designed to enhance daylight penetration under cloudy sky conditions. Some of these systems, such as anidolic systems or light shelves, can control sunlight to some extent. The application of simple architectural measures, such as reflective sills, is another opportunity to enhance daylight penetration, but the design of the window itself is the main influence on the performance of this type of strategy under cloudy conditions.

11. Strategies for Clear Skies

In contrast to daylighting strategies for cloudy skies, strategies that diffuse skylight in climates where clear skies predominate must address direct sunlight at all times. Shading of direct sunlight is therefore part of the continuous operating mode of this strategy. Openings for clear sky strategies do not need to be sized for the low daylight levels of overcast skies. Shading systems that allow the window to depend primarily on diffuse skylight are applicable in this case. (TNO, 2000)

12. Direct Sunlight

Strategies for sunlight and diffuse skylight are quite different. Direct sunlight is so bright that the amount of incident sunlight falling on a small aperture is sufficient to provide adequate daylight levels in large interior spaces. Beam daylighting strategies are applicable if sunshine probability is high. Since sunlight is a parallel source, direct sunlight can be easily guided and piped. Optical systems for direct light guiding and systems for light transport are applicable in this case. Apertures designed for beam daylighting do not usually provide a view to the outside and should therefore be combined with other view openings Because beam daylighting requires only small apertures, it can be applied as an added strategy in an approach that otherwise focuses on cloudy skies.

13. Functional Division of a Window

If a designer can allocate one predominant function to a window, he or she can design it for optimum performance that will not be compromised by contradictory requirements. The designer must then make sure that all windows together fulfill the full range of requirements in a room. When a window has to satisfy several functions in any operation mode, the range of applicable daylighting systems is constrained because the system selected must take account of all of the window's functions. The design approach for this type of opening therefore usually consists of applying moveable systems that can be recessed when not needed. The designer should consider controlling systems using a building energy management system because they might not otherwise be operated appropriately. The heterogeneous design of a window allots specific functions to specific areas of a window. Different daylighting systems can be applied to different parts of the window, or similar systems may be operated separately for different areas of the window. The interaction of daylighting systems in this case needs detailed design consideration. (Groot, E. de, 2001)

14. Requirements for the luminance in schools

In order to get a good lighting concept, knowledge of the different tasks in classrooms is important. Each task needs its own light conditions. During the day there are a number of different visual tasks in a classroom. So, high requirements for the light quality are important. Students and teachers have benefit by a lighting which supports them optimally in doing their activities. Important for a good lighting design is that the needs of the human being are central, but in the same time the energy efficiency may not be neglected.

The following values for luminances and contrasts have been required: the luminances must be below 3000 cd/m² and the luminance contrasts in the (wide) visual field must be lower than 1:30. According to the tasks of teacher and student and the light requirements for the different activities the classroom has been divided in zones: A blackboard zone and a classroom zone. The classroom zone has again been divided in two zones parallel to the facade in order to create the possibility to optimize the use of daylight: a window zone and a corridor zone

First, for a better understanding of daylight quality in schools, measurements have been done in a number of existing schools. That has showed, it was difficult to compare the different schools to each other .The divisions of the classrooms were different and the same holds for plants at the window-sill, drawings on the window-glass, opposite buildings and public green, etc. And of course the most important problem,

measurements in different schools could not be done at the same time under the same weather conditions. For that reason, in order to get more insight into the daylight qualities in schools, nine different classroom designs were simulated with Radiance. The Figures shows the different designs: a reference model, five basic models and three situation models. The situation models are based on designs of real schools. All the nine models satisfy the Dutch Building Regulations. (fig2)
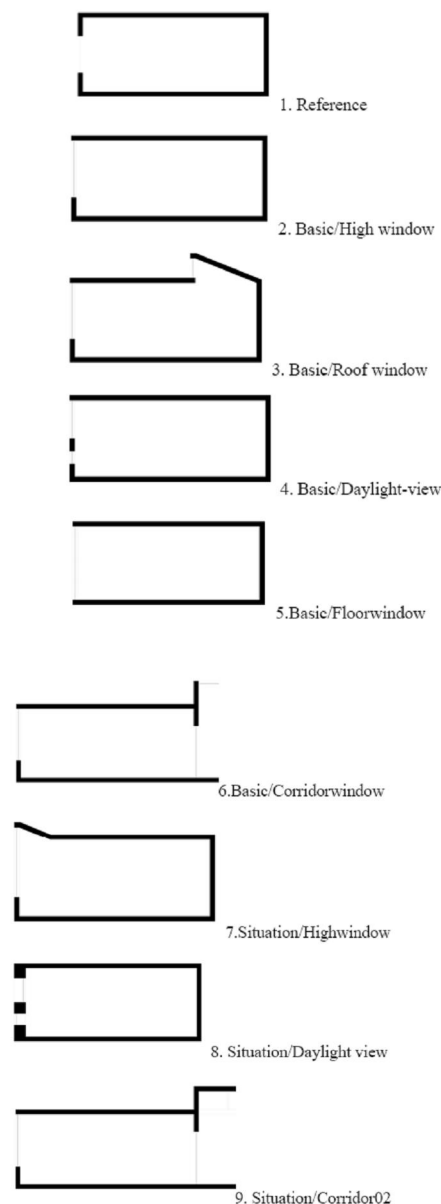
Figure2. A reference model, five basic models and three situation models.

15. Discussion and conclusion

It is obvious that daylight has been the favored light source in school buildings up to the present day. This is probably because the design of school buildings is relatively free from commercial influences in comparison with the design of the other building types. In addition, the variation of daylighting within a day, the view out giving visual relief, and contact with the constantly changing outdoor scene are all good reasons to keep daylighting in schools.

The major factors influencing daylighting in schools

Based on the review above, three major factors that affect the development of day lighting in schools are evident. First, improvement of technology acts an important role in the progress of the use of daylighting in schools. This can be seen to have followed a series of logical steps in line with development of building science. For instance, the use of steel framing, which allows the area of glazing to be maximized led to the open-air school movement in the early twentieth century. In recent years, advanced design and measuring tools for daylight has involved photometrical technology and computer simulation, etc. These technologies could improve the understanding of the interior daylit condition as well as allowing the distribution of daylight to be precisely predicted. (Groot, E. de, 2002)

The use of information and communication technology may also fundamentally change the classroom environment, building ecology and other areas of school design and building. Second, the need for daylighting often emerges with social, political and economic transformation forces. For example, unhealthy living conditions caused by industrialization and urbanization of the nineteenth and early twentieth century were responsible for the open-air school movement. The oil crisis in the 1970s made people realize the importance of energy conservation. As a result, the windowless schools and the passive solar schools appeared. Today, the radical green thinking related to school buildings places an emphasis on natural and environmental criteria.

Third, a parallel can be drawn between the development of daylighting in schools and the progression of educational theories in the twentieth century. For example, during the 1940s and 1950s the notion of progressive education seemed to fit in well with the modern movement of architecture with its emphasis on prefabrication and flexibility which allows the area of glazing in classrooms to be as large as possible. (Putten, J.S.C., E.H. de Groot, 2003)

When the twenty-first century was reached, the needs for quality education demanded a multi functioning school environment of the highest quality.

The development of daylighting in schools can be visualized as a pendulum swinging back and forth— from small windows to a demand that window area be as big as possible, from windowless classrooms to passive-solar schools.

This review shows that the above three factors have shaped the progress of daylighting in schools and it is believed that they will affect the future of daylighting in schools. Equally, the authors would like to believe that architects have learned from previous mistakes and those certain changes in philosophy and advances in technology represent a permanent improvement in daylighting development, and not just cyclical adjustment to the current condition. In addition, it can be noted that more daylight research has moved from performing specific visual tasks to understanding qualitative aspects of lighting in recent years, though previous studies on the qualitative and psychological effects of lighting have been sporadic and lack a shared agenda to guide investigators. (Groot, E., 2002b),

The future of school daylighting

A few studies have been made on daylighting quality in schools. In early 1976, Tikkanen conducted field research to study emotional reactions to light and color in a classroom environment under different window conditions at different seasons in five Swedish secondary schools. The study found that the observed sensation of color changed with quality and quantity of light, and a relationship was found between the quality of light and the pleasantness of the observed environment. In the 1990s, Iwata et al. conducted a pilot experiment to examine the relationship between daylighting and visual comfort in a daylit classroom. (NEN-EN, 2003) The researchers reported that one of the key factors to designing a comfortable lighting environment in a room was to eliminate the darkness or the excess brightness that occupants found on the desk, and both horizontal illuminance and vertical illuminance at the eye predicted comfort judgment. In addition to the above research work, Building Bulletin discussed the issue of daylighting quality in schools. It states that good design for daylighting not only provided a sufficient quantity of illumination but also gave the interior a character appropriate to its use. Moreover, three main recommendations of good quality for daylighting were listed:

1) A satisfactory balance of brightness throughout the room
2) The right proportion of direct and indirect light
3) The absence of glare from the sky or sun.

Unfortunately, there is little research evidence to support these recommendations. The ninth edition of the IESNA Lighting Handbook gives formalized recommendations of lighting quality in schools instead of recommended quantity of light for specific applications or visual tasks as in previous editions.

This Handbook describes lighting quality as the integration of human needs, architecture, and economics and the environment. In the section on educational buildings, it suggests that the most important factors contributing to lighting quality in schools should include: daylighting integration and control, direct and reflected glare, flicker (and strobe), light distribution on surfaces, light distribution on task plane.

On the whole, there is a scarcity of research on lighting quality in schools, especially in the daylighting area, although renewed interest in lighting quality has emerged since the 1990s. In addition, the absence of a common definition of daylighting quality is still a problem for lighting research as well as in practice. As it is well known, the study of lighting quality is a subjective topic that focuses on the human reaction to lighting. Therefore, it is questionable whether the finding regarding natural illumination, window size, view quality and need for privacy apply to students in different countries, of differing cultures and in climates, which may be temperate or tropical, because most daylight research has taken place in Europe and North America. It can be expected that a sounder basis for the provision of good daylighting quality may be made.

Lastly, by recalling the progress of daylighting in schools in the nineteenth and the twentieth centuries, the recent trends of daylighting development are anticipated. The literature study reveals that the development of technology, shifting educational theories, and transformation force of social, political and economic contribute significantly to the development of daylighting in schools; and it is believed that they will continue to produce similar changes in the future. The changing in the regulations and standards in recent years illustrates the movements from quantity to quality of lighting both in research and practice. In general, we have a poor understanding of daylighting quality in schools, and a poor understanding of the relationships between the quantity and quality of daylighting. These are the two areas that require further research.

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Serum Fetuin-A Levels in Type 2 Diabetes Patients with Early Diabetic Nephropathy: It's Relation to Diabetes Control

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Abstract: Background and objective: Fetuin-A is a circulating calcium-regulatory glycoprotein that inhibits vascular calcification. In the present study, serum fetuin-A was studied as a novel risk factor for the development of diabetic nephropathy and the relation between its levels with the state of diabetes control. Patients and Methods: 50 patients with type 2 diabetes mellitus (T2DM) and early diabetic nephropathy, 25 patients of them have well controlled diabetes on treatment (the first group), the other 25 patients have uncontrolled diabetes (the second group), and another 25 healthy volunteers (control group)) were enrolled in this cross sectional study. Serum fetuin-A, Fasting plasma glucose (FP glucose), glycoselated hemoglobin A1c, lipid profile (total cholesterol,HDL and triglycerides), Serum creatinine, Glomerular filtration rate (GFR), Albumin excretion in urine were measured. Results: There was a significant reduction in Serum fetuin-A levels in controlled diabetic patients (314±66.8) and uncontrolled diabetic patients (252.4±55.6) compared to control group (478.6±74.4). A significant decrease was also detected in uncontrolled diabetic patients when compared to controlled diabetic patients (P<0.001). A strong inverse correlation was found between serum fetuin-A and each of F P glucose, glycoselated hemoglobin (HbA1c), serum creatinine, and urinary albumin excretion   (r = -0.52, -0.55, -0.61, and -0.56 respectively; P < 0.001 for each). Whereas; GFR was significantly positively associated with serum fetuin-A levels (r = 0.53, P<0.001). Conclusion: The results of this study demonstrate that diabetic nephropathy, especially with uncontrolled diabetes, is linked to low serum fetuin-A levels which represents a novel risk factor for the development of vascular complications. This factor could be responsible for the development and progression of accelerated nephropathy especially with uncontrolled diabetes.

1. Introduction:

Various biomarkers have been studied for identification of type 2 diabetes patients at micro- and macrovascular risk. Most of these markers are inflammatory, metabolic or procoagulant molecules indicating an unfavorable metabolic and vascular status in patients with type 2 diabetes [1]. However, the different biomarkers show large variations in risk prediction depending on metabolic status and disease severity of the study groups [2,3]. Recently published data imply, that most novel biomarkers do not improve risk prediction when added to models based on conventional risk scores [4] Yet, associations of novel biomarkers such as fetuin-A with metabolic markers or complications do help to understand their role in the pathophysiology of vascular disease.

Fetuin-A, a circulating calcium-regulatory glycoprotein that inhibits vascular calcification, is predominantly synthesized in liver. It is secreted into the blood stream and deposited as a noncollagenous protein in mineralized bones and teeth. During fetal life, there is high serum concentration of fetuin-A. Its level declines following infection, acute or chronic inflammatory states and malignancy [5,6]. Low serum fetuin-A levels have been reported in chronic renal disease and dialysis patients and is associated with inflammation and outcome [7,8]. Recent data have shown a relationship between vascular calcification and endothelial dysfunction in vascular disease [9]. Therefore, low serum fetuin-A level could be one of the contributing factors for the development of endothelial dysfunction in chronic renal disease patients.

So far, there is few data available for associations of fetuin-A with parameters of microvascular disease in diabetes. To clarify the relation between fetuin-A and microvascular complications in patients with type 2 diabetes and early diabetic nephropathy, we studied its associations with albuminuria and parameters of renal function. In addition, the state of diabetes control of these patients was assessed by quantification of the

glycoselated hemoglobin A1c and its association with fetuin-A levels was assessed.

2. Methods
Study population and data collection
This study was carried out in Internal Medicine and Clinical Pathology departments, faculty of medicine, Zagazig University. This cross sectional study was conducted from January 2010 to January 2011.

This study included 50 patients with type 2 diabetes mellitus (T2DM) and early diabetic nephropathy who were recruited from the outpatient clinics of Endocrinology and Diabetes at Zagazig University Hospital and referred to the diabetes control for specialist treatment. The selection of patient groups was as follows:

25 patients were selected to have well controlled diabetes on treatment (First group): They were 13 males & 12 females, having a mean age of 53.76 ± 6.0 years, and a mean HbA1c of 6.2 ± 0.7.

25 patients were selected to have uncontrolled diabetes on treatment (second group): They were 13 males & 12females, having a mean age of 55 ± 6.2 years, and a mean HbA1c of 11 ± 2.1.

Another age and sex matched 25 healthy volunteers were chosen as a control group.

Inclusion criteria: patients with T2DM who had to have a documented history of albuminuria in at least two separate urine samples (urinary albumin > 20 mg/L as suggested by current German and international guidelines for the diagnosis of diabetic nephropathy) [10].

Exclusion criteria: We excluded patients with malignant neoplasms, severe infectious disease, severe congestive heart failure, type 1 diabetes and other renal disease by urinary sediments and medical records (macroscopic hematuria, abnormal sediment, urinary tract infection and past history of glomerulonephritis or nephro-ureterolithiasis).

All patients were submitted to full clinical assessment including history taking and through clinical examination including blood pressure measurements (systolic and diastolic) and assessment of body mass index (BMI). In all individuals, 24-h urine samples were collected and the albumin excretion rate in 24 hours is estimated. The study complied with the Declaration of Helsinki, and all subjects gave informed consent to participate in this study.

Clinical chemistry
Blood was drawn in a fasting state under sterilized conditions and stored at -80°C until analysis. The following investigations were done:

Fasting plasma glucose (FPglucose) was measured by a glucose oxidase method. Triglyceride (TG), total cholesterol, and high density lipoprotein cholesterol (HDL) levels were quantified by using ADVIA 1650 auto analyzer (Siemens Medical Solutions Diagnostic. USA). Glycoselated hemoglobin (Hb A1c) was estimated by ion exchange resin chromatography using Stanbio Glycohemoglobin.

Glomerular filtration rate is estimated from the Modification of Diet in Renal Disease (MDRD) formula [11] as follows: MDRD formula = 186 X [serum creatinine (mg/dl)]$^{-1.154}$ X [age]$^{-0.203}$ X [0.742 if patient is female] X [1.21 if patient is African-American], which is used for statistical evaluation of renal function.

Albumin excretion rate (AER) was assessed and performed in 24-h urinary collections. For collection of the urine sample, a 3-l plastic container was used, and the volume of urine was measured to the nearest 50 ml. Albumin levels were determined by turbidimetry (Siemens Healthcare Diagnostics, Eschborn, Germany). AER was expressed as milligrams per 24 h.

Serum fetuin-A was measured in duplicates by an ELISA (Epitope Diagnostics, Inc., San Diego, USA) The intra- and interassay variations were 5.3 and 7.1%, respectively.

Statistical analyses
Statistical analyses of the results were performed using SPSS software version 15.0 (statistical package for social science, SPSS inc. Chicago, USA). Continuous variables were expressed as means± standard deviation (SD). Comparison between two sets of patients was performed by independent t test, but more than two sets of patients were compared by one-way ANOVA. The Kruskal-Wallis (KW) test was applied to compare the values of HbA1c, F P glucose and Albumin in urine (non normal distributed variables) among the three groups of the study. Pearson correlation coefficient r was used to describe the association between serum fetuin-A and the variables of interest. P values <0.05 were considered statistically significant.

3. Results:
Clinical and laboratory characteristics of all patients with diabetes mellitus and healthy control subjects and comparison between all groups are given in Table 1.

Table 1: Demographic, Clinical and laboratory characteristics of the studied groups.

Parameter	Control group n=25	Controlled diabetic group n=25	Uncontrolled diabetic group n=25	F /X^2 / t	P
Age (y)	53.6 ± 6.1	53.76 ± 6.0	55 ± 6.2	0.4	0.6
Gender (M/F)	12(48%)/13(52%)	13(52%)/12(48%)	13(52%)/12(48%)	0.11	0.94
BMI (kg/m^2)	25.1 ± 4.1	26.8 ± 2.4	26.2 ± 3.2	1.6	0.2
Duration (y)		10.6± 4.9	10.56±4.9	0.02	0.97
Systolic B P (mmHg)	118.5±5.1	122.5±8.2	123.8±10.5	2.8	0.06
Diastolic B P(mmHg)	77.7±4.0	78.4±5.0	76.9±5.1	0.61	0.54
ACE therapy (n,%)		12 (48%)	13 (52%)	0.08	0.77
Insulin therapy (n,%)		14 (56%)	12 (48%)	0.32	0.67
HbA1c (%) X±SD Range Median	5.4 ± 0.5 4.4 – 6.1 5.4	6.2 ± 0.7 [+] 5.9 - 6.7 6.4	11.0 ± 2.1 * 7.5 – 15.0 11	KW 49.6	<0.001**
F P glucose (mg/dl) X ± SD Range Median	82.3 ±7.8 70 – 97 83	92.2± 12.82 [+] 70 – 120 94	127.3 ± 20.2 * 89 – 170 125	KW 47.69	<0.001**
Serum creatinine (mg/dl)	0.55 ± 0.12*	0.9 ± 0.18	0.95 ± 0.19	41.1	<0.001**
GFR (ml/min/1.73m^2)	126.4±14.6*	103.1±14.6	95.5±17.7	26.1	<0.001**
Serum albumin (gm/dl)	4.5± 0.3	4.4±0.3	4.4±0.35	0.27	0.75
Triglycerides (mg/dl)	119.2± 23.3*	160.2± 43.7	157.2± 49.4	7.99	<0.001**
Total cholesterol (mg/dl)	160.2±23.3 *	194.5±42.3	205 ±47.1	9.5	<0.001**
HDL (mg/dl)	52.5±9.7 *	45.9±7.0	42.7±8.1	8.94	<0.001**
Albumin excretion (mg/24h) X ± SD Range Median	6.7± 3.1 2 – 13 6	188.4± 114[+] 40 – 450 160	243± 140.5 * 56 – 560 247	KW 50.13	<0.001**
Serum fetuin-A (mg/L)	478.6±74.4	314± 66.8 [+]	252.4± 55.6*	78.3	<0.001**

   **P is significant.   KW, The Kruskal-Wallis test.
   * Significance is present between this group and the other two groups.
   [+] Significance is present between controlled diabetics and control group.
   BMI: Body mass index. HbA1c: Glycoselated hemoglobin. F P glucose: Fasting plasma glucose.
   GFR: Glomerular filtration rate. HDL: high density lipoprotein.

There were no differences in age {P=0.6}, sex {P=0.94}, duration of diabetes {P=0.97}, body mass index (BMI) {P=0.2}, systolic blood pressure {P=0.06}, diastolic blood pressure {P=0.54}, and serum albumin {P=0.75} among all groups of the study. There was no differences in the percentage of diabetic patients on treatment by ACE or insulin therapy between the two groups of diabetes mellitus {P=0.77 and 0.67 respectively}.

Fasting plasma glucose levels were significantly higher in the uncontrolled diabetic group (127.3 ± 20.2) than in the controlled diabetic group (92.2± 12.82) and healthy control group (82.3 ±7.8) {p<0.001}, and also there was a significant increase in FP glucose in the controlled diabetic group as compared to healthy control group {p<0.001}.

Hemoglobin A1c (HbA1c) was significantly higher in the uncontrolled diabetic group (11.0 ± 2.1) than in the controlled diabetic group (6.2 ± 0.7) and healthy control group (5.4 ± 0.5) {p<0.001}, and also

there was a significant increase in HbA1c in the controlled diabetic group as compared to healthy control group {p<0.001}.

Serum creatinine levels were significantly higher in both the uncontrolled diabetic group (0.95 ± 0.19) and controlled diabetic group (0.9 ± 0.18) than in the healthy control group (0.55 ± 0.12) {p<0.001}, there was no significant difference in Serum creatinine between the uncontrolled and controlled diabetic groups.

GFR levels were significantly lower in both the uncontrolled diabetic group (95.5±17.7) and controlled diabetic group (103.1±14.6) than in the healthy control group (126.4±14.6) {p<0.001}, there was no significant difference in GFR between the uncontrolled and controlled diabetic groups.

Albumin excretion in urine was significantly higher in the uncontrolled diabetic group (243±140.5) than in the controlled diabetic group (188.4±114) and healthy control group (6.7±3.1) {p<0.001}, and also

there was a significant increase in urinary Albumin excretion in the controlled diabetic group as compared to healthy control group {p<0.001}.

Triglyceride and cholesterol levels were significantly higher in both the uncontrolled diabetic group (157.2±49.4 and 205 ±47.1, respectively) and controlled diabetic group (160.2± 43.7 and 194.5± 42.3, respectively) than in the healthy control group (119.2±23.3 and 160.2±23.3 , respectively) {p<0.001}, there were no significant difference in triglyceride or cholesterol levels between the uncontrolled and controlled diabetic groups.

HDL levels were significantly lower in both the uncontrolled diabetic group (42.7±8.1) and controlled diabetic group (45.9±7.0) than healthy control group (52.5±9.7) {p<0.001}, there was no significant difference in HDL between the uncontrolled diabetic and controlled diabetic groups.

Serum fetuin-A levels were significantly lower in the uncontrolled diabetic group (252.4±55.6) and the controlled diabetic group (314±66.8) than in the healthy control group (478.6±74.4) {p<0.001}, and also there was a significant reduction in serum fetuin-A in uncontrolled diabetic group as compared to controlled diabetic group (p<0.001).

Table 2: Correlation between Serum fetuin and other Parameters of the study.

Parameter	Serum fetuin	
	r	P
Age	-0.09	> 0.05
Body mass index	0.001	> 0.05
Systolic blood pressure	-0.19	>0.05
Diastolic blood pressure	-0.03	>0.05
Duration of diabetes	0.02	>0.05
Glycoselated HbA1c	-0.55	<0.001*
Fasting plasma glucose	-0.52	<0.001*
Serum creatinine	-0.61	<0.001*
Serum albumin	0.06	>0.05
Triglycerides	-0.15	>0.05
Total cholesterol	-0.21	>0.05
high density lipoprotein	0.2	>0.05
Glomerular filtration rate	0.53	<0.001*
Albumin excretion in urine	-0.56	<0.001*

* Correlation is highly significant.

The overall mean serum level of fetuin-A was 348.36 ± 116.1 mg/L with a range of 170 to 620 mg/L. Correlation study revealed that each of HbA1c, FP glucose, serum creatinine and Albumin excretion were significantly and inversely associated with serum fetuin-A levels (r = -0.55, -0.52, -0.61, and -0.56 respectively; P < 0.001 for each), whereas; GFR was significantly positively associated with serum fetuin-A levels (r = 0.53, P<0.001). No other clinical or metabolic variable (as BMI, blood pressure, total cholesterol,HDL and triglyceride) was significantly correlated in these groups of diabetic patients with serum fetuin-A (P >0.05 in all, see table 2). The overall mean serum level of fetuin-A in male individuals was 347.5±126.5 mg/L, with no significant difference from that of female individuals (346.5 ± 107.6 mg/L, p = 0.97).

4. Discussion
The gene encoding fetuin-A is located on chromosome 3q27, the chromosomal region that was previously mapped as a type 2 diabetes and metabolic syndrome susceptibility locus (12). The aforementioned findings and the animal studies showing that fetuin-A induces insulin resistance (13-16) resulted in the view that fetuin-A is an interesting candidate involved in the pathophysiology of type 2 diabetes. Genetic analyses revealing that single nucleotide polymorphisms in the fetuin-A gene were associated with type 2 diabetes in cross-sectional studies (17) further corroborated this hypothesis. However, the role of fetuin-A in the natural history of type 2 diabetes still remained obscure. Fetuin-A, besides the placenta, is exclusively secreted from the liver (18). Expression of fetuin-A and plasma levels of the protein were found to be increased when there is fat accumulation in the liver (19,20) and circulating fetuin-A is increased in the metabolic syndrome (21), the condition that strongly associates with fatty liver (22). Moreover, fetuin-A complexes with calcium and phosphorus in the circulation and prevents the precipitation of these minerals in serum [23,24].

Fetuin-A is regarded as marker for vascular inflammation and as one of the most potent negative regulators of vascular ossification - calcification [25,26]. In animals lacking the fetuin-A gene, the aorta was found to be spared of calcification and fibrosis, whereas peripheral vessels in the skin and kidney showed evidence of extensive calcification, and the small artery involvement preceded the impairment of renal function [24,27].

In this study ,we evaluated the associations of parameters of microvascular disease in patients with T2DM and early diabetic nephropathy as the degree of albumin excretion and renal function(GFR and serum creatinine) with fetuin-A.

This study demonstrates that lower fetuin-A levels seem to be associated with microvascular complications in patients with early diabetic nephropathy disease in type 2 diabetes as evidenced by the significant inverse association between fetuin-A concentrations and the degree of 24 h urinary albumin excretion and also, the significant positive association between fetuin-A concentrations and GFR .

Furthermore, we could show that there is a link between fetuin-A serum levels and the state of diabetes control which was determined by the inverse association between fetuin-A concentrations and HbA1c .

In addition, fetuin-A levels do not correlate with some clinical and metabolic parameters as BMI, blood pressure, total cholesterol, HDL and triglyceride in our type 2 diabetic patients with early diabetic nephropathy with or without hyperglycemia.

The data presented herein allows to speculate, that fetuin-A could play a role in the development of early microvascular disease (especially nephropathy) in type 2 diabetes, yet possible mechanisms remain unclear. In line with this hypothesis, Eraso et al. showed that circulating fetuin-A was lower in 38 subjects with type 2 diabetes and an ankle/brachial index (ABI) < 0.9, compared with 700 diabetes controls [28]. Also Roos et al .assessed ABI as a paramerter of microvascular disease and demonstrated that type 2 diabetic patients with an ABI <0.9 had lower fetuin-A levels than patients with an ABI 0.9-1.3 or > 1.3 and that fetuin-A was significantly associated with ABI. Moreover, Roos et al. found that lower fetuin-A levels seem to be associated with prevalent macrovascular disease (as coronary artery disease, stroke and peripheral artery disease) in type 2 diabetes. But in contrast to our results, they showed also that fetuin-A serum levels are not associated with microvascular complications (24 h urinary albumin excretion) in patients with early diabetic nephropathy. In addition, they agree with us to some extent in that fetuin-A levels do not

correlate with metabolic parameters in their type 2 diabetes patients with prevalent late complications [29].

Again, a recently published study in patients without diabetes and renal impairment demonstrated decreased fetuin-A serum levels in patients suffering from advanced three-vessel disease compared with those without stenosis [30]. These finding go in line with our assumption of reduced fetuin-A serum levels in patients with diabetic nephropathy.

Reviewing the existing data as well as the results obtained in this study, it may be assumed that fetuin-A levels are lower in type 2 diabetes patients with early diabetic nephropathy especially those with uncontrolled diabetes.

Our results are in contrast to findings in several cross-sectional studies which showed an association of high fetuin-A levels with impaired glucose tolerance, metabolic syndrome and an atherogenic lipid profile (high low-density lipoprotein, high triglyceride concentrations and low HDL concentrations) [31,32] and the positive association of Plasma fetuin-A levels with the risk of type 2 diabetes [33].

We recognize the limitations of the present study. Our approach is limited by the small samples size. Therefore, especially the data for associations with microvascular disease and renal function in type 2 diabetes will have to be reproduced in larger groups.

5. Conclusions

In this study, low plasma fetuin-A levels predict microvascular complications in type 2 diabetes with early diabetic nephropathy and also there are associations of fetuin-A with hyperglycemia in these patients.

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IL 18 in diabetic patients with and without   coronary atherosclerosis

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Abstract: Objective: To assess interlukein 18 in diabetic patients with and without coronary atherosclerosis and to detect its relation to lipid profile and blood glucose. Also to investigate the hypothesis that the serum level of IL-18 is a predictor of coronary atherosclerosis in patients with type 2 diabetes. **Patients and Methods:** The study included 45 diabetic patients (15 with no complication and 30 with coronary atherosclerosis) and 15 age and sex matched as a control group. **Results:** Total cholesterol, HbA1c and IL 18 is significantly different in the 3 groups and the highest level is in the diabetic patients with atherosclerosis. On the contrary HDL-c is significantly lower in diabetic patients with atherosclerosis than the other 2 groups. IL8 shows a strong significant positive correlation with blood glucose in diabetic patients with no complication and in diabetics with atherosclerosis. **Conclusion:** that, IL8 is a useful inflammatory marker in diabetic patients and it is higher in those with atherosclerosis. IL-18 might serve as a marker of future cardiovascular risk in diabetic patients.
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Keywords: IL 18; coronary; atherosclerosis; inflammatory.

1. Introduction

Inflammation plays a key role in atherosclerosis, whose complications have drawn the attention of researchers and health entities. IL-6 is a cytokine that acts both in the innate and in the adaptive immune response. It is synthesized by monocytes, endothelial cells, fibroblasts and other cells, in response to microorganisms and also to the stimulation by other cytokines, mainly interleukin-1 (IL-1) and TNF.   IL- 18, a recently described cytokine from the IL-1 family, has a pleiotropic action, and participates in the innate as well as in the acquired immune response. Among its main functions is the stimulation of Interferon (INF) production by T lymphocytes, Natural Killer (NK) cells and macrophages (1).

Inflammatory mediators are intimately associated with the cascade of events leading to atherosclerotic plaque initiation, development, and rupture. This recognition has stimulated the evaluation of several markers of inflammation as a potential tools for cardiovascular risk prediction (2,3).

Atherosclerosis is the major cause of premature death in patients with type 2 DM, and nearly 80% of all deaths and 75% of all hospital admissions result from complications of atherosclerosis (4).

Interleukin (IL)-18, originally identified as an interferon inducing factor, stimulating interferon production in T lymphocytes and natural killer cells, which is believed to play a crucial role in atherosclerotic plaque rupture. Furthermore, IL-18

acts in synergy with IL-12 to promote the development of T helper 1 (TH1) responses (5, 6).

Interleukin (IL)-18 is a pleiotropic proinflammatory cytokine and plays a central role in the inflammatory cascade (7). Recently, evidence from experimental studies has shown that expression of IL-18 is intimately related to atherosclerotic plaque progression and vulnerability (8, 9). These results could be translated into the clinical setting, as shown in the AtheroGene Study, which suggested that the concentration of circulating IL-18 was one of the strongest predictors of future cardiovascular events in patients with stable and unstable Angina (10).

In this study, we are aiming to assess interlukein 18 in diabetic patients with and without coronary atherosclerosis and to detect its relation to lipid profile and blood glucose.

2. Materials and Methods
Patients:

The study included 45 diabetic patients, 15 with no complication (normal ECG, echocardiography and negative stress ECG.) and 30 with coronary atherosclerosis (admitted by ACS in the form of chest pain, ST depression and T wave changes and significant coronary artery lesion). 15 age and sex matched were included as a control group.

Methods:

The study was done after obtaining approval from the local institutional review board and human

subject's protection. Written informed consent was obtained from patients.

All patients were subjected to the following: Full history taking including chest pain and presence of risk factors of IHD, physical examination, ECG, Echocardiography and coronary angiography.

Venous blood samples (10 ml) were drawn in the morning after an overnight fasting from each subject. The venous blood sample was divided into three test tubes. 1 ml was added to a mixture of potassium oxalate and sodium fluoride (for plasma glucose estimation by oxidase/peroxidase kit (11), 2 ml was added to EDTA powder (whole blood to estimate HbA1c by cationic exchange resin(12) and the remaining 7 ml were allowed to clot at room temperature then centrifuged at 1000 rpm for 15 minutes. Serum was separated and divided into aliquots then frozen at -70 ^{0}C till the time of assay. The serum samples were used to estimate the Interleukin 18: by a solid phase enzyme linked immunosorbent assay (ELISA) Kit (13).

Plasma concentrations of cholesterol and triglycerides, LDL and HDL were determined by quantitative colorimetric kit.

Statistical Methods:

Statistical Package for social science (SPSS) version 9.0 was used for analysis of data (Chicago,Illinois, USA). One way ANOVA was used for comparison of the 3 groups followed by post hocc test (LSD) for detection of significance. Pearson's correlation was also done.

3. Results:

The study included 45 diabetic patients, their mean age were 65.3 ± 3.3 yrs ($60 - 72$ yrs). Fifteen diabetic patients with no complication ,their mean age was 64.5 ± 2.6 yrs ($61.0 - 70.0$ yrs), 30 diabetic patients with coronary atherosclerosis, their mean age was 65.8 ± 3.6 yrs ($60 - 72$ yrs) and 15 age and sex matched as a control group, their mean age was 64.2 ± 3.1 yrs($55 - 68$ yrs).

Table 1 : Comparison between laboratory data of diabetic patients and controls included in the study

Variables	Diabetic Patients Mean ± SD N = 45	Controls Mean ± SD N = 15	P –value
Fasting blood glucose (mg \ dl)	226.6 ± 64.5 (115.0 – 308.0)	89.7 ± 9.4 (70.0 – 105.0)	0.0001*
Total cholesterol (mg\dl)	234.2 ± 31.7 (178.0 – 296.0)	185.6 ± 9.8 (166.0 – 200.0)	0.0001*
Triglyceride (mg\dl)	178.1 ± 21.7 (122.0 – 230.0)	169.6 ± 4.9 (159.0 – 177.0)	0.02*
HDL-c (mg\dl)	39.0 ± 6.7 (28.0 – 58.0)	47.4 ± 5.4 (40.0 – 58.0)	0.0001*
LDL –c (mg\dl)	155.0 ± 20.9 (120.0 – 199.0)	148.1 ± 7.3 (136.0 – 159.0)	0.1
IL18	141.2 ± 34.6 (80.6 – 194.2)	69.2 ± 7.8 (55.6 – 80.5)	0.0001*

Table 2: Correlation between IL 18 of diabetic patients with other laboratory data

Variables	Diabetic patients	
	R	P- value
Fasting blood glucose (mg \ dl)	0.9	0.0001*
HbA1(%)	0.6	0.0001*
Total cholesterol (mg\dl)	0.7	0.0001*
Triglyceride (mg\dl)	0.1	0.7
HDL-c (mg\dl)	- 0.6	0.0001*
LDL –c (mg\dl)	- 0.2	0.3

Table 3 : Comparison between laboratory data of diabetic patients (with no complication and with coronary atherosclerosis) and controls included in the study

Variables	Diabetics with no complication Mean ± SD (Range) N =15	Diabetics with atherosclerosis Mean ± SD (Range) N = 30	Controls Mean ± SD (Range) N = 15	P -value
Fasting blood glucose (mg \ dl)	142.9 ± 17.5^{a} (115.0 – 164.0)	268.5 ± 27.1^{b} (222.0 – 308.0)	89.7 ± 9.4^{c} (70.0 – 105.0)	0.0001*
Total cholesterol (mg\dl)	199.9 ± 12.7^{a} (178.0 – 220.0)	251.4 ± 27.1^{b} (220.0 – 296.0)	185.6 ± 9.8^{c} (166.0 – 200.0)	0.0001*
Triglyceride (mg\dl)	177.3 ± 9.9 (166.0 – 198.0)	178.5 ± 25.9 (122.0 – 230.0)	169.6 ± 4.9 (159.0 – 177.0)	0.3
HDL-c (mg\dl)	$45.4 \pm 6,2^{a}$ (36.0 – 58.0)	35.8 ± 4.3^{b} (28.0 – 42.0)	47.4 ± 5.4^{a} (40.0 – 58.0)	0.001*
LDL –c (mg\dl)	148.1 ± 7.3 (136.0 – 159.0)	158.5 ± 24.5 (120.0 – 199.0)	148.1 ± 7.3 (136.0 – 159.0)	0.09
IL18	100.4 ± 11.4^{a} (80.6 – 115.5)	161.7 ± 21.6^{b} (125.5 – 194.2)	69.2 ± 7.8^{c} (55.6 – 80.5)	0.0001*
HbA1 (%)	8.8 ± 0.9^{a} (7.4 – 10.2)	10.6 ± 1.2^{b} (8.5 – 12.8)	5.4 ± 0.5^{c} (4.4 – 6.2)	0.0001*

Different symbol indicate significance.

Table 4 : Correlation between IL 18 of diabetics (with no complication and with coronary atherosclerosis) and controls included in the study with other laboratory data

Variables	Diabetics with no complication		Diabetics with atherosclerosis		Controls	
	R	P- value	R	P- value	R	P- value
Fasting blood glucose (mg\dl)	0.9	0.0001*	0.8	0.0001*	- 0.02	0.9
Total cholesterol (mg\dl)	0.2	0.4	0.05	0.8	0.5	0.07
Triglyceride (mg\dl)	0.4	0.2	0.03	0.9	0.2	0.4
HDL-c (mg\dl)	- 0.01	1.0	0.1	0.8	0.01	1.0
LDL –c (mg\dl)	- 0.3	0.3	0.1	0.6	0.5	0.07
HbA1 (%)	- 0.1	0.7	0.1	0.5	- 0.1	0.8

4. Discussion:

The prevalence of diabetes worldwide is increasing rapidly in association with the increase in obesity. Complications are a major fear of patients with diabetes. There is increasing evidence that an ongoing cytokine-induced inflammatory response is related closely to the pathogenesis of type 2 DM and the associated complications such as retinopathy, nephropathy, neuropathy, cardiovascular diseases, and peripheral vascular diseases (14).

The present study aimed to assess interleukin 18 in diabetic patients with and without coronary atherosclerosis and to detect its relation to lipid profile and blood glucose.

Our study showed that the mean serum level of Fasting blood glucose, HbA1c, total cholesterol, TG and IL8 is significantly higher, while HDL-c is significantly lower in diabetic patients than that of

the control group (table 1). Also, Fasting blood glucose, HbA1c and total cholesterol have a significant positive correlation, while HDL-c has a significantly negative correlation with IL18 (table 2).

In accordance to these results Esposito et al. (15) revealed that circulating levels of IL-18 concentrations were higher in type 2 diabetic patients than in control subjects. Also, they concluded that there was a significant positive correlation between fasting glucose and IL-18 levels in the diabetic patients. Also, a study done by Fischer et al. (16) demonstrated a higher plasma level of IL-18 in type 2 diabetic patients compared to control subjects.

Additionally, Hivert et al. (17) reported an elevated IL-18 levels that are associated with higher risk of diabetes. This association was independent of usual risk factors.

Atherosclerosis is an inflammatory disease and serum levels of inflammatory markers such as interleukin 18 are used to evaluate patients with coronary artery disease. By sharing classic risk factors with atherosclerosis, type 2 DM may also share a common etiologic pathway which can be the inflammatory pathway. In patients with type 2 diabetes, atherosclerosis is related to a larger number of events such as myocardial infarction and death, when compared with patients without diabetes (1).

In the current study, total cholesterol, HbA1c and IL8 is significantly different in the 3 groups and the highest level in the diabetic patients with atherosclerosis. On the contrary HDL-c is significantly lower in diabetic patients with atherosclerosis than the other 2 groups (table 3). IL8 shows a strong significant positive correlation with fasting blood glucose in diabetic patients with no complication and diabetics with atherosclerosis. No significant correlation was found between IL18 and total cholesterol, triglyceride, HDL or LDL (table 4).

Consistent with these results Suchanek et al. (18) concluded that the type 2 DM patients with coronary artery disease (CAD) had a higher concentration of IL-18 compared to the non diabetic CAD group. Also, the diabetic patients with triple vessel disease were characterized by a higher concentration of IL-18 than the non diabetic patients with the same grade of CAD. Therefore, these results may help to explain the vulnerability of those patients to fatal secondary cardiovascular events.

Additionally, Aso et al. (19) reported an elevated plasma concentrations of IL-18 that might be associated with acceleration of atherosclerosis in type 2 diabetic patients. Furthermore, numbers of carotid plaques were higher in diabetic patients with high IL-18 than in those with normal IL-18. Also, they found a significant positive correlation between plasma IL-18 and FPG in those patients.

IL-18 is thought to exert its main proatherogenic effects by inducing IFN- production, which potentiates the inflammatory process and may lead to thinning or inhibition of the fibrous cap formation, resulting in vulnerable, rupture-prone plaques. In addition, IL-18 seems to increase the expression of matrix metalloproteinases in vascular cells and macrophages, which might also contribute to plaque destabilization (20).

The distribution of several cardiovascular risk factors in the Irish PRIME population was different from the French cohort and thus might account, at least in part, for the excess risk of coronary heart disease (CHD) seen in Belfast. Indeed, several studies demonstrated that the Belfast participants, as compared with the French, had much higher levels of triglycerides and LDL-C and significantly lower concentrations of HDL-C (21).

In the present study, IL8 shows a strong significant positive correlation with blood glucose in diabetic patients with no complication and diabetics with atherosclerosis. This coincide with Thorand et al (22) and Koenig et al (23) who reported that IL-18 is strongly and independently predicted incident type 2 diabetes mellitus over 10.8 years.

The plasma IL-18 concentration was associated with a range of traditional cardiovascular risk factors such as BMI, LDL- and HDL-cholesterol, triglyceride, insulin and proinsulin (24).Other study revealed that different features of the metabolic syndrome such as BMI, triglycerides, HDL-cholesterol, blood pressure and insulin are related to IL-18 levels (24).

Other studies have also investigated the relationship between IL-18 and atherosclerosis. For example, over expression of IL-18 was found in carotid plaques retrieved from symptomatic patients at endarterectomy, as compared to carotid Plaques from non-symptomatic patients (25).

Furthermore, in Japanese patients with type-2 diabetes it was shown that greater intima-media thickness, as measured by ultrasound, was associated with high IL-18 levels (19). So far, however, the relationship between the plasma IL-18 concentration and coronary atherosclerosis has not been investigated.

5. Conclusion:

IL8 is a useful inflammatory marker in diabetic patients and it is higher in those with complication as atherosclerosis.

IL-18 might serve as a marker of future cardiovascular events in human with manifest CHD and/or in areas of high absolute risk of CHD. Thus, further studies are warranted to establish the role of IL-18 in the prediction of CHD risk in diabetic patients.

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Efficient radial basis functions collocation methods for numerical solution of the parabolic PDE's

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Abstract: In this paper, we apply the collocation methods of meshfree RBF over differential equation containing partial derivation of one dimension time dependent with a compound boundary nonlocal condition. in this work, we compare efficient collocation methods in order to obtain approximate solution of nonlocal parabolic differential equations.
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Keywords: partial differential equations, parabolic equations, Radial basis function, collocation method.

1. Introduction

In the recent decades the meshless methods became more considerable for their good flexibility in the finite dimension spaces; therefore the collocation of RBF methods are always successful [6,15] when they obtained suitable results over some types of differential equations containing time dependent partial derivations. If we apply special precision in selection of radial basis function, PDE equation solution can be approximated well, too.

In this paper, we focus on the solution of one dimensional and nonclassical parabolic time dependent differential equations which they have a mixture of integral term and ξ th-derivation of an unknown function u in nonlocal boundary conditions where $\xi \in \{0,1\}$.

Here, we try to solve the above equation by different RBF collocation methods.

Consider the following non-classic boundary value parabolic equation:

$$\frac{\partial u}{\partial t} = \alpha \frac{\partial^2 u}{\partial x^2} + q(x,t),$$

for $0 < x < l, \ 0 < t \leq T, \ \alpha > 0$.
with initial condition

$$u(x,0) = f(x), \ 0 \leq x \leq l. \tag{1}$$

and boundary nonlocal conditions

$$\frac{\partial^\xi u}{\partial x^\xi}(x_1,t) = g(t) \tag{2}$$

and

$$\int_0^{b(t)} u(x,t)dx + \beta \frac{\partial^\zeta u}{\partial x^\zeta}(x_2,t) = h(t),$$

where $\zeta, \xi \in \{0,1\}$, $x_1, x_2 \in [0,l]$, $\beta \in \mathrm{R}$ and the functions f, g, h, are all known and

$$0 < t \leq T, \ 0 < b(t) \leq l.$$

In the cases that $b(t)$ is a constant function, $q(x,t) = 0$, and $x_1 = l$, $\beta = \xi = 0$ an implicit finite difference method is offered for its numerical solution by Cannon and Vander Hoek [3,4].

This equation has been solved by Dehghan and Tatari [17] with the boundary condition $\beta = \xi = 0$, $x_1 \in \{0,1\}$ and constant function $b(t)$ by GA-RBF, and then improved by them [7,18]. Chen et. all also used radial basis function for PDE's in [5]. Some papers have been written to solve partial differential equations using the collocation method with radial basis functions [8,9,10,13,14,16]. Fornberg and Piret used radial basis function for solving a convective partial differential equations on a sphere [12].

We introduce some basic concepts of radial basis functions in Section2, then we try to impose them on the mentioned differential equations. In Section 3, we give some numerical examples and numerical results of these examples. Finally, we present the Conclusion in Section 4.

2. Radial Basis Functions Knowledge

For a fixed point $\mathbf{x}_j \in \mathrm{R}^d$, a radial basis function is defined as:

$$\varphi_j(\mathbf{x}) = \varphi(\|\mathbf{x} - \mathbf{x}_j\|) \tag{3}$$

which is a function only dependent on the

distance between $x \in \mathbb{R}^d$ and the point x_j. This function is radially symmetric near the center x_j.

Throughout of this work we use GA, MQ, IMQ and IQ-RBF with the following forms, respectively

$$\phi(r) = \exp(-cr^2) \qquad (4)$$

$$\phi(r) = \sqrt{r^2 + c^2} \qquad (5)$$

$$\phi(r) = (\sqrt{r^2 + c^2})^{-1} \qquad (6)$$

$$\phi(r) = (r^2 + c^2)^{-1} \qquad (7)$$

where c is a shape parameter which should be considered suitably also the Euclidean distance is considered for the RBF. These types of functions have a global support and they are suitable for interpolation of scattered data [2,11].

3. Method Discussion

Consider the following problem:
$$Lu(x,t) = q(x,t), \quad (x,t) \in \Omega \times (0,T] \qquad (8)$$

which Ω is a spacial domain and L is a second order linear parabolic operator. Also consider the initial and non-local boundary operators, respectively as follows:
$$\ell u(x,t) = f(x), \quad (x,t) \in \Omega \times \{0\}$$

and for $(x,t) \in \partial\Omega \times (0,T)$ we have two operatores

$$S_v u(x,t) = \begin{cases} g(t), & v = 1, \\ h(t), & v = 2, \end{cases} \qquad (9)$$

By considering:
$$\mathbf{x} = (x,t)$$

we try to find an approximating function $p(\mathbf{x})$ over $\mathbb{R}^2$ for the solution of the problem in the following form:

$$p(\mathbf{x}) = \sum_{j=1}^{m} \lambda_j \varphi(\|\mathbf{x} - \mathbf{x}_j\|) \qquad (11)$$

where λ_j's are real coefficients.

Suppose that the following sets contain a collocation of scattered nodes in every levels of interpolation for $T > T_1$

$$\Xi_1 = \{(x_i,t_i) \in \overline{\Omega} \times [0,T_1], \ i = 1,\dots,m\},$$

and for $k = 2,3,\dots$ and for all
$$(x_i,t_i) \in \Xi_1, \ i = 1,\dots,m$$

$$\Xi_k = \{(x_i, t_i + (k-1)T_1)\}$$

and the problem has a solution in $\overline{\Omega} \times [(k-1)T_1, kT_1]$.

Considering:
$$h_{ij} = \left[\frac{\partial \varphi}{\partial t} - \alpha \frac{\partial^2 \varphi}{\partial x^2} \right] (\|\mathbf{x}_i - \mathbf{x}_j\|)$$

and
$$q_i = q(\mathbf{x}_i), i = 1,\dots,N_1$$

we have a linear system of equations
$$H\Lambda = q$$

where $H = [h_{ij}]$, $\Lambda = [\lambda_j]$

Also applying initial operator lead us to an others linear system of equations:
$$Z\Lambda = f$$

where $Z = [z_{ij}]$, such that for $j = 1,\dots,m$ and $i = N_1 + 1,\dots,N_2$

$$z_{ij} = \ell \varphi(\|\mathbf{x}_i - \mathbf{x}_j\|),$$

Now for $j = 1,\dots,m$ and $i = N_2 + 1,\dots,N_3$ we define

$$v_{ij} = S_1 \varphi(\|\mathbf{x}_i - \mathbf{x}_j\|),$$

and for $j = 1,\dots,m$ and $i = N_3 + 1,\dots,m$

$$w_{ij} = S_2 \varphi(\|\mathbf{x}_i - \mathbf{x}_j\|).$$

By considering:
$$S_v u = g, \ S_v u = h$$

we have

$$V\Lambda = g,$$

and
$$W\Lambda = h.$$

By considering
$$A = [H, Z, V, W]^T,$$

$$B = [q, f, g, h]^T,$$

and
$$\Lambda = [\lambda_j]$$

We have the following linear system of equations with a $m \times m$ coefficient matrix

$$A\Lambda = B$$

A is an ill-conditional full and non-symmetric matrix which its condition number may be large. But it is strictly positive definite.

This system, besides, has always a unique solution that we can convert the matrix to the same small matrixes accompany with better and smaller condition number and represent an acceptable solution by preconditioning coefficient matrix with the help of numerical methods. Since, finding solution for large times needs a lot of operators and memory, so, if T_1 is chosen such that a small number of the collocation points provides an accurate approximation in $\overline{\Omega} \times [0, T_1]$, [4] we can solve this linear system easily by factorization methods in every level of small times accompany with discritization of space and time variables [17], because in every level of time resulted matrix have a small dimension and then computing will be done easily.

Chosen points, will produce the same matrix in every level of time that we just need decomposition of a matrix [1], Since a set of scattered nodes will use instead of mesh of whole points domain.

This advantage of mentioned collocation method will be result in computing solution in different level of time without instability.

3. Numerical Examples

In this section two examples are given which have been solved by considering IMQ, MQ, GA and IQ radial basis functions. In all examples we used the method for the first layer of equations.

Example 11

In this example, we considered the problem by using

$$b(t) = \beta = x_1 = x_2 = \xi = \zeta = 1,$$

$$\alpha = \frac{8}{\pi^2}, \quad \Omega = [0,1].$$

and

$$f(x) = \sin(\frac{\pi}{2}x), \quad 0 < x < 1,$$

$$g(t) = 0, \quad 0 < t < 1,$$

$$h(t) = \frac{2}{\pi}\exp(-2t), \quad 0 < t \le 1,$$

$$q(x,t) = 0, \quad 0 < t \le 1, \quad 0 < x < 1.$$

and $0 \le t \le 0.002$, $0 \le x \le 1$; in relations (1)-(4). By considering $m = 33$, $0 \le t \le 0.002$, $\delta = 20$, $c = 2$, $\Delta x = 0.1$ and $\Delta t = 0.001$ we have the following error functions
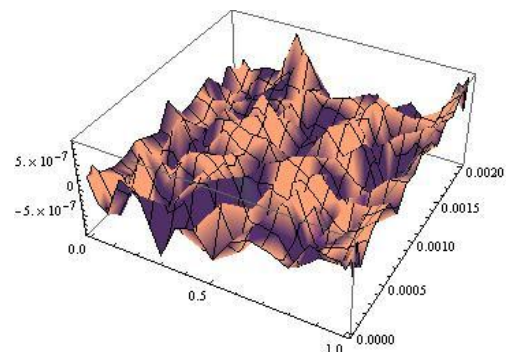
Figure 1: IMQ-RBF method
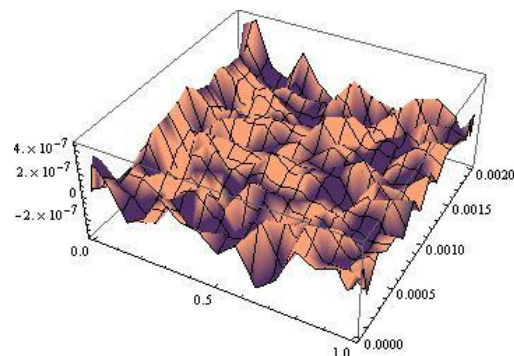
Figure 2: GA-RBF method
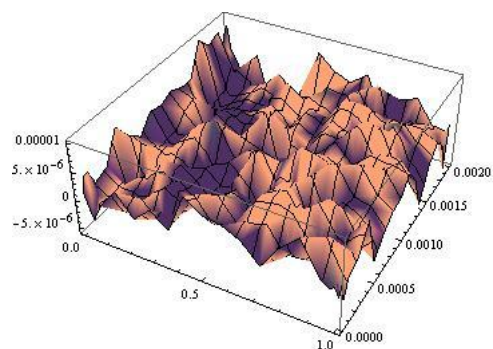
Figure 3: IQ-RBF method
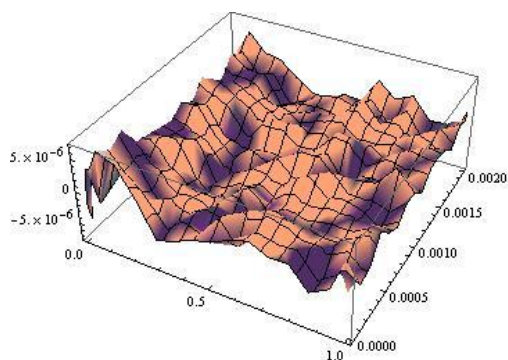
Figure 4: MQ-RBF method
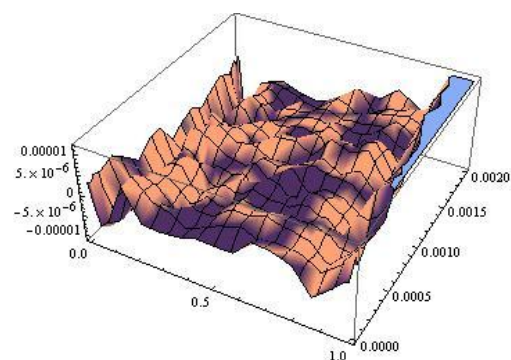
The exact solution of this problem is

$$u(x,t) = \sin(\frac{\pi}{2}x)\exp(-2t) \qquad (12)$$

Example 22

In this example, we considered the problem by using

$$b(t), \beta, x_2, \zeta = 1, x_1, \xi = 0,$$
$$\alpha = 2, \qquad \Omega = [0,1].$$

and

$$f(x) = \exp(x), \quad 0 < x < 1,$$

$$g(t) = \exp(2t), \quad 0 < t < 1,$$

$$h(t) = -\exp(2t), \quad 0 < t \le 1,$$

$$q(x,t) = 0, \quad 0 < t \le 1, \quad 0 < x < 1.$$

and $0 \le t \le 0.002$, $0 \le x \le 1$; in relations (1)-(4). By considering $m = 33$, $0 \le t \le 0.002$, $\delta = 20$, $c = 3$, $\Delta x = 0.1$ and $\Delta t = 0.001$ we have the following error functions
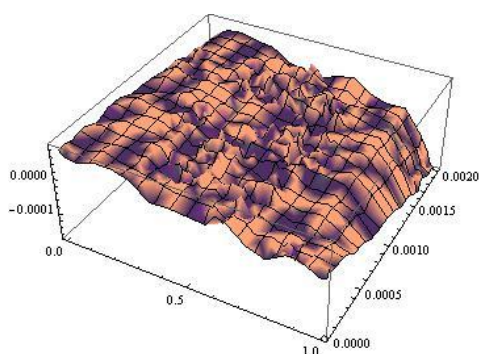
Figure 5: GA-RBF method

Figure 6: IMQ-RBF method
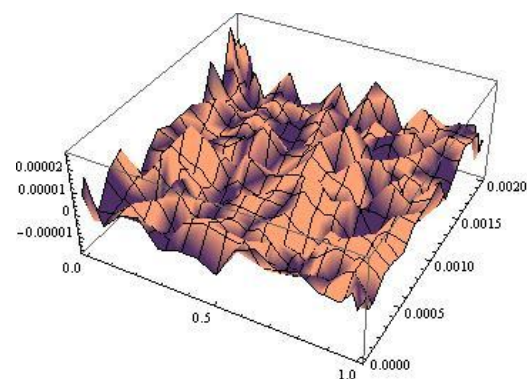
Figure 7: IQ-RBF method
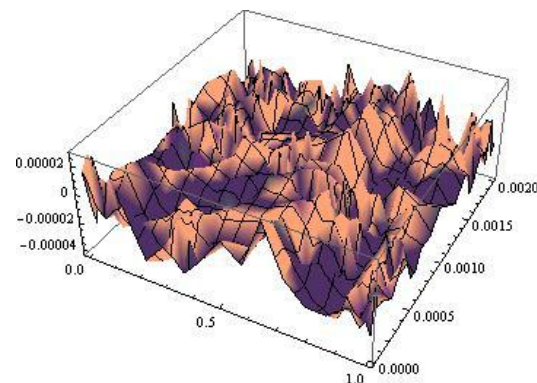
Figure 8: MQ-RBF method

The exact solution of this problem is
$$u(x,t) = \exp(x+2t) \qquad (13)$$

3. Conclusion

In such problems, the traditional mesh methods will never offer because we can do discretization of variables by collocation methods so that the cost of computations and discretization of variables will reduce strongly. Thus, meanwhile approximating accurate and correct solution, we have at least error and we are able to change the time and space interval divisions in every level. The used radial basis function is a collocation method in this type of

problems and if we take care in selection of approximator radial basis functions and their shape parameter we can obtain more accurate solution with less error.

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Menopausal Symptoms and Quality of Life among Saudi Women in Riyadh and Taif

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Abstract: This work aimed to study the effect of menopause symptoms on Saudi women's quality of life. A descriptive study was carried out on a convenient sample of 120 women during their menopausal period who attended two gynaecologic clinics, in Riyadh, KSMC and Taif, KSA. The subjects were interviewed individually throughout a period of 10 months from February 2010 to November 2010.An interview questionnaire and Greene Climacteric Scale,and menopausal symptoms and the Manchester health questionnaire were used for data collection. The results showed 80% of none educated menopausal women had poor quality of life, 75% of the worker also, had poor quality of life and 63.7% of them who were multipara had poor quality of life. The Pearson correlation test proved a negative significant correlation between the total mean score of quality of life and total mean score of menopausal symptoms. The study concluded that Saudi menopausal women in the study subjects experience high prevalence of menopausal symptoms that adversely affected their quality of life. Women's general characteristics such as: educational level, cohabitation, family size and their gravidity were among factors contributed to their poor quality of life.
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1. Introduction:

The term "menopause" denotes the final cessation of menstruation, either as a normal part of aging or as the result of surgical removal of both ovaries. (Gharaibeh*et al*., 2010). In a broader sense, the passing of time makes ovaries lose their ability to produce estrogen and progesterone, the hormones which regulate the menstrual cycle. In this stage, when menstruation ceases, there appear physical and psychical changes such as hot flushes, sweating, vaginal dryness, articulation and bone pain, headaches, insomnia, sadness, depression and loss of memory, known as climacteric symptoms (Zoler*et al*., 2005). Furthermore, the time of menopause often coincides with other major life changes, such as departure of children from the home, a midlife identity crisis, or divorce. These events, coupled with a sense of the loss of youth, may exacerbate the symptoms of menopause and cause psychologic distress. (Satoh*et al*., 2005).

Midlife is the critical period of human life. In this period, women have the responsibility to take care of their grown up children, parents, and other family members (Chedraui*et al*., 2009).This situation leads to women being identified as a sandwich generation (De Loach&Greer., 198,Alexander.,2001) , they stated that physical disability occurring during middle-age presents problems that often differ from other developmental periods. Thus, if middle age women have a disability, it may affect their quality of life.

Some peri-menopausal women, however, consider that these symptoms are natural and transient, and they often wait for the symptoms to pass. Therefore, community-dwelling, middle-aged, healthy women may possibly experience a decrease of QOL for 4–5 years around the menopause without any social help (Satoh*et al*., 2005).

The WHO task Force on quality of Life (1993) defined it as an individual's perception of his/her position in life in the context of the culture and value systems in which the women lives, and in relation to her goals, expectations, standards and concerns. Also, the WHO identified four broad domains as being universally relevant for quality of life, namely physical health, psychological well-being, social relationships, and environment (Hendry ., 2004 and Pensri., 2007).

The menopause has been reported as one of the opportunities for women, to visit health-care services (Guthrie, 2003). Health-care providers need to play a more visible and instrumental role in continuously assessing menopausal women's needs as well as to implement appropriate health educational programs and to develop a new way to meet their demands. So, standardized measures are needed to assess changes of quality of life arising from menopause. (Krajewska ., 2007 andGharaibeh*et*

al.,2010). Thus the present study aimed to assess the effect of menopause symptoms on Saudi women's quality of life.

2. Subjects & Method:
Research Settings:
This research was carried out in King Saud Medical Complex (KSMC), at the Gynaecological Clinic, and at King Abd El Aziz hospital in Taif.

Subjects:
The sample consisted of 120 Saudi menopausal women, whom ages ranged between 45 and 55 years, who were seeking medical help.
Women who are on HRT, or had an ovarectomy, hysterectomy or chronic disease were excluded from the study.

Tool of Data Collection:
A structured questionnaire sheet was prepared by the researchers including 3 parts. First part , was developed by the researchers after exclusive review of literature , second and third part were modified from Greene Climacteric Scale (Greene .,1998), menopausal symptoms list by (Schneider and Behre., 2002 andGermain*et al*.,2001) and Manchester health questionnaire (Bugg*et al*., 2001) to collect the necessary data and cover the aim of the study as follow:

First part: used to collect the socio demographic data, including: age and level of education, occupation, gravidity, cohabitation and family size.

Second part: modified vision of Greene Climacteric Scale(Greene J.G.1998) and menopausal symptoms list (Germain*et al*., 2001and Schneider and Behre., 2002)done by the researchers to assess the menopausal symptoms and severity. This part consisted of 62 items categorized under 10 main menopausal symptoms with different sub items .Each symptom severity scored from 0 (none) to 3 (severe). In order to facilitate analysis and interpretation of the result, total scores in each area were between zero and 100, those who obtained scores less than 25 were considered to have no symptoms, less than 50 was mild symptoms, less than 75 were moderate symptoms and more than 75 were considered to have severe symptoms.

Third part: The Manchester health questionnaire was developed by (Bugg*et al*., 2001) .The questionnaire is both a valid and reliable instrument for the assessment of health-related quality of life among women and it will be useful in many different clinical settings. So , it was modified by the researchers for the purpose of assessing the quality of life (QOL) for menopausal women, it contained 15 items, categorized under 5 main areas with different relatedsub items.

A separate 5 point scale ranging from never (4) to always (o point) was used for the measurement of each items. total score of each domain were ranged between zero and 100 ; the higher score indicating a good QOL, a lower score indicating a poor QOL and high effect of menopausal symptoms on quality of life. Those who obtained scores from 0 to 33.3 % were considered to have high effect of menopausal symptoms on QOL (poor QOL), more than 33.3 % to 66.7% were considered to have moderate effect of menopausal symptoms on quality of life (average QOL) and more than 66.7% were considered to have mild effect of menopausal symptoms on quality of life (good QOL)

Methods:
Official permissions to conduct the study were obtained from the responsible authorities.
Informed consent to participate in the study was obtained from the subjects.
 A pilot study was carried out after the development of the tool on 10 % of the sample of menopausal women who were taken from the previously mentioned setting.

Content validity of tools was determined through an extensive review of literature regarding menopausal symptoms and quality of life.

The structured questionnaire sheet was ascertained by jury who consisted of 5 experts with more than 10 years of experience in maternity and gynaecologic nursing, community health nursing and psychiatric health nursing. Modifications of the tools were done accordingly.

Each subject was individually interviewed using the previously mentioned tool. Time consumed for each interview ranges from 15 to 30 minutes.

The collected data were categorized, tabulated and made ready for use.

The tools of data collection were translated into Arabic by the researchers, tested and verified by bilingual persons.

Statistical analysis:
The Data was collected and entered into the personal computer. Statistical analysis was done using Statistical Package for Social Sciences (SPSS/version 17) software. The statistical test used as follow:

Arthematic mean, standard deviation, for categorized parameters Chai square test was used. While for twogroups t-test was used for parametric data, while for more than 2 groups ANOVA (F) test was used. Spearman correlation coefficient was used

to detect the correlation between different variables. The level of significant was 0.05.

3. Results

The general characteristics of the study subjects (Table I) showed that , slightly more than one half (54.17%, 50.83% respectively) of the study subjects were aged 50 to less than 55 years old and had primary or preparatory education respectively. The table (I) also presented that, half of them (50%) house wife, more than one third (34.17%) of the study subjects had more than nine children, most of them (94.17%) were multipara and less than two thirds (61.67%) live in extended family.

On assessing severity of the menopausal symptoms (Table II) it can be observed that, the highest mean scores of menopausal symptoms were in different domains urinary tract, muscles and skeletal (12.3±3.1, 10.4± 2.7, respectively) compared to respiratory and cardiovascular (2.0±0.9 and 3.4± 1.2, respectively) which are the lowest.

Concerning quality of life items (Table III), it can be observed that, mean scores of poor quality of life in different domains as physical limitation, role limitation, social limitation, and sleep and energy were averaged 6.98±4.98, 5.98±2.98, 6.98±4.98 and 5.65±2.98, respectively. This means that, the low score of quality life items (poor quality of life) high effect of postmenopausal symptoms on quality of life.

Regarding the relation between the general characteristics and quality of life (Table IV) , It was found that the majority (80%) none educated menopausal women had poor quality of life compared to educated women that had good quality

of life, there was a statistical significance differences between quality of life and education (P=0.04), As regards occupation ,three quarters (75%) of the worker also, had poor quality of life ,while more than one quarter were employed and had good quality of life, there was a statistical significance differences between quality of life and occupation (P=0.02). About two thirds 63.7% of menopausal women who were multipara had poor quality of life, there was a statistical significance differences between quality of life and gravidity (P= 0.01), It was observed that, the poor quality of life for the subjects who live alone and had no children (80% and 80% respectively, there was a statistical significance differences between quality of life and cohabitation (P= 0.01) and family size (P= 0.01) .

The Pearson correlation test proved a negative significant correlation between the total mean score of quality of life and total mean score of menopausal symptoms (r=-0.75 and P=0.04) as seen in Table V.

Regarding the correlation between total score of quality of life and menopausal symptoms, from this table it was found that there was a negative significant correlation between total score of quality of life and Gynaecological, Urinary tract, Integumentary, GIT, Muscle-skeletal, Vasomotor , Psychosocial and Sexual symptoms. i.e. the increasing in this symptoms cause significant decreasing in the total score of quality of life, while both CVS symptoms and respiratory symptoms had no significant correlation with total score of quality of life as showed in Table VI.

Table I: **Distribution of the study sample according to their general characteristics.**

General characteristics	No. (120)	%
Age:		
45	37	30.8
50-	65	54.2
55+	18	15.0
Education:		
Illiterate	10	8.3
Primary/Preparatory School	61	50.8
Secondary School	41	34.2
University	8	6.7
Occupation:		
Housewife	60	50.0
Worker	60	50.0
Gravidity:		
Null Para	7	5.8
Multi-Para	113	94.2
Cohabitation:		
Alone	15	12.5
Husband/Sibling	31	25.8
Relatives/Children	74	61.7
Family Size:		
Less than 3	21	17.5
3 to 5	22	18.3
6 to 8	21	17.5
9 and more	41	34.2

Table II: Distribution of the sample according to the Severity of the menopausal Symptoms.

Severity of menopausal symptoms	No	%	Mean +SD (range)
Gynaecologic symptoms			
None	6	5.0	7.4± 2.3 1-12
Mild	20	16.7	
Moderate	44	36.7	
Severe	50	50.0	
Urinary tract symptoms			
None	0	0.0	12.3±3.1 1- 15
Mild	5	4.2	
Moderate	38	31.7	
Severe	77	64.2	
Integumentary symptoms			
None	3	2.5	8.2± 2.5 1 – 15
Mild	5	4.2	
Moderate	44	36.7	
Severe	68	56.7	
Gastrointestinal symptoms			
None	0	0.0	8.1± 2.7 1-12
Mild	0	0.0	
Moderate	38	31.7	
Severe	82	68.3	
Cardiovascular symptoms			
None	13	10.8	3.4± 1.2 1-6
Mild	33	27.5	
Moderate	31	25.8	
Severe	43	35.8	
Respiratory symptoms			
None	33	27.5	2.0±0.9 1-3
Mild	32	26.7	
Moderate	55	45.8	
Severe	0	0.0	
Muscles and skeletal symptoms			
None	0	0.0	10.4± 2.7 1-18
Mild	6	5.0	
Moderate	65	54.2	
Severe	49	40.8	
Vasomotor symptoms			
None	2	1.7	6.1±2.2 1-9
Mild	0	0.0	
Moderate	16	13.3	
Severe	102	85.0	
Psycho- social symptoms			
None	0	0.0	7.1±2.6 1-12
Mild	10	8.3	
Moderate	40	33.3	
Severe	70	58.3	
Sexual symptoms			
None	0	0.0	6.5±2.8 1-9
Mild	5	4.2	
Moderate	40	33.3	
Severe	75	62.5	

Table III: Distribution of the samples according to quality of life items

Items	No	%	Mean +SD (range)
Physical limitation			6.98±4.98 0-12
Good	16	13.3	
Moderate	10	8.3	
Poor	94	78.3	
Role limitation			5.98±2.98 0-8
Good	7	5.8	
Moderate	10	8.3	
Poor	103	85.8	
Social limitation			6.98±3.98 0-12
Good	23	19.2	
Moderate	11	9.2	
Poor	86	71.7	
Psychological limitation			10.2±3.89 0-20
Good	8	6.7	
Moderate	10	8.3	
Poor	102	85.0	
Sleep & Energy			5.65±2.98 0-8
Good	0	0.0	
Moderate	4	3.3	
Poor	116	96.7	
Total quality of life score Mean± S.D. Range	45.9±4.2 0-60		

Table V: Distribution of the sample according to their general characteristics and quality of life.

General characteristics	Quality of life			Total	P
	Good _N=15_	_Moderate_ _N=29_	_Poor_ _N=76_	N=120	
Age (years)					
40 -	5(13.5%)	12(32.4%)	20(54.1%)	37 (100%)	
50-	8(12.3%)	12(18.5%)	45(69.2%)	65 (100%)	
55+	2(11.1%)	4(22.2%)	12(66.7%)	18 (100%)	P=0.06
Min –Max (age)	42 – 58	44 – 59	49-61	42 – 61	NS
Mean +_ SD	51.8±11.9	52.7±13.2	55.4± 12.5	54.2 +- 11.7	
Education					
Illiterate	0	2(20%)	8(80%)	10(100%)	
Primary\ preparatory school	4(6.6%)	15(24.6%)	42(68.8%)	61(100%)	P= 0.04
Secondary school	8(19.5%)	11 (26.8%)	22(53.7%)	41(100%)	Sig.
University	3(37.5%)	1(12.5%)	4(50%)	8(100%)	
Occupation					
House wife	1(1.7%)	17(28.3%)	42(70%)	60(100%)	
Worker	0	2(25%)	6(75%)	8(100%)	P=0.02
Employ	14(26.9%)	10(19.2%)	28(53.9%)	52(100%)	Sig.
Gravidity					
Null Para	0	3 (42.9%)	4(57.1%)	7(100%)	P= 0.01
Multi-Para	15(13.3%)	26(23%)	72(63.7%)	113(100%)	Sig.
Cohabitation					
alone	0	3(20%)	12(80%)	15(100%)	
Husband\ sibling	2(6.5%)	4(13%)	25(80.5%)	31(100%)	P=0.001
Relatives\ children	13(17.6%)	22(29.7%)	39(52.7%)	74(100%)	Sig.
Family size:					
Less than 3	1 (4.7%)	6 (28.6%)	14 (66.7%)	21 (100%)	
3 – 5	5 (22.7%)	4 (18.2%)	13 (59.1%)	22 (100%)	P=0.01
6 - 8	0	4 (19%)	17 (81%)	21 (100%)	Sig.
9 & More	9 (22%)	12 (29.3%)	20 (48.7%)	41 (100%)	

Table V: The total means score and relation between severity of menopausal symptoms and quality of life among menopausal women

Total N= 120	Total mean score of menopausal symptoms	Total mean score of quality of life
Min- Max	0- 84	0-60
Mean + SD	51.6±8.2	45.9±4.2
Pearson correlation (r)	- 0.75	
Significance (2 tail)	0.04 sig.	

Table VI: Correlations between total score of quality of life and total score of menopausal symptoms as well as symptom's sub domains

Total score of Menopausal symptoms	Pearson correlation (r)	Significance
Gynaecological symptoms	- 0. 62	0.05*.
Urinary tract symptoms	- 0.75	0.03*
Integumentary symptoms	- 0.68	0.04*
GIT symptoms.	-0.80	0.01*
CVS symptoms.	- 0.58	0.07 NS
Respiratory .symptoms.	- 0.51	0.06 NS
Muscle-skeletal symptoms	- 0.85	0.001**
Vasomotor symptoms.	-0.70	0.04*
Psychosocial symptoms	- 0.72	0.03*
Sexual symptoms.	-0. 81	0.01*

4. Discussion:

Menopause is a transitional period that every woman goes through if she lives beyond the age of 52 years (Gharaibeh*et al.*, 2010).The individual response to menopause and estrogen deficiency varies considerably due to genetic, cultural, lifestyle, socioeconomic, education, and dietary factors (Sturdee.,2008).

Unfortunately, the incidence of menopausal symptoms may be increasing due to modern life styles which tend to emphasize ease rather than physical activity (Leplegeand Lorraine., 2000). The results of the present study revealed that, almost all of the Saudi women in the study subjects suffered from different menopausal symptoms such as: musculoskeletal, sexual, vasomotor, psychological as well as cardiovascular symptoms. These results are congruent with Gharaibeh*et al*., (2010) who found that vasomotor signs were reported to have the highest scores for severity as manifested by hot flushes and night sweating. The prevalence of cardiovascular diseases increases more dramatically in older post-menopausal women, potentially attributable to the decline in sex steroids (Leplegeand Lorraine, 2000).

Poor scores for different items of quality of life were observed among the study subjects including physical, role, social and psychological limitation as well as sleep and energy. These results were supported by Sturdee(2008) who denoted that, hot flush is the characteristic and most common menopausal symptoms and together with night sweats and disturbed sleep can have a major impact on quality of life.

A negative significant relation was demonstrated between quality of life and post-menopausal symptoms, where quality of life adversely affected by postmenopausal symptoms among the postmenopausal Saudi women in the study subjects. This in agree with the results of Karaçamand eker(2007)who found a significant and moderately negative relation between total menopausal symptom scores and quality of life scores. Also, Daly *et al*., (1993) concluded that quality of life is severely compromised by the presence of menopausal symptoms, indicating that the effects of these symptoms may have been underestimated. Wafaa .,(2007)explained these results by the fact that wellbeing in general is related to self-rated health status, symptoms, stress, vasomotor symptoms and attitude toward aging and menopause.

Regarding factors associated with post-menopausal symptoms and their relationship with the quality of life among the post-menopausal Saudi women in the study subjects, a significant relation was observed between quality of life and their general characteristics including: education, occupation, cohabitation, family size as well as their gravidity. Similar results were reported by Gharaibeh*et al*.(2010)who found a significant relationship between the severity and occurrence of menopausal symptoms and age, family income, level of education, number of children, perceived health status and menopausal status.Krajewska*et al* .(2007) added that age, level of education and working/non-working status may contribute to significant variations in menopausal symptoms. This may be related to the fact that menopausal symptoms are influenced by socio- demographic/ socio-cultural factors, economical stresses, general health status, individual perception of menopause, genetic and racial differences and reproductive parameters like parity (Nisar andSohoo2010).

Conclusion:

It can be concluded that post-menopausal Saudi women in the study subjects experience high prevalence of menopausal symptoms that adversely affected their quality of life. Women's general characteristics such as: educational level, cohabitation, family size and their gravidity were among factors contributed to their poor quality of life.

Recommendation:

This study has implications for research, practice and education where, Health-care providers need to play a more visible and instrumental role in continuously assessing menopausal women's needs as well as to implement appropriate health educational programs. Further research addressing women's health needs is also essential for improving the quality of life of menopausal women in Saudi Arabia.

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Amendment Effect of Antioxidants of Barley and Oat against Teratogenicity Induced by Amitraz

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Abstract: The present study investigated the protective effect of phytonutrients and antioxidants in barley and oat added to diet on teratognic effects induced by amitraz® after maternal exposure during pregnancy. 40 pregnant albino rats were divided into 4 groups each of 10. one group was kept as control fed the balanced ration& administered distilled water. Three groups were administered amitraz® (50 mg/ kg b.w.) by gavage during organogenesis from days 6 through day15 of gestation, a group of them fed the balanced ratio and the other 2 groups fed the same diet supplemented with barley or oat (20%), 4 days prior of gestation and continued till the end of the experiment. All dams underwent a caesarean section on day 20 of gestation and their fetuses were examined for external, visceral and skeletal abnormalities. Amitraz induced maternal toxicity manifested as lower body weight gain, developmental toxicity included fetal death, a decrease in fetal body weight and length, as well as increased incidence of fetal external, visceral & skeletal anomalies. These findings were prevented or in lower incidence in groups provided with barley or oat. The obtained data were reviewed and discussed. Conclusively, barley and oat supplement have protective and positive modulation response due to their phytonutrients and antioxidants against congenital anomalies induced by amitraz®. In recommendation, the incorporation of cereal grains such as barley and oat in the food products are chemopreventive agents for adverse effects of xenobiotics.
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Keywords: Amendment Effect; Antioxidant; Barley; Oat; Teratogenicity; Induced; Amitraz

1. Introduction:

Amitraz is a triazapentadiene compound, a member of the amidine chemical family. It is an insecticide and acaricide used in agriculture and veterinary medicine. It is used to control ticks, mites, lice and other animal pests (Institoris *et al.*, 2007). Amitraz poisoning can occur through oral or dermal routs and potentially by inhalation. Poisoning cases were reported in both human and animal (Proudfoot, 2003). The most common adverse effects associated with amitraz are central nervous system alterations (Yilmaz and Yildizdas, 2003; Kim *et al.*, 2007). There are limited data on reproductive and developmental toxicity due to amitraz. Landmarks alterations due to amitraz exposure in rats were recoded by Palermo – Neto *et al*.(1994) and (1997) prenataly and posnataly respectevly . Osano *et al.* (2002) reported that exposing the frog to amitraz resulted in an increase in the incidence of edema, pigment loss and encephalomegaly. Al–Thani *et al*. (2003) recorded a decrease in fertility index, sperm production and postimplantation loss in male mice exposed to amitraz (40 ppm) in drinking water. Kim *et al.* (2007) studied developmental toxicity in rats given amitraz during gestation.

Phytonutrients are abundant in whole grains such as barley & oat which protect against cancer and heart diseases. Dietary modulation immune functions by barley or oat – glucans is useful to immune system & increase resistance against pathogens (Voiman *et al*, 2007), lower high cholesterol, LDL & triglycerides (Ames & Rhymer, 2008; Nancy and Camille, 2008). Barley and oat are dietary sources of water soluble, fat soluble & insoluble antioxidants include vit. E, tocotrienals; phenolic & phytic acids, flavons, flovonoids, selenium as well as good sources of amino and fatty acids, sugar, carbohydrate, vitamins, -glucans, minerals Ca, P, Na, K, F, Cu, Zn, Mn, & Mg (Erkkila *et al.*, 2005; Djousse & Gaziano, 2007; Kurtz & Wallo, 2007, Lee- Manion *et al.*, 2009 and Gallagher *et al.*, 2010). Therefore, the aim of this work was to evaluate the amendment effect of barley & oat supplement against teratogenicity induced by amitraz during pregnancy at the period of organogenesis in albino eats.

2. Material and Methods

Amitraz [N, N – (methylimino) dimethylidyne], a formamidine insecticide and acaricide was obtained from ADWIA company Egypt, Barley (Hordeum Vulgare L) and oat (Avena sativa L) were used in this work.

Experimental animals:

40 females & 20 males adult albino rats of Wistar strain were used in this study.

Experimental Design:

Rats were divided into 4 groups each of 10. one group was kept as control, administered sterilized distilled water & fed the balanced ration. The other Three groups administered by gavage, amitraz (50 mg / kg b.w.) from days 6 through day 15 day of gestation and fed the same diet, except 2 groups supplemented with barley or oat as 20% of diet, 4 days prior gestation and continued during gestation till the end of the experiment.

Teratogenicity study:

Experimental rats were mated overnight with control males and the next morning, the presence of sperms in vaginal smear was considered to be 0 day of pregnancy. Initial and final maternal body weight was measured. At the scheduled termination, day 20 of gestation, all dams were euthanized by ether inhalation and caesarian sections were performed. The ovaries and uteri from each female were removed and examined for the number of corpora lutea, status of all the implantation sites (ie, live & dead fetuses, early and late resorptins and total implantations). The uteri with no evidence of implantation were stained with a 2% sodium hydroxide solution to identity the presence of early resorptin sites (Yamada *et al.*, 1985). If no stained implantation sites were present, the rat was considered not pregnant. Resorption was classified as "early" when only a resorption site resembling a dark brown clot and with no embryonic tissue was visible and it was classified as "late" when both the placental and embryonic tissues were visible at the post – mortem examination. All live fetuses were removed, dried on absorbent paper, individually weighed, sexed, measured the crown- rump length and examined for any morphological abnormalities

including a cleft palate. Alternative fetuses were selected for either a skeletal or visceral examination. Half of live fetuses from each litter was fixed in ethanol, cleared with KOH and stained with Alizerin red S and examined for skeletal malformations (Staples & Schnell, 1964). The other half was preserved in Bouin`s solution and examined for internal soft tissue changes using a free hand razor sectioning technique and examined under a dissecting microscope (Wilson 1972; Nishimura, 1974).

Statistical analysis: of quantitative data were subjected to "t" test, while the incidence of fetal anomalies using litters was analysed by the Fisher`s exact probability test and the Mann – Whitney U test. The significance level for each statistical comparison was reported at P < 0.05 using software SPSS (2006).

3. Results

Table 1, summarizes the maternal and fetal findings for dams treated with amitraz. The number of implantations, placental weight and the gender ratio of live fetuses were similar among the experimental groups. However, the number of fetal deaths including resorptions and dead fetuses was significantly higher, whereas fetal body weight and length were lower in amitraz – treated group than the control and the supplemented groups with barley or oat. Table 2 shows the fetal external abnormalities with a significantly higher incidence in amitraz – treated group in comparison with the supplemented and control groups.

Fetal visceral and skeletal anomalies were recorded in Tables (3 & 4), respectively. Malformations were severe with high incidence in the group given amitraz only, versus the supplemented groups with barley or oat.

Table(1):Effect of barley (B)or oat(O)supplement on fetal maternal and fetal values from dam given amitraz(A)50/kg by gavage through 6-15days of gestation.

Parameter \ Group	Control	A	A±B	A±O
Maternal weight gain.	63.6 ±0.5	*31.3±.055	*54.5±1.33	0.78±*56.1
No. Of corpora lutea.	12.2 ±0.2	12.25±0.4	12.4±0.2	12.3±0.3
No. of implantation sites	11.9±0.2	11.9±0.4	12.0±0.3	11.9±0.2
Resorption :Early	0.2±0.01	*1.1±0.01	0.5±0.04	0.5±0.02
.Late	0	*4.4±0.03	1.6±0.05	1.4±0.03
Live fetuses.	11.7±0.5	*6.2±0.12	9.9±0.4	10.0±0.22
Dead fetuses.	0	*0.2±0.01	0	0
Fetal weight(g)	4.0±0.22	*2.2±0.28	3.5±0.3	3.3±0.5
Fetal length(cm)	3.7±0.3	*2.0±0.1	3.2±0.33	3.0±0.5
Sex ratio(M/F)	1.2±0.02	1.57±00.3	1.35	1.26
Placental weight(g)	0.5±0.04	0.7±0.02	0.62±0.02	0.64±0.05

*Significantly different form controls using" t"test and *,Mann-Whitney U test at P<0.05

Table(2): Effect of barley (B)or oat(O)supplement on fetal external abnormalities from dam given amitraz(A)50/kg by gavage through 6-15days of gestation.

Group Parameter	Control	A	A±B	A±O
Fetuses examined.	116	69	98	100
Cleft palate	0	15(*24.2)	0	2*(2)
Hydrocephaly.	0	13(*21)	0	0
Hematoma.	0	15(*24.2)	5(*5.1)	5*(5)
Micromelia.	0	20(*32.25)	7(*7.4)	5*(5)
Syndactyly.	0	12(*19.4)	0	3*(3)
Tail:short or stunt .	0	21(*33.87)	10(*10.2)	8*(8)
Anal atrasia.	0	11(*17.74)	3(*3.1)	3*(3)
Improforated anus.	0	11(*17.74)	5(*5.1)	3*(3)
No genital papillae.	o	10(*16.13)	0	0

Values indicate the No. malformed fetuses (average %of malformed fetuses per liter)
Significantly different form controls by Fisher's exact test at P<0.05.*

Table(3):Effect of barley (B)or oat(O)supplement on fetal visceral anomalies from dam given amitraz(A)50/kg by gavage through 6-15days of gestation.

Group Parameter	Control	A	A±B	O±A
Fetuses examined	58	31	49	50
Stenosis of olfactory bulb .	0	11(*35.5)	2(*4.1)	2(*4)
Oblique nasal septum .	0	7(*22.6)	2(*4.1)	3(*6)
Anophthalmia and/or microphthalmia.	0	23(*74.2)	5(*10.2)	3(*6)
Internal hyprocephaly.	0	6(*19.4)	0	0
Brain hydrotrophy.	0	11(*35.5)	3(*6.1)	3(*6)
Dilatation of lateral and/or 3rd ventricle.	0	18(*58.1)	6(*12.2)	5(*10)
Cranial hemorrhage.	0	5(*16.1)	1(*1.1)	1(*2)
Heart hypertrophy.	0	15(*48.4)	2(*4.1)	5(*10)
Ventricular septal defects.	0	8(*25.81)	2(*4.1)	2(*4)
Small lung.	0	11(*35.5)	6(*12.2)	5(*10)
Small spleen.	2(3.51)	7(*22.6)	7(*14.2)	7(*14)
Large stomach.	0	7(*22.6)	3(*1.6)	4(*8)
Hepatomegaly.	0	12(*38.7)	2(*4.1)	0
Enlarged adrenals.	0	7(*22.6)	0	0
Renal agenesis and/or hypertrophy.	0	18(*58.06)	3(*66.1)	3(*6)
Misshapen and/or malpositioned kidney.	1(1.7)	7(*19.4)	2(*4.1)	3(*6)
Dilated renal pelvis.	0	15(*48.4)	4(*8.2)	3(*6)
Testis agenesis and/or hypotrophy.	0	15(*48.4)	3(*6.1)	3(*6)
Undescended testis.	0	7(*22.6)	2(*4.1)	2(*4)

Values indicate the No. malformed fetuses (average %of malformed fetuses per liter)
*Significantly different from controls by Fisher's exact test at P<0.05.

Table(4): Effect of barley (B)or oat(O)supplement on fetal skeletal malformations from dam given amitraz(A)50/kg by gavage through 6-15days of gestation.

Group / Parameter	Control	A	A±B	A±O
Fetuses examined.	58	31	49	50
Skull:cranioschisis,wide cranial suture.	0	12(*38.71)	0	0
Incomplete ossification of parietal,interparietal and occipital bones.	0	23(*74.2)	5(*10.2)	7(*14)
Vertebrae:Fused cervical.	0	10(*32.3)	0	0
Lumbar Centrum :misaligned,.	0	22(*71)	7(*14.3)	9(*18)
Unossified,Bipartite	0	11(*35.5)	0	0
Wide intercostal space.	0	9(*62.9)	3(*6.1)	3(*6)
Sacrocaudal vertebra (fused,and/orincomplete ossification)	0	21(*67.74)	7(*14.3)	9(*18)
Sternebrae:Malaligned.	2 (3.5)	7(*22.6)	5(*10.2)	6(*12)
. Misshapen	0	15(*48.39)	4(*8.2)	3(*16)
Bipartite.	0	16(*51.61)	4(*8.2)	2(*14)
. Surplus	0	2(*6.4)	0	0
Scrambled.	0	7*(22.6)	0	0
Unassified .	0	11(*35.48)	3(*6.1)	3(*16)
Ribs:Fused	0	7(*22.6)	0	0
Wavy	0	12(*38.71)	7(*14.3)	9(*18)
Rudimentary	0	6(*19.35)	0	0
. Shortened	0	18(*58.07)	9(*18.4)	11(*22)
Limbs:Fused/incomplete ossification of metacarpal and/or bones.	0	16(*51.61)	6(*12.2)	8(*16)
Unassified Centrum of phalanges.	0	12(*15.48)	0	0

Values indicate the No. malformed fetuses (average %of malformed per liter)
   *Significantly different from controls by Fisher's exact test at P<0.05.

4. Discussion

Amitraz is a pharmaceutical veterinary and agricultural product which is used worldwide under numerous generic names as an acaricide and insecticide (Yilmaz & Yildizdas, 2003). This study investigated the potential chemoprotective effects of phytonutrients and antioxidants of barley and oat against teratogenicity induced by amitraz. The results show that, groups of pregnant albino rats supplemented with barley or oat, completely prevent severe terata & provoked positive protective response towards the incidence of congenital malformations in fetuses obtained from dams given amitraz (50 mg / ky) by gavage during pregnancy at the period of organogenesis on days 6 through 15 days. Amitraz–treated group without supplement, showed a decrease in maternal body weight gain, which may be attributed to post implantation loss and/or the decreased fetal body weight. Amitraz induced the embryo–fetal development toxicity, which included increased fetal death, post impartation loss, decreased fetal body weight and length as well as increased fetal external, internal and skeletal anomalies. The reduction in fetal body weight is classified as an indicator of intrauterine growth retardation (Kim et al., 2004). The accurrence of a delay in ossification in several skeletal districts coincided with the decreased fetal body weight.

This is consistent with the results of Osano et al., (2002) in frog exposed to amitraz and resulted in high incidence of encephalomegaly. Kim et al., (2007) showed that a 19 – day oral repeated dose of amitraz during pregnancy is embryotoxic & teratogenic in rats at the maternally toxic dose (10 – 30 mg / kg).

Amitraz and its degradant 2, 4 – dimethylaniline is genotoxic, teratogemic and carcinogenic (Brimecombe et al., 2006). Amitraz blockes monoamine oxidase activity in liver and brain (Bonsall & Turnbull, 1983); increases the levels of noradrenalin & dopamine in brain (Florio et al., 1993); induces CNS alterations (Yilmaz and

Yildizdas, 2003; Kim *et al.*, 2007). During development the CNS can be especially susceptible to the toxic xenobioties due to maternal exposure during gestation and/or lactation, causing developmental neurotoxicity and/or behavioral abnormalities in the offspring that may persist throughout the lifetime (Francis *et al.*, 1990).

In this work, it is worthy to mention that both barley and oat supplement are in the same order of magnitude in preventing or inhibiting the incidence of congenital malformations of fetuses obtained from dams exposed to amitraz during period of organogenesis of pregnancy.

Tocotrienols highly enriched in barley and oat have antioxidant and potent anticancer properties (Colombo *et al.*, 2009; Sun *et al*, 2009). Phenolic acids in barley and oat possess high antioxidant antiradical, antiproliferative potentials, oxygen and hydroxyl radical scavenging capacity and potency in prevention of lipid oxidation (Madhujlth & Shahidi, 2007; Gallagher *et al.,* 2010) as well as -glucons, which increase immune defence by activating complement system that improve regulation against oxidative damage and genotoxicity authorizing a health claim (Akramiene *et al.*, 2007; Voiman *et al.*, 2007).

Barley has antioxidant activity via total phenols, flavons and flavonoids as protective compounds (Atrooz, 2009; Ferreres *et al.*, 2009; perez-lopez *et al.*, 2010) Barley seeds contain 3, 4– Dihydroxy–benzaldehyde, which inhibits oxidative DNA damage and apoptosis via its antioxidant activity by blocking H_2O_2 (Kanauchi et al.,2008;Jeong *et al.*, 2009). Anthocyanin compostion and oxygen radical scavenging capacity of barley were reported by Bellido and Beta (2009); as well as melatonin (N–acetyl–5–methoxy tryptamine) (Hernandez – Ruiz and Amao, 2008); and Lunasin, cancer preventive peptide (Hernandez–Ledesma and de Lumen, 2008). Oat contains a number of antioxidants such as tocols, ferulic acid and phenolics such as avenanthramides, alpha-linolenic acids, omega-3, omega-6 fatty acids (Moreau *et al.*, 2008; Gallagher *et al.*, 2010). -glucans and fat content in oat are higher than most other grains. The presence of different types of phenols in oat confers antioxidant and antinflammatory (Kurtz & Wallo, 2007). Avenanthramides, the unique alkaloid phenols, exert antioxidant and antigenotoxic activities (Chen *et al.*, 2007; Lee – Manion *et al.*, 2009; Gallagher *et al.*, 2010), increase the stability of the genetic protein P53, which is a critical factor in the reduction of cell mutation as regulates tumor necrosis factor (Nie *et al.*, 2006; Guo *et al.*, 2008; Wise *et al.*, 2008). Conclusively, the current study indicates that the inclusion of whole barley or oat into the daily diet render health benefits as well as protection against teratognicity induced by amitraz. It is recommended that the incorporation of cereal grains such as barley and oat in the food products improves not only the nutrition, but also a therapy against genotoxicity, teratogenicty and carcinogenicity induced by xenobiotics.

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Quality and fertility of the frozen-thawed bull semen as affected by the different cryoprotectants and glutathione levels

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Abstract: Five sexually mature Friesian bulls (3-4 years old and 600-650 kg as an average body weight) were used in the present study. Two experiments were carried out. The first experiment aimed to define the effect of different types of cryoprotective agents (7%glycerol: GL and 7% dimethyl sulfoxide: DMSO) and their combinations (3.5% GL plus 3.5% DMSO) on post-thawing sperm motility, freezability and acrosomal damage of spermatozoa. Enzymatic activity (aspartate-aminotransferase: AST, alanine- aminotransferase: ALT, acid phosphatase: ACP, alkaline phosphatase: ALP and lactic dehydrogenase: LDH) in the frozen-thawed semen was also determined. The second experiment was carried out to establish the effects of 3.5% GL plus 3.5% DMSO (the best cryoprotectant in the first experiment) supplemented with different levels of glutathione (0.0, 0.2, 0.4 and 0.8 mM/ 100 ml) on the frozen-thawed semen quality and enzymatic activity during thawing-incubation at 37°C for 2 hours. The conception rates of the cows artificially inseminated with the frozen-thawed semen containing 7% GL, 7% DMSO, 3.5% GL plus 3.5% DMSO with or without 0.4mM glutathione (GSH) were also assessed. The results revealed that the highest (P<0.05) percentage of sperm motility, freezability of spermatozoa and the lowest (P<0.05) percentage of acrosomal damage of spermatozoa were obtained in the post-thawed semen extended with 3.5% GL plus 3.5% DMSO as compared to 7% GL or 7% DMSO alone.Moreover, the frozen-thawed bull semen extended with 3.5% GL plus 3.5% DMSO showed significantly (P<0.05) lower amounts of AST, ALT, ACP, ALP and LDH enzymes released into the extracellular medium than7% GL or 7% DMSO alone the (first experiment). The obtained results in the second experiment showed that the frozen-thawed semen extended with 3.5% GL plus 3.5% DMSO added with GSH at levels of 0.2, 0.4 and 0.8mM showed significantly (P<0.05) increased the percentage of frozen-thawed sperm motility and freezability of spermatozoa and decreased (P<0.05) percentage of acrosomal damage of spermatozoa and amount of AST, ALT, ACP, ALP and LDH enzymes released into the extracellular medium compared to free GSH medium (control). It is of interest to note that, the best level (P<0.05) of GSH which maintained frozen-thawed semen quality and enzymatic activities was 0.4mM/100ml GSH. The advancement of thawing- incubation time at 37°C for up to 2 hours of the frozen-thawed bull semen decreased significantly (P<0.05) the percentage of post- thawing sperm motility and freezability of spermatozoa, while increased significantly (P<0.05) the percentage of the acrosomal damage of spermatozoa and leakage of AST, ALT, ACP, ALP and LDH enzymes into the extracellular medium with the different glutathione levels or free glutathione medium. The highest conception rate (P<0.05) was recorded in the cows artificially inseminated with the frozen-thawed bull semen extended with 3.5% glycerol plus 3.5% DMSO added with 0.4mM GSH, and the lowest (P<0.05) conception rate was observed with the frozen-thawed bull semen extended with 7% GL or 7% DMSO alone.

1. Introduction

Success of AI (Artificial Insemination) is dependent on the quality of fresh semen and its capacity for dilution and storage with minimum loss of fertilizing ability. The best preservation technique to date of post-thaw survival is restricted to about 50% of the sperm population (Watson, 1995). The final cryopreservation goal of semen is not only to maintain the initial motility but also to maintain the necessary metabolism to produce energy, plasma proteins to survive in the female reproductive tract at the time of fertilization, acrosomal enzymes for the penetration of the ovum, capacity of progressive movement and to prevent any damage which reduce life span of spermatozoa and its fertilizability (Palacio-Ango, 1994).

The major factor affecting the results of insemination with frozen-thawed semen is the addition of cryoprotectants (Aboagla and Trade, 2004), extension media, extension rate and spermatozoal damage due to the formation of internal ice crystals, to

the increase in solute concentration in the extension media or interaction of both physical factors (Leboeuf *et al*., 2000). The cryoprotectants are added to extenders to protect the sperm from damage during freezing process (Singh *et al*., 1995). The level and type of cryoprotectants in semen diluent influence these events and their effects on the sperm cells during freezing (Jorge *et al*., 2003 and Abdel-Khalek *et al*., 2008).

Most semen preservation protocols still favor glycerol in the cryoprotective media (Zeidan, 1994 and Abdel-Khalek *et al*., 2008). In certain instances other cryoprotectants are possibly better, for example, dimethyl sulphoxide (DMSO) was preferred for bovine (Snedocor and Gaunya, 1970) and buffalo bull (Khalifa, 2001 and Gabr, 2009). Also, ethylene glycol (Rodrigues *et al*., 2004), acetamide and lactamide (Nagase *et al*., 1972) provided good protection to bull spermatozoa during freezing. However, little information is available on their combinations in extenders for bull semen.

On the other hand, mammalian sperm cells are susceptible to lipid peroxidation by O_2 and H_2O_2 due to their high content of polyunsaturated fatty acids in their membranes and the lack of a significant cytoplasmic components containing antioxidants which results in a decreased sperm motility and viability (Von Schantz *et al*., 1999 and Satish and Das, 2005). One of enzymes that are distributed in sperm cells is glutathion (GSH) where one of its functions is to protect cell against the destructive effect of reactive oxygen species (Meister, 1983 and Lewis *et al*., 1997). However, the endogenous antioxidative capacity of semen may be insufficient during storage or dilution (Maxwell and Salamon, 1993) and the addition of antioxidants as GSH, ascorbic acid or catalase (El-Nenaey *et al*., 2006; Ahmed, 2008 and Gabr, 2009) improved the motility and survival of frozen-thawed bull spermatozoa.

Therefore, the present study aimed to study the effect of various cryoprotective agents (glycerol, dimethyl sulfoxide, and their combinations) on post-thawing motility, freezability, acrosomal damage of spermatozoa and enzymatic activity of the frozen-thawed semen (the first experiment). The effect of different levels of glutathion (GSH) addition to the frozen-thawed semen with the best cryoprotectants (based on results of the first experiment) on frozen-thawed semen quality and enzymatic activities during thawing-incubation for 2 hours at 37°C was recorded. Conception rates of the cows artificially inseminated with frozen-thawed semen with the best results in both experiments were also assessed (the second experiment).

2. Material and Methods

The present study was conducted in the Department of Animal Production, Faculty of Agriculture, Mansoura University. The experimental work was carried out at Animal Production Research Station, El-Gemmezah, Gharbiya Governorate, located in the north eastern part of Nile Delta (31°N), belonging to Animal Production Research Institute, Egypt.

Two experiments were carried out. The first experiment was carried out to investigate the effect of various cryoprotective agents (glycerol: GL and dimethyl sulfoxide: DMSO) and their combinations on post-thawed semen quality in terms of sperm motility, freezability of spermatozoa and acrosomal damage of spermatozoa. Enzymatic activity (aspartate-aminotransferase: AST, alanine -aminotransferase: ALT, acid phosphatase: ACP, alkaline phosphatases: ALP and lactic dehydrogenase: LDH) was also determined. The second experiment aimed to examine the effects of 3.5% glycerol plus 3.5% DMSO (the best obtained cryoprotectant in the first experiment) supplemented with different levels of glutathione (0.0, 0.2, 0.4 and 0.8 mM / 100 ml) on post-thawing sperm motility, freezability of spermatozoa, acrosomal damage of spermatozoa and enzymatic activity (AST, ALT, ACP, ALP, LDH). The conception rates of the cows artificially inseminated with the frozen-thawed semen extended with 7% glycerol, 7% DMSO, 3.5% glycerol plus 3.5% DMSO with or without the best level of glutathione (0.4 mM), were also assessed.

Experimental animals

Five sexually mature Friesian bulls aging 3-4 years with an average live body weight of 600-650 kg were used in the present study. They were housed individually under semi-open sheds and partially roofed with asbestos. All bulls were healthy and clinically free of external and internal parasites. Palpation of the external genital tract showed that they were typically normal. The testicular tone was glandular, all epididymal regions were present and both testes were almost in size and moved freely up and down within the scrotal pouches. Coupulatory patterns for all tested bulls at the beginning of the trials were judged to be normal.

Feeding system and management

A concentrate mixture was used in addition to rice straw. The mixture is composed of 25% undecorticated cotton seed cake, 15% corn, 44% coarse wheat bran, 8.5% extracted rice bran, 3% molasses, 3% limestone and 1.5% sodium chloride. The daily ration was offered in a certain mode of feeding starting with concentrate mixture at 8.30a.m followed by the straw at noon and continuing to next morning feeding. Bulls were not allowed to graze or to receive green fodder. The

bulls were allowed to drink clean fresh water *ad libitum.*

Semen collection

Semen was collected from five bulls twice a week for ten weeks by means of an artificial vagina between 08.00 and 09.00 a.m. Two successive ejaculates were obtained from each bull at each day of collection. Only semen with progressive motility of 70% or more was pooled and used for different treatments.

Semen freezing procedure

Semen extension

Semen was evaluated immediately after collection then extended with lactose-yolk – citrate (LYC) at a rate of 1 semen: 20 extender containing different levels of cryoprotectants as presented in Table (1). The final concentration of cryoprotectant was 7% GL (Salisbury *et al.,* 1978), 7% DMSO (Hafez, 1993) and 3.5% GL plus 3.5% DMSO in the first, second and third extenders, respectively (the first experiment). In the second experiment ,semen was extended and supplemented with glutathione at levels of 0, 0.2, 0.4, and 0.8 mM/100ml with 3.5% glycerol plus 3.5% DMSO (best cryoprotectant in the first experiment).

Equilibration period

Extended semen with the different cryoprotective agents was kept at 5°C for 4 hours as an equilibration period. Then after, the samples were packaged in straws and frozen in liquid nitrogen (-196°C) as the method described by Salisbury *et al*. (1978).

Evaluation of the frozen-thawed semen

Frozen semen in straws was thawed in a water bath at 37°C for 30 seconds. The frozen-thawed semen was then incubated at 37°C for up to 2 hours. After each incubation time (0, 1, and 2 hours), the percentage of post-thawing sperm motility, freezability of spermatozoa, acrosomal damage of spermatozoa, and enzymatic activity (AST, ALT, ALP, ACP and LDH) of the frozen-thawed semen were recorded.

Post-thawed semen quality

The percentage of post-thaw motile spermatozoa was examined according to Amann and Hammerstedt (1980). The percentage of acrosomal damage was assessed according to Watson (1975).Freezability of the individual samples was examined as a percentage of spermatozoa recovered after freezing and thawing according to Patt and Nath (1969), using the following formula:

$$Freezability = \frac{\text{Post-thawing motility (\%)} \times 100}{\text{Initial motility (\%)}}$$

Enzymatic activity (U/10⁹ spermatozoa)

In the first and second experiments, frozen-thawed semen samples (5 straws of each experiment) were centrifuged at 600 *g* for 20 minutes. The superratant fluid (diluted seminal plasma) was collected and kept at -20°C till assay of AST, ALT, ACP, ALP and LDH enzymes activity. All enzymatic activities were assayed in post-thawed semen at zero time (immediately after thawing) and in post-thawed semen incubated at 37°C for 1 and 2 hours. Activity of AST and ALT enzymes in the post-thawed semen were determined colourimetrically using QCA kits (Amposta, Spain) according to Reitman and Frankel (1957). While, activity of ACP, ALP and LDH enzymes were determined colourimetrically using commercial kits (Stanbio kits, Texas, USA) according to Graham and Pace (1967). All enzymatic activities were adjusted according to sperm-cell concentration $(U/10^9$ spermatozoa).

Conception rate

Based on the best results in the first and second experiments, one hundred and twenty normally cyclic Friesian cows (in heat) were divided into six groups. Cows in the first (n=20), second (n=19), third (n=20), fourth (n=21), fifth (n=20) and sixth (n=20) groups were artificially inseminated with the frozen-thawed semen added with 7% glycerol, 7% DMSO, 7% glycerol plus 0.4mM glutathione, 7%DMSO plus 0.4mM GSH, 3.5% glycerol plus 3.5% DMSO and 3.5% glycerol plus 3.5% DMSO with 0.4mM GSH, respectively. For each cow, two inseminations were carried out, one in the morning and the second in the evening. Inseminations were usually carried out on the same day if the cows were notified to be in heat before 10.00 hr. Requests received by the Center after this time were looked to be inseminated on the following day. The straws were thawed by dipping immediately into thermos at 35°C for 30 seconds. The number of motile spermatozoa per insemination was nearly about 20×10^6 for each straw (0.25 ml). Semen was deposited into the uterus by using recto-vaginal insemination technique (Salisbury *et al*., 1978). Conception rate was estimated on the basis of pregnancy diagnosis by the rectal palpation after 60 days from date of insemination.

Statistical analysis

Data were statistically analyzed using Least Square Analysis of Variance according to Snedecor and Cochran (1982). Percentage values were transformed to Arcsine values before being statistically analyzed. The differences between means of individual treatments were evaluated by Duncan's New Multiple Range Test (Duncan, 1955). The conception rate results were analyzed using Chi-Square test.

3. Results

The first experiment:

1. Post- thawed semen quality

The results presented in Table (2) revealed that the highest (P<0.05) percentage of sperm motility and freezability of spermatozoa and the lowest (P<0.05) percentage of damaged acrosome in post-thawed semen were obtained in semen extended with 3.5% GL plus 3.5% DMSO. The highest (P<0.05) percentage of sperm motility (60.20%), freezability of spermatozoa (75.25%) and the lowest(P<0.05) percentage of the acrosomal damage of spermatozoa (10.00%) was recorded with the post-thawed semen extended with 3.5% GL plus 3.5% DMSO as compared to semen extended with 7% GL or 7% DMSO alone. Similar trend was reported by El-Harairy *et al.* (2010) in Friesian bulls. The same author found that the highest percentages of post-thawing sperm motility and freezability of spermatozoa and the lowest acrosomal damage of spermatozoa were recorded in the frozen-thawed bull semen diluted with a combination of glycerol plus DMSO. Gabr (2009) showed that post-thawing and freezability in buffalo semen extended with GL or DMSO were significantly better than ethylene glycol). Moreover, Khalifa (2005) reported that extender containing 3% glycerol had the highest percentage of post-thawing motility as compared to 3% ethylene glycol in goats. On the other hand, Singh *et al.* (1995) showed that both motility and percentage of live goat bucks spermatozoa were improved with a combination of GL plus DMSO**.** Moreover, Abd-El-Salaam (2002) and Zeidan *et al*. (2002) found that 2% glycerol and 4% DMSO maintained higher percentage of acrosomal integrity of frozen rabbit spermatozoa.

It is of interest to note that, the freezing semen at low temperatures causes structural damage as a result of cold shock including damage to the plasma membrane over the acrosome and damage to the plasma membrane of the middle piece. These changes are followed by decrease in the proportion of spermatozoa with intact acrosome. Therefore, the morphological characteristics of sperm acrosome and initial motility, gives the best indication, so far, of initial quality for frozen semen. Penetrating cryoprotectants are used to preserve spermatozoa viability during freezing by reducing or preventing ice crystal formation. The osmotic effects of molar concentrations of cryoprotectants may also result in membrane damage either during the introduction of the cryoprotectant or on its removal depending on the permeability of the cell membrane to the cryoprotectant (Watson, 1995).

2. Enzymatic activity (U/10^9 spermatozoa)

2.1. Activity of transaminase (AST and ALT) enzymes

The results presented in Table (3) revealed that the highest (P<0.05) AST and ALT enzymes activity was significantly (P<0.05) obtained in the post-thawed semen extended with 7% GL or 7% DMSO alone. However, the lowest (P<0.05) activity of AST and ALT was observed with the post-thawed semen extended with 3.5% GL plus 3.5% DMSO. Activity of transaminases (AST and ALT) is a good indicator of semen quality. Good quality of semen was characterized by lower AST and ALT activities (Taha *et al.,* 2000). The present results are in agreement with those obtained by Zeidan *et al*. (2002) and Khalifa (2005), who found that a combination of 2% GL plus 2% DMSO recorded the lowest AST and ALT activities. However, Gabr (2009) found that activity of AST in post-thawed buffalo semen was significantly lower in post-thawed semen extended with ethylene glycol than with glycerol or DMSO, being the highest with DMSO. The activity of AST in post-thawed bull semen was always higher than ALT activity as reported by several authors in semen of Friesian bulls (El-Sherbieny, 2004 and El-Harairy *et al.,* 2010) and in buffalo semen (El-Nagaar, 2008).

2.2. Activity of acid (ACP) and alkaline (ALP) phosphatases and lactic dehydrogenase (LDH)

The results presented in Table (3) revealed that the lowest (P<0.05) ALP, ACP and LDH enzyme activity was recorded in post-thawed semen extended with 3.5% glycerol plus 3.5% DMSO as compared to 7% glycerol or 7% DMSO alone. These results are in agreement with those of Zeidan *et al*. (2002) who found that activity of ACP and ALP was significantly lower in post-thawed semen extended with 4% DMSO and 2% glycerol plus 2% DMSO than with other cryoprotectants. El-Harairy *et al.* (2010) found that the frozen-thawed bull semen extended with 3.5% GL plus 3.5%DMSO had significantly lower amounts of AST, ALT, ACP, ALP and LDH enzymes into the extracellular medium than other cryoprotective agents or their combinations. On the other hand, Gabr (2009) revealed that activity of ACP in post-thawed buffalo semen was significantly lower in post-thawed semen extended with GL than with DMSO or ethylene glycol alone.

Based on the foregoing results, adding a combination of 3.5% glycerol plus 3.5% DMSO as cryoprotectants to lactose-yolk citrate extender during freezing of bull semen showed the best sperm motility, recovery rate of spermatozoa and intact acrosome of spermatozoa and maintained enzymatic activity in post-thawed semen for use in artificial insemination (AI) programmes.

The second experiment:

1. Percentage of post-thawed sperm motility

Data presented in Table (4) showed that GSH supplementation at levels of 0.2, 0.4 and 0.8mM

significantly (P<0.05) increased the percentage of the frozen-thawed sperm motility as compared to free GSH semen (control), during thawing-incubation at 37ºC for up to 2 hours. Among supplementation levels, the highest (P<0.05) percentage of frozen-thawed sperm motility was recorded with the semen supplemented with 0.4mM GSH (57.27%), moderate with 0.2mM GSH (52.94%) and the lowest with 0.8mM GSH (50.08%) versus 46.47% in free GSH semen (Table 4). These results are in agreement with those reported by El-Nenaey *et al.* (2006) and El-Kishk (2010) in Friesian and Gabr (2009) in buffalo bull semen. El-Sherbieny *et al.* (2006) also found that supplementation of bull semen extended with 0.4mM of GSH resulted in spermatozoa maintaining their motility and livability above 50% and abnormality percentage less than 15% at room temperature (25ºC) or at cooling temperature (5ºC) for 48 hours. The observed improvement of post-thawing sperm motility with antioxidant supplementation (GSH) was attributed to maintaining bull spermatozoal motility (Lindemann *et al.*, 1988, Bilodeau *et al.,* 2001 and Foote *et al.,* 2002), protecting spermatozoa against oxidative damage (Alvarez and Storey, 1989) and preserving spermatozoal viability by protecting membrane structure and function (Gadea, 2005).

Due to the effect of thawing-incubation at 37ºC for up to 2 hours, the overall percentage of frozen-thawed sperm motility decreased significantly (P<0.05) in free GSH and all GSH levels with increasing incubation time. The reduction rate in frozen-thawed sperm motility became higher with free GSH semen and with 0.8 m*M* GSH than 0.2 or 0.4mM GSH after 2 hours of thawing - incubation at 37°C (Table 4). Similar trend was reported by Zeidan *et al.* (1998) and El-Harairy *et al.* (2010) in bull semen. Moreover, frozen-thawed motility decreases significantly during incubation because of the gradual decline in ability of spermatozoa to generate ATP through mitochondrial respiration. This mitochondrial impairment might be due to mitochondrial aging and the toxic effect of membrane bound aromatic amino acid oxidase enzyme resulted from dead spermatozoa (Bag *et al.,* 2004). On the other hand, the decreasing motility during incubation may be related to change in spermatozoa morphology, the spermatozoa has usually containing mitochondria in mid-piece and tail after freezing and thawing. In addition, severe dilation or even loss of mitochondria in the mid-piece and tail breakage frequently occurred in the post-thawed spermatozoa. These changes might adversely affect the function of mitochondria and tails, thus reducing the spermatozoa flagellum movement. The loss of mitochondria was probably a result of swelling of mid-piece,the swelling pushed mitochondria away from the mid-piece or caused structural damage within mitochondria that decrease ATP generation(Zhang *etal*.,2003).

2. Freezability of spermatozoa (%)

As shown in Table (5), supplementation of GSH at levels of 0.2, 0.4 and 0.8mM to frozen-thawed semen significantly (P<0.05) increased the mean of freezability of spermatozoa as compared to GSH-free medium, during thawing-incubation at 37ºC for up to 2 hours. The freezability of post-thawed spermatozoa was significantly (P<0.05) highest with 0.4mM GSH (71.58%), moderate with 0.2mM GSH (66.17%) and the lowest with 0.8mM GSH (62.59%) versus 58.09% with free GSH semen. Similar trends were reported by El-Nenaey *et al*. (2006) and El-Kishk (2010) in bovine and Gabr (2009) in buffalo bull semen.

The advancement of thawing-incubation for up to 2 hours at 37ºC, showed significantly (P<0.05) decreased freezability of frozen-thawed semen containing different levels of GSH or free-GSH semen (Table 5). Similar trends were reported by Zeidan *et al*. (1998), Gabr (2009) and El-Kishk (2010).The reduction of post-thawing sperm motility and freezability of spermatozoa with increasing thawing-incubation was discussed by many authors. The production of free radicals during incubation has been suggested as the principal cause of decrease spermatozoa survivability and integrity (Mann *et al*., 1980 and Vishwanath and Shannon, 1997). The leuter authors found that spermatozoa exhibited an aerobic or even a partially aerobic system, the production of reactive oxygen species is inevitable. The superoxide anion (O_2), peroxide (H_2O_2) and hydroxyl free radicals are of the most damaging. The reaction producing these free radicals is more active at higher storage temperatures than in the cryopreserved state. They also found that the latent damage during freezing and thawing is exhibited during incubation and the greatest latent damage will be caused in the female genital tract.

3. Acrosomal damage of spermatozoa (%)

Data presented in Table (6) showed that the supplementation of GSH at levels of 0.2, 0.4 and 0.8 mM to the frozen-thawed semen significantly (P<0.05) decreased the percentage of acrosomal damage of spermatozoa as compared to free GSH medium, during thawing-incubation at 37ºC for up to 2 hours. When comparing the differences between different levels of GSH, extended semen supplemented with 0.4mM GSH showed the lowest(P<0.05) percentage of spermatozoa with acrosomal damage (9.47%), being significantly (P<0.05) lower than 11.80 and 12.60% with 0.2 and 0.8mM GSH levels, respectively (Table 6).However, semen free GSH showed significantly (P<0.05) higher percentage acrosomal damage of spermatozoa (16.73%) than other levels of GSH. These results are in agreement with those recorded by El-Kishk (2010) who found that the addition of 0.4 mM of

GSH to frozen bull semen significantly decreased the percentage of acrosomal damage of spermatozoa than GSH free medium, during thawing-incubation at 37ºC for up to 2 hours.

The advancement of thawing-incubation at 37ºC for up to 2 hours significantly (P<0.05) increased the percentage of acrosomal damage of post-thawed spermatozoa either free or supplemented with different levels of GSH. However, the rate of increase was higher with the control semen as compared to those supplemented with different GSH levels (Table 6). These results are in agreement with those obtained by El-Harairy et al. (2010) and Gabr (2009). The observed improvement with all GSH levels may be attributed to the protective mechanism of GSH to the spermatozoa cell against the destructive effect of reactive oxygen species (Meister, 1983 and Lewis et al., 1997). Similar trends were reported by El-Nenaey et al. (2006) and El-Kishk (2010) in Friesian and Ahmed (2008) and Gabr (2009) in buffalo bull semen. They reported that the addition of antioxidants to extended frozen semen improved spermatozoal quality, being the best with GSH at a level of 0.4mM.

4. Enzymatic activity (U/10^9 spermatozoa):

The results in Tables (7 to 11) confirm that supplementation of GSH at levels of 0.2, 0.4 and 0.8mM to the frozen-thawed semen significantly (P<0.05) reduced the amount of AST, ALT, ACP, ALP and LDH enzymes released into the extracellular medium as compared to free GSH medium. The lowest (P<0.05) amount of these enzymes (AST, ALT, ACP, ALP and LDH) released in the extracellular medium was recorded in post-thawed semen supplemented with 0.4mM, moderate with 0.2mM and the highest with 0.8 mM GSH, being all significantly (P<0.05) lower than free GSH medium. Such findings indicated beneficial effects of GSH addition at a level of 0.4 mM on membrane integrity of spermatozoa compared to other GSH levels. Similar trends were obtained by Gabr (2009) in buffalo and El-Kishk (2010) in Friesian bull semen.

The advancement of thawing-incubation at 37ºC for up to 2 hours significantly (P<0.05) increased the activity of AST, ALT, ACP, ALP and LDH enzymes in post-thawed bull semen supplemented with different levels of GSH or free GSH medium (Table 7 to 11). These results are in agreement with those reported by Zeidan et al . (1998 and 2008). It appears spermatozoal damage during storage may be associated with inccreas sperm membrane permeability and leakage of intracellular enzymes.

It is of interest to note that GSH supplementation at a level of 0.4mM to the extended frozen-thawed bull semen showed that the lowest enzymatic activities (AST, ALT, ACP, ALP and LDH) at different thawing-incubation times. The highest percentage of post-thawing sperm motility and freezability of spermatozoa as well as the lowest percentage of acrosomal damage of spermatozoa, indicating beneficial effects of GSH (0.4mM) on semen quality in terms of less spermatozoal cell injury and less membrane damage of spermatozoa (Rasul et al., 2000).

5. Conception rate (%)

The results in Table (12) revealed that the frozen-thawed semen extended with 3.5% glycerol plus 3.5% DMSO added with 0.4mM GSH gave significantly (P<0.05) higher conception rate (CR) than the frozen-thawed semen extended with 7% glycerol or 7%DMSO. However, the conception rates of the cows artificially inseminated with the frozen-thawed semen with 7% glycerol, 7%DMSO, 7% glycerol plus 0.4mM GSH, 7%DMSO plus 0.4mM GSH and 3.5% glycerol plus 3.5% DMSO were insignificant (Table 12). Similarly, the conception rate of the cows artificially inseminated with the frozen-thawed semen with 7% GL plus 0.4mM GSH, 7% DMSO plus 0.4mM GSH and 3.5% GL plus 3.5% DMSO with or without 0.4mM GSH were insignificant. In addition, the conception rate of the cows artificially inseminated with the frozen-thawed semen extended with 7% DMSO showed insignificantly higher than the frozen-thawed semen extende with 7%GL. These results revealed that the fertilizing efficiency is nearly equal for the different frozen-thawed bull semen added with the different levels of glycerol. The highest CR of frozen-thawed semen with LYC extender containing a combination of 3.5% glycerol plus 3.5% DMSO supplemented with 0.4mM of GSH was mainly related to the best improvement of post-thawing sperm motility, freezability as well as the lowest of acrosomal damage of spermatozoa. Gabr (2009) confirmed that the conception rate of buffalo cows inseminated was recorded with frozen-thawed semen extended with Tris-based extender containing 0.4 or 0.8 mM GSH. In this respect, Foote et al. (2002) found that, the 59 days non-return rates for semen containing 0, 0.5 and 1.0 mM of GSH were 71.9, 69.5 and 70.9% respectively. Frozen-thawed semen with 0.5 mM of GSH and 100 U/ml of superoxide dismutase resulted in 74.0 and 73.9% of CR, respectively. El-Nenaey et al. (2006) and El-Kishk (2010) suggested that the addition of GSH to the extender during freezing phase improved the quality and fertilizing ability of frozen-thawed spermatozoa. These results are in agreement with those of Nishimura and Morii (1993).

Table (1). Composition of lactose-yolk citrate extender containing different types of cryoprotectants and their combinations .

Ingredients	Type of extender		
	Extender1	Extender2	Extender3
Lactose-yolk citrate (ml)*	73	73	73
Glycerol (ml)	7	-	3.5
Dimethyl sulfoxide (ml)	-	7	3.5
Fresh egg yolk(ml)	20	20	20
Penicillin(IU/ml)	500	500	500
Streptomycin(µg/ml)	500	500	500

* Lactose-yolk citrate (2.9g sodium citrate dihydrate, 0.04g citric acid   anhydrate, 1.25 g lactose dissolved in 100 ml distilled water).

Table (2). Effect of cryoprotectants type on the percentages of post-thawing motility, freezability and acrosomal damage of bull spermatozoa.

Type of cryoprotectants	Post-thawing sperm motility(%)	Freezability of spermatozoa (%)	Acrosomal damage of spermatozoa (%)
7% Glycerol (GL)	57.60 ± 0.51^{b}	72.00 ± 0.68^{b}	12.20 ± 0.87^{a}
7% Dimethyl sulfoxide (DMSO)	57.20 ± 0.67^{b}	71.50 ± 1.37^{b}	12.00 ± 0.96^{a}
3.5% GL + 3.5% DMSO	60.20 ± 0.49^{a}	75.25 ± 0.40^{a}	10.00 ± 0.32^{b}

a, b: Means with different superscripts in the same column are significantly different at (P 0.05).

Table (3). Enzymatic activity (U/10^{9} spermatozoa) of frozen-thawed bull semen as affected by the different types of cryoprotectants.

Type of cryoprotectans	Aspartate aminotransferase	Alanine aminotransferase	Acid phosphatase	Alkaline phosphatase	Lactic dehydrogenase
7% Glycerol (GL)	18.40 ± 0.52^{a}	10.04 ± 0.72^{a}	149.00 ± 1.87^{a}	59.00 ± 1.14^{a}	278.20 ± 2.08^{a}
7% Dimethyl-sulfoxide(DMSO)	17.60 ± 0.98^{a}	9.40 ± 0.67^{a}	147.02 ± 1.84^{a}	60.01 ± 1.13^{a}	275.43 ± 2.58^{a}
3.5% GL + 3.5% DMSO	16.02 ± 0.91^{b}	7.01 ± 0.72^{b}	105.02 ± 1.85^{b}	50.02 ± 1.15^{b}	245.61 ± 1.78^{b}

a, b: Means with different superscripts in the same column are significantly different at (P 0.05).

Table (4). Mean percentage of motility of frozen-thawed bull spermatozoa supplemented with the different levels of glutathione, during thawing-incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Overall mean
	0	0.2	0.4	0.8	
0	54.01±0.55	58.62±0.52	62.60±0.28	57.61±0.69	58.21 ± 0.74^{a}
1	48.62±0.52	54.00±0.34	58.81±0.23	51.42±0.99	53.21 ± 0.90^{b}
2	36.80±0.67	46.21±0.82	50.40±0.57	41.21±1.30	43.65 ± 1.24^{c}
Mean	46.47 ± 1.93^{d}	52.94 ± 1.40^{b}	57.27 ± 1.36^{a}	50.08 ± 1.87^{c}	51.69

a, b,c,d: Means with different superscripts in the same row or column are significantly different at (P 0.05).

Table (5). Mean percentage of freezability of bull spermatozoa supplemented with the different levels of glutathione, during thawing-incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Overall mean
	0	0.2	0.4	0.8	
0	67.51±0.61	73.27±0.67	78.25±0.28	72.01±0.87	72.76±0.91[a]
1	60.77±0.69	67.50±0.36	73.51±0.23	64.27±1.22	66.51±1.10[b]
2	46.00±0.96	57.76±0.98	63.00±0.76	51.51±1.67	54.56±1.51[c]
Mean	58.09±2.35[d]	66.17±1.72[b]	71.58±1.76[a]	62.59±2.37[c]	64.61

a, b, c, d: Means with different superscripts in the same row or column are significantly different at (P 0.05).

Table (6). Mean percentage of post-thawed bull spermatozoa with damaged acrosome supplemented with the different levels of glutathione, during thawing-incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Overall mean
	0	0.2	0.4	0.8	
0	12.40±0.61	9.60±0.60	7.80±0.50	10.40±0.69	10.05±0.47[c]
1	17.00±0.72	11.60±0.52	9.40±0.52	12.40±0.83	12.60±0.70[b]
2	20.80±1.36	14.20±0.55	11.20±0.82	15.00±0.72	15.30±0.89[a]
Mean	16.73±1.03[a]	11.80±0.57[b]	9.47±0.49[c]	12.60±0.63[b]	12.65

a, b, c: Means with different superscripts in the same row or column are significantly different at (P 0.05).

Table (7). Activity of aspartate-aminotransferase enzyme (U/10⁹ spermatozoa) of frozen -thawed bull semen supplemented with the different levels of glutathione, during thawing- incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Overall mean
	0	0.2	0.4	0.8	
0	17.80±1.04	15.00±0.55	12.80±0.86	15.80±0.8	15.35±0.55[c]
1	30.40±1.75	23.60±0.98	20.40±1.09	25.20±0.98	24.90±1.02[b]
2	42.00±0.85	33.00±1.16	30.20±1.08	36.40±1.04	35.40±1.11[a]
Mean	30.06±2.71[a]	23.86±2.01[c]	21.13±1.96[d]	25.80±2.29[b]	25.21

a, b, c,d: Means with different superscripts in the same row or column are significantly different at (P 0.05)..

Table (8). Activity of alanine-aminotransferase enzyme (U/10⁹ spermatozoa) of frozen- thawed bull semen supplemented with the different levels of glutathione, during thawing-incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Mean
	0	0.2	0.4	0.8	
0	13.40±0.52	8.60±0.40	7.60±0.39	9.40±0.52	9.75±0.32[c]
1	17.60±0.51	13.20±0.75	11.40±0.76	14.40±0.69	14.15±0.47[b]
2	31.00±0.55	23.20±0.98	21.40±1.23	24.20±1.04	24.95±0.64[a]
Mean	20.66±1.87[a]	15.00±1.66[b]	13.46±1.61[c]	16.00±1.68[b]	16.28

a, b, c: Means with different superscripts in the same row or column are significantly different at(P 0.05).

Table (9). Activity of acid phosphatase enzyme (U/10⁹ spermatozoa) of frozen-thawed bull semen supplemented with the different levels of glutathione, during thawing- incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Overall mean
	0	0.2	0.4	0.8	
0	144.00±1.48	123.40±1.59	113.60±1.13	131.40±0.51	128.10±2.61^c
1	174.60±1.64	145.40±1.96	125.80±1.77	156.60±3.63	150.60±4.20^b
2	228.40±3.34	172.60±2.30	141.00±3.54	187.00±3.43	182.25±7.36^a
Mean	182.33±9.34^a	147.13±5.44^c	126.80±3.22^d	158.33±6.22^b	153.65

a, b, c, d : Means with different superscripts in the same row or column are significantly different at (P 0.05).

Table (10). Activity of alkaline phosphatase enzyme (U/10⁹ spermatozoa) of frozen-thawed bull semen supplemented with the different levels of glutathione, during thawing-incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Overall mean
	0	0.2	0.4	0.8	
0	55.00±1.72	44.60±1.18	39.20±0.90	47.20±1.88	46.50±1.45^c
1	86.20±2.86	67.80±1.95	53.60±1.77	74.20±3.88	70.45±2.97^b
2	127.00±5.40	96.00±5.70	80.40±4.95	102.20±6.01	101.40±4.58^a
Mean	89.40±8.05^a	69.46±5.87^b	57.73±4.79^c	74.53±6.35^b	72.78

a, b, c: Means with different superscripts in the same row or column are significantly different at (P 0.05).

Table (11). Activity of lactic dehydrogenase enzyme (U/10⁹ spermatozoa) of frozen-thawed bull semen supplemented with different levels of glutathione, during thawing- incubation at 37°C for 2 hours.

Incubation time (hrs)	Glutathione level (mM)				Overall mean
	0	0.2	0.4	0.8	
0	278.05±2.59	247.41±2.18	222.61±4.01	252.03±1.54	250.02±4.67^c
1	319.02±4.04	276.02±2.45	248.05±5.20	303.42±3.09	286.62±7.96^b
2	352.83±6.36	299.42±4.45	274.80±4.72	312.06±4.13	309.77±6.86^a
Mean	316.63±8.46^a	274.28±5.88^c	248.48±6.15^d	289.17±9.48^b	282.14

a, b, c, d: Means with different superscripts in the same row or column are significantly different at (P 0.05).

Table (12). The conception rate of Friesian cows artificially inseminated with frozen-thawed semen as affected by the different cryoprotective agents added with 0.4 mM glutathione.

Treatments	No. of cows inseminated	No. of cows conceived	Conception rate (%)
7% Glycerol (GL)	20	14	70.00b
7% Dimethyl sulfoxide (DMSO)	19	14	73.68b
7%GL + 0.4 mM Glutathione (GSH)	20	16	80.00ab
7%DMSO+0.4 mM GSH	21	17	80.95ab
3.5% GL + 3.5% DMSO	20	15	75.00ab
3.5% GL+3.5 %DMSO+0.4 mM GSH	20	17	85.00a

a, b : Means with different superscripts in the column are significantly different (P 0.05).

4. Conclusion

In conclusion, a high proportion of the bull spermatozoa retained active motility after freezing and thawing from -196°C in a medium containing dimethyl sulfoxide as a cryoprotective agent. The obtained results revealed that dimethyl sulfoxide with glycerol protect bull spermatozoa more effectively than glycerol or dimethyl sulfoxide alone during freezing and thawing. The frozen-thawed bull semen added with 0.4 mM glutathione / 100ml is more efficient in maintaining post-thawing sperm motility, freezability, acrosomal integrity, maintaining enzymatic activities and subsequent fertilizing efficiency of bull spermatozoa than free glutathione medium. Therefore, it can be recommended to extension and freezing of bull semen with 3.5% glycerol plus 3.5% dimethyl sulfoxide supplemented with glutathione at a level of 0.4 mM / 100ml for artificial insemination programmes to enhance conception rates in cows.

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Burden and coping strategies in caregivers of schizophrenic patients

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Abstract: Care of schizophrenic patients is an enduring stress and leads to considerable amount of burden among caregivers. Little is known about the ways in which families cope while caring for a relative with schizophrenia in developing countries. The aim of the present study was to explore burden and coping strategies in caregivers of schizophrenic patients and identify the relationship between burden and coping strategies among them. Caregivers were assessed by utilizing caregiver burden self report and ways of coping questionnaires. A descriptive correlational design was used for the study. The sample comprised of 100 caregivers of schizophrenic patients from psychiatric in patient and the outpatient clinic of Neuropsychiatry Department at Assiut University Hospital. The result revealed that level of burden reported by caregivers of schizophrenic patients was high. The most coping strategies used by caregivers of schizophrenic patients were self controlling, positive reappraisal and escape-avoidance. Burden was negatively and non significantly correlated with confrontive coping, distancing, seeking social support and positive reappraisal coping strategies. However, it was positively and non significantly correlated with self controlling, accepting responsibility, escape- avoidance and planful problem solving. Sociodemographic variables were not associated significantly with burden and coping strategies. It is concluded that: Caregivers experienced high level of burden. Burden was none significantly correlated with coping strategies. Recommendation: Psycho educational program is needed to assist caregivers cope successfully with burden resulting from the care of schizophrenic patients.
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Key words: schizophrenia; caregivers; Sociodemographic.

1. Introduction:

Caregiver burden refers to the negative feelings and subsequent strain experienced as a result of caring for a chronically sick person (Natalie et al., 2003).

Schizophrenia is a severe mental illness, which is stressful not only for the patients, but also for family members. Numerous studies have demonstrated that family caregivers of persons with severe mental illness suffer from significant stress, experience moderately high levels of burden and often receive inadequate assistance from mental health professionals (Saunders, 2003). In the same respect, Seltzer et al., 1997 stated that-care for severely mentally ill individuals, particularly in the community, may carry a heavy burden, more so than care of other disabled individuals such as mentally retarded people. Such burden manifests in reduced caregiver well being (Jungbauer & Angermeyer, 2002). Hence caregiver burden, particularly that of closely involved family members such as parents, is important as an outcome measure in mental health care, so as to assess and reduce it for the well- being of both caregivers and mentally ill. Indeed, the measurement of caregiver burden has been shown to enhance worker and administrator awareness of the need to reduce such burden in the health care field in general (Guberman et al, 2003).

Similarly, Gutierrez-Maldonado et al., 2005 and Bandeira et al., 2006 stated that de-institutionalization of psychiatric patients has led to a greater emphasis on family management in the community and family members are often overwhelmed by the demands that caring for a patient with schizophrenia involves. Most studies of family burden in schizophrenia have taken place in developed countries. However, they examined family burden and its correlates in a regional area of a medium income country in South America and they found that the average levels of burden were very high, particularly for mothers, carers with less education, carers of younger patients and carers of patients with more hospitalizations in the previous 3 years. Also, Shibre et al., 2003 postulated that, studies have consistently shown that both the subjective and objective dimensions of burden among family members of schizophrenia patients and other psychiatric disorders are prevalent. However, as most of these reports were from western societies, we lack information on the subject in developing countries.

Scazufca and Kuipers, 1999 concluded that ways of coping are influenced by relatives' perceptions of the situation with patients.

Avoidance strategies seem to be less effective in regulating the distress of caregivers than problem-focused strategies. On the other hand, Johnson in 2000 found passive coping styles associated with a high level of burden, and problem solving coping styles related to lower levels of burden in caregivers. The results of Lakiska, et al., 2000 showed that caregivers used emotional and practical strategies to cope with participant's negative symptoms and difficult behaviors and experienced more worries about these problems.

Significance of study:

Magliano et al., in 2000 stated that only few data are available on how family burden in schizophrenia changes over time. In addition, no study has explored how such factors as coping styles and social support influence burden over time. Similarly, Chandrasekaran et al., in 2000 stated that, little is known about the ways in which families cope while caring for a relative with schizophrenia in developing countries. Perhaps if professional nurses and other health team members explored how much caregivers of schizophrenic patients burdened and how they cope with this burden, this could be a useful way of generating information that can guide management strategies.

Aim of the study:

1. To explore burden and coping strategies in caregivers of schizophrenic patients.
2. To identify the relationship between burden and coping strategies in caregivers of schizophrenic patients.

2. Subjects and Methods

Research Design: A descriptive correlational design was used on the study.

Setting: This study was conducted at the in-patient unit of Psychiatry and the outpatient clinic of Neuropsychiatry at Assiut University Hospital.

Subjects: The subjects of this study consisted of 100 caregivers of schizophrenic patients from psychiatric in patient unit and the outpatient clinic of Neuropsychiatry at Assiut University Hospital.

Tools of the study:

1. Caregiver burden self report questionnaire:

It will be used to assess caregiver burden. It was developed by Rudnick and Otsma representatives in 2003. The questions are conceptualized as belonging either to practical burden or to emotional burden, according to an established framework of practical vs. emotional needs, as utilized in health care in general and in mental health care in particular. The final form of the questionnaire consists of 27 items, of which the first 12 address practical burden, the next 13 address emotional burden, and the last 2 address total burden and burden in the last month relative to the last year. All questions are rated on a 4-point ordinal scale, ranging from 1 (no) to 4 (very much).

2. Ways of coping questionnaire (revised form):

It will be used to assess caregivers coping strategies. It was developed by Folkman et al in 1986. It consists of 66 items. These items are classified into 8 coping subscales as the following: Confrontive coping, distancing, self-controlling, seeking social support, accept responsibility, escape-avoidance, planful problem-solving and positive reappraisal. The subjects responds on a 4-point Likert scale (o = does not apply and/or not used; 3 = used a great deal).

The previous questionnaires were translated into Arabic language to suit caregivers' culture and revised by the researchers to ensure that they give the same meaning of the original ones.

Statistical measures:

The following statistical measures were used:

a) Descriptive measures included: count, percentage, arithmetic mean and standard deviation.

b) Statistical tests included: Unpaired T-test, used to compare two independent means. One way analysis of variance (ANOVA) test used to compare means of more than two groups. Pearson correlation coefficient (r) was used to study correlation between quantitative variables. The level of significance selected for this study was p equal to, or less than 0.05.

3. Results

Table (1) shows socio-demographic characteristics of the caregivers of schizophrenic patients. The mean age of the studied caregivers was 33.6 ± 11.6 (17 – 60 years), 25.0% of them were males and 75.0% of were females, 59.0% were from rural areas. 50.0% were single and 35.0% and were married. 62.0% of them were illiterate- read & write. In relation to consanguinity, it was noticed that 77.0% were from first degree relatives. In addition, it was found that 67.0% were housewives.

Distribution of the means and standard deviations of burden questionnaire scores among caregivers of schizophrenic patients was illustrated in table (2). It was found that the mean score of burden of being busy to care for their mentally ill family members was 3.66 ± 0.77 followed by burden of being sad and worried related to their mentally ill family members mean $\pm$ SD was 3.54 ± 0.92 and then burden of investing time, physical effort in caring for their mentally ill family members and spending money on them mean $\pm$ SD was ($3.49 \pm$

0.86, 3.47 ± 0.89 and 3.35 ± 0.89) respectively. In addition, the total mean score of burden among them was 77.16 ± 15.91 and this indicates that they were suffering from high level of burden.

Table (3) reveals the total mean scores of each subscale (factor) of coping strategies among caregivers of schizophrenic patients. It was found that, the mean ± SD of self controlling as coping strategies was 10.01 ± 3.39 followed by positive reappraisal and escape-avoidance; the mean ± SD was 9.29 ± 3.96 and 9.22 ± 3.10 respectively.

The relation between socio- demographic characteristics and burden among caregivers of schizophrenic patients revealed no statistical significant association (Table 4).

Concerning the relation between socio demographic characteristics and coping strategies among caregivers of schizophrenic patients, it was found that, the mean score of coping strategies was slightly higher among younger age groups, male, divorced/ widow, educated caregivers and those of urban areas. There were no statistical significant association between socio- demographic characteristics and coping strategies among

caregivers of schizophrenic patients as shown in table (5).

Table (6) illustrates the relation between burden and coping strategies among caregivers of schizophrenic patients. It was found that burden was negatively and non significantly correlated with confrontive coping, distancing, seeking social support and positive reappraisal coping strategies (r= -0.126, -0.066, -0.013 and -0.190 with p-value = 0.211, 0.517, 0.897, and 0.059) respectively. However, it was positively and non significantly correlated with self controlling, accepting responsibility, escape- avoidance and Planful problem solving (r= 0.158, 0.129, 0.087and 0.010 with p- value= 0.116, 0.201, 0.391 and 0.924) respectively.

Figures 1& 2 demonstrate correlation between age and self controlling as well as escape-avoidance as coping strategies. It is clear from these figures that the age was negatively and significantly correlated with both self controlling (r= -0.276 at P= 0.006*) and escape- avoidance (r= -0.233 at P= 0.020*). This indicates that the older caregivers use minimum self controlling and avoidance coping strategies.

Table (1): Distribution of sociodemographic data of the caregivers of schizophrenic patients

Variables	No. (n= 100)	%
Age:		
< 30 years	47	47.0
≥ 30 years	53	53.0
Mean ± S D (Range)	33.6 ± 11.6 (17 – 60)	
Sex:		
Males	25	25.0
Females	75	75.0
Residence:		
Urban	41	41.0
Rural	59	59.0
Marital status:		
Single	50	50.0
Married	35	35.0
Divorced/ widow	15	15.0
Education:		
Illiterate/ read & write	62	62.0
Basic education	10	10.0
Secondary education	25	25.0
University	3	3.0
Consanguinity:		
First degree	77	77.0
Second degree	8	8.0
Others	15	15.0
Work:		
Housewife	67	67.0
Employed	5	5.0
Farmer	4	4.0
Others	4	4.0
Unemployed	20	20.0

Table (2): Distribution of the means and standard deviations of burden questionnaire scores among caregivers of schizophrenic patients

Variable items	Mean ± SD
I invest time in my mentally ill family member (MIFM)*	3.49 ± 0.86
I spend money on my MIFM	3.35 ± 0.89
I invest physical effort in caring for my MIFM	3.47 ± 0.89
I am busy caring for my MIFM	3.66 ± 0.77
I am ill due to caring for my MIFM	2.86 ± 1.32
I am in danger due to caring for my MIFM	2.30 ± 1.34
I lack privacy due to caring for my MIFM	2.83 ± 1.26
I lose work time due to caring for my MIFM	3.01 ± 0.85
My leisure activities are reduced due to caring for my MIFM	3.07 ± 1.06
I lack rest due to caring for my MIFM	3.24 ± 1.08
I lack company due to caring for my MIFM	2.98 ± 1.16
My plans are inhibited due to caring for my MIFM	2.87 ± 1.19
I lack assistance in caring for my MIFM	2.97 ± 1.13
I cannot share with others my concerns regarding my MIFM	2.70 ± 1.19
I am angry about the care of my MIFM	1.53 ± 0.95
I am desperate, related to my MIFM	1.81 ± 1.10
I am ashamed, related to my MIFM	2.51 ± 1.37
I am sad, related to my MIFM	3.54 ± 0.92
I am worried, related to my MIFM	3.54 ± 0.92
I am humiliated, related to my MIFM	2.76 ± 1.35
I am exhausted, related to my MIFM	3.03 ± 1.25
I am frightened, related to my MIFM	3.12 ± 1.18
I feel guilty, related to my MIFM	1.66 ± 1.07
I feel exploited, related to the care of my MIFM	1.40 ± 0.90
I feel misunderstood, related to my MIFM	3.04 ± 1.08
I generally suffer from burden, related to my MIFM	3.18 ± 1.11
I suffered such burden the last month relative to the last year	3.24 ± 1.14
Total mean score of burden scale (total score= 108)	77.16 ± 15.91

* MIFM: Mentally Ill Family Member

Table (3): The total means scores of each subscale (factor) of coping strategies among caregivers of schizophrenic patients

Factors of coping strategies	Score	Mean ± SD	Range
Confrontive coping	18	6.29 ± 2.40	1 – 13
Distancing	18	7.54 ± 2.98	2 – 16
Self controlling	21	10.01 ± 3.39	3 – 17
Seeking social support	18	6.11 ± 3.48	0 – 14
Accepting responsibility	12	3.59 ± 1.69	0 – 10
Escape- Avoidance	24	9.22 ± 3.10	0 – 16
Planful problem solving	18	5.14 ± 2.87	0 – 13
Positive reappraisal	21	9.29 ± 3.96	1 – 21

Table (4): The relation between socio- demographic characteristics and burden among caregivers of schizophrenic patients

	Mean ± SD	Range	P-value
Age: (years)			
< 30 years	79.5 ± 15.2	41 – 100	0.161
≥ 30 years	75.1 ± 16.4	33 – 97	
Sex:			
Male	77.4 ± 16.6	37 – 98	0.931
Female	77.1 ± 15.8	33 – 100	
Marital status:◦			
Single	79.4 ± 15.1	41 – 98	0.380
Married	75.3 ± 17.0	33 – 100	
Divorced/ widow	74.3 ± 16.0	48 – 94	
Education:			
Illiterate/ read & write	76.8 ± 16.7	33 – 100	0.778
Educated	77.7 ± 14.7	37 – 98	
Residence:			
Urban	79.0 ± 14.7	37 – 97	0.325
Rural	75.8 ± 16.7	33 – 100	

Unpaired T-test   ◦ANOVA

Table (5): Relation between socio- demographic characteristics and coping strategies among caregivers of schizophrenic patients

	Mean ± SD	Range	P-value
Age: (years)			
< 30 years	58.3 ± 12.0	32 – 93	0.386
≥ 30 years	56.2 ± 12.0	24 – 81	
Sex:			
Male	58.3 ± 10.5	37 – 80	0.602
Female	56.8 ± 12.5	24 – 93	
Marital status:◦			
Single	58.2 ± 11.7	32 – 93	0.272
Married	54.7 ± 12.2	24 – 85	
Divorced/ widow	59.8 ± 11.9	44 – 81	
Education:			
Illiterate/ read & write	56.8 ± 11.8	24 – 85	0.685
Educated	57.8 ± 12.4	32 – 93	
Residence:			
Urban	58.8 ± 11.8	37 – 93	0.263
Rural	56.1 ± 12.0	24 – 85	

Unpaired T-test   ◦ANOVA

Table (6): Correlation between burden and coping strategies

Coping strategies	Burden score
Confrontive coping	r= -0.126
	P= 0.211
Distancing	r= -0.066
	P= 0.517
Self controlling	r= 0.158
	P= 0.116
Seeking social support	r= -0.013
	P= 0.897
Accepting responsibility	r= 0.129
	P= 0.201
Escape- avoidance	r= 0.087
	P= 0.391
Planful problem solving	r= 0.010
	P= 0.924
Positive reappraisal	r= -0.190
	P= 0.059
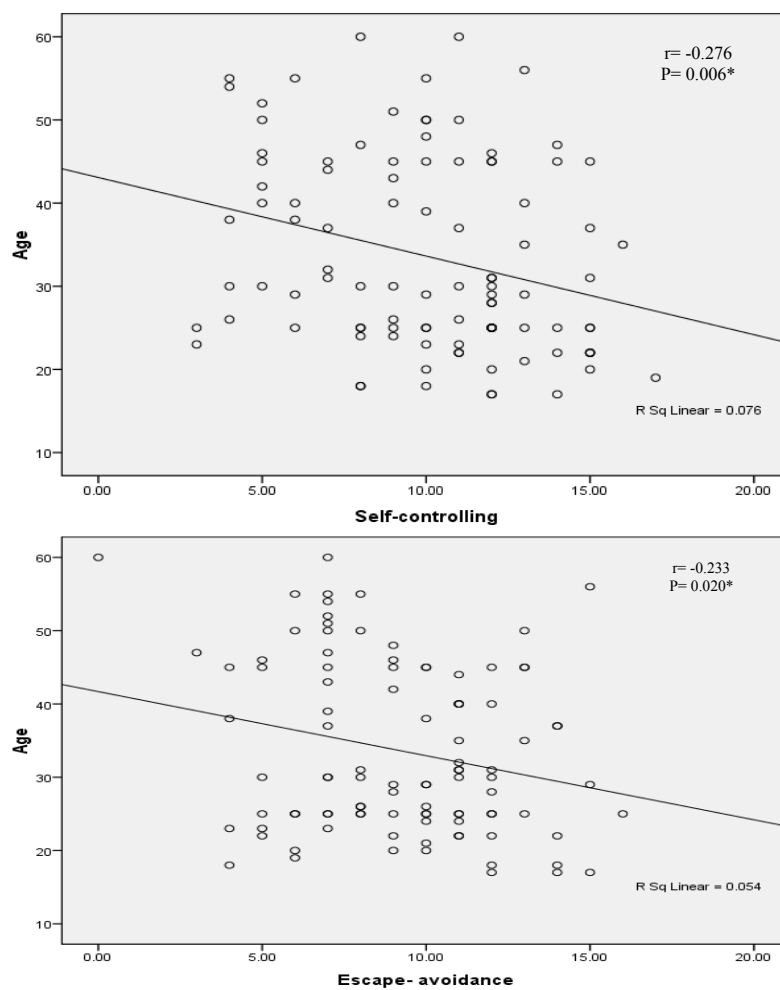
Fig. (2): Correlation between age and escape- avoidance

4. Discussion

Various study results showed that caregiver caring for patients with schizophrenia experience burden (Caqueo-Urizar & Gutierres-Maldonaldo, 2006; Roick, et al. 2007; Grandon, et al, 2008; Shu-Ying, et al, 2008). The current study showed that the general burden reported by caregivers of schizophrenic patients was high. The highest scores of burden were related to being busy to care for their mentally ill family members, being sad and worry, investing time, physical effort in caring for their mentally ill family members and spending money on them respectively. This could be attributed to the characteristics of the sample as the majority of them were females who are responsible for household duties and more than half of them were illiterate.

This finding is partially supported by Yusuf (2010) who reported that a high level of caregiver burden was found in 47.3% respondents and Rudnick (2004) who found that the general burden reported by the family members of schizophrenic was moderate and reported that the highest burden was related to worry, which is particularly understandable if satisfactory services are not provided, and the second highest burden was related to financial costs, which again is understandable if sufficient public resources are not in place. The same author stated that practical and emotional burden were not clearly distinguished among our subjects, perhaps because each type of burden may feed into the other (e.g., financial costs may augment worry, and worry, which is stressful, may augment physical illness).

Similarly, the majority of studies on burden of caregivers of patients having schizophrenia conducted so far report significant burden of caregivers with over 90% of families, experiencing moderate to severe burden. (Provencher,1996, Unal et al., 2004; & Magliano et al., 2005). The burden of carers of schizophrenia is large and multifaceted. Headmost, there are the direct costs of providing care for individuals with schizophrenia. The indirect costs encompass the loss of productivity through impairments, disability as well as some legal problems including violence. The burden was present in areas like finance, routine activities, family leisure and interaction. Similarly the study of Sreeja et al., 2009 revealed that , thirty-eight out of sixty caregivers have reported 'Moderate burden' and 22 out of 60 have reported 'Severe burden'. Caregivers of both groups have burden predominantly in the same areas; i.e. patient care, finance, physical and emotional burden, family relations and occupation respectively. Furthermore, the study of (Kumar & Raguram (2009) showed that caregivers of schizophrenic patients in experienced moderate level of burden. The higher mean score was recorded for

physical and mental health followed by external support, caregivers' routine, taking responsibility, patient behavior, support of patient and other relations respectively. In the same study, caregiver, also reported greater use of emotion focused copings strategies as acceptance, denial religious. Similar findings reported by Chandrasekaran et al., 2002.

Caregivers used a wide variety of coping strategies, both problem and emotion-focused. In the current study, the most coping strategies used by caregivers of schizophrenic patients were self controlling, positive reappraisal and escape-avoidance. This finding is not supported by Chakrabarti & Gill (2002) found that problem-focused coping strategies were more common in caregivers of bipolar patients and emotion-focused strategies in caregivers of schizophrenic patients. Similarly, Chandrasekaran et al., 2002 reported that an emotion-focused coping strategy was found to be more commonly employed by the relatives, than other strategies. In contrast, Scazufca & Kuipers (1999) found that Problem-focused coping was the strategy used more often at inclusion than at follow-up.

In this respect, Rammohan et al., 2002 reported that parent caregivers were found to use denial as a coping strategy more than spouses. Spouses used more of negative distraction strategies when compared to the parent group. Negative distraction strategies such as use of alcohol and drugs are reported more often in males. A predominance of male caregivers in the spouse group could have influenced the scores on this subscale. The results suggest that male caregivers need to be specifically targeted in intervention programs to teach them more adaptive ways of handling stress**.**

Although the present study demonstrated that the mean score of burden was higher among younger age groups, male, single, illiterate caregivers and those of urban areas, there were no statistical significant association between these socio-demographic characteristics and burden among caregivers of schizophrenic patients.

The study of Juvang et al, (2007) is not in agreement with the current study findings as they investigated the relationship between demographic characteristics of caregiver's burden when providing care for a member with schizophrenia in China and the finding showed that the age of caregiver was positively correlated to burden of caregiver. When caregiver becomes older, they are worried about who will take care of their ill family member in the future. Older caregiver also cannot provide care well to the ill member. In addition, younger age of caregiver which has to provide caring for ill member, result in increasing sense of life is worth living (Fujino & Okamura, 2009).

Also, the findings of Juvang, et al., (2007) showed that the education level has negative correlation with caregiver's burden. It was assumed that higher the level of education, higher the salary will be. High salary would decrease financial problem related to providing care for ill family member. Level of education of the caregiver also tends to have more knowledge to deal with the stressful event. Therefore caregiver's education level influences burden of the caregiver.

In general, the current study revealed that there were no statistical significant associations between socio- demographic characteristics and coping strategies among caregivers of schizophrenic patients as shown in table (5). However, the age was negatively and significantly correlated with both self controlling and escape- avoidance as demonstrated in figures 1& 2. In contrast, Kumar et al., (2010) reported that female spouses were found high on emotion focused - religion/faith coping mechanisms. In this coping mechanism one visits places of worship, go on a pilgrimage, participates in religious groups, pray to God, perform special 'puja'. This is partially supported by Miller (2002) who reported that women are more religious than men to the extent that being irreligious constitutes risk-taking behavior. The differential use of high religious coping by female spouses is obviously because of their high religiosity. In female spouses, problem solving coping mechanism is negatively associated with spousal burden, (Beta: -.268; t-value=2.236, p=.029). Problem focused coping is considered the best. It points out to the ways of solving the problem and minimizes negative emotional consequences. In this approach an individual typically review the problems several times to enhance understanding, come up with a variety of probable solutions, works harder to manage the situation, analyze the problem bit by bit and seek assistance from others .

The results of the present study revealed that burden was negatively and non significantly correlated with confrontive coping, distancing, seeking social support and positive reappraisal coping strategies. However, it was positively and non significantly correlated with self controlling, accepting responsibility, escape- avoidance and planful problem solving. This could be interpreted by that, using confrontive coping, distancing, seeking social support and positive reappraisal coping strategies lead to decrease of the level of stress of mentally ill patients and consequently diminish the level of burden. In contrast, the use of self controlling, accepting responsibility, escape-avoidance and planful problem solving increase stress level and consequently the level of burden increase.

This result is partially supported by (Scazufca and Kuipers, 1999) who noticed that avoidance coping is strongly associated with burden, distress and high expressed emotion. Avoidance strategies appear to be less effective in regulating the distress of care-givers of schizophrenic patients than problem-focused strategies. Rammohan, et al., 2002 found that caregivers who used denial as a coping strategy experienced greater burden. Similarly, it was reported that the use of avoidance and denial coping methods results in greater burden and distress. (Hinrichsen & Lieberman, 1999, Scazufca & Kuipers,1999).

In this respect, Rauktis et al., 1995 found that negative social interactions were more important predictors of burden than social interaction. On the other hand, a reduction of family burden was found over time among relatives who adopted less emotion-focused coping strategies (Magliano et al., 2000). Moreover, Solomon and Draine (1995) found that perceptions of self- efficacy, mastery and satisfaction with coping responses were predictors of lower levels of burden. In contrast, Hobbs (1997) found no significant relationship between coping and burden in care giving mothers of adult schizophrenics.

Recommendation: Psycho educational program is needed to assist caregivers cope successfully with burden resulting from the care of schizophrenic patients.

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The Influence of Oral Administration of Simvastatin on Delayed Non-Union Facial Fractures-Clinical Study

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Abstract: In this study ten patients with delayed facial fractures presented to our clinic, three of them were in the Research institute of ophthalmology clinic, dental and maxillofacial unit and the other seven were in AL Haram hospital clinic, maxillofacial unit. The patients were in a range of age 25-45 years old, two females and eight males (table.1). All of the patients had non-union fibrous healing and most of them had facial scars at different sites of the face. Others had a chief complaint of pain or numbness of different areas of the face.   All of them underwent physical, clinical and radiographic investigations using computed tomograph. Reduction of bone fragments using bone holder was done. The infraorbital nerve was evaluated and decompressed when necessary. Following alignment of the fractures, fixation was maintained by a titanium miniplate and in some cases microplates and screws, after adaptation of the plates to the area. Postoperative care included antibiotics (Clindamycin 300mg.) for a total of 7 days, ice compresses intermittently for 24h., Voltaren 75mg. I.M. every12 h.. Simvastatin (zocor 20 mg. tab.) daily dose was prescribed only to five patients for 3 months (group1) while the other five patients received only the ordinary postoperative prescription (group 2). The aim of this study is to evaluate the effect of oral administration of simvastatin drug on accelerating delayed non –union fractured bone healing. Results: Follow up of the cases revealed slight edema, swelling and hematoma in the first2 weeks; however, it was less in simvastatin group patients, while no infection was noticed in all the patients. Clinical examination of the patients revealed good stability of the bones immediately postoperative. Three months postoperative CT. and/ or three dimensional (3D) facial bone CT scans for all patients revealed that the displaced bone was reduced to its normal anatomy. . It was noticed that patients on the regimen of simvastatin (zocor tablets) (group1) had ameliorated recovery without any complications than in (group2), as the inflammatory reaction was more severe in this group. Bone healing seemed to be accelerated as seen in the CT. radiograph in (group1). At 6-month follow- up, all patients complained of no particular discomfort in everyday life activities and were satisfied with their external appearance. Conclusion:-From this study it could concluded that oral administration of simvastatin 20mg.tablets (zocor) could be prescribed as a regimen postoperatively for all patients with fractures specially in delayed cases for acceleration of bone and soft tissue healing and enhancement of postoperative inflammatory reactions.
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Keywords: Oral Administration; Simvastatin; Facial

1. Introduction

Maxillofacial trauma has recently increased due to increases in social activities and advances in diagnostic methods [1]. The evaluation and treatment of maxillofacial trauma tends to be delayed when it is associated with injuries to other parts of the body. If treatment is delayed due to concurrent systemic diseases, permanent facial deformities may be unavoidable because surgical manipulation is frequently difficult or even impossible. Considering that maxillofacial injuries occur mostly in younger subjects [2], the problem of aesthetic outcome is especially serious.

Still today, there is no classification of non-unions in maxillofacial traumatology. There is a broad spectrum of definitions that simultaneously describe the pathological conditions and functional implications determined by the anatomical location of the fractures and the time factor.

Weber, in 1973, introduced the term "pseudo-arthrosis" to describe an altered process of bone healing characterised by the presence of fibrous tissue interposed between the fracture segments, that was lined with cartilaginous tissue and joined by a capsule; Spiessl, in 1988, used the term "non-union" to define any alteration of the bone healing process after a time period of more than 6 months from the initial traumatic event; Rosen, in 1990, proposed a new classification of the modes of altered bone healing in fractures, distinguishing 5 categories: delayed consolidation, non-union, non-union vascular, non union avascular, pseudoarthrosis. There is also the term "poor bone positioning", This term describes the incorrect anatomical position of the

bone fragments despite perfectly normal healing according to Gruss. [3]

A substantial part of the maxillofacial surgery practice deals with maxillofacial bone healing. In the past decades, low-intensity ultrasound treatment has been shown to reduce the healing time of fresh fractures of the extremities up to 38%, and to heal delayed and non-unions up to 90% and 83%, respectively. Based on the assumption that the process of bone healing in the bones of the extremities and maxillofacial skeleton is essentially the same, the potential of ultrasound to stimulate maxillofacial bone healing was investigated. Although limited evidence is available to support the susceptibility of maxillofacial bone to the ultrasound signal, ultrasound may be of value in the treatment of delayed unions, in callus maturation after distraction, and in the treatment of osteoradionecrosis [4].

Statin, 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitor is the first-line drug for hyperlipidemia, and it has been recognized to be a safe and low-priced drug [5–7]. As a result of its worldwide long time usage statin has multiple functions including antiinflammation, bone formation by improving the osteoblast function via the BMP-2 pathway and suppresses osteoclast function; resulting in enhanced bone formation . [8, 9]

Statins can also induce angiogenesis, and improve the vascular endothelial cell function. For this reason statins could be used either alone or in combination with other bone substitute material(BSMs) for enhancement of its properties and acceleration of bone formation. [10, 11]

Statins include naturally occurring lovastatin, chemically modified simvastatin and pravastatin, and the synthetically derived atorvastatin, fluvastatin, and cerivastatin. Simvastatin has shown to be among the most potent in stimulating bone growth [12,13,14]

Some authors have associated the use of statins, hypolipidemic drugs, and new bone formation to evaluate the effect of locally administered simvastatin on bone healing. It was concluded that locally administered simvastatin was detrimental to the repair of defects in the calvaria of rats.[15]

Suppression of residual ridge resorption after tooth extraction is a hot spot in dental research. Recently, simvastatin was reported to influence bone turnover by stimulating bone formation. The effect of simvastatin application on residual ridge resorption following tooth extraction was investigated. The findings indicate that local application of simvastatin would effectively preserve the residual alveolar bone by promoting bone formation in extraction socket.[16]

In other study simvastatin was administered either subcutaneously or directly to the fracture area, with the goal of stimulating fracture repair at acceptable doses. It was concluded that dramatic positive effect on biomechanical parameters of fracture healing by simvastatin treatment directly applied to the fracture area was obtained. [17]

HMG-CoA reductase inhibitors, statins, are widely prescribed to lower cholesterol. High doses of orally administered simvastatin have previously been shown to improve fracture healing in a mouse femur fracture model. [18]

The aim of this study is to evaluate the effect of oral administration of simvastatin drug on accelerating delayed non –union fractured bone healing.

2. Patients and Method:

In this study ten patients with delayed facial fractures presented to our clinic, three of them were in the Research institute of ophthalmology clinic, dental and maxillofacial unit and the other seven were in AL Haram hospital clinic, maxillofacial unit. The patients were in a range of age 25-45 years old, two females and eight males (table.1). All of the patients had non-union fibrous healing and most of them had facial scars at different sites of the face (Fig.1). Others had a chief complaint of pain or numbness of different areas of the face. All of them underwent physical, clinical and radiographic investigations using computed tomography (CT) (Fig.2, 3, 4, 5). The importance of the eye evaluation was stressed when indicated. Pre-and postoperative ophthalmic examination included assessment of visual acuity, papillary reaction ,and extraocular mobility. The degree of enophthalmos was assessed by direct observation from beneath the chin. The patients were prepared for general anesthesia. . In one case polyethylene sheet implant was needed to correct a missed bone segment of inferior orbital rim, the sheet was soaked in hot saline (autoclaved) for 10 min., to which a first generation cephalosporin had been added .The implant was molded and adapted to a template of the anatomy of the area, then fixed and secured to the site using microscrews.Irrigation and debridment of the wounds were done before closure using 4/0 Vicryl suture. For all patients with subciliary incision, a 4/0 silk suture was placed in the lower lid and taped to the forehead (Frost suture) for 48h. .This helps to redrape the lower lid and improves lymphatic drainage (19). All patients received the steroid methylpredisolone sodium 125 mg I.V.during the procedure.

Postoperative care included antibiotics (Clindamycin 300mg.) for a total of 7 days, ice compresses intermittently for 24h., Voltaren 75mg. I.M. every12 h.. Simvastatin (zocor 20 mg. tab.) daily dose was prescribed only to five patients for 3 months (group1) while the other five patients

received only the ordinary postoperative prescription   (group 2).

Fig. 1: Preoperative picture showing scars on the nasal bridge and right upper eye lid with telecanthus. case.(Case No. 1)

Fig. 2: Photograph showing reconstructed 3D from CT of the same
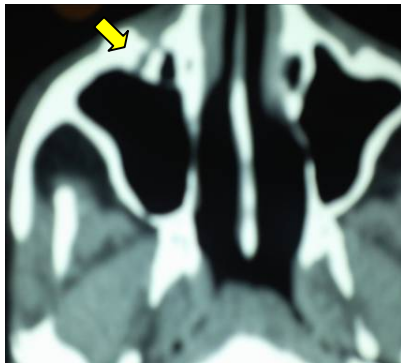
Fig.3: Photograph showing CT of another case with fractured inferior orbital rim impinging on the infraorbital foramen. (Case No.2)

Fig.4: Photograph showing reconstructed 3D from CT of the same case.
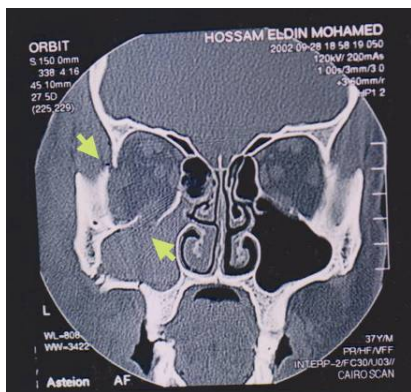
Fig.5: Photograph showing coronal cut CT of case 3 fracture of the lateral and inferior orbital rim.
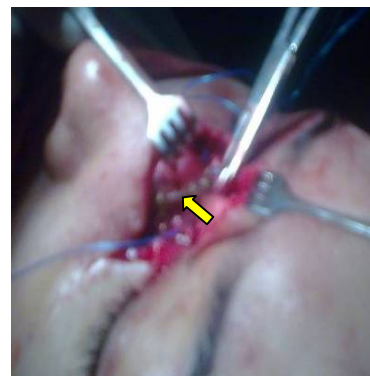
Fig. 6: Picture showing plating of the nasal bridge and bone. (Case No. 1)

Table (1): List of cases:

Case no.	Age	Sex	Delay	Site of fracture	Chief complaint
1	٢٧	female	3/ m.	Nasal bridge and nasal bone with telecanthus	Esthetics
٢	٣٥	male	٤/ m.	Inferior orbital rim pressing on the inferior orbital foramen. R	Pain at the area of the cheek with numbness of the upper lip
٣	٣٧	male	٢ / m.	Inferior and lateral orbital rim. L	Esthetics
٤	٤٠	female	٨/ m.	Inferior orbital rim with deformity of the lateral corner of the eye. R	Esthetics
٥	٢٥	male	٢ /m.	Anterior maxillary wall and lateral nasal bone. L	Esthetics
٦	٤٢	male	٨ /m.	Inferior orbital rim medial side with diplopia and lateral motility restriction of the eye	Diplopia
٧	٣٠	male	٤/ m.	Inferior orbital rim with lateral nasal bone. L	Numbness at the area of the cheek and esthetics
٨	٣٥	male	٣/ m.	Anterior maxillary wall and lateral nasal bone. R	Esthetics
9	30	male	4/m	Inferior and lateral orbital rim with diplopia due to motility restriction of the upper gaze	Esthetics and Diplopia
10	45	male	3/m	Anterior maxillary wall and lateral nasal bone. L	Esthetics

3. Results:

Follow up of the cases revealed slight edema, swelling and hematoma in the first2 weeks, however, it was less in simvastatin group patients, while no infection was noticed in all the patients .Pain and edema was controlled by analgesic and anti-inflammatory drugs. Clinical examination of the patients revealed good stability of the bones immediately postoperative. Three months postoperative CT. and/ or three dimensional (3D) facial bone CT scans for all patients revealed that the displaced bone was reduced to its normal anatomical location(Fig.7,8,9,10)..In case no.1 the patient was referred to ophthalmic plastic surgeon for correction of the old scares, dropping of the upper eye lid ,and reconstruction of artificial eye. In case no.3 also artificial eye was needed. In case no.2 the trigger zones of pain on the cheek disappeared immediately postoperative but the numbness of the upper lip lasted for 6months postoperative.

In case no. 4 in which polyethylene sheet was used some inflammatory reaction appeared in the eye, however, no implant extrusion occurred .In case no.6&9 diplopia was improved 2 weeks postoperative and the eye movement returned to its normal range immediately postoperative. It was noticed that patients on the regimen of simvastatin (zocor tablets) (group1) had uneventful recovery period without any complications than in (group2) as the inflammatory reaction was more severe in this group. Bone healing seemed to be accelerated as seen in the CT. radiograph in(group1). At 6-month follow- up, all patients complained of no particular discomfort in everyday life activities and were satisfied with their external appearance (fig.11,12).
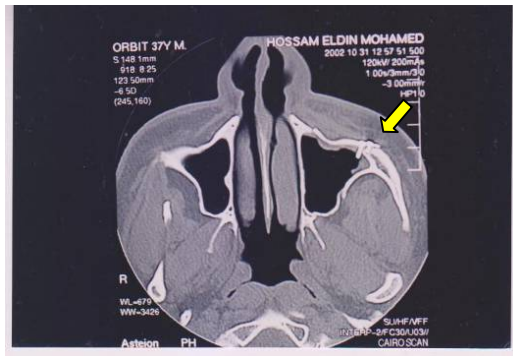
Fig.7.picture showing postoperative CT of case no.3

Fig.8.picture showing postoperative CT of case no 2. arrow showing the plate

Fig. 9. Postoperative picture reconstructed 3D CT of case no. 1 showing miniplates fixed on the nasal bone &bridge

Fig.10. Postoperative picture showing sinus view of case no.3 with miniplates fixed to the lateral and inferior orbital rim
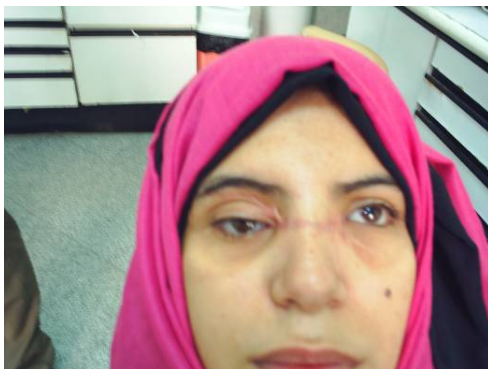
Fig.11.picture showing case (no.1) 3 months postoperatively

Fig.12.picture showing case (no.1) 6 months postoperatively

4. Discussion:

Traumas to the head and neck area can result from various causes including traffic accidents, violence, sports injuries and industrial accidents. It has been reported that associated injuries occur in approximately 30 percent of patients who sustain

facial trauma [20]. Maxillofacial injuries are often neglected in patients with serious clinical conditions such as intracranial injury and injury to the cervical spine. In cases that have neurosurgical conditions or underlying medical diseases, surgical manipulation may be difficult, and the success rate of the surgery may be lowered due to the delay in treatment. Some times fracture sites start to heal spontaneously 10 to 14 days after trauma without immediate management, healing of the fractures could be completed in a normal way after 2or 3months causing maluonion or fibrous tissues formation and multiple fracture lines may prevent normal healing to occur causing non-uonion and sever deformity of the face . It is generally accepted that fracture reduction is difficult or impossible in delayed maluonion cases even with the maximal force possible with an extractor. Such delayed cases may require surgical procedures such as loosening of the bony fragment by refracturing previous fracture sites with an osteotome [21] or plugging up the defect area using grafts [22].

In this study all patients had fibrous non-union fractures so reduction was not complicated, hwoever, some missed very small parts of the bone and other deeply displaced ones in some cases caused few changes of the normal anatomy. In(group1) simvastatin administration from the first day post operative makes the course of healing more easy and smooth due to its anti-inflammatory effect and angiogenic activity[10] ,in addition to its function of bone formation by improving the osteoblast function via the BMP-2pathway and suppressing osteoclast function; resulting in enhanced bone formation[8,9].In clinical studies the difference between (group1) with simvastatin oral administration and(group2) without simvastatin could not be obviously detected with accurate parameters as in the experimental studies ,however, the accelerated recovery and the improved clinical picture of the patients indicates that simvastatin 20mg.as daily dose tablets had an effective role in acceleration of recovery of patients with delayed fractures and bone healing in agreement with Skoglund B .and Aspenberg P., .who claimed that oral administration of simvastatin has previously been shown to improve fracture healing in a mouse femur fracture model. [18]

5. Conclusion:

From this study it could concluded that oral administration of simvastatin 20mg.tablets (zocor) could be prescribed as a regimen postoperatively for all patients with fractures specially in delayed cases for acceleration of bone and soft tissue healing and enhancement of postoperative inflammatory reactions.

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Evaluation of the Effects of *Colatropis gigantea* Leaf Extracts on Blood pH, Blood Glucose and Total Protein concentrations in Diabetic Rabbits.

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ABSTRACT: Screening for the most effective organic extract revealed that acetone fraction significantly decreased the blood glucose level ($p < 0.05$) when compared to other fractions and therefore was used for further study in phase 11. The result showed reduction of blood pH with significant value ($p < 0.05$) of diabetic untreated when compared to group treated with acetone fraction of *C. gigantea* leaf extract. There was no significant difference ($p > 0.05$) in blood pH among the extract-treated groups and glibenclamide-treated group. Protein concentration was observed to increase significantly ($p < 0.05$) in diabetic rabbits treated with *C. gigantea leaf* extract when compared to diabetic untreated group. A significant decrease ($p < 0.05$) in value of protein concentration of the group treated with acetone fraction of *C. gigantea* leaf extract was observed when compared with group treated to reference drug (glibenclamide).

INTRODUCTION

The quality of life and the life span of the patients with the disease depend on its complications. Hence, there is an increased interest in dealing with this disorder. Convincing evidences of the role of free radicals and oxidative stress in the pathogenesis and complications of diabetes mellitus have been established over times. It was shown that the patients were put under increasing oxidative stress in conjunction with different biochemical defects – the inactivation of nitric oxide, which is key to maintaining vascular tones. Significant changes in lipid metabolism and structure also occur in diabetes. In these cases the structural changes are clearly oxidative in nature and are associated with development of vascular disease in diabetes (Baynes *et al.,* 1999).

Diabetes mellitus is the most important disease involving the endocrine pancreas. Its major manifestations include disordered metabolism and inappropriate hyperglycaemia. Currently there are over 150 million diabetics worldwide and this number is likely to increase to 300 million or more by the year 2025 due to increase in sedentary lifestyle, consumption of energy rich diet, and obesity (Yajnik, 2001). While management of diabetes mellitus includes diet, exercise, oral hypoglycaemic agents, and insulin, these treatments do not effectively prevent the complications of diabetes like nephropathy, neuropathy, cataract, and hypertension (Palumbo, 2001).

Random, or "casual," plasma glucose measurement is inexpensive, easily accomplished, and free of risk and discomfort, except for risks from phlebotomy. The test can be performed at the same clinic visit as the patient evaluation. Sources of error relate to technical problems, such as delayed centrifugation (McIntyre *et al*., 1997), and medications that alter serum glucose levels (National Diabetes Data Group, 1979). In the absence of metabolic decompensation, a patient with a random plasma glucose level of 11.1 mmol/L or higher (200 mg/dL) and classic symptoms of diabetes should have a second confirmatory test to diagnose diabetes. Measurement of fasting plasma glucose level requires the patient to fast overnight for at least 8 hours, which can be inconvenient and requires a follow-up clinic visit. Otherwise, it is inexpensive and risk-free. The accuracy of test results may be compromised by patient nonadherence to fasting or laboratory error; moreover, use of certain medications can affect test results (National Diabetes Data Group, 1979). Fasting plasma glucose levels vary considerably within individuals over the long term (Muggeo *et al*., 1997) but are relatively stable over the short term. The results of fasting plasma glucose measurement are substantially more reproducible than those of the OGTT. Studies that have directly compared the two tests have found intra-individual coefficients of variation of 6.4% to 11.4% for measurement of fasting plasma glucose and 14.3% to 16.7% for measurement of 2-hour plasma

glucose (Feskens *et al*., 1991). The implications for the overall prevalence of diabetes inherent in lowering the fasting plasma glucose threshold from 7.8 mmol/L (140 mg/dL) to 7.0 mmol/L (126 mg/dL) are somewhat unclear. Given universal screening (for example, in one epidemiologic study), use of one fasting plasma glucose value with the lower threshold would lead to fewer diagnoses of diabetes than would use of the OGTT. However, because the OGTT is infrequently used in clinical practice (Orchard, 1994), the lowering of the fasting plasma glucose threshold will probably increase the prevalence of diabetes diagnosed in clinical practice.

The study is primarily aimed at evaluating the effect of the extract of *Colatropis gigantea* on blood pH, blood glucose and total protein concentrations in both normal and diabetic rabbits.

MATERIALS AND METHODS

Chemicals

The chemicals used for this study are of analytical grades and include ethanol, methanol, n-hexane, butanol, chloroform, acetone, ethylacetate, ethylene diamine tetracetate (EDTA), hydrochloric acid, sulphuric acid, sodium hydroxide, trichloroacetic acid, (TCA) adrenaline, 2-thiobarbituric acid (TBA), alloxan monohydrate (sigma-Aldrich, USA) and 1 chloro-2,4-dinitrothiobenzene, glutathione peroxidase kit (Randox Laboratories Limited, United Kingdom), Protein kit (Randox Company, USA). Glucose test (Life Scan Inc, California, USA)

Drug

The known hypoglycaemic drug used was glibenclamide 10mg/kg body weight.

Plant Material

The leaves of the plant *Colatropis gigantea* were obtained from Ogadimma Research Farm in Effiom, Ebonyi state. The plant was identified at Department of Botany, University of Nigeria, Nsukka.

Animals

The animal care and handling was done according to the guidelines set by the World Health Organization, Geneva, Switzerland. Healthy, adult male rabbits with an average body weight of 700±50 g obtained from the animal house of Faculty of Veterinary Medicine, University of Nigeria, Nsukka, Nigeria were used for the study. he mice used for LD_{50} determination were 4-6 weeks old with average weight of about 25.50 ± 0.50g. The animals were housed at room temperature ($25\pm3^{o}C$) with a 12 h reverse light cycle and had free access to water and food (standard laboratory diet).

Experimental design

The study was made up of two phases.

Phase I

Phase I was the screening phase at which the most potent fractionated extract amongst the fractions was noted and used in the second phase.

Diabetes was induced by slow intraperitoneal injection of 1% solution of alloxan (200mg/kg body weight) in normal saline and administered within few minutes of preparation. Diabetic state was confirmed after three days using glucometer. The animals were administered with the extract twice daily intraperitoneally at a dose of 300mg/kg body weight for five days. Screening was done by estimating the fraction that reduced the elevated blood glucose level close to normal using glucometer.

A total of eighteen (18) rabbits were used and was divided into nine groups:

- Group 1:   Normal rabbits fed on normal rabbit chow and water ad libitum.
- Group 2: Diabetic rabbits not treated and given water *ad libitum*.
- Group 3: Diabetic rabbits treated with glibenclamide (standard) and water *ad libitum*
- Group 4:Diabetic rabbits treated with n-hexane fraction and water *ad libitum*.
- Group 5: Diabetic rabbits treated with chloroform fraction and water *ad libitum*.
- Group 6: Diabetic rabbits treated with ethylacetate fraction and water *ad libitum*.
- Group 7: Diabetic rabbits treated with butanol fraction and water *ad libitum*.
- Group 8: Diabetic rabbits treated with acetone fraction and water *ad libitum*.
- Group 9: Diabetic rabbits treated with methanol fraction and water *ad libitum*.

Phase II

This Phase of the study was made up of four (4) groups of three (3) rabbits each. Diabetic induction was done as described in the phase I. Treatment was administered twice daily intraperitoneally at a dosage of 300mg/kg body weight for five (5) days. Blood samples were collected through ear vein for biochemical analysis. Liver and pancreatic tissues were dissected out, washed in normal saline and kept in formal calcium removed for histopathological study.

A total of twelve rabbits were used and divided into groups.

Group 1:Normal rabbit fed on normal rabbit chow and water *ad libitum*.

Group 2:Diabetic rabbits not treated and water *ad libitum*.

Group 3:Diabetic rabbits treated with Glibenclamide (Standard) and water *ad libitum*.

Group 4:   Diabetic rabbits treated with most active fraction (acetone fraction) and water *ad libitum*

Plant treatment

Fresh leaves of *C. gigantea* were dried under room temperature, crushed and soaked in 200ml of analytical grade of methanol for 48 hours then filtered and was evaporated with rotary evaporator at room temperature to obtain the crude extract.

Extraction procedure

The crude extract was subjected to fractionation using different organic solvents. It was first extracted using n-hexane. The n-hexane soluble fraction was obtained and concentrated using rotary evaporator at an optimum temperature of 25°C. The resulting residue (residue – A) was dried and then fractionated using chloroform. The soluble chloroform fraction was concentrated using rotary evaporator and obtained chloroform extract while the resulting residue (residue B) was subsequently fractionated using ethyl acetate. The ethyl acetate soluble fraction was concentrated using rotary evaporator and an insoluble residue (residue C). The insoluble residue obtained was re-suspended in acetone, filtered and the filtrate concentrated. The residue obtained (residue D) was further fractionated using methanol. The methanol soluble fraction was concentrated and the methanol concentrate was obtained while the insoluble portion obtained was dried; this was soluble in water.

Dried and blended *C. gigantea*

Extraction with methanol, dried

Whole extract   Fractionation with n - hexane

Residue A   n – hexan fraction (concentrate)

Fractionation with Chloroform
Chloroform fraction (concentrate)

Residue B

Fractionation with ethyl acetate

Residue C   Ethyl acetate fraction (concentrate)

Residue D   Fractionation with acetone
Acetone fraction (concentrate)

Fractionation with methanol
Methanol fraction (concentrate)

Residue E

Fig. 1: Fractionation of *C. gigantea* leaves

Determination of Yield of Extract

$$\% \ Yield = \frac{Weight \ (g) \ of \ Extract \ Evaporated}{Weight \ (g) \ Ground \ Sample \ Pulp} \times 100$$

Anti-diabetic Evaluation
Induction of Diabetes
Phase I
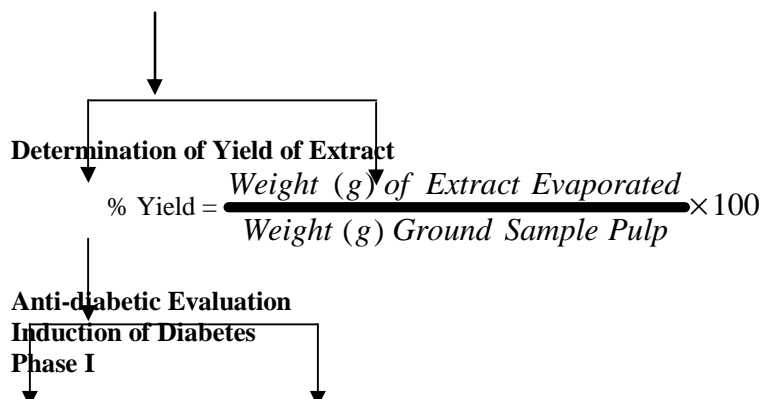
Twenty four rabbits with sugar concentrations of 60-90mg/dl after 12 hours of fasting were injected intraperitoneally (i.p.) with 200mg/kg body weight of freshly prepared alloxan monohydrate (Sigma, USA) in normal saline. The animals were fed with Bendel Feed and Flour Mill Limited Pelletized Guinea Growers mash.

After three days, blood sugar concentrations were determined using glucometer. Blood sugar concentrations found to be 150mg/dl and above were used for determination of hypoglycemic effects of *C. gigantea* leaves extract. The diabetic rabbits were divided into eight groups of two animals each. The extract dissolved in the normal saline and was injected intraperitoneally.

Group 1 represented the control group, while group 2 represented diabetic not treated as described in the experimental design. Group 3 received glibenclamide as standard hypoglycaemic agent. Groups 4 – 9 received different fraction of the extract at the dose of 300mg/kg body weight twice daily for five days.

After five days treatment, Groups 4 – 9 were screened down to one group using blood sugar level as a marker that determined the most active fraction.

Phase II

Twelve rabbits having sugar concentration of 60 – 90 mg/dl after 12 hours of fasting were injected intraperitoneally (i.p.) with 200 mg/kg body weight of freshly prepared alloxan monohydrate (Sigma, USA) in normal saline. After 3 days, blood sugar was determined using glucometer. Blood sugar levels were found to be 150 mg/dl and above. The diabetic rabbits were divided into 4 groups of 3 rabbits each. Group 1 represented normal control; group 2 represented diabetic untreated; group 3 represented diabetic treated with glibenclamide (reference drug) while group 4 received the acetone fraction (most active fraction). After 5 days treatment, blood samples were collected through the ear veins of the animals for oxidative parameter assay.

Methods
Determination of **Serum Glucose Concentration**

The one touch glucose monitoring meter (life scan inc. Johnson - Johnson Company, Mulpiter California, USA) was used as described in the operation manual. A drop of whole blood (0.04ml) was placed on a strip connected to the glucometer. The glucometer automatically separates serum from blood cells and determined the blood glucose.

This method was based on the reaction of glucose and oxygen in the presence of glucose oxidase to yield gluconic acid and hydrogen peroxide.

Hydrogen peroxidase subsequently metabolizes H_2O_2 producing a blue coloured product, the colour intensity of which was proportional to the glucose concentration in the sample, which was read from the one – touch glucometer.

Determination of Total Protein Concentration

The determination of total protein concentration was done according to the method of Slater (1986.).

Principle:

This method is based on the principle that cupric ions, in an alkaline medium, interact with peptide bonds of proteins resulting in the formation of a coloured complex.

Determination of Blood pH

Test strips (Medi-Test combi 9) for rapid determination of blood pH was used.

Principle:

The determination is based on the pseudoperoxidative activity of hemoglobin and myoglobin, which catalyze the oxidation of an indicator by an organic hydroperoxide producing a green colour.

Procedure:

Dip the reagent strip for approximately 1 second in the fresh blood. Test paper contains indicators which clearly change colour between pH 5 and pH 9 (from orange to green to turquoise).

Statistical Analysis

The results were expressed as mean $\pm$ SD and tests of statistical significance were carried out using student t-test and both one-way and two-way analysis of variance (ANOVA). The means were separated using Duncan Multiple Test. The statistical package used was Statistical Package for Social Sciences (SPSS); version 18.

RESULTS

Effect of the Fractionated Extracts of *C. gigantea* on Glucose Level in Diabetic Rabbits

The data in Table 1 below depict the respective effects of 300 mg/kg body weight of different fractionated extract on mean fasting blood glucose level of diabetic rabbits. The effect on the blood glucose levels was the basis of determining the most potent fraction of *C. gigantea* leaves.

Acetone fraction significantly ($P<0.05$) lowered blood glucose levels of diabetic rabbits when compared to other solvent fractions.

Effect of Acetone Fraction of *C. gigantea* Leaf Extract on Total Protein Concentration

Total protein concentration was observed to increase significantly ($p<0.05$) in diabetic rabbits

treated with *C. gigantea leaf* extract when compared to diabetic untreated group (Fig. 2). A significant decrease ($p<0.05$) in value of protein concentration of the group treated with acetone fraction of *C. gigantea* leaf extract was observed when compared with group treated to reference drug (glibenclamide).

Effect of Acetone Fraction of *C. gigantea* Leaf Extract on Blood pH

The result showed reduction of blood pH with significant value ($p<0.05$) of diabetic untreated when compared to group treated with acetone fraction of *C. gigantea* leaf extract. However, there was no observable difference in the blood pH value of both groups treated with glibenclamide and group treated with acetone fraction of *C. gigantea* leaf extract.
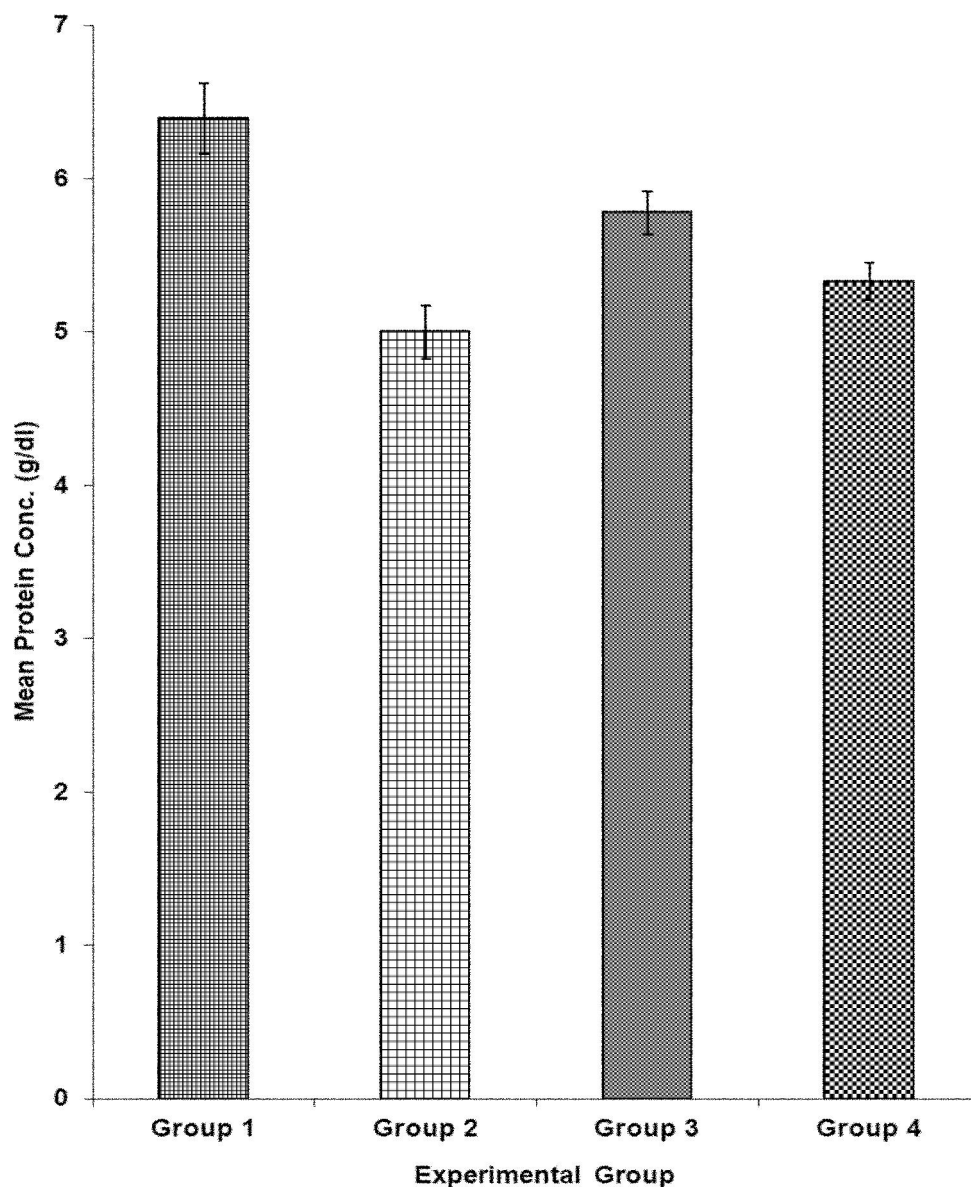
Fig. 2: Effect of acetone extract of *C. gigantea* leaf on the total protein concentration in rabbits

Group 1 = Control;	Group 3 = Diabetic treated with Glibenclamide
Group 2: Diabetic Untreated;	Group 4 = Diabetic treated with Acetone fraction
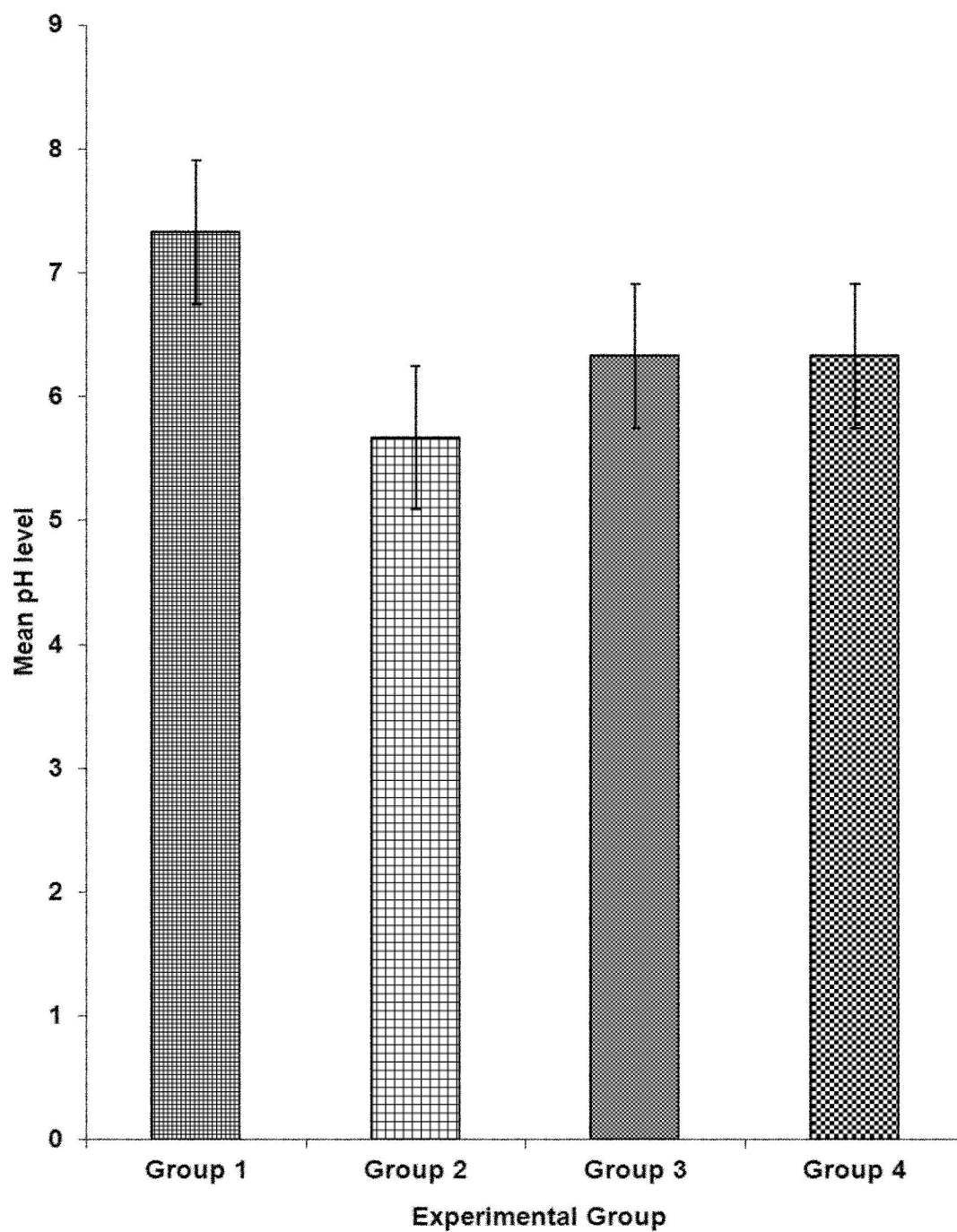
Fig. 3: Effect of acetone extract of *C. gigantea* leaf on the blood pH concentration in rabbits

Group 1 = Control;	Group 3 = Diabetic treated with Glibenclamide
Group 2: Diabetic Untreated;	Group 4 = Diabetic treated with Acetone fraction

Phase I

Table 1: Effect of solvent fractions of *C. gigantea* leaf on glucose level

Treatment Group	Mean FB sugar level (mg/dl)	Mean sugar level (mg/dl) after induction	Mean sugar level (mg/dl) after treatment	% Maximum reduction
1 (Control)	95.00±4.24	–	–	–
2 (Diabetic not treated)	84.00±2.83	249.00±1.41	236.00±2.83	5.20
3 (Diabetic treated with standard drug)	96.50±0.71	153.00±1.41	112.00±4.24	26.80
4 (Diabetic treated with n-hexane fractions	87.00±1.41	152.00±5.66	150.00±2.83	1.30
5 (Diabetic treated with chloroform fraction)	88.50±0.71	204.50±2.12	203.50±0.71	0.75
6 (Diabetic treated with ethylacetate fraction	74.50±4.95	174.00±5.66	166.00±1.41	4.60
7 (Diabetic treated with butanol fraction)	98.50±0.71	307.50±0.71	290.50±20.51	5.53
8 (Diabetic treated with acetone fraction)	95.50±3.54	153.00±7.07	127.50±0.71	16.99
9 (Diabetic treated with methanol)	74.00±5.66	165.00±7.07	281.00±7.07	14.70

Phase II

Table 2: Effect of acetone fraction of *C. gigantea* leaf on glucose level

Treatment Group	Mean FB sugar level (mg/dl)	Mean sugar level (mg/dl) after induction	Mean sugar level (mg/dl) after treatment	% Maximum reduction
1 (Control)	90.00±4.24	–	–	–
2 (Diabetic untreated)	98.50±3.54	239.00±15.56	236.00±7.07	25.10
3 (Diabetic treated with standard drug)	98.00±7.07	184.50±2.12	115.00±4.24	37.20
4 (Diabetic treated with acetone)	98.50±6.36	308.00±31.11	205.50±27.58	33.30

DISCUSSION

Diabetes mellitus is probably the fastest growing metabolic disease in the world and as the knowledge of the multifactorial/heterogenous nature of the disease increases so does the need for more challenging and appropriate therapies. Traditional plant remedies have been used for centuries in the treatment of diabetes (Akhtar and Ali, 1984), but only a few have been scientifically evaluated.

In phase I it appeared that acetone fraction at the dosage of 300mg/kg body weight reduced blood sugar more than other solvent fractions. However, glibenclamide at 10g/kg (a reference drug) could reduce blood sugar slightly above that of acetone extract which informs the use of this plant as an anti-diabetic agent. Although the mechanism of action of the extracts has not been investigated, some scientists have suggested that the hypoglycaemic principle of some extracts work by binding to the ATP-Inhibited K^+ channel in the -cells membrane. This is meant to inhibit the channel activity which depolarizes the -cell membrane and increase Ca^{2+} influx to stimulate more insulin release (Ganong, 2001).

The results indicated that the administration of acetone fraction of *C. gigantea* leaf extract improved the alloxan effect, but did not completely normalized the diabetogenic action induced by allozan when compared with control group. Adephate (1999b) showed that the increase in the tissue concentration of glucagons might play a significant role in the development of hyperglycaemic. It is believed that long-term administration of the plant extract could provide an opportunity for regeneration of more insulin-producing beta cells with subsequent decrease of glucagons immuno-expression and normalization of the blood glucose concentration.

Alloxan induces hyperglycaemia by selective cytotoxic effect on pancreatic -cells (Szkudelski, 2001) causing permanent destruction of -cells. The dosage of 200mg/kg of alloxan used in this study caused moderate diabetes (Grover *et al.,* 2000). It has been reported that glibenclamide was not very effective after the occurrence of complete destruction of -cells; hence more effective in the moderately diabetic rabbits than in severe diabetes (Sharma *et al.,* 1997). The acute hypoglycaemic effect of glibenclamide has been shown to be by the stimulation of production of the residual -cells of the pancrease in addition to enhancement of glucose utilization (Moller, 2001). This suggests that the extracts may have a similar mechanism of action with glibenclamide and may in addition possess an isulinomimetic effect on peripheral tissue (i.e.

extrapancreatic mechanism) either by promoting glucose uptake and metabolism or inhibiting hepatic gluconeogenesis (Djomeni, 2006). This postulation correlates with that of Farjou *et al*. (1987) on the work with Artemisia.

The antihyperglycaemic activities of the acetone fraction of *C. gigantea* leaf extracts were quite considerable and found to be close to that of glibenclamide; and this inferred that this extract may be more efficacious than glibenclamide as more than one component may be responsible for the activity. The evidence reported that the attributed antihyperglycaemic effects of most plants are due to their ability to restore the function of pancreatic tissues by causing an increase in insulin output or inhibit the intestinal absorption of glucose or to facilitate the metabolite in insulin dependent process (Elder, 2004; Jia *et al*., 2003).

Statistical significance ($p<0.05$) was observed in the serum protein concentration in the diabetic rabbits treated with *C. gigantea* leaf extracts compared with diabetic control. Normal rabbits showed higher protein concentration compared with diabetic treated with *C. gigantea* leaf extract and diabetic treated with glibenclamide.

The result of the blood pH indicated increase in the blood pH (i.e. towards normal) of the diabetic rabbits treated with acetone fraction of *C. gigantea* leaf extract and group treated with glibenclamide when compared with normal. There was no significant difference ($p>0.05$) between diabetic rabbits treated with acetone fraction of *C. gigantea* and group treated with glibenclamide. It can be inferred that increased blood levels of acetoacetate and D- -hydroxybutyrate observed in diabetic condition lowered the blood pH, thereby causing the condition known as acidosis in the untreated group.

In conclusion, the results of this study have shown that leaves of *C. gigantea* possess antihyperglycaemic effect. Intraperitoneal administration of *C. gigantea* leaf extract revealed their action on glucose metabolism. The protective effect of *C. gigantea* leaf extract may be connected with the normalization of hyperglycaemia and the inhibition of autoxidation.

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Physicochemical Evaluation of the Effects of Total Suspended Solids, Total Dissolved Solids and Total Hardness Concentrations on the Water Samples in Nsukka Town, Enugu State of Nigeria.

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ABSTRACT: The problem of environmental pollution due to toxic metals has begun to cause concern now in most major metropolitan cities. Nsukka environs have been plagued with perennial problem of water supplies round the year and a better understanding of its water physicochemically status will help to address this daunting problem and issues of human health. The analysis carried out was on the utility water supplies in Nsukka area. Thirteen sampling areas consisting of four boreholes, six dugwells and three springs were chosen for this research work. A total of 26 water samples were taken from the sampling areas during the dry season and another 26 samples during the wet season. Water samples were collected from these sampling areas and refrigerated at 4^0C for processing. Harch Model C50 digital multirange meter was used to measure total dissolved solid. Complexiometric titration was employed in the determination of total hardness of water samples. Bacteriological analysis of the water samples were carried out to ascertain whether there was faecal contamination by the use of multiple tube/most probable number techniques. It was observed that total suspended solid concentration of water samples from dugwell sources was found to have significant increase (p<0.05) when compared with the water samples from the samples obtained from borehole and spring sources during both dry and rainy seasons. Total dissolved solid concentration was found to be significantly higher (p<0.05) in the water sample from dugwell sources when compared with the total dissolved solid concentration in the water samples from both borehole and spring sources during both dry and rainy seasons. Water sample from dugwell sources had showed significant increase (p<0.05) in the level of total hardness as compared with water samples from borehole and spring sources during dry and rainy seasons. Also, there was significant increase (p<0.05) in the level of total hardness of water sample from borehole sources when compared with the spring sources during dry and rainy seasons. Therefore, from the foregoing, it could be concluded that these boreholes, springs and dugwells water tested in Nsukka town are physicochemically good for human consumption as all the physicochemical parameters tested conformed to WHO, SON and NAFDAC water quality standards except Iyi-adoro spring water which might not be very good for consumption during rainy season because of possible bacteria contamination.

INTRODUCTION

Most of our water resources are gradually becoming polluted due to the addition of foreign materials from the surroundings. These include organic matter of plant and animal origin, land surface washing, and industrial and sewage effluents (Karnataka State Pollution Control Board, 2002)[1]. Rapid urbanization and industrialization with improper environmental planning often lead to discharge of industrial and sewage effluents into lakes. The lakes have a complex and fragile ecosystem, as they do not have self-cleaning ability and therefore readily accumulate pollutants. Bellandur Lake, the largest one in Bangalore urban area, recently attracted a lot of public attention because of the formation of froth during rainy season due to chemicals (soaps, detergents, etc.) and biosurfactants. For the last few decades, the treated,

partially treated and untreated wastewater has been discharged to this lake and the lake water is being used for farming purposes (Pruss *et al*., 2002)[2].

Individual rural homeowners are often responsible for providing and protecting their own water supplies. Where safety of these sources is concerned, no "short-cuts" can be taken. Protecting the quality of individual water supplies is a combination of controlling land use around the supplies and using proper water treatment techniques where necessary. Rural homeowners must assume responsibility for protecting their families from contaminated drinking water. Assistance in this regard can be obtained from a number of agencies (Ward, 1995)[3]. Local health authorities can answer questions relating to applicable local regulations; health hazards posed by contaminated water, and suggested procedures for

sampling and analyzing drinking water for contaminants. In some cases, local health officials will analyze individuals' water samples for common pollutants at no cost or for a nominal charge. Complete well water analysis is the homeowner's responsibility and is not free. State regulatory agencies charged with water resource management can answer questions regarding water use. They usually also have information regarding the availability and suitability of water sources in the State. Such agencies usually administer safety regulations for dams as well (Ward, 1995)[3].

Although hardness may have significant aesthetic effects, a maximum acceptable level has not been established because public acceptance of hardness may vary considerably according to the local conditions. Water supplies with a hardness greater than 200 mg/L are considered poor, but have been tolerated by consumers; those in excess of 500 mg/L are unacceptable for most domestic purposes. Higher levels are generally associated with groundwater sources. Water hardness is a traditional measure of the capacity of water to react with soap. Hard water requires a considerable amount of soap to produce lather, and it also leads to scaling of hot water pipes, boilers and other household appliances. Water hardness is caused by dissolved polyvalent metallic ions. In fresh waters, the principal hardness-causing ions are calcium and magnesium; strontium, iron, barium and manganese ions also contribute (Rajesh et al., 2004)[4].

Faecal coliforms, otherwise known as thermotolerant coliforms, are a type of coliform bacteria generally found in the intestines of healthy humans and animals. Coliform bacteria can be found everywhere in the environment, and most coliforms, including most faecal coliforms are relatively harmless, naturally occurring organisms. Faecal coliforms, which include E. coli and a few other species, are an indicator of faecal contamination. Faecal coliform testing has been replaced by E. coli testing in most jurisdictions as more specific tests for E. coli have become routinely available. The maximum acceptable concentration (MAC) of faecal coliforms in drinking water is zero. If fecal coliforms are found in treated drinking water, a boil water advisory is generally issued right away (Rajesh et al., 2004)[4].

Research Objective

This study is aimed at evaluating the effects of total suspended solids (TSS), total dissolved solids (TDS) and total hardness concentrations on the water samples in Nsukka Town, Enugu State of Nigeria with a view of creating the consciousness of the inhabitants of such location on the state of domestic drinking water as it affects human health.

Table 1: Physicochemical Combined Standards of WHO, SON and NAFDAC (IPAN, 2005)[5]

S/No.	Parameter	NAFDAC MAXIMUM ALLOWED LIMITS	SON STANDARD	Highest Desirable WHO STANDARDS	
1.	Color	3.0TCU	3.0 TCU	3.0TCU	15.0TCU
2.	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3.	Taste	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
4.	pH at 20^0C	6.50-8.5	6.50-8.5	7.0-8.9	6.50-9.50
5.	Turbidity	5.0 NTU	5.0 NTU	5.0 NTU	5.0 NTU
6.	Conductivity	1000 (us/cm^{-1})	1000 (us/cm^{-1})	900 (us/cm^{-1})	1200 (us/c^{-1})
7.	Total solids	500 mg/L	500 mg/L	500 mg/L	1500 mg/L
8.	Total Alkalinity	100mg/L	100 mg/L	100 mg/L	100 mg/L
9.	Phenolphthalein Alkalinity	100mg/L	100 mg/L	100 mg/L	100 mg/L
10.	Chloride	100mg/L	100 mg/L	200 mg/L	250 mg/L
11.	Fluoride	1.0mg/L	1.0 mg/L	1.0 mg/L	1.5 mg/L
12.	Copper	1.0mg/L	1.0 mg/L	0.5 mg/L	2.0 mg/L
13.	Iron	0.3 mg/L	0.3 mg/L	1 mg/L	3 mg/L
14.	Nitrate	10 mg/L	100 mg/L	10 mg/L	50 mg/L
15.	Nitrite	0.02 mg/L	0.02 mg/L	0.2 mg/L	3 mg/L
16.	Manganese	2.0 mg/L	0.05 mg/L	0.1 mg/L	0.4 mg/L
17.	Magnesium	20 mg/L	20 mg/L	20 mg/L	20 mg/L
18.	Zinc	5.0 mg/L	5.0 mg/L	0.01 mg/L	3.0 mg/L
19.	Selenium	0.01 mg/L	NS	0.01 mg/L	0.01 mg/L
20.	Silver	-	-	NS	NS
21.	Cyanide	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.07 mg/L
22.	Sulphate	100 mg/L	100 mg/L	250 mg/L	500 mg/L
23.	Calcium	75 mg/L	75 mg/L	NS	NS

24.	Aluminum	0.5 mg/L	NS	0.2 mg/L	0.2 mg/L
25.	Potassium	10.0 mg/L	10.0 mg/L	NS	NS
26.	Lead	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L
27.	Chromium	0.05 mg/L	0.05 mg/L	0.05 mg/L	0.05 mg/L
28.	Cadmium	0.003 mg/L	0.003 mg/L	0.003 mg/L	0.003 mg/L
29.	Arsenic	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L
30.	Barium	0.05 mg/L	0.05 mg/L	0.05 mg/L	0.07 mg/L
31.	Mercury	0.001 mg/L	0.001 mg/L	0.001 mg/L	0.001 mg/L
32.	Antimony	NS	NS	-	0.02 mg/L
33.	Tin	-	-	-	1.2 µg/L
34.	Nickel	-	-	-	0.02 mg/L
35.	Total Hardness (CaCO₃)	100 mg/L	100 mg/L	100 mg/L	500 mg/L
36.	Vinyl chloride	0 mg/L	0 mg/L	0 mg/L	0003 mg/L

NAFDAC - National Agency for Food and Drug Administration and Control.
SON - Standards Organization of Nigeria
WHO – World Health Organization
IPAN – Institute of Public Analysts of Nigeria.

MATERIALS AND METHODS

Water Sampling Sources

Thirteen sampling areas consisting of four boreholes, six dug wells and three springs were chosen for this research work. A total of 26 samples were taken during the dry season and another 26 during the wet season. The sampling was carried in Nsukka (Fig. 1) and were sampled seasonally as follows: dry season (January, 2004); and rainy season proper (August, 2004). All were equipped with headwall and cover, and some had a cemented surrounding. The analyses carried out were on the utility water supplies in Nsukka area. Water samples were collected from these sampling areas and refrigerated at $4^{O}C$ for processing.

Chemicals/Reagents/Samples

All chemicals used in this study were of analytical grade and products of May and Baker, England; BDH, England and Merck, Darmstadt, Germany.

Experimental Design

The analyses carried out were on the utility water supplies in Nsukka area. Five sampling stations consisting of four bore holes, six dug wells and three springs were chosen for this research work. A total of 26 samples were taken during the dry season and another 26 during the wet season. Water samples were collected from these sampling stations and refrigerated at $4^{O}C$ for processing. Concentrations of zinc and sulphate were determined by spectrophotometric method while Harch Model C50 digital multirange meter was used to measure pH value. Bacteriological analysis of the water samples were carried out to ascertain whether there was faecal contamination by the use of multiple tube/most probable number techniques.

Sampling Areas

The analyses carried out were on the utility water supplies in the University Campus of Nsukka town. The Sampling areas are shown on the sampling map. The sampling areas consists four boreholes, two of which are located in University of Nigeria, Nsukka Campus, they are Franco Hostel borehole and the UNN water works borehole. The other two boreholes are found in Nsukka town, they include Work and Pay borehole near Peace Mass Transit Motor Park, and the Nsukka water scheme borehole. Sampling areas also include six dug wells and three springs. The dug wells are found, one at No 4 Saint Theresa Road one at No 95 New Anglican Road, one at Amaozala village, three at Eburu Mmili village after Saint Cyprian's college.

The three springs are Asho spring off Ugwuawarawa/Onuiyi Road. Ajie spring behind El-rina Hotels Limited, and Iyi- Adoro at Alo-uno village. These are utility water supplies in Nsukka town and environs. Contamination of these water sources will result in epidemic outbreak or health problems in the Nsukka populace.
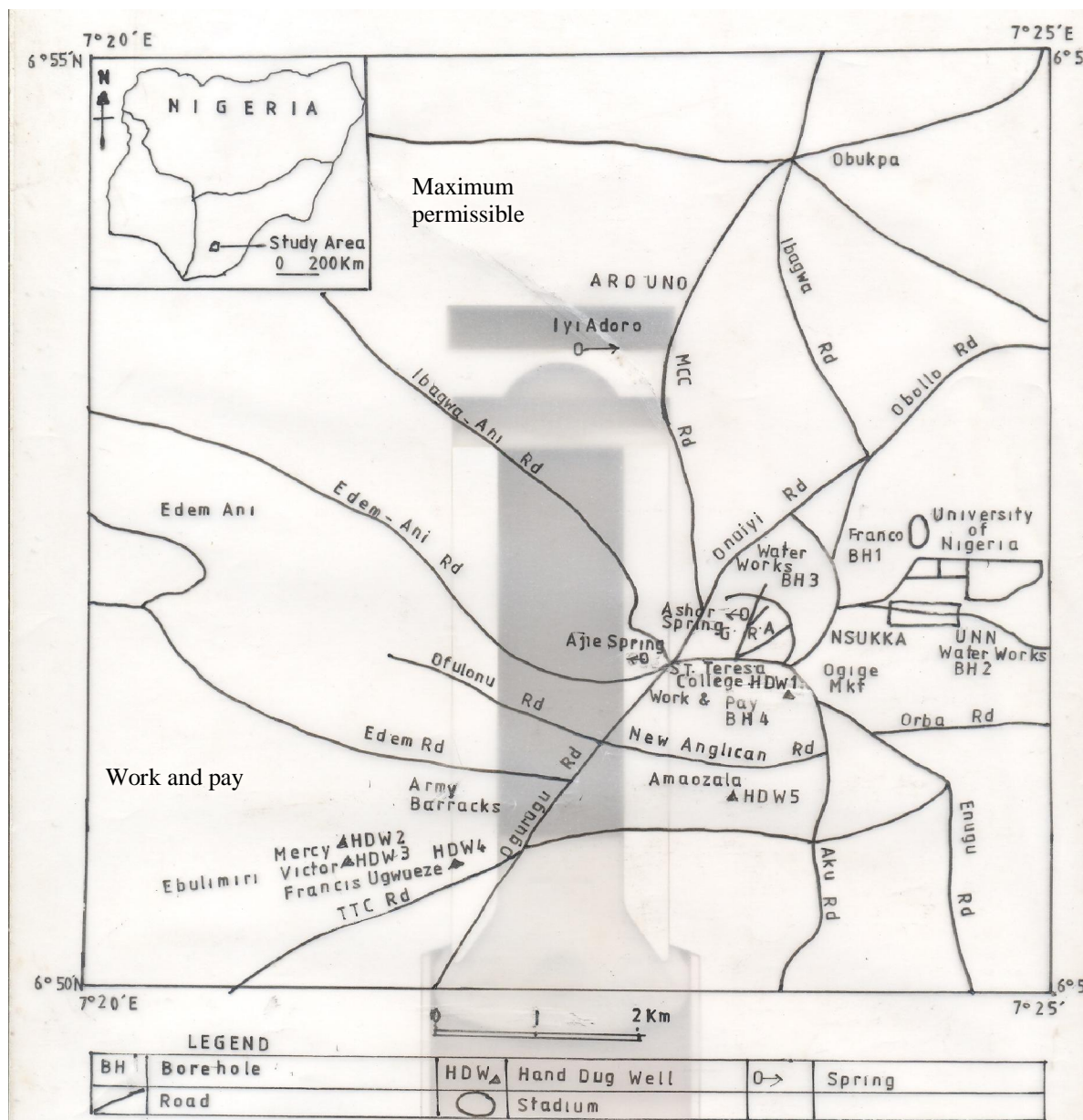
Fig. 1: Map of Nsukka showing the location of sampled areas

Table 2: Sampling points description

Sampling points	Description and location
UNN water works borehole	The UNN water scheme borehole is located near the gate leading to Owerre-Eze-Orba village. The University of Nigeria, Nsukka Campus receives greater supply of water from this borehole. Occasionally water is pumped to the surface and aerated before storage. Currently there is a major work going on around the place to upgrade it.
Franco borehole	This is the second borehole from which the University Community receives her supply of water. It is about 700ft deep and it is surrounded by small farm land. The inhoff sewage treatment plant is about 350-450 meters away.
Nsukka water scheme borehole	Sample of water was collected from the overhead pipe feeding the water-tankers that collect water for sale and distribution to Nsukka inhabitants. It has a dept of 725ft, and is located behind peace mass transit. It belongs to Mr. Augustine Madueke of No 23c Amaeze Lane Nsukka.
Saint Theresa's Road Dug well (Mr. Vincent Ezeh)	This is located at No 47 Saint Theresa's road, behind Bishop Shanahan Hospitals, Nsukka. It has a dept of about 30ft.
New Anglican Road (Mr. N.E. Ogboso) Dug well	This is situated at No 95 New Anglican Road, Nsukka. It is about 60ft. They use water pumping machine to pump out water hygienically

Amaozala village. Dug well	The well is about 28ft deep with clean surroundings. It is cited along the road off New Anglican Road to Aku.
Mr. Francis Ukwueze of Eburu	Mr. Francis Ukwueze's dugwell in Eburu Minili village is about 32ft deep. The surrounded well is by
Mrs. Mercy Onah of Eburu-Minili village.dug well	Mrs. Mercy's dugwell in Eburu-Minili village is about 40ft deep. It is surrounded by farm lands.
Mr. Victor Ugwuanyi's dug well	Mr. Victor Ugwuanyi dugwell located in front of his house is about 38ft deep. The surroundings is relatively clean.
Asho spring water	This is off Ugwuawarawa /Onuiyi Road just after Tochukwu motor depot as one goes to Odenigbo roundabout. The water is channeled through a pipe as it descends the forested steep hill of the area
Ajie spring water	This is located right behind Elrina Hotels limited. The water is also channeled through a pipe.
Iyi-adoro spring water	This is located at Alo-Uno village. It is on a think forested hill just as one passes the Adoro shrine. The water perculates from the rocks and it is exposed to dust and fallen leaves as it collects in a trough of the rocks.

Determination of Total Hardness of Water Samples

Principle:

Complexiometric titration was employed in the determination of total hardness of water samples. Originally water hardness was understood to be a measure of the capacity of water to precipitate soap, but in conformity with current practice, total hardness is defined as the sun of the calcium and magnesium concentrations, both expressed as calcium carbonate in milligrams per litre (mg /l). The significance of this analysis is to check if the water is hard, so as to know the kind of treatment the water will be subjected to.

Total Dissolved Solids (TDSs) and Total Suspended Solids (TSSs)

Principle:

Harch Model C50 digital multirange meter was used to measure total dissolved solids (TDSs) and total suspended solids (TSSs). Total dissolved solids is the expression used to describe the total amount of minerals dissolved in a water sample. TDS is commonly expressed in ppm (part per million or mg/l). Water with high dissolved solid greater than 500ppm often have a laxative effect upon people whose bodies are not adjusted to them.

Bacteriological Examination

The bacteriological analysis of water can confirm whether a water supply has been faecally contaminated. The *E. coli* count is the most useful test for detecting faecal contamination of water supplies in water quantity analysis. Two principal techniques are available for counting faecal coliforms.

(a) Membrane filtration

In this technique, a 100ml water sample or a diluted sample is filtered through a membrane filter. The membrane with the coliform organisms on it is then cultured on a pad of sterile selective broth containing lactose and an indicator. After incubation, the number of coliform colonies can be counted. This gives the presumptive number of *E. coli* in the 100ml water sample.

(b) Multiple tube/Most Probable Number (MPU)

In this technique, a 100ml water sample is distributed (five 10ml amounts and one 50ml amount) in bottles of sterile selective culture broth containing lactose and an indicator. After incubation, lactose fermentation with acid and gas production has occurred are counted. The lactose is fermented by the coliform in the water. By reference to probability tables, the most probable number of coliforms in the 100 water sample can be estimated.

Statistical Analysis

The results were expressed as mean ± SD and tests of statistical significance were carried out using student t-test and both one-way and two-way analysis of variance (ANOVA). The means were separated using Duncan Multiple Test. The statistical package used was Statistical Package for Social Sciences (SPSS); version 18.

RESULTS

Effect of Total Suspended Solid on Different Water Sources Compared to WHO And NAFDAC

Total suspended solid concentration of water samples from dugwell sources was found to have significant increase ($p<0.05$) when compared with the water samples from the other test water samples from borehole and spring sources during both dry and rainy seasons (as shown in Fig. 2). There was no significant ($p>0.05$) difference in the total suspended solid level between the dry season and rainy season of all test samples when considering different seasons. Likewise, the water samples from borehole and spring sources showed no significant difference ($p>0.05$) in the level of total suspended solid as shown in Fig. 2. The levels of total suspended solid in the two standards (WHO and NAFDAC) are found to be relatively higher than the three test samples (borehole, dugwell and spring).

30mg/L   30mg/L

Fig. 2: Total suspended solid (mg/L) concentration of different water sources in Nsukka compared with WHO and
        NAFDAC standards

Effect of Total Dissolved Solid Concentration on Different Water Sources Compared to WHO and NAFDAC
        Total dissolved solid concentration, as shown in Fig. 3, was found to be significantly higher ($p<0.05$) in the
water sample from dugwell sources when compared with the total dissolved solid concentration in the water samples
from both borehole and spring sources during both dry and rainy seasons. In terms of seasonal comparison, the total
dissolved solid concentration of water sample from spring source during rainy season was observed to be relative
higher than that observed during the dry season. However, significant difference ($p<0.05$) was also observed
between the two standards and the test water samples from the three sources (borehole, dugwell and spring) during
both dry and seasons. Comparatively, Fig. 3 shows that the two reference standards (WHO and NAFDAC) have the
same value (500mg/L) of total dissolved solid.

Effect of Total Hardness Concentration on Different Water Sources Compared to WHO and NAFDAC
        Fig. 4 shows significant increase ($p<0.05$) in the level of total hardness in the water sample obtained from
dugwell sources as compared with water samples from borehole and spring sources during dry and rainy seasons.
Also, there was significant increase ($p<0.05$) in the level of total hardness of water sample from borehole sources
when compared with the spring sources during dry and rainy seasons. There was no significant difference ($p>0.05$)
in the level of total hardness when comparing between the dry and rainy seasons across the test water samples from
the three test sources (borehole, dugwell and spring). The standards (WHO and NAFDAC) had relatively higher
values (100mg/L each) of total hardness compared to the test samples. But the two reference standards (WHO and
NAFCON) have the same level of total hardness as shown in Fig. 4 below.
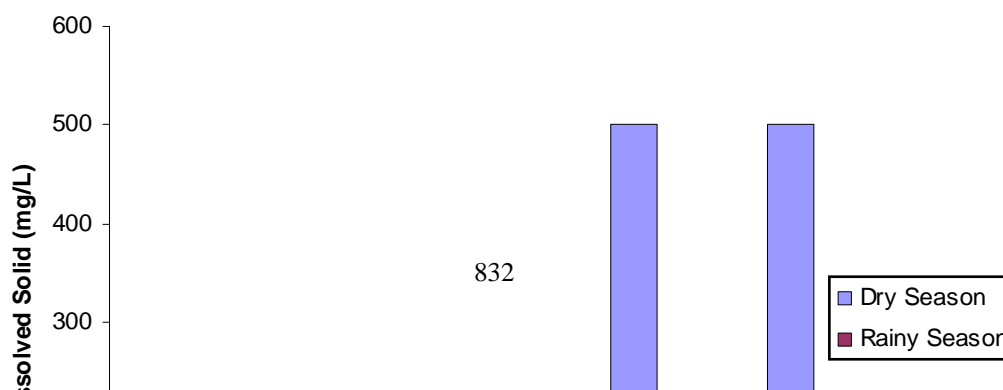
500mg/L   500mg/L

Fig. 3: Total dissolved solid (mg/L) concentration of different water sources in Nsukka compared with WHO and NAFDAC standards
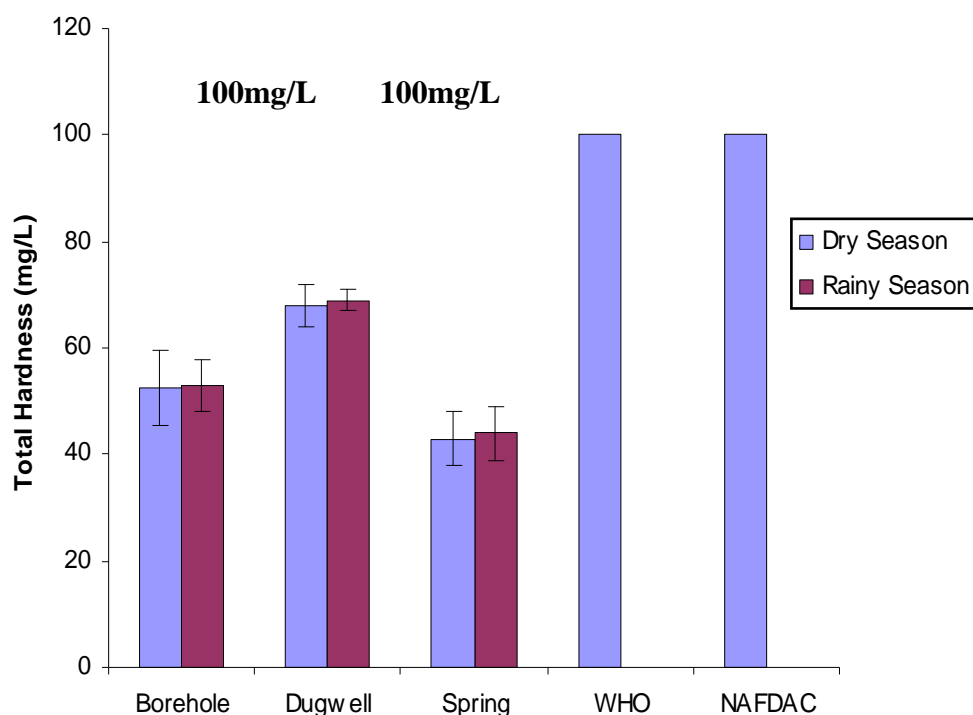
Fig. 4: Total hardness (mg/L) concentration of different water sources in Nsukka compared with WHO and NAFDAC standards

Effect of most Probable Number of Coliform on Different Water Sources Compared to WHO and NAFDAC

As shown in Fig. 5 below, most probable number of coliform was found to be significantly higher ($p < 0.05$) in the three test water samples (borehole, dugwell and spring) during the rainy seasons as compared with the dry season. The most probable number of coliform in the water sample of spring sources during rainy season showed significant increase ($p < 0.05$) as compared with the two reference standards (WHO and NAFDAC). Both WHO and NAFDAC had relatively the same range of most probable number of coliform range of values (1 – 10 npm). The standards (WHO and NAFDAC) had most probable number of coliform count to be significantly higher ($p < 0.05$)

than that of the water samples from the test sources with the exception of most probable number of coliform count obtained in water samples from spring sources during rainy season.
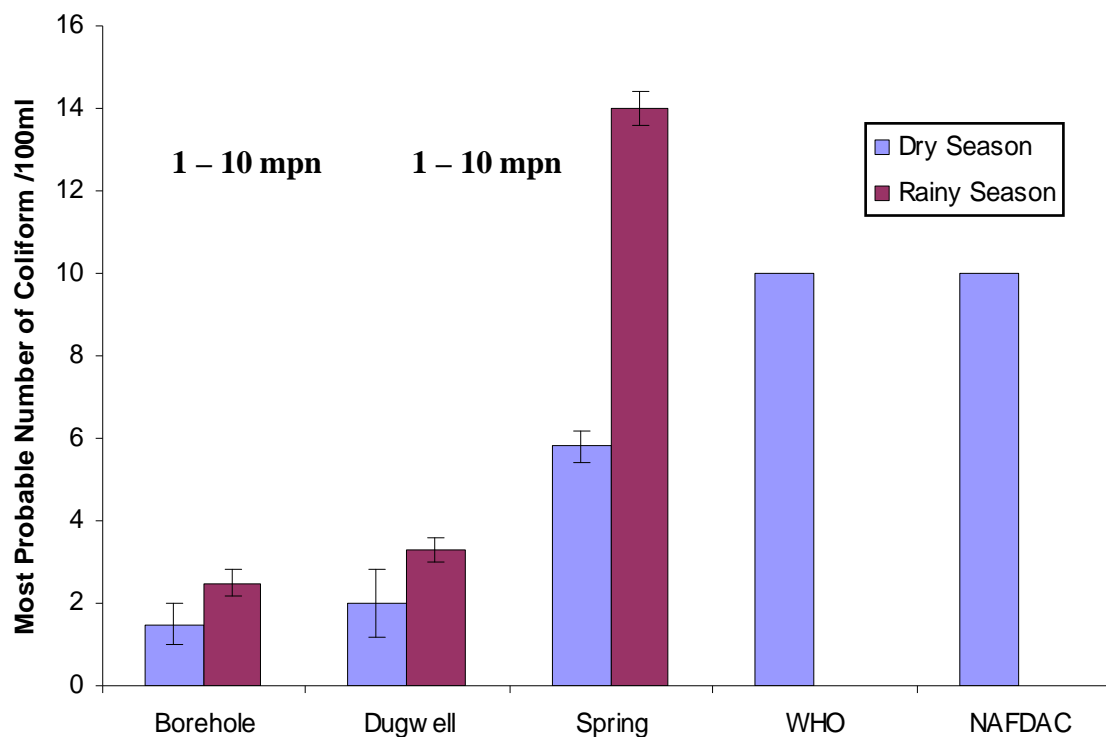
Fig. 5: Most probable number of coliform of different water sources in Nsukka compared with WHO and NAFDAC Standards

DISCUSSION

Virtually all metals can produce toxicity when ingested in sufficient quantities, but there are several which are especially important because either they are so pervasive, or produce toxicity at such low concentrations. In general heavy metals produce their toxicity by forming complexes or "ligands" with organic compounds. These modified biological molecules lose their ability to function properly, and result in malfunction or death of the affected cells. The most common groups involved in ligand formation are oxygen, sulfur, and nitrogen. When metals bind to these groups they make inactive important enzyme systems, or affect protein structure.

Different physical parameters studied are total suspended solids and total dissolved solids. The chemical parameter studied was total hardness with extension to the number of coliforms. The values were compared with the WHO and NAFDAC standard values which are given in the same figures (Figures 2 to 5). The results indicate that the quality of water considerably varies from location to location. Water quality in Nsukka area of Enugu State of Nigeria is spatially variable and has been impacted by some

contaminants which are mostly organic. The replacement of forestland with impervious surfaces during urbanization can have significant effects on watershed hydrology and the quality of storm water runoff. One component of water quality, total suspended solids (TSS), is both a significant part of physical and aesthetic degradation and a good indicator of other pollutants, particularly nutrients and metals that are carried on the surfaces of sediment in suspension. A TSS turbidity relationship can be affected by water colour from dissolved organic compounds which can absorb more light than inorganics (Packman *et al.*, 1999)[6]. In Fig. 2, it was observed that total suspended solid concentration of water samples from dugwell sources was found to have significant increase ($p<0.05$) when compared with the water samples from the other test water samples obtained from borehole and spring sources during both dry and rainy seasons. Total Suspended Solids (TSS) are solids in water that can be trapped by a filter. TSS can include a wide variety of material, such as silt, decaying plant and animal matter, industrial wastes, and sewage. High concentrations of suspended solids can cause many problems for stream health and aquatic

life. This could also be attributed to the fact that dugwells are at higher risk of contamination than drilled wells because they obtain water from shallow groundwater aquifers, and contaminants are more likely to be found closer to the surface. There was no significant ($p>0.05$) difference in the total suspended solid level between the dry season and rainy season of all test samples when considering different seasons.

Total dissolved solids (TDS) is the term used to describe the inorganic salts and small amounts of organic matter present in solution in water (WHO, 1996)[7]. Water with extremely low concentrations of TDS may also be unacceptable because of its flat, insipid taste (WHO, 1996)[7]. Total dissolved solid concentration was found to be significantly higher ($p<0.05$) in the water sample from dugwell sources when compared with the total dissolved solid concentration in the water samples from both borehole and spring sources during both dry and rainy seasons. This may be attributed to the principal constituents which are usually calcium, magnesium, sodium, and potassium cations and carbonate, hydrogencarbonate, chloride, sulfate, and nitrate anions, as outlined by WHO (1996)[7], found in the surrounding environmental sources where the dugwells are located. The result as shown in Fig. 3 showed that concentration threshold of total dissolved solids (TDS) fell below 300 mg/litre. This is consistent with the findings of WHO (1996)[7] which stated that the palatability of drinking water has been rated by panels of tasters in relation to its TDS level as follows: excellent, less than 300 mg/litre; good, between 300 and 600 mg/litre; fair, between 600 and 900 mg/litre; poor, between 900 and 1200 mg/litre; and unacceptable, greater than 1200 mg/litre.

Stone and Droppo (1994)[8] suggest suspended solids probably act as the primary transport mechanism for pollutants and nutrients in streams through flocculation, adsorption and colloidal action.

Water sample from dugwell sources had showed significant increase ($p<0.05$) in the level of total hardness as compared with water samples from borehole and spring sources during dry and rainy seasons. Also, there was significant increase ($p<0.05$) in the level of total hardness of water sample from borehole sources when compared with the spring sources during dry and rainy seasons. Geetha *et al.* (2008)[9] attributed total hardness contamination on the probable effluent effect, though it affects the ground water, and it has no adverse effect on human health. In most of the samples, total hardness value exceeds the tolerance limit; this may be due to industrial discharge of the effluents on to the land.

In terms of seasonal variation, the result x-rayed the fact that most probable number of coliform was found to be significantly higher ($p<0.05$) in all the three test water samples (borehole, dugwell and spring) during the rainy seasons as compared with the dry season. The most probable number of coliform in the water sample of spring sources was found to have the highest significant increase ($p<0.05$) during the rainy season. This may be as a result of possible contamination of spring water sources with sewage from immediate surroundings of Nsukka environ. The coliform group is an indicator bacteria to evaluate the quality of drinking water and any presence of coliforms indicates the contact of water with sewage or inadequate treatment/post treatment contamination. In unpiped water supplies, sometimes up to 10 coliforms/100 ml are as allowed per WHO standards for tropical countries but this should not occur repeatedly; if occurrence is frequent and sanitary conditions cannot be improved, an alternative source must be found if possible (Geetha *et al.*, 2008)[9].

Therefore, from the foregoing, it could be concluded that these boreholes, springs and drugwells water samples tested in Nsukka town are physicochemically good for human consumption as all the physicochemical parameters tested conformed to WHO, SON, and NAFDAC water quality standards, although Iyi-adoro spring water might not be very good for consumption during the rainy season because of possible bacteria contamination.

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Hadji Mirza Aghasi and Political, Social and religious events in his era

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Abstract: Mirza Abbas Irvaani nicknamed as Hajj Mirza Aghasi, the Sadr-e Aazam (Prime Minister) of Mohammad Shah Qajar must be regarded as one of the star-crossed Iranian Sadr-e Aazams, because he undertook the office when Iran economy and agriculture was devastated due to the Russo-Persian Wars and in the other hands, both Britain and Russia were seeking more influence in Iran and in the court. So, in this harsh condition, Mohammad Shah appointed Hajj Mirza Aghasi as Sadr-e Aazam despite of domestic and foreign efforts to bring the power one that capable to meet their purposes. Although, historians described him as incompetent, semi-insane but history also depicts another picture of him as judicious, gentle, indisposed of punishment and kingcraft and science loving patriot. Following to development of the relations between Iran and the European countries, the economic backwardness and sociological and cultural evolution necessity of Iran was completely revealed and impelled some of the Iranian conscious and provident individuals, under the leadership of Abbas Mirza and then Hajj Mirza Aghasi to ponder and undertake effective measures to obviate this backwardness. In economic and sociologic perspective, as well as student dispatching, order book from abroad, abolishment of torture and execution and take advantage of western civilization are of the beneficial measure of Hajj Mirza Aghasi. In the economic field, he succeeded to launch great leaps towards economical development and advancement and calmed disturbed economical situation after two wars of the Fath Ali Shah period. By relying on agriculture as the pivotal economic factor of that age, Hajj Mirza Aghasi succeeded to relief economical difficulties via aqueduct building and stream construction to irrigate agricultural fields, in a manner that the plenty of cheap agricultural products of that period were available in the markets. Weaponry activity in the field of making artillery and other munitions is another important measure of Hajj Mirza Aghasi which played decisive role in the Iran-Harat war. In foreign affairs, Hajj Mirza Aghasi in struggling to reduce the Britain and Russia influences in Iran was forced to drag third country influence (France) in to the country. [Ali Ahmadalizadeh. **Hadji Mirza Aghasi and Political, Social and religious events in his era.** Journal of American Science 2011;7(5):837-849]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Qajar, Hajj Mirza Aghasi, Sadr-e Aazam, Iran

1. Introduction

In the beginning of the nineteenth century A.D. (the lunar thirteenth century), new changes began to occur in international politics which directly influence Iranian political and social status. Russia's invasion of Iran during the Qajar era, Napoleon's envoy of troops towards the East through Iran, Britain's decades-long attempt to keep its colonies in Asia, and Iran's efforts to preserve its land and independence against foreign invasion were all factors posing a challenge to Iran's participation in the international political scene. The main issue for Iran was to mobilize its own people to fight the Russian invasion. This factor determined Iranian policy in its relationship with Western countries and, occasionally, propelled Iran to fight Britain and, sometimes, France. Whenever France and Britain attacked Russia, they strengthened and assisted Iran, according to their own political needs and interests. Various trips by British and French military boards to Iran resulted in a reform of the army, the establishment of a new system, the advent of gunpowder and cannon manufacturers, and the development of surveys and geographic and geologic data collection. From the circumstances, and in particular from Iran's defeat of Russia, some rulers realized the necessity of obtaining Modern technology. The Vice-Regent, Abbas Mirza, and his minister, Mirza Isa, known as the Great Mirza (first deputy), were the leaders of school reform and progress in Iran. However they had few followers. Because most of Iran's statesmen were former civil servants in both the Russian and British governments, they often compromised the national interests of Iran by performing their orders. Deputy Ghaem Magham Farahani, Prime Minister under Mohammad Shah Qajar, was among the followers of Iran's reform and progress who sought non-intervention in foreign and domestic affairs, and also sought improvements in various aspects of the country. He was ultimately murdered by internal and external enemies who saw their interests threatened.

After death of Deputy Farahani, Hadji Mirza Agassi, considered free-thinking and pro-progress, succeeded Farahani as Prime Minister. He planned to remove Britain and Russia from Iranian domestic

policy, just as his predecessors had sought to do. Thus, he hoped to France help, due to his complete unawareness of the situation in world politics. Agassi did not ultimately become a positive and justified figure in Iranian history; there are many forged narrations about him which hid his true nature, which introduced him as naive, a dunce, and stupid. These forgeries were written by great foreign powers and domestic writers and statesmen. Most of the texts related to the neutralized policies of great powers in Iran and to the efforts to remove the power and further wealth of domestic opponents were written after death of Hadji Mirza Agassi and kingdom of Naser-al-din Shah. But among the writings, certain texts show the other character of Hadji Mirza Agassi, which the curious reader is encouraged to investigate and search further.

This study will consider the role of Hadji Mirza Agassi, including Dervish behavioral characteristics in Iran's domestic and foreign conflicts in the era of Mohammad Shah. Additionally it will consider what effects were left, and will investigate life aspects as well as the social, religious, and political events of his era.

2. Personal and political life of Mirza Aghassi

Mirza Abbas Iravani, known as Hadji Mirza Agassi, was born in Anno Hebraico 1198 / AD 1783 in Yerevan (Etemadoltaneh, 1970). Mirza Moslem was wealthy, and had estates in Yerevan, Salmas and Khoy. After the conquest of Armenia by Russia, Mirza Moslem, along with his family, emigrated to Khoy. His property and assets in Yerevan were then confiscated by Russia due to his linkage to Iran. Years later, Hadji Mirza Agassi wrote a letter to Mohammad Shah, noting that, "In nine years, Russian government took my nine hundred Toman and moreover confiscated my property in Iran" (Iqbal, 1984). Mirza Agassi studied with his father until he was 14 years old, and then, along with Moslem Mirza, went to Atabat to study in 1213 AH / 1789 AD under Mullah Abd-al-samad Hamedani. Mullah Abd-al-samad had been a student of Mr. Mohammad Behbahani and Seyyed Ali Karballayee, and had a brilliant figure in the principles of jurisprudence when Mirza Abbas Agassi went to apprentice with him. He was also considered to be a great man in the school of Sofia NoorAlishahi Sect. Mirza Abbas, influenced by the Master, became interested in theosophy, in addition to current science, which led him to the Alishahi Dervishes sect. However, he did not stay in Karbala for long, as Vahhabis attacked Karbala in November AH 1216/ CE1801. During the massacre, five thousand people were killed, including Mullah Abd-al-samad. According to his will, Mirza Abbas was forced to take his master's wife and children to Hamadan. Staying at Khoy, he then turned to theosophy and dressed in Sufism dervishes, later embarking on a pilgrimage to Mecca and Medina in 1225 AH /1810 CE. After returning from the Hadj, He stayed at Khoy, where his house became a meeting place for students and interested religious science. With this reputation, Hadji Mirza Agassi left Khoy and went to Tabriz. After a while, Hadji Mirza Agassi's reputation became known in Tabriz and deputy Mirza chose him to train his child Hadji Mirza Musa Khan (Jahangir Mirza, 1948). Jahangir Mirza writes in "New History" that

"He encountered to the Deputy Grand Mirza in a way. Grand Mirza who was a gentleman and kind to any tribe took him home and behaved in a kindness manner got dervish cloaks and dress him as Mullah. Teacher Mirza Habib Abadi knew Hadji Mirza Agassi knowledge and awareness to penetrate in deputy regime".

As Mirza Agassi was familiar with rational and transcription sciences, as well as divine and mathematical mysticism, the great men respected his works, and Deputy Mirza Isa employed him to teach his son (MoalemHabibabadi, 1958). "New entry of Hadji Mirza Agassi to Great Deputy provided him with the way of progress and advance. Sometimes Hadji Mirza Agassi was gone to Vice-Regent by Great Mirza; totally he was popular (Jahangirmirza, 1905)."Following these meetings, possibly influenced by Hadji Mirza Agassi's fame, Abbas Mirza, the Vice-Regent, began to trust him, and made him a seat and comate in his own house" (Etemadolsaltaneh, 1970).

The death of Deputy Mirza was particularly difficult for Hadji Mirza Agassi as he supported and advocated Mirza Musa Khan, the younger son of Deputy Mirza, in his quest to obtain the position of Vice-Regent. Hadji Mirza Agassi was then forced to leave Tabriz when Mirza Abolghasem was appointed as Vice-Regent instead. From Tabriz, Hadji Mirza Agassi went to Khoy and lived with Amir Khan Qajar , the ruler of Khoy, for three years while teaching the sons of the Vice-Regent Abbas Mirza, particularly Mohammad Mirza (Khan Malek Sasani, 1967). "The Vice-Regent said to Amir Khan Qajar, find an ethical reform teacher and he also reminded Hadji Mirza Agassi and then he obliged to teach and train princes". Mohammad Mirza was taught by Mirza Agassi, and the relationship gradually became that of devotee and follower. When Mohammed Mirza reigned for the next few years, he saw Hadji Mirza Agassi as his heir, and increased his sincerity to him so that "he was sure that Hadji Mirza Agassi

had permanent and direct relationship with God and he himself was an extraordinary creature (Moalem Habibabadi, 1958)" Mohammad Mirza, the Crown Prince and future Mohammad Shah, respected Mirza Agassi much, and accordingly displayed a special sincerity and munificence to him. The Etemad-al-Saltaneh writes,

> "Before his prince, Mohammad Mirza goes to decedent Hadji home; there is a book on the ledge; he takes it and found a paper including the manuscript of Hadji , imply the year of decedent price (Abbas Mirza) , then pardon Khaqan (Fath Ali Shah) and finally the reign of Mohammad Shah has been written extensively; after the decedent Hadji begged him not to say anybody".

The incerity of Mohammad Shah to Hadji Mirza Agassi was primarily due to their Dervish relations (Etemadolsaltaneh, 1953). Hadji Mohammad Shah's piety and contentment was influenced by the Dervish world such that in most cases, he sufficed to a piece of bread at morning and at night, and prohibited the use of foreign meals and dresses (Jahangirmirza, 1948). But Hadji Mirza Agassi was not the only influence of Mohammad Shah in his tendency to mysticism and Dervishism, as when Hadji Mirza Agassi was elected to be the teacher of Mohammad Mirza, Mohammad Mirza already had tendencies to mysticism. Before he met Hadji Mirza Agassi, two famous dervishes of the period, Hamedani, also called Kosar Ali Shah, and Hadji Zain Abedin Shirvani, also called Mostali, became guides for the Shah. But Hadji Mirza Agassi had a high-level position and credibility in the eyes of of Mohammad Shah (lesanolmolk, 1931). According to "Nasekh- Al-Tavarikh," Mohammad Shah knew Hadji Mirza Agassi as religious and a spiritual man (Jahangirmirza, 1948). Unfortunately, this did not please Abbas Mirza and the chiefs, because:

> "Something was inconsistent with the kingdom such as leaving politics, statecraft given by Mohammad Mirza and thereby blamed him, after the death of Fath Ali Shah in 1250 AH /1834 AD of Mohammad Shah became king. According to Reza qoli Mirza, the Prince Mohammad Mirza had a little interest to the throne Crown Prince and acceptance of King problems and disasters, and had not desire to the monarchy but finally he was forced to accept the monarchy because of too much insist of Deputy".

Mohammad Shah was coroneted in Tehran during Ramadan 1250 AH /1834 CE. The main ethical and personal feature that influenced Mohammad Shah regarding Mirza Agassi was the Dervish sect. "Originally he lived simply; didn't accumulate money; didn't follow Harem; did not put on fine clothes, sufficed to his homemade clothing and keep him from kingdom ritual and ceremony (lesanolmolk, 1974)." Mohammad Shah surrendered the Chancellery appointment to Deputy Mirza AbulGhasem, but he was killed by order of Mohammad Shah less than a year later. Hadji Mirza Agassi was unjustly charged with playing a decisive role in the King's order to kill the Deputy. He informed the Mohammad Shah the immorality of the Deputy. Finally, the order of murder was issued. After killing the deputy, Mohammad Shah appointed his teacher Hadji Mirza Agassi as Chancellor, and he kept this position to the end of Mohammad Shah's reign.

3. Academic works

Hadji Mirza Agassi was a writer interested in poetry, and used the pseudonym "Fakhri" in his poetry reminiscing his great master and mentor Mullah Abd-al Samad Hamedani, under title of Fakhr-Al-din. Mirza Agassi composed Arabic and Persian poetry, a sample of which is as follows:

> "Founded Parvin cluster on the fog and the hair
> Placed a black point on flower called tattoo beneath the black hair as Badr cloud
> My drown in bloody tears as Aurora Crescent"

Or:
> "Again a think of my darling
> Took me to Tabriz by Camel
> As a Majnoon in Day and Night on Mount and Desert
> A plain reason, search and check there"

Mirza Agassi also composed a book entitled "Mesbah Mohammadi," and compiled a thesis to interpret some of the more difficult verses (Etemadolsaltaneh, 1970).

4. Cultural actions in the age of Hadji Mirza Aghassi
4.1. Publish newspapers and order books

Mirza Saleh Shirazi, founder of the first newspaper in Iran, went to England to study new sciences in the era of Vice-Regent Abbas Mirza. There he learned typography and brought two printers back (Adamiat, 1961). In the last decade of Ramadan 1252 AH, Mirza Saleh Shirazi started a

publication called "Kaghaz Akhbar (i.e. News Paper. It is obvious for residents of protected countries that royal government had a great efforts to train the residents protected countries And since the majority of the training is to notify and aware of the world affairs, so news paper containing western and eastern news will registered in impression office and will sent to different places (Cohen, 1980). Three months after the publication of this newspaper, the first issue of *paper news* newspaper was published in Tehran on Monday 25th of Muharram 1253 AH/ 1787 AD. In the first page "News of East countries and the second page" News of West countries" were published. One issue was published every month, according to Tabatabai of *News Paper (Tabatabai, 1988).* The daily news contained primarily predication and reflected ideas, and the opinions of Hadji Mirza Agassi and the chiefs of the period. When a person was disappointed with everything and everyone, and found no way to relieve himself, he went to Hadji Mirza Agassi and told the matter and. As the government did not recognize the position and title, he dedicated his own honorable time to ideology. He did not want to lose anyone, as he was compassionate for the poor and devoted his time to appreciating God with sincerity, honesty and loyalty to the Emperor. The Emperor implemented religion, fought wars for Islam, launched supplies of munitions for the army, reclaimed cities, repaired damages and failures, restored canals and gullies, enhanced religion and supported government, and met the needs of Muslims. If anybody had pain or grief he would tell him that he meets their need. He saw no difference between rich and poor, beggars and emperors (Cohen, 1980). No complete and exact information is available about the number and years of the published paper.

Additionally, lithography publishing houses were established in the age of Mohammad Shah. Tehran Lithography publishing house began operation in 1253 AH /1836 AD. A second publishing house was built in Tehran in 1261 AH / 1845 CE, and others were established in Uremia in 1256 AH / 1840 CE, 1259 AH - / 1843 CE, and in Isfahan in 1260 AH /1844 CE (Mahboobi Ardekani, 1991) Perhaps one of the more important cultural works of Hadji Mirza Agassi was to order books from abroad. When Mohammad Alikhan went to the embassy in Paris, Hadji Mirza Agassi supplied him with a list of scientific and technical books to bring back when returning to Iran. The book list demonstrates Hadji Mirza Agassi's intellectual tendencies and the progression of thought in the government of Mohammad Shah; for example, "the Great Encyclopedia" by many authors of the intellectual age, particularly Pascal, Descartes, and Sismund, "French Revolution History," "Shot

Effect," "Great Britain History" by Hume, "Turkish, English and French Dictionaries," "Medical Chemistry," in "Iron and Steel Making" by Flasho and Barro in "Iron Making Industry" by Walter, "Steel Industry" by Amor, "the Best Literatures About Agriculture," and "Steam Machine Model," among others (Nateg,1990).

4.2. The Dispatch of Students to Europe

Since the early 19th century, following the development of the relationship between Iran and Europe, Iranian scholars and politicians saw an opportunity to become familiar with the new Western civilization and modern ideas. Gradually such ideas were raised and developed in Iran, and following Iran's defeat in two wars against Russia, not only was the country's overall underdevelopment quite obvious, but also rulers and great men sought to find the causes of Iran's lag and identify "the secret" of European capabilities. The known figures of this movement were minister Mirza Abbas and his respected surrogate Great Mirza who took necessary action to and warn the Iranian people to overcome underdevelopment and the weaknesses of the country, including sending a group of Iranians to Europe to study and learn new industries and science "to be used and be beneficial for Iranian needs". Adamiat, (1961) In line with this thought, in 1226 AH/ 1811 CE, two students were sent to the UK, in addition to a group of five Iranian youths England to study various subjects such as Medical Engineering, Chemistry, artillery, and science. During the reign of Mohammad Shah and Hadji Mirza Agassi's chancellery, the idea of establishing new industries and dispatching students to Europe was raised. At first, Hadji Mirza Agassi thought of sending the students to Egypt, and it was determined that "forty and fifty people were sent from Iran by request of esteemed Great Pasha, His Excellency Mohammad Ali pasha (Adamiat, 1961)" However the trip never occurred due to unknown reasons, and Iran made a decision to send students to France because of bitter experience caused by abuse and betray of Colonel Darcy Todd, disturbance of James Moiré and the difficulties encountered by the five students in the second group to England. Mirza Saleh Shirazi has elaborated in his itinerary that sabotage and hindrance of the British political officials in Iran from one side, and the position of British government during the Herat War and the capture of Kharg Island by the British Navy from the other side, caused the Iranian government and people to grow suspicious of British intentions, and deterred sending students to Britain. For this reason a large group of Iranian students were sent to France (Garmroodi, 1968). In 1254 AH / 1838 CE, five people or more were sent to Europe led by

Ajudanbashi. These students were the third group dispatched to France to study science (Garmroodi, 1968).

Mirza Mohammad Ali Khan Shirazi, Iran's superior ambassador to France negotiated with the French Foreign Minister, Mr. Gyzo, regarding the employment of master craftsmen and dispatching students to France. Gyzo promised integrated cooperation and assistance to Khan.(Adamiat, 1961) Hadji Mirza Agassi then wrote a letter to Gyzo and mentioned the reason for sending students accordingly. "The main reason why we made your agents into trouble was that each student studied in academic science and industry with fluent scholars and professors" (Nateg, 1990). Therefore Hadji Mirza Agassi requested the French authorities to perform and supervise more strictness on Iranian students. Hadji Mirza Agassi expected that students would learn and complete science and technology courses and return to Iran to implement their knowledge, thus avoiding extra costs and expenditures. In other words, he expected them to only think of science education. Certainly, he had realized the necessity of implementing new science in Iran, which is was why he tried to send students to Europe and monitor their academic affairs.

5. Mirza Aghassi and Annul the torture

An important measure initiated by Hadji Mirza Agassi during his Chancellery was to annul torture. The reason for doing so was that the king was the absolute controller and owner of life and property and the other rulers and chiefs were entitled to such rights over their subordinates. Hadji Mirza Agassi, influenced by his Sufi experiences, applied these rights when Iran was under a complete autocratic and dictatorial government. According to Moor Khan, Mirza Agassi was a kind and just man in domestic and foreign affairs. According to Etemad Al Saltaneh, "Hadji Mirza Agassi often pleaded intercedes for people sentenced to murder and save them. He had no desire to the bloodshed at all and didn't any action for removing and dismantling homes and family slaughter" (Etemadolsaltane, 1970). Grant Watson, the British historian, writes,

> "At this time power level of Hadji Mirza Agassi was soared and the King held him in high regard and how nice that there was such a gracious chancellor .... According to altruism, the most important events is manuscript which the King prohibited strongly physical torture of his citizens, based on recommend and urge of Hadji Mirza Agassi. The other step was to ban the

entry of African slaves to Iran through the Persian Gulf and Red sea". (Watson, 1977)

A letter from Mirza Agassi to Mohammad Shah clearly indicates the depth of his hate for punishment and politics.

> "Hey for devote myself under your royal ethereal foot, it is extravagant for my seven ANCESTRAL to be sheriff of a village than to be a ruler, punishment and politics belongs to Sultan, and I ignorant Mullah, I can not overstep and take something beyond the limit. I do not have the ability to do a little than a great affairs, maybe it is said to me "you are inept and unemployed. Yes. If I wasn't unemployed and inept, what was the problem of Mullah and Dervish which now I had to hear and tolerate thousands inconvenient form Russian envoy every day. Yea! I accomplished my commitment to the Palace in a true and Dervish manner... Honor is lost, life died out; the wealth and property which we don't have will be lost" (Nateq, 1990).

Hadji Mirza Agassi issued the order to annul torture methods in 1262AH/1846CE. Without any action or complete research about the documents and claims on the behalf of ruler, the true and false claims come to accuracy and clarity, and the ruler and his supervisor do not dare to disturb or hurt human beings without scrutiny and research. The vote against the supreme sacred would bring about punishment (Adamiat, 1961).

6. MIRZA AGASSI AND THE AGHAKHAN MAHALATI UPRISING

A great sedition which led to stimulating foreign clergy to unsettle the situation in southern Iran was an uprising led by Seyyed Mohammad Hasan Husseini, known as Aga Khan, leader of the Ismaili sect. Khalil Shah, Father of Aga Khan, leader of the Ismaili sect in 1232 AH /1816 CE, was killed by pro-Yazd people because of Mullah Hussein Yazdi, and his son Aga Khan became his successor when he was thirteen years old (Nateq, 1990). Fath Ali Shah appeased Aga Khan to prevent crisis and religious conflict, and sent many gifts to him and his daughter Sarve Jahan. Sarve Jahan later married Ali Shah and paid 23,000 Toman and handed over the Qom and Mahallat reign to him (Mahmoud, 1965). Aga Khan lived respectfully at Qajar until he was attracted by Mirza Abolghasem. He appointed Aga Khan to the Kerman reign during his chancellery in Mohammad Shah's kingdom. Despite the deputy of

Shah, Hadji Mirza Agassi paid little attention to Aga Khan. Aga Khan rebelled in 1255AH/1839CE as he was dissatisfied with Mirza Agassi's behavior towards himself. But he could not rebel against Firooz Mirza, who was sent to fight him, and finally refuged at Bam Fortress (Iqbal, 1968). He hoped to be pardoned after Mohammad Shah returned. After returning from Mohammad Shah, Fereidoun Mirza became Governor of Fars and asked Mohammad Shah for the remission of Aga Khan, and the king pardoned him. Aga Khan then went to Tehran and settled in Abdulazim Harem To terminate the Aga Khan problem, and to prevent another crisis in his country, Hadji Mirza Agassi pardoned him and finally gave him Mahallat Region. Etemad Al Aaltaneh writes,

> "This year, Aga Khan Mahallati, the head of the Ismaili tribe who had already refuged to Bam made sure to come to State Cabinet and cloistered in Abdulazim Harem.... Hadji Mirza Agassi sent Hadji Abdul Hamid Mahallati to sacred Hermitage and ensured to bring Aga Khan to State Cabinet.... Aga Khan dressed with the green turban came to Hadji Mirza Agassi and in result he was pardoned and released by his intercession".

Aga Khan left Tehran for a pilgrimage to the sacred Harems, and collected Corps and human force. He then moved towards Kerman and counterfeited the command by Hadji Mirza Agassi to strengthen the position that Kerman ruling was given to Aga Khan (Etamadolsaltane, 1970). When Aga Khan moved to Tehran, provisions for disposal and to prevent him moving to Kerman and Yazd were issued. Kerman pursued Aga Khan Mahalati, and he escaped to Babak where there were many disciples, and then left there to capture Sirjan. He was then defeated by Fazalikhan Biglari. To help Aga Khan, the Emperor of India sent Saeed Khan Balooch, together with abundant artillery and ammunition, via Sistan and Kandahar. But Aga Khan and his followers met defeat. His forces completely disappeared and he fled to India by aid of Britain. In 1262AH/1844 CE, Hadji Mirza Agassi wrote a letter of protest to the British ambassador to discuss the subject, which implicitly referred to Aga Khan dependency to Britain and its help to him

> "Hereby the story of the Aga Khan Mahalati , traitor and escapee servant of this eternal state is such that four years before the plaintiff gathered some bandits in Kerman –Baluchistan border he started

to conflict and **Repugnance**, the state border soldiers ruptured his population against his government, they caught the head of artillery gear which engraved in English, he fled to British troops camp located in Kandahar on that time , seized him and took the document to their own country ; kept it there" (Adamiat, 1961).

According to the literature on Aga Khan, on the way to Kandahar when he arrived in Kereshk, Ravelinson was informed of his arrival. Aga Khan was welcomed to Kandahar in 17, 1258. Britain then captured and took over Herat by Aga Khan and gave him the ruling of Herat, so Ravelinson wrote to Lord McNaten, the British army commander in Kabul. Aga Khan sent a letter attached, but the Afghan uprising against Britain and the slaughtered by Afghan groups caused their plot to capture Herat to fail (Mahmoud, 1965). When the plan to capture Herat failed, and the news concerning Aga Khan's complicity toward Britain was relayed to the commanders, the Prince, Safdarjung, and Mohammad Omarkhan Sardar, wrote a letter to Aga Khan stating, "if you came out and joined us it will be desirable and better, otherwise whenever we achieve, First we kill you and your family and then the rest escapees." (Adamiat, 1961). Aga Khan went to India together with British residents of Kandahar, but something happened and that resulted in the separation of Baluchistan from Iran by Aga Khan. At first Aga Khan combated Baluch and as a result of the skirmishes, Baluch plundered his property. In 1260AH /1843 CE, Aga Khan sent his brother Headed Mohammad Baqerkhan, equipped with munitions supplied by the Indian government, to conquer Bahamfel fortresses in Baluchistan, so he went to Bombay. Mohammad Ali Khan Baloch fought with Aga Khan's army and Aga Khan sent his other brother Headed Abolhassan Khan to help Mohammad Baqer Khan, but Iran sent Fazlali Khan along with the army to aid Mohammad Khan Baloch. Provocative letters were written to the heads of Baloch tribes by Aga Khan, and thereby were invited to rebel against the Iranian government and instead obey the government of India (Robin, 1946). Mirza Agassi wrote to the British government to protest this action. In the letter he requested the states to establish discipline and obey limitations, and called for the return and submission of Aga Khan to Iran according to Article I of the treaty signed in 1229 AH /1814 CE. But the British government did not accept Iran's request." (Mahmoud, 1965). Again, Mirza Agassi wrote a letter to the British ambassador, asking "why have British agents seized the opponent escapee contrary to treaty provisions? You ought to surrender him to our borderers or to expel him from

occupied l and..."(Adamiat,48 Again, the British government failed to return Aga Khan to Iran, and finally it was determined that Iran would accept Britain's request and Aga Khan was not returned to Iran, and Indian government was obliged to take Aga Khan from Bombay to Calcutta. But the Indian government did not fulfill its commitment. Hadji Mirza Agassi sought to expel Aga Khan from Bombay. Finally, Aga Khan was sent to Calcutta in 1263 AH/1845CE. But British political forces continually mediated to return Aga Khan to Iran. Mr. Shil, British minister, asked Iran by India's viceroy whether Iran would return Aga Khan to Iran or not; Hadji Mirza Agassi replied in written form

"it is obvious that presence or absence of Aga Khan in Iran is so so and that he left the country was purely foolish and unwise performance ... there is no contrary and object If he accompanied by his wife come from the road of Fars or if in Sacred Harem he come to Mahallat through Kermanshah and sit in his house"(Raein, 1968).

But Aga Khan did not want such a return and Hadji Mirza Agassi disagreed any other conditions for return the Aga Khan to Iran. Hadji Mirza Agassi prevented the entry of Aga Khan to Iran by establishing subtle terms and conditions that were not accepted by Aga Khan, and thus prevented his entry.

7. MIRZA AGASSI AND SALAR RIOT

The riot led by Mohammad Hassan Khan Salar, son of Qajar Allahyar Asifodoleh, began in 1260 AH/1844 CE. His plan was designed and programmed several years prior in the period of Asifodoleh's reign. His son Asifodoleh, groom of Fath Ali Shah, and uncle of Mohammad Shah, was the Chancellor from 1240 to 1243 AH/1824-1827AD in Iran, but he escaped from the field during skirmishes between Russian and Iranian forces in Abbas Abad Castle. He was convicted of betrayal, was dismissed from the Chancellery and was reprimanded (Raein, 1968) But he always considered the Chancellery position. According to Etemad Al Saltane, after the death of Fath Ali Shah and the kingdom of Mohammad Shah, he sought to the reach the Chancellery position without seeking humiliation and greed (Etemadolsaltane, 1951). But the Ghaem Magham Farahani was appointed to the Chancellery and to get him way from the Capital he sent Asifodoleh to Khorasan to be ruler. After the murder of Ghaem Magham, Asifodoleh, who still sought the Chancellery position, went to Tehran quickly to bench the Chancellery seat. But when Hadji Mirza

Agassi was selected for the Chancellery, Asifodoleh came back to Khorasan again. From then on, hostility between Asifodoleh and Hadji increased because according to Mostofi, "Khan Qajar found Hadji Mirza Agassi obedience opposite to his affairs."(Etemadolsaltaneh,52 Thus he engaged in a great effort to shake the position of Mirza Agassi, but because of the great influence of Hadji Mirza Agassi on Mohammad Shah, all measures of Asifodoleh remained null and void; hostility between Asifodoleh and Mirza Agassi reached its highest level in the late reign of Mohammad Shah. In particular, the enemy between Mohammad QoliKhan, the son of Asifodoleh Allah Qoli Mirza Ilkhani, the son of Hadji Mirza Agassi's wife was provoked to this hostility. Mohammad Qoli Khan always wrote to his father and brother in Mashhad about the necessity of the disposal of Hadji Mirza Agassi.(Iqbal,53 When Ghaem Magham's brother and Astan died in 1262 AH/1846CE; Asifodoleh found the position appropriate for substituting his son Mohammad Hassan Khan Salar by himself, and asked the King to allow him to work in Astan Qods and for his son to be the ruler of Khorasan. After Hassan Khan Salar became the ruler of Khorasan, he openly rebelled against the court and challenged the orders of Hadji Mirza Agassi (Iqbal, 1954). According to "Top Histories," Salar told his father that "the general masses of people were offended and dissatisfied Hadji and were also disappointed due to strengthening his reign. If we rebelled and transgressed undoubtedly we would not solve the problem."(Etemadolsaltaneh,55 Thus Salar allied with some Khans in Khorasan and began to gather an army. The main reliance of Salar was on Quchan Kurds and Turkmens of northern Khorasan. But some Kurd Khans did not cooperate with him and supported Hadj Mirza Agassi instead. The palace that one of them was Mohammad Hussein Khan Nardini who became the ruler of Nardini Fort by command of Hadji Mirza Agassi and he disregarded to Asifodolleh and Salar due to the order of Hadji Mirza Agassi and informed him that it was unnecessary to obey the rule of the governor of Khorasan (Watson, 1977).

Mohammad Hasan Khan Nardini was killed by order of Asifodolleh and his followers. After hearing of the killing of Mohammad Hussein Khan Nardini, the King and Mirza Agassi wanted the killer to be sent to Tehran and thus summoned Asifodolleh. Asifodolleh not only did not go to Tehran but also delayed sending the killer of Mohammad Khan Nardini to Tehran. By sending various letters and messages against Hadji Mirza Agassi, he tried his best to undermine him in the court, but Mohammad

Shah did not pay attention to the messages (Iqbal, 1984).

Mirza Agassi sent one of his appointees, Hadji Mirza Abdullah, to Mashhad and appointed him as custodian of as Astan Qods Razavi to immobilize and restrict Asifofolleh. Against this measure, Asifofolleh went to Tehran inwardly to improve his position and outwardly to strengthen his son Mohammad Hassan Khan Salar, but his trip did not turn out the way he intended, and he was exiled to Atabat by order of Mohammad Shah (Raein, 1968). Hadji Mirza Agassi played an important role in this verdict, and due to the dependence of Asifodoleh on the British government, Hadji Mirza Agassi was not favorable to him and wants him off the hands of the conspiracy and betrayal.

Hadji Mirza Agassi sent Hamzeh Mirza, the King's brother, as governor to Khorasan (Mostofi, 1947). By sufficient force on behalf of Hadji Mirza Agassi and Mohammad Shah, Hamza Mirza, who was sent to suppress the insurgents, sent a message to Salar to stop, but he replied "It is opprobrious I am the hero but be servitude (Watson, 1977). " By this answer, the war between the two sides began, and finally Salar was defeated and refuged amongst Turkmen. The Salar rebellion and related riots increased more strongly every day due to Mohammad Shah's disease, and these riots continued until Salar and his followers were defeated at Naser-Al-din-Shah in 1266AH/1850 CE. Ultimately, Salar and his followers were killed by order of Al-din-Shah.

8. MIRZA AGASSI AND AGRICULTURE

With the reign of Mohammad Shah and the Chancellery of Hadji Mirza Agassi, from dedicated property were developed and some dedicated property and lands were converted to dedicated property and lands. To save the state from economic decline, Hadji Mirza Agassi initiated the policy of adding public estates and sequestered 1,438 estates, farms and villages in favor of the government in different parts of the country during his Chancellery (Feshahi, 1971). The estates were obtained by confiscation either by princes or by great landowners. In addition, Hadji Mirza Agassi made serious measures to revive barren and arid estates. Abdullah Mostofi writes, "Wherever he found a barren land, he bought and revived it by the aqueduct. In fact when he found a wasteland anywhere he launched to dig the creek closest to the river." (Mostofi, 1947). Hadji Mirza Agassi's interest in agriculture, prosperity and reclamation of lands and estates was such that "he divided his time between office work and agricultural affairs." (Feshahi, 1971) He himself conducted agricultural tasks. The reclamation of Abbas Abad land in Tehran and its conversion to a garden was

under his direct supervision (Mostofi, 1947). Hadji Mirza Agassi used all attempts to increase domestic wealth. One of his efforts in this regard was to a plant mulberry tree for silkworm feeding in Kerman in order that the "decline in export and trading of silk be prevented, according to Watson" (Watson, 1977). But the most important economic action of Hadji Mirza Agassi was in the field of irrigation. He had a strong understanding of agriculture and consequently of the economy. Abdullah Mostofi writes about activities of Hadji Mirza Agassi such that he established and canalized a stream from Karaj River for YaftAbad and Sefanard, which later resulted in the reclamation of Clock, Garmdarreh and MianJoob, and many villages that today are fed by this creek. Hadji Mirza Agassi commissioned the digging of the creek by Qom troops. The creek was ramified from Jajrud River to Amin Abad, near Shahr-e-Ray, which begins in the northern mountains range Behnam Yazeky and Varamin (Mostofi,1945). Hadji Mirza Agassi asked for follow-up agricultural affairs and attempted to revive the country's irrigation system from the Board of Governors of all states and provinces. He wrote in response to Farrokh Khan Aminodoleh, ruler of Kashan, "Write to your father to renovate Kashan, we may find water for Kashan to reclamation it."

Hadji Mirza Agassi also sought the reclamation of the Shiraz duct of 6Pir River to revive villages surrounding the region. Several subterranean water reservoirs and aqueducts were built near Naeen, Yazd, Kerman and Khezrabad, so Hadji Abad and Husseinabad pulled out of the desert (Garmrodi, 1968). Hadji Mirza Agassi was so attracted to irrigation canals that he personally participated in establishing an aqueduct ceremony (Feshahi, 1971). Hadji Mirza Agassi's agricultural efforts maintained their effects for years later. For example, "most Tehran Khalesjat was of Hadji Mirza Agassi ones which is used as a means of bread providing" (Mostofi, 1947). The nonstop efforts of Hadji Mirza Agassi in the field of agriculture led to lowered costs and an abundance of agricultural products. Mohammad Hasan Khan Etemad Al Saltaneh writes in this regard, "bread price in Tehran on his age was one Abbasi. Meat, oil and other goods were so cheap that now seems to mention them exaggerated" (Etemadosaltane, 1970).

9. HADJI MIRZA AGASSI AND COMMERCE

Mohammad Shah reigned under difficult conditions faced by Iran, including an economic crisis that was a result of the defeat in the Russian-Iranian wars, and compensation for damages in the amount eight Cruor. On the one hand, fertile agricultural lands were isolated from Iran, and on the other hand, based on Article 9 of the commercial

agreement, all goods imported or exported from the Russian borders were subject to a five percent customs duty. Further, to determine "capitulation" right incurred irreparable damages on Iran's political and economic independence (Motazed, 1987). In such circumstances, Mohammad Shah took steps to organize the country's economy. During the reign of Mohammad Shah and his Chancellery under Hadji Mirza Agassi, foreign trade was increasingly expanded. Nateq expresses that:

> "Thus reason for release from business recession in the early reign of Mohammad Shah was interpreted that Iran was subjected to border wars with Russia until Abbas Mirza, the viceroy, was alive, i.e. until 1249 AH /1883 CE the traders have little confidence in the peace and did not feel safe. They were afraid that war started again and made passageways of the border into the problem, but to the idea of traders, the new government was not WARMONGER and had confidence to it somehow" (Nateq, 1990).

In addition, commercial routes were a problem often encountered by Iranian businessmen in trade with Europe. After the loss of Yerevan, which a center of international trade through which Iran conducted foreign trade with Europe, Iranian merchants sought other ways to trade. Trade through Baghdad path was considered one of the main roads in late eighteen century, but increasing chaos and infrastrucutre problems in Iraq led merchants to use new ways, including Erzurum Trabozan (Isavi, 1983). Choosing this way led to several developments in significant trade regions so that Iranian business centers were transferred to Tabriz, which was soon converted to a large warehouse for goods transported from Europe to Iran. Consequently, the population of Tabriz during the Abbas Mirza era was less than seventy thousand people, which increased to 120 thousand people by early 1830, and to 140 thousand people in 1858 (Feshahi,1971). Based on trade balances,

> "Import influenced strongly on Export in the first half nineteenth century. Increased trade with Turkey, Russia, Central Asia, much reduced trade with India trade which generally led to non-trading caused a great change in Iran business structure and composition... Like other countries, textiles which were one of the major items exported in Iran converted to one of the main items imported because local handicraft had not

ability to compete with European mechanized products. Another important change in imports was uncontrolled increasing of "colonial goods" especially tea and sugar .... During this period authority export legumes was relegated to import level" (Isavi, 1983).

The main developments in Iranian trade in the first half of the nineteenth century, that is, during the reign of Mohammad Shah and Hadji Mirza Agassi, included a large increase in trade with Britain through Turkey and the Persian Gulf. In this era, "Britain seized at least half of Iran trade and the value of its imports was increased strongly" (Isavi, 1983). Increase in foreign trade led some foreign companies such as Rally Angeles and Burjes to engage in business in Iran and to establish offices in Tabriz (Motazed, 1987).

10. HERAT BATTLE AND HADJI MIRZA AGASSI

Afghanistan was always a target of the great powers, especially Britain, due to its shared borders with India, Iran and Russia. The fear of attack by Afghan groups to India both through Iran and other great powers caused Britain to be sensitive in this area. Herat was important in the region as a key to attacking and capturing India. So Britain sought to separate this region from Iran and to establish a reign to maintain control. Herat had faced problems since the reign of Fath Ali Shah which continued under Mohammad Shah. Mohammad Shah always thought of attacking Herat, and the only minimal stimulus would stimulate him to attack to Herat. Mohammad Shah attack made a loss to Britain and made a profit to the Russia. This was why Britain strongly believed that Iran would take serious actions in Afghanistan. They tried to establish close relationships with the friend of Amir Mohammad Khan Kabul; thus the British political relations completely established with friend of Mohammad Khan in 252 AH /1836 CE. A British political agent, Lord Auckland, wrote to him "we hope to see Afghanistan as a united nation.... and would like Amir Mohammad Khan to improve shipping in Send Rivers (Mahmoud, 1965). " In 1253 AH / 1837 AD Mohammad Shah went to Khorasan in order to suppress some of the rulers of Khorasan stimulated by Afghanistan, to suppress rebel rulers, and to ensure security in Khorasan. They then went to Herat to conquer and instil Iranian sovereignty over Herat. According to Peter Arvri, Britain was very upset and concerned about movement of Mohammad Shah and the major reason for their opposition to government action in the capture of Herat was that "Britain was more concerned about

Article 11 Turkamanchai treaty which basically Russia had the right of consulate and business agency at any point Iran and if Iran had captured Herat, the Russians had to create representative in Heart" (Avri, 1990). This indicated the risk of failure in India because they believed that Russia had influence in the court; in fact when Russia approached India, also due to the weak British weak position with the King and Hadji Mirza Agassi, they were not sure to make advantages of Russia's scores obtained in Turkamanchai.

The Iranian Army clashed with the Afghan Army near Ghorian castle in the 1253 22 Sha'ban AH /1837 AD. After conquering Ghorian, the army moved to Herat on Rabi Thani, and finally was surrounded by the Iranian King. Britain announced Mohammad Shah that the government was "opposed to the siege of Herat, and this action would be considered a hostile action and openly the siege of Herat is disgusted by England" (Kerzen, 1951). The Herat siege lasted nearly a year and at this time British officers were trying to convince Mohammad Shah to stop the siege and even mentioned this measure was against the pact between Iran and Britain. In this case, Captain Alderd Patinjer met with Hadji Mirza Agassi and protested Iran's stratagem, arguing that the "capture of Herat by Iranian corps is against right and justice and makes inconvenience to India and also is against Iran-Britain promise of the Covenant". By offering and showing the official maps supplied by Brans, one the skilled political agents and spies, and thereby Afghanistan, had been introduced as a component of Iranian territory. Hadji Mirza Agassi did not accept the protests of Patinjer and replied by locating a piece of land which is part of Iranian territory according to English admission, which is not unfair and against the Covenant and Testament. Indeed, Hadji Mirza Agassi reminded Britain that it had no right to interfere with Iranian territory, as it was against the contract signed in 1229 AH /1814 CE. According to the contract, "if the war between Iran and the Afghan happens, Britain has no right to intervene and should not help any party help unless the parties ask to be the mediator of peace".

Hussain Khan Ajudanbashi, Iranian ambassador, wrote Lord Palmereston regarding this case.

> "Under the treaty it was asserted that England intervention in Afghanistan is not permitted and every time the state trustees shall fight against Afghans, the British government should not intervene and now on the contrary of the Convention, what is means by permitting itself to intervene against Iran and prohibit Iran from his right?

Secondly, Heart is not inside Afghanistan but is part of Iran in Khorasan under the verdict of Kings, and Kamran was ruler of Heart by the order of descendant King.(Mahmoud,1965) Herat was the government... by confidential communication with Kamran Mirza, the governor of Herat,Mc. Nil ,British minister tried his best to stop Mohammad Shah seize to Heart and to establish peace and calm with Kamran Mirza and the king allowed him go to Herat to talk with Yar MohammadKhan, Minister of Kamran Mirza, and develop a peace agreement to meet Mohammad Shah needs. Mc. Nil went to Herat while encouraged them to British support, he adjusted a peace deal and then came back to Iran. Hadji Mirza Agassi announced Mc. Nil that the King's losses by stratagem should be compensated or at least receive the amount of money to divide between corps had serious injuries" (Watson, 1977).

Mc. Nil objected that nothing should be added to the peace treaty. Mirza Agassi wrote,

> "This Treaty has not made a commitment to Iran because Afghans still have not stopped shooting and sudden attack (Watson, 1977). Meanwhile, on that letter Hadji Mirza Agassi estimated incurred damage amount caused by army movement campaign as five or six cruor. Mohammad Shah did not accept peace and continued siege of Herat. The presence of Russia's minister, Count Simonich in Iran camp, increased concern of the British and they accused Iranians to irritate Russia attack to Afghanistan".

K. William wrote that "No health consciousness person won't doubt that Russian diplomats encouraged Mohammad Shah to rally troops and capture Heart". These purposes are only for Russian intent and were conducted against positions held by Britain in India.

> "Fear of Russian influence and Afghans willingness to surrender and hardiness Mohammad Shah in Herat led to British threatening Iran to war. McNil gave a message to the Shah of Iran by Stewart now British government force to militate if you do not return and keeps the country such as India and now our military ships has entered in Kharg Island. I announce the war

if you don't give up here, be ready through Fars. Ma. Nill tegether with some British officers had abandoned the camp of Iran and went to Mashhad and from there to Tehran. After a while Mohammad Shah was informed of departure of Mc. Nil, the British warships seized Kharg Island. Mohammad Shah who knew war with England unsuitable disregarded of the siege of Herat and returned to the capital in JamadiAval 1254AH - 1838 AD".

11. Conclusions

Hadji Mirza Agassi, the chancellor of Mohammad Shah Qajar, should be mentioned among the most misfortune Chancellors in Iran because, despite his efforts to maintain Iran's power and prosperity during his chancellery, historians have defined him through unappealing traits. It must be determined where these misunderstandings originated. As it was explained, Mirza Abbas Iravani, known as Mirza Agassi, turned to mysticism and the Nooralishahi dervish sect during his studies. At the time, Sufi studies did not matter because he was as a normal individual, but when he became a teacher of a prince and then prime minister, his Sufism was not accepted by clerics, scholars and politicians. Particularly, the influence of Hadji on Mohammad Shah was such that it created a mutual relationship as followed and follower (disciple). After the murder of Ghaem Magham Farahani, despite the efforts of domestic and foreign forces to put someone in the Chancellery position who would be unable to achieve their intentions, Mohammad Shah chose Hadji Mirza Agassi as his Chancellor. Mirza Agassi was appointed to the Chancellery under poor economic and agricultural circumstances, the result of long-term wars at Fath Ali Shah reign. Britain and Russians tried to penetrate more and more into Iran's court.

Foreign and domestic documents regarding the performance of Hadji Mirza Agassi during his Chancellery pose two different viewpoints. It should be noted, however, that the majority of these documents were written against him. But even among these literatures we encounter two positive points about him. Historians have introduced him as incompetent, half insane, insincere, hypocritical, scurrilous, and and obscene wealth and greed. They have shown in their own literatures that the king saw another figure and character of Hadji Mirza Agassi in history, including kindness, a hatred of politics and punishment, an interest in science, nationalism and intellectualism. To determine the actual figure of Hadji, we must study his performance during his Chancellery. It is necessary to mention that,

following the development of relations with European countries, economic backwardness and the necessity of changing Iran's social and cultural affairs was completely clear and some informed and provident figures, led by Abbas Mirza, took the necessary actions to solve this problem. Hadji Mirza Agassi was among the Iranian politicians who tried for the continuation of this movement in many ways to resolve the probelm and make Iran a strong and powerful state. Hence, he launched political, economic, cultural and social actions. Regarding Iran's economy, the economic policies of Hadji Mirza Agassi sought to empower the Iranian economy. He inherited a situation of economic chaos caused by the Iran-Russia wars and tried to reconstruct the structure of agricultural economics and agricultural irrigation systems to ensure prosperity. In this regard, he initiated measures such as adding to estate property through seizure of estates, farms and villages and the establishment and maintenance of irrigation canals, subterranean streams and aqueducts.

Hadji Mirza Agassi also sought to attract foreign experts to Iran to develop the economy of the state. He didn't restrict himself to this case, as he sent students to Europe to acquire knowledge of science and industry and attempted to improve the country's industries with the support of domestic industries, particularly the textile industry. In the political, social and religious arena, he entered a new attitude into the traditional policy that until then had no meaning in Iran and it was attempted to restrict traditional religious policy and to promote tolerance and religious enlightenment in Iran. This was achieved by weakening the influence of the clerics and expanding the authority of the state and the government. The most important event in the social realm may be Mohammad Shah's declaration after the termination of the Herat war. This was the first time in Iran that a King obliged himself to explain to the nation and the people, namely the people who were called peasant at that time and were not given the smallest importance to them. Regarding different reason, British historians called him the stooge of Russia in Iran's court. One of the reasons for this was that Iran took his troops to Herat by instigation and order of Russia, but looking in the writings and books we find he was neither a stooge of Russia nor a British servant. On the other hand, concerning Russia, non-giving some advantages such as not to permit the fishery to Russia or to Hadji's direct supervision of building stock by the Russia due to his lack of confidence in Russia indicates an independence of Hadji from Russia. Finally, the firm opposition of Hadji Mirza Agassi against Russian and British governments and maintenance of the national interest has brought

about hate, hostility and defamation. Once again we repeat the statement of Ibrahim Safai about Hadji Mirza Agassi "Hadji was one of the scare Ministers and Chancellors in Iran who didn't accept no nicknames and titles and even name of Chancellery and he was ingrate by history." The cultural policies of Hadji Mirza Agassi were conducted with tolerance towards other religions, such as Christianity, issuing commands to freedom of opinion, abolition of torture and execution, and also seeking to instil Western civilization and sending Iranian students to study new Western scientific and cultural achievements. One of the other fields of Hadji Mirza Agassi's activities was his efforts to preserve territorial integrity and to neutralize the fight between Russia and Britain fight for their growth and development in Iran.. During these few decades, Iran's arsenal was filled primarily by weapons which had been prepared in Hadji Mirza Agassi's age. Moreover, Hadji Mirza Agassi opposed the influence and presence of foreign governments in Iran and sought assisting from France to neutralize the two strong powers. He ultimately converted the country to a third power to counter the influence of Russian and British powers.

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Solving an Inverse Diffusion Problem Using Tikhonov Regularization Method

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Abstract: This paper is concerned with the evaluation of the diffusion coefficient based on the measurement obtained at the boundary by using a numerical approach. We consider the problem of recovering the diffusion coefficient of a rod that is a function of space. The approach is based on finite-difference method and the least-squares scheme. At the beginning of the algorithm, the finite-difference method is used to discretize the problem domain. The present approach is to rearrange the matrix forms of the differential governing equations and estimate unknown diffusion coefficient. The least-squares method is adopted to find the solution. This solution is unstable, hence the problem is ill-posed. This instability is overcome using the Tikhonov regularization method with the gcv criterion for the choice of the regularization parameter. The stability and accuracy of the scheme presented is evaluated by comparison with the Singular Value Decomposition method (SVD). Results show that a good estimation on the diffusion coefficient can be obtained within a couple of minutes CPU time at pentium IV-2.4 GHz PC.

1 Introduction

Inverse problems appear in many important scientific and technological fields. Hence analysis, design implementation and testing of inverse algorithms are also are great scientific and technological interest.

Several functions and parameters can be estimate from the inverse problem: static and moving heating sources, material properties, initial conditions, boundary conditions, optimal shape etc.

Fortunately, many methods have been reported to solve (IHCPs) [1]-[5], [6], [13], [14], [16]-[19], and among the most versatile methods the following can be mentioned: Tikhonov regularization [22], iterative regularization [1], mollification [15], BFM (Base Function Method) [16], SFDM (Semi Finite Difference Method) [13], and the FSM (Function Specification Method) [2].

Beck and Murio [4] presented a new method that combines the function specification method of Beck with the regularization technique of Tikhonov. Murio and Paloschi [14] propose a combined procedure based on a data filtering interpretation of the mollification method and FSM. Beck et al. [3] compare the FSM, the Tikhonov regularization and the iterative regularization, using experimental data. Another effective technique to solve ill-posed problems is based in the Singular Value Decomposition (SVD) of an ill condition matrix [8].

The plan of this paper is as follows: In section 2, we formulate an inverse diffusion problem. A method consists of Tikhonov regularization to the matrix form of least-squares method for solving this inverse problem will be presented in section 3. Finally some numerical experiment will be given in section 4.

2 Mathematical formulation

Consider a one-dimensional rod whose thermal conductivity $k(x)$ is a function of space. The conduction of heat is governed by the equation given by

$$T_t = (k(x)T_x)_x, \quad 0 < x < 1, 0 < t < t_M \qquad (1)$$

$$T(x,0) = f(x), \quad 0 \le x \le 1, \qquad (2)$$

$$T(0,t) = p(t), \quad 0 \le t \le t_M, \qquad (3)$$

$$T(1,t) = \phi(t), \quad 0 \le t \le t_M, \qquad (4)$$

and the overspecified condition

$$T(a,t) = q(t), \quad 0 \le t \le t_M, \qquad (5)$$

where $0 \le a \le 1$ is a fixed point, t_M is a given constant, $f(x)$ is the initial temperature of rod, $p(t)$ is the temperature at the left-hand side and $\phi(t)$ is the temperature at the right-hand side. In this context we consider that the functions $f(x)$, $p(t)$, and $\phi(t)$ are known functions, while $k(x) > 0$ and $T(x,t)$ are unknown functions which remain to be determined. Note that, for an unknown positive function $k(x)$ we must therefore provide additional

information (5) to provide a unique solution $(T(x,t), k(x))$ to the inverse problem (1).

The inverse problem for the above system is then to recover the unknown function $k(x)$ based on the knowledge of the initial temperature, $f(t)$, temperature $p(t)$ at the boundary $x = 0$, temperature $\phi(t)$ at the boundary $x = 1$, and the measured temperature of the rod $q(t)$ [19].

3. Overview of the Method

Consider an inverse diffusion problem described by the equations (1). The application of the present numerical method will find a solution of problem (1), by using the following steps.

3.1. Finite difference method for discretizing

The explicit finite differences approximation for discretizing problem (1) may be written as follows [20]

$$\frac{1}{\delta t}(T_{i,j+1} - T_{i,j}) = \frac{1}{\delta x^2}(k_{i+\frac{1}{2}}(T_{i+1,j} - T_{i,j}) - k_{i-\frac{1}{2}}(T_{i,j} - T_{i-1,j})) \quad (6)$$

$$T_{i,0} = f(x_i), \qquad i = 0,...N, \quad (7)$$

$$T_{0,j} = p(t_j), \qquad j = 0,...,M, \quad (8)$$

$$T_{N,j} = \phi(t_j), \qquad j = 0,...,M, \quad (9)$$

where $x_i = i\delta x, t_j = j\delta t, i = 0,1,...,N$ and $j = 0,1,...,M$. Equation (6) for $i = 1,...,(N-1)$ may be written in the following matrix form

$$T_{j+1} = AT_j + C_j \quad (10)$$

$$A = \begin{pmatrix} \gamma_1 & \alpha_1 & K & 0 & 0 & 0 \\ \beta_2 & \gamma_2 & \alpha_2 & K & 0 & 0 \\ M & M & M & M & M & M \\ 0 & 0 & K & \beta_{N-2} & \gamma_{N-2} & \alpha_{N-2} \\ 0 & 0 & K & 0 & \beta_{N-1} & \gamma_{N-1} \end{pmatrix},$$

and

$$T_j^t = (T_{1,j} \ T_{2,j} \ ... \ T_{N-1,j}),$$

$$T_{j+1}^t = (T_{1,j+1} \ T_{2,j+1} \ ... \ T_{N-1,j+1}),$$

$$C_j^t = (r\beta_1 T_{0,j} \ 0.. \ 0 \ r\alpha_{N-1} T_{N,j}),$$

where, for $\nu = 1,2,K, N-1$,

$$\gamma_\nu = 1 - r(k_{\nu-\frac{1}{2}} + k_{\nu+\frac{1}{2}}), \alpha_\nu = rk_{\nu+\frac{1}{2}}, \beta_\nu = rk_{\nu-\frac{1}{2}}.$$

Theorem. If k_μ be the maximum value of $|k_{\nu+b_i}|$; $\nu = 1, K, N-1$, $b = (-1)^i \frac{1}{2}$; $i = 1,...,t$ then the finite difference scheme (10) is stable for

$$r < \frac{1}{2k_\mu}.$$

Proof. In system (10), the matrix determining the propagation of the error is A. Therefore scheme (10) will be stable when the modulus of every eigenvalue of A does not exceed one. Application of Gerschgorins circle theorem to the matrix A shows that its eigenvalues λ lie on or within the circle

$$|\lambda - a_{ss}| \le \sigma_s,$$

where σ_s is the sum of the moduli of the elements along the *sth* row excluding the diagonal element a_{ss}.

Hence, for row 1 we obtain $r < \frac{2}{3k_\mu}$.

Similarly for row $N-1$ we require $r < \frac{2}{3k_\mu}$.

For rows $2, K, N-2$ we obtain $r < \frac{1}{2k_\mu}$.

For overall stability, we obtain $r < \frac{1}{2k_\mu}$.

By solving the equation (10), we obtain

$$T_{j+1}^t = (T_{1,j+1} \ T_{2,j+1} \ ... \ T_{N-1,j+1}), \quad (11)$$

These updated values of T_{j+1} are used to calculate A, T_j, and C_j for iteration. This computational procedure is performed repeatedly until desired convergence is achieved.

Remark: In this work the polynomial form proposed for the unknown $k(x)$ before performing the calculation. Therefore $k(x)$ approximated as

$$k(x) = a_0 + a_1 x + a_2 x^2 + ... + a_\lambda x^\lambda, \quad (12)$$

where $\{a_0, a_1, ..., a_\lambda\}$ are constants which remain to be determined.

The unknown function $k(x)$ is difficult to be approximated by a polynomial function for the whole time domain considered. Therefore the time domain $t_0 \leq t \leq t_M$ will be divided into some intervals where t_0 is the initial measurement time. Each of the intervals is assumed to be $t_{m-1} \leq t \leq t_m$ where $t_m = t_0 + m\Delta t$, $m = 1, ..., M$ and

$$\Delta t = \frac{t_M - t_0}{M}.$$

For linearized nonlinear terms in equations (11) we use Taylor's series expansion. Let $\Psi(\xi_1, ..., \xi_n)$ be a many differentiable nonlinear function of $\xi_1, ..., \xi_n$ then its Taylor's series expansion is given as

$$\Psi(\xi_1, ..., \xi_n) = \Psi(\overline{\xi_1}, ..., \overline{\xi_n}) +$$
$$\sum_{\lambda=1}^{n} \frac{\partial \Psi}{\partial \xi_\lambda}(\overline{\xi_1}, ..., \overline{\xi_n})(\xi_\lambda - \overline{\xi_\lambda}) + O((\xi_\lambda - \overline{\xi_\lambda})^2), \quad (13)$$

where the overbar denotes the previously iterated solution. Therefore we obtain

$$T_{\frac{a}{\delta x}, j+1}(a_0, ..., a_1) = T_{\frac{a}{\delta x}, j+1}(\overline{a_0}, ..., \overline{a_1}) +$$
$$\sum_{i=0}^{1} \frac{\partial \hat{T}_{\frac{a}{\delta x}, j+1}}{\partial a_i}(\overline{a_0}, ..., \overline{a_1})(a_i - \overline{a_i}), \quad (14)$$

where $(\overline{a_0}, ..., \overline{a_1})$ denotes the previously iterated solution.

3.2. Least-squares minimization technique and the Tikhonov regularization method

The estimated coefficients a_{ii}; $ii = 0, 1, K, \lambda$ can be determined by using least squares method when the sum of the squares of the deviation between the calculated $T_{\frac{a}{\delta x}, j+1}$ and the measured $q((j+1)k))$ at $x = a$ is less than a small number. The error in the estimates $E(a_0, a_1, ..., a_\lambda)$ can be expressed as

$$E(a_0, a_1, ..., a_1) =$$
$$\sum_{j=0}^{i}(T_{\frac{a}{\delta x}, j+1} - q((j+1)k))^2, \quad i = 1, 2, K, \quad (15)$$

which is to be minimized for each interval $t_{m-1} \leq t \leq t_m$, $m = 1, K, M$. To obtain the minimum value of $E(a_0, a_1, ..., a_\lambda)$, with respect to $a_0, a_1, ..., a_\lambda$, differentiation of $E(a_0, a_1, ..., a_\lambda)$, with respect to $a_0, a_1, ..., a_\lambda$, will be performed. Thus the linear system corresponding to the values of a_i can be expressed as

$$\Lambda\Theta = B. \quad (16)$$

The Matrix Λ is ill-conditioned. On the other hand, as q is affected by measurement errors, the estimate of Θ by (16) will be unstable so that the Tikhonov regularization method must be used to control this measurement errors. The Tikhonov regularized solution ([21], [10] and [11]) to the system of linear algebraic equation (16) is given by

$$F_\alpha(\Theta) = \|\Lambda\Theta - B\|_2^2 + \alpha\|R^{(s)}\Theta\|_2^2.$$

On the case of the zeroth order Tikhonov regularization method the matrix $R^{(s)}$, for $s = 0$, is given by, see e.g. [12]:

$$R^{(0)} = I_{M \times M} \in R^{M \times M},$$

Therefore, we obtain the Tikhonov regularized solution of the regularized equation as

$$\Theta_\alpha = [\Lambda^T \Lambda + \alpha(R^{(s)})^T R^{(s)}]^{-1} \Lambda^T B.$$

In our computation, we use the gcv scheme to determine a suitable value of α ([7], [9] and [23]).

4. Numerical Results and Discussion

In this section, we are going to demonstrate numerically, some of results for the unknown diffusion coefficient in the inverse problem (1). The propose of this section is to illustrate the applicability of the present method described in section 0 for solving inverse diffusion problem (1). As expected the inverse problems is ill-posed and therefore it is necessary to investigate the stability of the present method by giving a test problem.

In an IHCP, there are two sources of error in the estimation. The first source is the unavoidable bias deviation (or deterministic error). The second source of error is the variance due to the amplification of measurement errors (stochastic error). The global effect of deterministic and stochastic errors is considered in the mean squared error or total error, [5].

We also compare Tikhonov method and SVD method by considering total error S defined by

$$S = [\frac{1}{N-1}\sum_{i=1}^{N}(\hat{q}_i - q_i)^2]^{\frac{1}{2}}, \quad (17)$$

where N is the total number of estimated values.

Example.

In this example, let us consider following inverse diffusion problem,

$$T_t = (k(x)T_x)_x , \quad 0 < x < 1, 0 < t < t_M \quad (18)$$

$$T(x,0) = x, \quad 0 \le x \le 1, \quad (19)$$

$$T(0,t) = 2t, \quad 0 \le t \le t_M, \quad (20)$$

$$T(1,t) = 1 + 2t, \quad 0 \le t \le t_M, \quad (21)$$

and the overspecified condition

$$T(a,t) = 0.5 + 2t, \quad 0 \le t \le t_M. \quad (22)$$

The exact solution of this problem is

$$T(x,t) = x + 2t, k(x) = 2x,$$

Tables 1 and 3 show the comparison between the exact solution and approximate solution result from our method by Tikhonov regularization 0th and SVD regularization with noiseless data. Table 2 and 4 and figures 1 and 2 show these comparisons with noisy data. Finally, we compare two methods with computation total error by (17)

Table 1. The comparison between exact and Tikhonov and SVD solutions for $k(i\delta x)$ with noiseless data when $\delta x = 0.1$.

i	Exact	SVD	Tikhonov 0
	$k(i\delta x)$	$\tilde{k}(i\delta x)$	$\tilde{k}(i\delta x)$
1	0.200000	0.200000	0.200000
2	0.400000	0.400000	0.400000
3	0.600000	0.600000	0.600000
4	0.800000	0.800000	0.800000
5	1.000000	1.000000	1.000000
6	1.200000	1.200000	1.200000
7	1.400000	1.400000	1.400000
8	1.600000	1.600000	1.600000
9	1.800000	1.800000	1.800000
S		$7.9e-015$	$7.6e-015$

Table 2. The comparison between exact and Tikhonov and SVD so lutions for $k(i\delta x)$ with noisy data when $\delta x = 0.1$.

i	Exact	SVD	Tikhonov 0
	$k(i\delta x)$	$\tilde{k}(i\delta x)$	$\tilde{k}(i\delta x)$
1	0.200000	0.206294	0.206294
2	0.400000	0.412587	0.412587
3	0.600000	0.618881	0.618881
4	0.800000	0.825175	0.825175
5	1.000000	1.031468	1.031468
6	1.200000	1.237762	1.237762
7	1.400000	1.444056	1.444056
8	1.600000	1.650349	1.650349
9	1.800000	1.856643	1.856643
S		0.037564	0.037564

Table 3. The comparison between exact and Tikhonov and SVD solutions for $T(0.7, j\delta t)$ with noiseless data when $\delta t = 0.002$.

j	Exact	SVD	Tikhonov 0
	$T(0.7, j\delta t)$	$\tilde{T}(0.7, j\delta t)$	$\tilde{T}(0.7, j\delta t)$
1	0.704000	0.704000	0.704000
2	0.708000	0.708000	0.708000
3	0.712000	0.712000	0.712000
4	0.716000	0.716000	0.716000
5	0.720000	0.720000	0.720000
S		$3.9e-018$	$6.8e-018$

Table 4. The comparison between exact and Tikhonov and SVD solutions for $T(x,t)$ with noisy data when $\delta t = 0.002$.

t	Exact	SVD	Tikhonov 0
	$T(0.7, j\delta t)$	$\tilde{T}(0.7, j\delta t)$	$\tilde{T}(0.7, j\delta t)$
1	0.704000	0.704126	0.704126
2	0.708000	0.708252	0.708252
3	0.712000	0.712378	0.712378
4	0.716000	0.716498	0.716498
5	0.720000	0.720613	0.720613
S		$1.4e-005$	$1.4e-005$

5. Conclusion

A numerical method, to estimate unknown boundary condition is proposed for these kinds of IHCPs and the following results are obtained.
1. The present study, successfully applies the numerical method to IHCPs.
2. Numerical results show that an excellent estimation can be obtained within a couple of minutes CPU time at pentium(R) 4 CPU 3.20 GHz.
3. The present method has been found stable with respect to small perturbation in the input data.

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Iran and Saudi Arabia Relationship under Iran's Pragmatic Approach (1989-1993)

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Abstract: Iran's revolution and its consequences distorted the previous close relationship between Iran and Saudi Arabia. This paper, first as introduction, will discuss the historical competition between ideological and pragmatic approaches in Iran's foreign policy. Then it will study the domination of ideology in the foreign policy of Iran after the Islamic revolution and its role in Iran's foreign relations with littoral states in the Persian Gulf region, in particular, Saudi Arabia. The study further examines the superiority of the pragmatic approach after the end of the Iran- Iraq war (1988) and gradual changes in Iran's foreign policy from 1989. The research also analyzes the role of the new approach in re-establishing and improving the Iran-Saudi Arabia diplomatic relationship, which was severed in 1988, and limited cooperation of the two sides afterwards. The study concludes that despite Iranian-Saudi primary cooperation and agreement after the restoration of mutual ties, they were unable to maintain peaceful relations due to the bilateral and regional problems of the two countries.

Key Words: Iran, Saudi Arabia, pragmatic approach, foreign policy

1. Introduction

Historical researches pertaining to Iran's foreign policy indicate that there has been always competition between pragmatism, as national interest-orientation, and idealogy, religious principles, in the arena of the foreign policy of Iran. However, both of them have coexisted throughout the history of Iran. Ramazani (2004) argues that from the Achaemenid dynasty (580-530 B.C.E) until the demise of the Pahlavi regime in 1979, there has been combination between ideology and pragmatism, but the balance was often tilted towards pragmatism in the national interest except during the Pahlavi regime. The Pahlavi regime - from Reza Shah (1925-1941) to his son Mohammad Reza Shah Pahlavi (1941-1979) - had privileged pragmatism in foreign policy, and considered national interest as "conterminous" with their own interest. In this respect, Groot (2007) states that Reza Khan's Coup in 1921 not only was by virtue of domestic and external factors but also was even based on his own "ambition". He also mentions "conformism" as a feature of Pahlavi's nationalism in which they tried to revive Persian dynasty customs and traditions such as renaming towns and regions in "Persian Style" and using Persian as the national language. Indeed, they pursued national interest in the framework of King Family's aspirations. In this case, Mohammad Reza Shah Pahlavi with "historical memory" of being the only powerful state in the region intended to actualize his own aspiration of "Great Civilization" or in the words of Amuzegar

(1991), for "past glories of the Persian Empire". Nevertheless, the emergence of the Islamic republic in 1979 led to the dominance of ideology and revolutionary thoughts and standards on Iran's foreign policy in the first decade of the revolution. In this period, most decisions in the arena of foreign policy were made in the framework of Islamic ideology. However, as Marschall (2003) explains, Islamic ideology and national interest have coexisted "side by side" and sometimes overlapped in Iranian foreign policy since the revolution. For instance, Iran's arms dealing with Israel and the United States during the eighth-year war can be mentioned as examples. At the same time that Iran rhetorically attacked these countries as enemies of Islam and Iran, it implemented covert cooperation with them due to its severe necessity for armament during the Iran-Iraq war. Despite this, it is evident that, in the first decade of the revolution, Iran's foreign policy was driven and controlled widely by ideology.

2. Ideological Approach in Iran's Foreign policy in the 1980s

Since Iran's Islamic revolution in 1979, which gave rise to the "first theoretic regime" in the modern world, until the last years of the 1980s, the spirit of ideological thoughts dominated decision-making concerning foreign policy. In this regard, revolutionary thoughts were top priorities of the new government and foreign policymakers. Marschall (2003) quoted Rejai Khorassani, former Iranian

Ambassador to the United Nations in New York, as saying that "religious slogans and values determined many aspects of policy making, since the ideological foundation of the revolution was Islamic and the leaders came from the clergy". That is why Western media labeled Iran as "irrational religious fundamentalism" (Rasmussen, 2009). To this, the principles of Iranian foreign policy can be mentioned as evidence. These principles, which are enshrined in the Iranian constitution, are "First, rejecting all forms of external domination: 'Neither East nor West but the Islamic Republic', second, preserving Iran's independence and territorial integrity; third, defending the rights of all Muslims without allying with hegemonic powers; and fourth, maintaining peaceful relations with all non-belligerent states".

In this period the most prominent policy was 'Neither East nor West' or "non-alignment policy". Based on it, unlike Pahlavi's term, the Islamic Republic attempted to keep its distance from any block of the East led by the (then) Soviet Union, and the West, headed by the United States or the "great Satan", as Khomeini termed it. In this case, Tragert (2003) states that Ayatollah Khomeini's 'Neither East nor West' strategy indicated that "[He] pursued its own course in foreign policy rather than adhering to the policies of any pre-existing bloc of countries". In fact, the Islamic Republic pursued an independent foreign policy from the Great Powers. That is why, as Sadri (1998) states, Iran soon cancelled its membership in the Central Treaty Organization (CENTO) and joined the Non-Alignment Movement (NAM). Sadri contends that by its non-alignment policy Iran was looking at four critical policy goals: (1) "autonomy" in foreign policy; (2) keeping its distance from direct involvement in rivalry of the two blocks; (3) being independent from 'one ideological camp' and (4), to develop its relations with all countries except Israel, America, and the former South Africa regime. Sadri argues that Iranian leaders chose the non-alignment policy because they claimed that the Shah' dependency was "culturally an anti-Islamic and anti-Iranian notion."

Furthermore, in this period, Iran strived to spread its own brand of Islam all over the world in order to expand its perceived Islamic ideology. In this case, Tragert (2003) indicates that "Immediately after the Islamic Revolution, Iran competed with other Muslim countries to push its own brand of Islam around the world. In the 1980s and early 1990s, Iranian foreign policy was driven by the concept of the *umma*, or greater community of Islam. The goal was to strengthen the *umma* by establishing Iran-type Islamic republics that eventually would unite to create a great Muslim state". In other words, Iran

persisted to establish more Islamic Republics contrary to the ones which existed in Saudi Arabia, Wahhabism, or Turkey, Islamic secular, in order to unify Islamic peoples, on the basis of the Iranian constitution, against Imperialism. Khomeini accused the Arab countries of having "deserted Islam" or embracing "American Islam", which gave rise to tension between Iran and the Persian Gulf countries (Parsi, 2007).

In this respect, 'exporting of the revolution' was the regime's means to embody its revolutionary ideology. However, as Walt (1996) observes: Ayatollah Khomeini opposed spreading the revolution by force or "sword". Notwithstanding this, the idea of exporting the revolution, not only had affected Iran's international position but also threatened the legitimacy of Iran's Persian Gulf neighbors. In order to export the revolution, Iran supported the Shiites in Lebanon and in other Gulf countries and also broadcasted propaganda over Radio Tehran. It also used the hajj ceremony as an opportunity to spread revolutionary thoughts amongst other Muslims. Iranian revolutionaries, in general, argued that the Arab masses should follow Iran and replace the US-backed sheikhdoms by Islamic governments. In fact, Iran intended to create an Islamic Republic in regional Arab countries, since Khomeini named them as regional "un-Islamic" countries. In addition to the ideological incentive, Iran's regional leadership in the mind of Iranian leaders was another motivation for exporting the revolution. It was, historically, a long-standing goal which had been followed by Mohammad Reza Shah as well as the revolutionaries. Parsi (2007) states that "by exporting the revolution and spreading the ideology of political Islam , Iran hoped to bridge the Persian-Arab divide and establish a regional values system that would cast Iran in the leadership role".

Rakel (2007) believes that the role of Ayatollah Khomeini in changing Iran's foreign policy approach was very important in the first decade of the revolution. He states that "Khomeini followed a confrontational and isolationist foreign policy that was very much influenced by his own interpretation of Shiite ideological doctrine." That is why, according to Rakel, Iran's good relations with the US, Israel, US-friendly Middle Eastern regimes were replaced by hostility. He further argues that "For Ayatollah Khomeini, the 'export of the revolution' was more important than political stability and economic development". In this respect, Ramazani (2004) explains that the foreign policy doctrine of 'Neither East nor West, but the Islamic Republic' and insistence on the export of the Islamic Revolution, both stemmed from Khomeini's

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"overriding aspiration" to create an Islamic-led international order. In general, Iran's foreign policy in the first decade of the revolution was controlled by ideology which was mainly rooted in Khomeini's thoughts.

3. Iran-Saudi Confrontational Relationship under Iran's Ideological Foreign Policy

Iran's Islamic revolution caused serious problems for neighboring countries such as Saudi Arabia, Kuwait, as well as Bahrain, which involved some Shiites in these countries. Amongst them, Saudi Arabia had faced problems such as riots in the eastern province of al-Sharghiya, in November 1979 and February 1980, and also the insurgency of Salafi radical groups and occupation of the Sacred Mosque (in Mecca). In addition, the Kingdom faced great challenges from Iran's new regime due to the latter's endeavors to spread the revolution as well as holding political demonstrations of the so-called "liberation from infidels" in Mecca by Iranian pilgrims against the United States and Israel.

As for Kuwait, Iran attacked three Kuwaiti oil facilities in October 1981 and supported a series of terrorist explosions in this monarchy, while an Iranian agent attempted an unsuccessful coup attempt in Bahrain in December of the same year (Walt, 1996). These events, eventually led to strong reactions from the Arab neighbors. Indeed, they caused them to reform and change several internal and regional policies in order to preserve their stability. In this regard, Walt (1996) explains that "The Gulf States responded to the threat by arresting or deporting potential dissidents, providing greater economic benefits to their own Shiite populations, trumpeting their own Islamic credentials, and stressing Arab nationalism rather than Islamic solidarity." Furthermore, they established the Gulf Cooperation Council (GCC) in January 1981 to coordinate their activities against the Iranian threat. Saudi Arabia and Kuwait, likewise, increased their support of the Iraqi government in the Iran-Iraq war. For instance, they loaned Iraq roughly $40 billion to mend its so-called war machine.

In 1986, clashes between Iranian pilgrims and Saudi security forces during the hajj led Rafsanjani to proclaim that Iran must "uproot the Saudi rulers... and divest the control of the shrines from [them]" (Walt, 1996). It was because of Iran's attempt to export revolution during the hajj ritual as well as holding demonstrations of Iranian pilgrims which threatened Saudi legitimacy. Indeed, politicizing of the hajj was one of the main causes of friction between the two countries after Iran's revolution and which continued until 1987. On 31 July 1987, a clash between Iranian pilgrims and Saudi forces left a tragic mark in the history of bilateral relations between Iran and Saudi Arabia. The event which left 275 Iranian pilgrims dead and 303 wounded created the worst tension between the two countries since the Islamic revolution in 1979. It led to many verbal wars and propaganda between the two sides. In this respect, Imam Khomeini vowed that "even if it were possible to forgive Saddam Hussein, it would never be possible to forgive Saudi Arabia" (Ismael & Ismael, 1994). Furthermore, Hashemi Rafsanjani announced that "The martyrs' blood must be avenged by burning the roots of Saudi rulers in the region. ...The true revenge is to remove the colossal and precious wealth belonging to the Islamic World which lies under the soil of the Arabian Peninsula from the control of criminals, the agents of colonialism. The Saudi rulers have chosen an evil path, and we will send then to hell" (Mohaddessin, 2003). When the news of the riot and the casualties reached Iran, through returning pilgrims, mobs in September 1987 attacked the Tehran embassies of Kuwaiti and Saudi Arabia, the two countries allied with Iraq in the eight-year war (Institution for Political Research and Studies, 2007), which resulted in the death of a Saudi diplomat, Mousa'ad Al Ghamdi (Reuters, 2007). In March 1988, Saudi Arabia limited the hajj quota based on 1000 pilgrims in one million, which led to reduction of Iran's quota to 45000. Finally, following these events, the two sides cut off mutual relations in April 1988 and Iran boycotted the hajj for three years because of Ayatollah Khomeini's insistence on a quota of only 150,000 Iranian pilgrims and also holding the political demonstrations (Lunn, 2002). This is why; Metz (2004) argues that in the 1980s the annual Hajj was the main problem between the two sides and not Saudi support of Baghdad during the Iran-Iraq war.

4. Superiority of the Pragmatic Approach in Iran's Foreign Policy during the Rafsanjani Administration

In general, there were several factors in that led to the emergence of pragmatism in Iran's foreign policy arena in the early years of the 1990s, which can be divided into two main sections: internal and external. The main domestic factors were Iran's acceptance of the UN's cease-fire in 1988 which strengthened the realists' position due to their support of peace; the death of Ayatollah Khomeini in June 1989 which led to a weakening of ideologists who followed him; the leadership of Khamenei as successor to Khomeini;, the presidency of Hashemi Rafsanjani in July 1989, the amendment of the

Iranian constitution, which reinforced the president's position and abolishing the post of the prime minister who was seen as a rival.

Azghandi (2002) explains that when Hashemi Rafsanjani came into office he faced changes at internal and international levels. These changes such as adopting of UN resolution 598 (which led to the ending of the Iran-Iraq war), revising the Iranian constitution, the collapse of the Soviet Union and its impact on international system, had influenced the thinking of the elites and the process of decision making in Iran. At the same time, the financial and spiritual problems which had been carried over from the war and threatened the existence of the Islamic Republic of Iran, made Rafsanjani chose pragmatism as the best way to deal with domestic and foreign hardships. Despite all these, it appears that the death of Ayatollah Khomeini had the most significant effect... According to Walt (1996) "…His passing allowed Rafsanjani and the moderates to resume their efforts to adapt the principles of Islamic government to contemporary political conditions". In this regard, Ismael & Ismael (1994) indicate that the revolutionaries intended to maintain and spread revolutionary desires, however, Khomeini's death weakened their resolve because they had lost their main supporter. This is why, Rasmussen (2009) reiterated that after the war and Ayatollah Khomeini's death, Iran put its "strategic interest before ideology" in the foreign policy as a rational actor. This policy had begun, as Tehranian (1993) argues, with "dual leadership" of Ayatollah Khamenei and Rafsanjani in 1989, which was characterized by less ideological and more pragmatic policy. With regard to Khamenei's role it seems that despite his primary support of the new trend, pragmatism, his direction had changed gradually. According to Marschall (2003), "Khamenei seemed to be interested in the same policy orientation. However, many extremist groups accused Khamenei and Rafsanjani of diverting from the 'line of the Imam.' Khamenei had to maintain his legitimacy as Leader and therefore took a more ideological line than Rafsanjani." Later, Khamenie became leader of the opposite group due to Rafsanjani's foreign policy, which was based on establishing relations with all countries, even the United States.

With regard to external factors, various elements such as international pressure and the tarnished image of Iran in the international community, isolation of Iran, the Iraqi invasion of Kuwait, the collapse of the Soviet Union and the announcement of the New World Order by the Bush Administration, which strengthened US influence in the Persian Gulf region, significantly influenced the emergence and solidification of the pragmatic approach in the Iranian foreign policy apparatus. During this period, one of the significant factors that assisted Iran to improve her position in the region and the international system was the country's condemnation of Iraq's occupation of Kuwait and its "neutrality" policy during the Second Gulf war, and the US-led coalition attack on Iraq in 1991. During this time while the radical elements insisted that the government should interfere in the war in favor of Iraq the realist administration, headed by Hashemi, preferred to stay uninvolved. In fact, Iran chose a "positive neutrality" position, neither going to the aid of Iraq nor joining the American coalition (Parsi, 2007). The policy, which was supported by the Iranian leader, Khamenei, placed the pragmatists in a better situation.

5. Gradual Changes in Iran's Foreign Policy Arena after 1989

After solidification of the new approach, the Hashemi administration attempted to improve Iran's relations with many countries, in particular, the West by an "open door policy" in order to modify domestic problems such as reconstruction of the country after the war, which received precedence over other issues. In order to achieve this goal some primary principles of the revolution were softened during this period. For instance, "Iranian officials defined the export of revolution to mean building Iran into a model Islamic country for others to emulate" (Daneshkhu, 1994). In this case, Parsi (2007) explains that Rafsanjani's approach was "exporting Iran's model by leading as an example of a modern, independent Islamic state" instead of overthrowing regional states. Indeed, Iranian leaders realized that in the interdependent world they could not act alone and they needed to have better relations with other countries. In the framework of this new foreign policy orientation, Iran also reduced its support of Hezbollah in Lebanon and Palestinian groups and declared to accept whatever the Palestinian wished (Parsi, 2007). Hashemi Rafsanjani further noted that Khomeini's call for Salman Rushdie's death was the "view of one expert" which was debatable (Sadri 1998). In fact, Iran's foreign policy turned into maintaining the *status quo* in the early years of the 1990s, unlike before.

During this period, there were also many changes in the elite circle in the Hashemi administration. The new group, known as "technocrats", was educated in the West, in particular the United States while before this most of the elite were clergy. In this regard Marschall (2003) states that "In order to determine how, when and why

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decisions were taken on the basis of ideology or national interest, it is necessary to examine the members of the political elite involved in making the decisions, their beliefs as well as domestic and external factors which drove them to certain decisions. During this period, as Walt (1996) argues, "...the leaders of the regime seemed to be increasingly willing to sacrifice doctrinal purity for the sake of political stability, economic recovery, and international acceptance." Despite the changes, nevertheless, as the writer says, the pragmatists did not totally forsake the Islamic revolution principles. According to Rasmussen (2009), despite Khomeini's death, which led to many changes, "the ideological teachings" remained the main references of Iranian foreign policy afterwards. However, as the writer continues, "pragmatic Hashemi" had to soften "Islamic Puritanism" in order to rebuild the devastated country and re-establish relations with other states. During this period, Hashemi's pragmatic policy was based on three principles: First, Iran should not change the political map of the region. Second, Iran must attempt to create a new balance of power in the region vis-a-vis US strategies, and third, establishment of relationship with Saudi Arabia as the most important member of GCC (Tajik, 2004).

6. Iran's Substantial Necessities and Restoring Diplomatic Relations with Saudi Arabia

Iran's imperatives after the war were divided into three main sections: the economy, security, and religion (the hajj). With regard to the economy, when pragmatism dominated Iranian foreign policy, Rafsanjani drew some plans, known as first and second "five-year development plans", which focused on the rebuilding of war-torn areas and a shift from a state-run economy to privatization, and referred to by Kamrava (2005) as the "Second Republic". According to Sadowski (1993), Iran spent $644 billion, almost ten times the value of the 1978 gross national product (GNP) during the war, regardless of matters such as inflation, war casualties, etc. He says that these problems "pushed Iran's real gross domestic product (GDP) down from $ 6,052 per capita in 1977 to $ 2,944 in 1988". Moreover, as the writer indicates, Iran also owed $6 billion in foreign debts during the war. During the Iran-Iraq war, many building and industries were destroyed or greatly damaged, such as Khorramshahr port, Abadan refinery, and the Kharg loading facilities. In addition, as Kiddie & Richard (2006) state: "Per capita income had dropped at least 40 percent since the revolution, and many wartime shortages continued. ...problems like high inflation, unemployment, deficit spending, overwhelming dependence on oil, and declining

agricultural self-sufficiency were worse than ever." Meanwhile, Iran had faced natural catastrophes, such as the Gilan earthquake, which left forty thousand dead. Likewise, the new administration intended to implement economic reforms, which included "...privatization of large industries and mines, the revival of the Tehran Stock Exchange, the abolition of the multiple exchange rate mechanism and its replacement with a single market rate, the founding of a number of free trade zones and the encouragement of foreign direct investment (FDI)" (Mohammadi, 2003).

In the "decade of reconstruction", what Rafsanjani termed the second decade of Iran, the new leadership further attempted "To transform a vastly regulated, badly distorted, and mismanaged economy into an investment-driven, market-oriented and more efficient system. As part of this economic liberation policy, concerted efforts have been made towards the marketization and privatization of the economy" (Amuzegar, 1997). Accordingly, Majlis (Parliament) approved $394 billion for the first five-year plan (1989/90-1993/94). Since the main part of expenditure of the economic privatization plan and reconstruction of the country was based on petrodollars, Iran needed to cooperate with Saudi Arabia within the Organization of the Petroleum Exporting Countries (OPEC), as the most powerful country in oil exporting and production, in order to stabilize an appropriate price for oil. In this case, Ramazani (2001) explains that on the one hand, Iran moderated its aggressive policy regarding determination of oil price and on the other hand, it was about to increase its production to 4.5 million barrels each day in the future. This policy caused Iran to make serious decision in order to consolidate its relations with Saudi Arabia and other members of GCC inside and outside of OPEC in order to stabilize the oil market. He cited Gholam Reza Aghazade, Oil Minister, as saying that Iran's new oil policy marked a "new realism" in the world market. The new policy was based on making friendship instead of ideological friction. In other words, since petrodollars was considered the "backbone" of Iran's economy, establishment of good relations with Persian Gulf states as the main producers of oil seemed necessary.

From the security prospective, one of the significant questions in Iranian foreign policy was American military presence in the Persian Gulf region (Kaim, 2008). Iran was confronted with the wide influence of US forces in the region. In other words, after the collapse of the Soviet Union in 1990, the United States appeared as the only Super power. Therefore, the United States needed a new doctrine in order to control different parts of the world. Bush's

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doctrine, "the New World Order", could provide the needed condition. In this case, one of the areas with a significant position in US foreign policy, was the Persian Gulf region due to its rich oil resources. The Iraqi invasion of Kuwait paved the way for the intervention and presence of the United States in the region while Iran was totally against the presence of foreign forces in the Persian Gulf and had always called for security arrangement by the littoral states.

So, with the purpose of solving the security dilemma, Iran attempted to improve its relations with Gulf States. In fact, in contrary to the early years of the revolution during which isolation was accepted by the leaders as a policy, in this period, however, it was overlooked by the new leaders. In this regard, Velayati, the ex-Iranian Foreign Minister, warned that if Iran was not present on the world scene, then important issues would be decided without it. Further, Khamenie, also called for "Rational, sound, and healthy relations with all countries..." (Walt, 1996). As a result, Iran withdrew its rethoric attack on regional Arab countries and announced that it was about to have relations with other states in the framework of "legal norms" and "mutual interest and respect". In this case, President Rafsanjani declared: "One of the wrong things we did in the revolutionary atmosphere was to constantly make enemies. We pushed those who could be neutral into hostility and did not do anything to attract those who could become friends. It is part of the new plan that in foreign policy we should behave in a way not to needlessly leave ground to the enemy" (Ismael & Ismael, 1994). That is why, during this period, the central principle of "Neither East Nor West" was replaced by "Either North or South" in Iran's foreign policy (Ramazani, 2001). By North, it meant Caucasia and central Asia, and South referred to the Persian Gulf Countries. Indeed, Iran attempted to change its foreign policy towards Persian Gulf states based on "economic and strategic considerations" and Hashemi made efforts to establish diplomatic relations with neighboring countries with a slogan of "development first, rearmament second" as a first reform in its foreign policy. In general, one of the main purposes of Hashemi Rafsanjani's "good neighbor" policy during this period, which was based on accommodating Persian Gulf states, in particular Saudi Arabia, were first, regaining Iran's leadership in OPEC, like in the 1960s, which could enable the country to increase its oil revenues in order to reconstruct the devastated economy. Another purpose was the security arrangement of the Persian Gulf by regional countries due to its importance to Iran's commercial activities which had been conducted mostly through the Gulf. In addition, Iran could emerge from diplomatic isolation, which was created by the Gulf States during the war. It was at the time when Saudi Arabia needed a friendly relationship with Iran, in order to "balance the politically embarrassing situation" of US forces presence in its Kingdom and to keep Iraq under control and also decrease Iran's support of Shiites in Saudi Arabia.

In addition to economic and security necessities, the hajj was also another element which caused Iranian leaders to renew their relations with Saudi Arabia after the Iran-Iraq war because the hajj is a religious duty that all Muslims have to perform if they have enough physical and financial abilities. In this regard, Iran has always been a country with one of the most number of pilgrims among other Muslim countries. This issue, on the one hand, put pressure on Iranian leaders to counsel with the Saudi side after cutting off diplomatic relations in 1988.. On the other hand, Khomeini had ordered a responsible official to solve the question of the hajj. In other words, Khomeini, despite his previous speeches about "... not (being) able to forgive Saudis" after the tragic incident of 1987, instructed responsible officials to operate the hajj in order that people could perform it. After his death, Khamenei, the new leader, also made the hajj a top priority. For this, many attempts were carried out to open the hajj ceremony, finally succeeding, by the end of March 1991 when Iran and Saudi Arabia renewed their diplomatic relations after Velayati and Prince Saud met in Muscat. Then, Velayati went to Saudi Arabia. At this meeting with Fahd the two sides emphasized the economic cooperation as well as Iran-Saudi Arabia's key role in the Persian Gulf. They elevated their relations to ambassadorial level in June 1991, which was unprecedented since the Iranian revolution.

7. Iranian-Saudi Relations after Re-establishment of Diplomatic Relation

After the re-establishment of mutual ties, Iran and Saudi Arabia relations waxed and waned regarding the main issues of the hajj, oil (OPEC), and security of the Persian Gulf. The hajj had always been one of the "sticky issues" in the Iran-Saudi Arabia, which helped Iran, as Covarrubias and Lansford (2007) state, "to apply pressure and reach a broader audience." So, when diplomatic ties were renewed, in 1991, Velayati, the Iranian Foreign Minister, and Fahd, the Saudi King, discussed the issue of the hajj. It was because achieving an agreement on the hajj issue was easier than the security issue (Wilson & Graham, 1994). Iranian participation in the hajj ritual had been stopped for three years due to the "psychological damage" of the 1987 incident and there was the "continuing struggle"

over the hajj quotas and political demonstrations during the ceremony. However, Saudi Arabia finally agreed in 1991, for 115,000 pilgrims to attend the ceremony, which also included 5,000 family members, of the "martyrs" who had been killed in the tragic event in 1987. In a positive response, Hashemi Rafsanjani asked Iranian pilgrims to respect Saudi's rule and "restrain themselves" during the hajj ceremony. In this fashion, 'Khamenie's edict', in the 1992 hajj, was significant: "…Khamenei himself issued a *fatwa* (religious edict) that the performance of any ritual by the Shiites which created discord among the Muslims or weakened Islam was *haram* ("evil") (Dietl, 1995). Following the positive steps of the Iranian leaders, Saudi Arabia further allowed Iranians to hold a demonstration in the year. However, later, Saudi Arabia's support of the United Arab Emirates (UAE) in its dispute over the three Iranian Islands of Abo Musa, greater and lesser Tunbs, led to a deterioration of the Iran-Saudi relations. Subsequently, in December 1992, Hashemi Rafsanjani threatened the Gulf States that "they would have to cross a sea of blood to reach the islands" (Salloukh & Brynen, 2004). Tehran and Riyadh ties became worse in 1993 and as result Saudi Arabia declared that it would not allow Iranians to hold the demonstration in the hajj like before. The reason was that Iranian forces on the island [Abo Musa] deported hundreds of UAE nationals, closed the school, police station, and desalination plant. Further, as Wilson and Graham (1994) state, the people who came from UAE were required to have Iranian visas and residence permits. At the same time, both countries competed within OPEC and other Muslim countries which had surfaced after the collapse of the Soviet Union in 1991.

After re-establishment of Iran and Saudi Arabia relations, Iran also attempted to accommodate Saudi Arabia as the indisputable leader in OPEC because reconstruction and economic reforms needed to be supported by a budget which conventionally came from oil earnings. In fact, among oil producer countries, Saudi Arabia has an almost exclusive role in controlling the oil price because it has 25.99 percent of world oil resources and also, its production capacity is more than 9 million barrels per day. Despite Iran's attempts for cooperation with Saudi Arabia, there was no agreement on oil quotas and price in OPEC in 1991-92. According to Salloukh & Brynen (2004), "[T]he two sides continued to differ fundamentally on [oil] quota and output issues and Iran exceeded its production quota for most of the next year" (1992). During this period, despite Iran and the Persian Gulf countries, in particular Saudi Arabia, searching for a security formula after the

Second Gulf war; it was not easy to shape such a formula. Signs that Iran and Saudi Arabia had different security agendas became evident almost immediately following the defeat of the Iraqi military in the Second Gulf War. Indeed, after the victory of the US-headed international coalition against Iraq, the Gulf countries signed the Damascus Declaration, or "six plus two agreement", in 1991, which was based on the establishment of a standing force in the Persian Gulf. The force was formed of troops from the six littoral countries plus Syria and Egypt. Although Iran had adopted a neutral position during the Gulf crisis, the agreement did not include Iran. It was evident that the Persian Gulf countries still intended to isolate Iran in the region. This is why Iran termed the Damascus Declaration as an 'illegitimate' and a 'destabilizing' agreement. In this regard, Al-Suwaidi (1996) explains that achieving an agreement on security arrangements was difficult in the Persian Gulf region and each country looked for a security agreement unilaterally. He names a 'large network of Arab contacts', 'different priorities' of every state and disagreement on a 'common threat' as main reasons for the failure.

8. Conclusion

As discussed, after Iran's revolution in 1979, ideology dominated all sections of the new regime such as foreign policy. Although at this juncture, approximately all actions of Iran's Shiite regime were considered in the framework of Islamic and revolutionary thought, however, in practice, the regime acted sometimes in favor of national interest. Internal hardships resulted from the eight-year war along with international isolation and pressures paved the ground for the growth of the realist group in the mid-1980s. Nevertheless, they could not take control of the foreign policy until 1989 because of the powerful dominance of the ideology and clergy leadership. However, when the pragmatic Hashemi Rafsanjani came into office, Iran's foreign policy underwent some significant changes in order to rebuild parts of the war-torn country after the eight-year war, reform the state-run economy by privatization and also release Iran from international isolation. Therefore, Hashemi Rafsanjani tried to improve Iran's foreign relations with world countries, especially with the Gulf States. In this case, one of the countries that had a significant position in the region, due to its influence in OPEC and on Persian Gulf countries and also security of the Gulf, was Saudi Arabia. During this period, Iran's requirement for security arrangements in the Persian Gulf, Iranian pressure to perform the hajj, and the country's dependence on oil revenues made cooperation with

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Saudi Arabia a necessary top priority in Iranian foreign policy. So, despite their rivalry and serious tensions during the first decade of the revolution, which finally led to severing their diplomatic ties with Saudi Arabia in 1988, Iran strived to take conciliatory steps to normalize mutual relationships with the Saudis As a result, the two countries renewed diplomatic relations in March 1991. Although Iran and Saudi Arabia attempted to cooperate with each other regarding the hajj, security of the Gulf and oil after resumption of relations, proved to be a difficult issue to resolve due to different viewpoints and the existence of mutual problems.

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Critical Viewpoint toward Shaykhiyya
Concerning the Coincidence of Hurqalya and the Imaginal World

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Abstract: The Shaykhis believed, that between the physical world and the spiritual world, there exists an intermediary world called Hurqalya (from the Greek word Huvarkalya) or the world of archetypal images (Alame' Mithal). From the Shaikhi's point of view, the first corporal form will annihilate completely after death and there will have no there return in the Intermediately World and the Resurrection Day, while the corps astral body will remain rotundas, away from any annihilation and destruction. The first body of man will accompany the soul only to the end of the Intermediately World, and while the first Israfil's Blowing of trumpet is heard it will be annihilated too. But the second body as the soul carrier will always accompany the soul and it will never be separated from it, except the time of the Blowing after the second Blowing of the Trumpet in the Resurrection Day, the soul will join the second corps along with the second body, and therefore the spiritual and the corporal resurrection of Sheikhiet will occur. In this paper, the critical viewpoint toward Shaykhiyya is discussed concerning the coincidence of Hurqalya and the Imaginal World. The imaginal world in the spiritual topography of a domain that can only be seen by those who have turned away from the sensus communis and rely on spiritual hermeneutics (ta'wil), a profound issue which he discusses both in the al -Talwihat and Alwah- i imadi. Seeing the archetypes requires transcending all obstacles in order to go beyond what Suhrawardi symbolically refers to as the Qaf Mountain. Finally, the Sheikhis' view of resurrection has been reviewed and analyzed from the point of view of exalted theosophy.
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Keywords: Shaikhiyya, imaginal world, Intermediately World, Critical Viewpoint, Coincidence.

1. Introduction

Let us begin, however, with a brief account of the emergence and development of Shaykhism and Babism, thereby providing a base for our more theoretically grounded remarks. In terms of the subsequent discussion, it is of particular note that the Bábí movement began as a sub-sect of the Shaykhi school, in the specific context of the succession crisis of 1844 (Corbin,1994).As a religious movement, the early Bábí religion may be described as having passed through two very distinct phases of development: an initial "Islamic" phase (1844-48), and a later "radical" one (1848-53). We are not concerned, except incidentally, with developments after the collapse of Babism as an organized movement.

2. Shaykhism

Originating with the teachings of Shaykh Ahmad al-Ahsá'í (1753-1826), Shaykhism became a powerful expression of the tradition of theosophical Shi'i dissent. Under the leadership of Shaykh Ahmad's successor, Sayyid Kázim Rashtí (c. 1795-1843/44), it developed into a well-organized movement within Ithná-'Ashari Shi'ism. Although clerically dominated, it gained a large popular following throughout Iran and the Shi'i areas of Iraq. At a time when the newly dominant Usúlí faction of the ulama was stressing the importance of orthodoxy and the authority of the *mujtahids,* Shaykhism represented an appealing continuation of speculative religious esotericism. It gained, thereby, the increasing enmity of Usúlí orthodoxy. Although careful to conceal their more heterodox teachings, the Shaykhi leaders also promulgated the doctrine that the spiritual guidance of Shi'is depended on the existence in the world of a "true Shi'i" to function as intermediary between the Hidden Imam and the faithful. By implication, this was a function performed by the Shaykhi leaders. Again, some Shaykhis at least were evidently attracted by messianic expectation (Rafati,1998).

The genesis of the Babi Faith lies in the doctrines of the Shaykhi sect originally expounded by Shaykh Ahmed ibn Zaynud Deen Al Ahsai (1166 AH - 1241 AH) and then by his student Sayyed Kazim Rashty (1205 AH - 1259 AH). One needs to go back in history to understand their unique beliefs to appreciate how the thought process of the Bab was fashioned. While discussing the Shaykhi sect, I have relied extensively on the work "The Introduction to Shi'i Islam" by Moojan Momen - a leading

contemporary Bahai author. While much is available on the doctrines of Shaykh Ahmed Ahsai and Sayyed Kazim Rashty in Arabic and Persian texts, Mr. Momen has put these down in his book in a fairly lucid manner. Both Shaykh Ahmed Ahsai and Sayyed Kazim Rashty seem to be followers of the Shiah Ithna Ashari sect. This is clear from their beliefs on the concept of Imamate (MacEoin, 1983). The reason why I have initiated my discussion with this aspect of their belief is to show that the Shaykhis and subsequently the Babis believed in the 12 Imams after the Holy Prophet. This viewpoint is important to appreciate the significance of some of the writings of the Bab in future articles. Shaykh Ahmed considered that the first creation issuing forth from God's will was the light of Mohammed (an nur al Mohammadiyya). From this light, the light of the Imams came into being. From the light of the Imams, the light of the believers came into being, and so on. Thus the Imams are the instruments of the creation of the world. They are also the ultimate cause of creation since God has created the world for their sake. They are the intermediaries through which man can obtain some comprehension of God and God's bounties can reach man.

The Shaykhis differed greatly in some fundamental concepts about God and on the nature of the world which caused a conflict with Muslim scholars. These concepts expounded by Shaykh Ahmed Ahsai had no precedent - either in the Quran, traditions or even beliefs of other groups which arose in Islam. The Bab - both in personality and thought rose out of the Shaykhi sect and some of its unique principles. Moojan Momen writes on page 231, "It was the Shaykhi teachings which paved the way for the Bab and it is doubtful if the Bab would have attracted so many adherents if it had not been for Shaykhi doctrines" (Balyuzi,1973).

3. An intermediary world called Hurqalya

The Shaykhis believed, that between the physical world and the spiritual world, there exists an intermediary world called Hurqalya (from the Greek word Huvarkalya) or the world of archetypal images (Alame' Mithal). Everything in this world has its counterpart in the world of Hurqalya. Each individual being has two bodies - one of which exists in the physical world and one in Hurqalya. The occulted, but living Twelfth Imam and the cities of Jabulqa and Jabulsa, where he is supposed to live, all exist in the realm of Hurqalya. He (Shaykh Ahmed, founder of Shaykhism) believed that the body of man was compounded of parts derived from each of the nine heavens and the four elements that the grosser elemental part perished irrevocably at death; and that the more subtle celestial portion would appear at

resurrection. This subtle body, he named as 'Jism-e-Hurqalya - the word Hurqalya being supposed to be of Greek origin (Herculean). He regarded Imams as creative forces, quoting in support of this view, the expression "God, The Best of Creators" occurring in Quran Surah 23, verse 14; 'for said he 'if God be the best of creators.' He cannot be the sole creator. It is clear that these concepts have no place in Islam. There is no concept of any city of Jabulqa or Jabulsa for that matter and definitely no mention of Hurqalya in the either the Quran or its exegesis by the Holy Prophet (pbuh) and the Holy Imams (as) (Balyuzi,1973).These were obviously a figment of the imagination of Shaykh Ahmed Ahsai. In the same book on page 236, we find that the leading Shiite cleric of the time, Haji Mulla Mohammed Taqi having examined the beliefs of Shaykh Ahsai declared him a heretic.

4. Physical resurrection

With regards to the phenomenon of resurrection, Shaykh Ahmed also regarded this as an event that occurs to man' subtle body in the world of Hurqalya. Similarly, heaven and hell are the results of men's actions which create the situation of either Heaven and Hell in each individual's personal life in Hurqalya.This belief too is totally contrary to the Islamic concept of the belief of the Day of Judgment, Heaven and Hell. The Bahais too have lifted this concept of the Shaykhi resurrection and added their own flavor to it indicating that reward and punishment are spiritual in nature. God willing, I hope to explain the fallacy of this belief at a later stage.

5. The Fourth Support or Rukne' Rabe'

This key doctrine of the Shaykhis was developed not so much by Shaykh Ahsai as much as his followers. Shiites believe in five roots of religion or Usule' Deen (Unity of God, Justice of God, Prophethood, Imamate and the Day of Judgment). Shaykh Ahmed Ahsai altered these in this own fashion to form 3 roots of religion - Knowledge of God, Prophethood and Imamate. To this he added the Fourth Support - the need for an intermediary between the Imam and the populace. The concept makes it appearance at the time of Sayyed Kazim Rashty and the early writings of Karim Khan Kirmani (one of the claimants of successorship to Sayyed Kazim).

The Fourth Support appears to be the continuing physical presence of a Perfect Man who acts as an intermediary between the Hidden Imam and the world. The Hidden Imam inspires this intermediary who thus comes to represent the Will of the Hidden Imam. Most of the Bab's leading disciples

and many of the rank and file had previously been Shaykhis, that is followers of the Ithna-'Ashari school or sect founded by Shaykh Ahmad al-Ahsa'i (d. 1826) (29). In contradiction to the claims of many mujtahids to authority in the absence of the Imam, the Shaykhis believed that there must always exist in the world a perfect Shi'i (Shi`iy-i-Kamil) who acts as the intermediary (na'ib, bab) between the Imam and the faithful and hence is the legitimate authority; by implication the Shaykhi leaders might be considered that authority. It is through this concept that the Shaykhi sect opened the doors for Bab (Mohammadi, 1979). The Shaykhis themselves (Shaykh Ahmed Ahsai and Sayyed Kazim Rashty) used the principle of the Fourth Support to propagate their beliefs under the garb that it was inspired by the Hidden Imam. This is further endorsed by the fact that he also propounded the intuitive uncovering (Kashf) of knowledge, which further gave him the license to propound his beliefs.

6. Derived conception of the hurqalya, the realm between the Platonic Forms and this material plane

It was from Suhrawardi that Shaykh Ahmad derived his conception of the hurqalya, the realm between the Platonic Forms and this material plane: Rafati, "The Development of Shaykhi Thought,". To explain the saying that God called the Muslims before their creation, Shaykh Ahmad refers to the scene found in the Qur'an and often evoked in Sufi mystical literature, in which God assembles his creation before him in preexistence and asks them "`Am I not your Lord?' They say `Yes (bala), we have borne witness.'" (Qur'an 7:172) That he singled them out for his bestowal before they asked for it is a way of saying that when Being emanated forth, and became arranged within itself, some of its parts attained priority. This is because these parts had a greater receptive faculty, and they became a first emanation. Because of their close connection with the beginning, it was fitting that they should receive the gift before asking orally, since the creation of those who came after them depended on their mediation. Thus, the Prophet, the Imams, and the Muslims generally represent the earliest differentiated portion of Being, and they therefore receive God's prevenient grace (Balyuzi,1973).

In illustrating this principle, Shaykh Ahmad provides a parable, apparently drawing on his experiences as a villager in al-Hasa. Suppose, he says, you owned two plots of land, one of them contiguous to a water source, the other receiving water from the adjacent plot. In order to irrigate the first field, you need not irrigate the second, but may leave it fallow. But if you wish to irrigate the second, you must willy-nilly irrigate the one next to the water. Even though the souls of the Muslims did not ask for "water," since they are the intermediaries for all humankind, it was necessary to bestow it on them even before they asked. In the same way, God directly addressed the souls of the Muslims in pre-eternity, but his effective word reaches others if he is well-pleased with them, through their agency (especially that of the Prophet and Imams). In Shaykh Ahmad al-Ahsa'i's view, then, a primordial text, the Preserved Tablet or the Leaf, made of letters, influences the unfoldment of human existence. Human beings are, indeed, the embodiments of that preexistent text on earth. They are also subject to the same forces that shape the Leaf, being pulled upward toward the subtle, simple plane of the Universal Intellect, and earthward by the heavy gravity of gross matter and complexity. Each of the primordial letters out of which the world was made corresponds to both a name of God and to a plane of reality. His schema in this regard resembles, but is not identical to, the correspondences put forward by Ibn `Arabi, who also held that the twenty-eight basic letters come together to form all things in the cosmos.

Shaykh Ahmad calls these letters "existential letters." When asked how each thing in the world could be governed by a divine name and letter, when there are only twenty-eight of the latter, he explains that the letters correspond to entire planes, which are universals, not to individual particulars. The Shaykhi emanations are starkly linguistic insofar as they are letters and they are divine Names and attributes, having the power of bestowing upon the world meaningfulness and therefore Being.

7. Mystical signs

Suhrawardi, speaking as a salik ,asks Gabriel to discuss his original abode. Their conversation goes as follows :I asked from which direction have you, the exalted ones come. The old man who was at the corner replied that they are a group of incorporeals who have come from "the nowhere but prosperous land" (nakuja abad). I did not understand that ,so I asked to which region that city belongs? He said "It belongs to the domain where the index finger cannot point to." So I came to know that the old master knows [the secrets]. Describing the archetypal worlds, Suhrawardi uses several terms that are uniquely his own such as "nowhere but prosperous land "(nakuja abad), "ruinous but prosperous land" (kharab abad), and "the city of the soul" (shahristan- i jan), all of which he identifies as he eighth domain) iglim- i hashtum). Henry Corbin refers to this domain as mundus imaginalis and considers it to be a level of reality that has no external existence and yet is real, in fact, more real than the external world, the

seemingly real. This real world therefore is the "imaginal" as opposed to "imaginary" which implies both non- real non- existence (Corbin, 1994).

8. The Spiritual Imagination

We will touch here on the decisive point for which all that precedes has prepared us, namely, the organ that permits penetration into the *mundus imaginalis*, the migration to the "eighth climate." What is the organ by means of which that migration occurs-the migration that is the return *ab extra ad intra* (from the exterior to the interior), the topographical inversion (the *intussusception*)? It is neither the senses nor the faculties of the physical organism, nor is it the pure intellect, but it is that intermediate power whose function appears as the preeminent mediator: the active Imagination. Let us be very clear when we speak of this. It is the organ that permits the transmutation of internal spiritual states into external states, into vision-events symbolizing with those internal states. It is by means of this transmutation that all progression in spiritual space is accomplished, or, rather, this transmutation is itself what spatializes that space, what causes space, proximity, distance, and remoteness to be there.

A *first postulate* is that this Imagination is a pure spiritual faculty, independent of the physical organism, and consequently is able to subsist after the disappearance of the latter. Sadra Shirazi, among others, has expressed himself repeatedly on this point with particular forcefulness. He says that just as the soul is independent of the physical material body in receiving intelligible things in act, according to its intellective power, the soul is equally independent with regard to its *imaginative power* and its *imaginative operations*. In addition, when it is separated from this world, since it continues to have its active Imagination at its service, it can perceive by itself, by its own essence and by that faculty, concrete things whose existence, as it is actualized in its knowledge and in its imagination, constitutes *eo ipso* the very form of concrete existence of those things (in other words: consciousness and its object are here ontologically inseparable). All these powers are gathered and concentrated in a single faculty, which is the active Imagination. Because it has stopped dispersing itself at the various thresholds that are the five senses of the physical body, and has stopped being solicited by the concerns of the physical body, which is prey to the vicissitudes of the external world, the imaginative perception can finally show its essential superiority over sensory perception. "All the faculties of the soul," writes Sadra Shirazi, "have become as though a single faculty, which is the power to configure and typify (*taswir* and *tamthil*); its imagination has itself become like a sensory

perception of the suprasensory: its *imaginative sight* is itself like its sensory sight. Similarly, its senses of hearing, smell, taste, and touch-all these *imaginative senses*-are themselves like sensory faculties, but regulated to the suprasensory. For although *externally* the sensory faculties are five in number, each having its organ localized in the body, *internally*, in fact, all of them constitute a single *synaisthesis* (*hiss moshtarik*)." The Imagination being therefore like the *currus subtilis* (in Greek *okhema*, vehicle, or [in Proclus, Iamblichus, etc.] spiritual body) of the soul, there is an entire physiology of the "subtle body" and thus of the "resurrection body," which Sadra Shirazi discusses in these contexts. That is why he reproaches even Avicenna for having identified these acts of posthumous imaginative perception with what happens in this life during sleep, for here, and during sleep, the imaginative power is disturbed by the organic operations that occur in the physical body. Much is required for it to enjoy its maximum of perfection and activity, freedom and purity. Otherwise, sleep would be simply an awakening in the other world (Isfahani, 2006). This is not the case, as is alluded to in this remark attributed sometimes to the Prophet and sometimes to the First Imam of the Shi'ites: "Humans sleep. It is when they die that they awake." A *second postulate*, evidence for which compels recognition, is that the spiritual Imagination is a cognitive power, an organ of true knowledge. Imaginative perception and imaginative consciousness have their own *noetic* (cognitive) function and value, in relation to the world that is theirs-the world, we have said, which is the *'alam al-mithal, mundus imaginalis*, the world of the mystical cities such as Hurqalya, where time becomes reversible and where space is a function of desire, because it is only the external aspect of an internal state. The Imagination is thus firmly *balanced* between two other cognitive functions: its own world *symbolizes with* the world to which the two other functions (sensory knowledge and intellective knowledge) respectively correspond. There is accordingly something like a control that keeps the Imagination from wanderings and profligacy, and that permits it to assume its full function: to cause the occurrence, for example, of the events that are related by the visionary tales of Sohravardi and all those of the same kind, because every approach to the eighth climate is made by the imaginative path. It may be said that this is the reason for the extraordinary gravity of mystical epic poems written in Persian (from 'Attar to jami and to Nur 'Ali1-Shah), which constantly amplify the same archetypes in new symbols. In order for the Imagination to wander and become profligate, for it to cease fulfilling its function, which is to perceive or generate symbols

leading to the internal sense, it is necessary for the *mundus imaginalis*--the proper domain of the *Malakut*, the world of the Soul-to disappear. Perhaps it is necessary, in the West, to date the beginning of this decadence at the time when Averroism rejected Avicennian cosmology, with its intermediate angelic hierarchy of the *Animae* or *Angeli caelestes*. These Angeli caelestes (a hierarchy below that of the *Angeli intellectuales*) had the privilege of imaginative power in its pure state. Once the universe of these Souls disappeared, it was the imaginative function as such that was *unbalanced* and devalued. It is easy to understand, then, the advice given later by Paracelsus, warning against any confusion of the *Imaginatio vera*, as the alchemists said, with fantasy, "that cornerstone of the mad."(Cole, 1994).

This is the reason that we can no longer avoid the problem of terminology. How is it that we do not have in French [or in English] a common and perfectly satisfying term to express the idea of the *'alam al-mithal*? I have proposed the Latin *mundus imaginalis* for it, because we are obliged to avoid any confusion between what is here the *object* of imaginative or imaginant perception and what we ordinarily call the *imaginary*. This is so, because the current attitude is to oppose the real to the imaginary as though to the unreal, the utopian, as it is to confuse symbol with allegory, to confuse the exegesis of the *spiritual sense* with an allegorical interpretation. Now, every allegorical interpretation is harmless; the allegory is a sheathing, or, rather, a disguising, of something that is already known or knowable otherwise, while the appearance of an Image having the quality of a symbol is a primary phenomenon (*Urphanomen*), unconditional and irreducible, the appearance of something that cannot manifest itself otherwise to the world where we are. Neither the tales of Sohravardi, nor the tales which in the Shi'ite tradition tell us of reaching the "land of the Hidden Imam," are imaginary, unreal, or allegorical, precisely because the eighth climate or the "land of No-where" is not what we commonly call a *utopia*. It is certainly a world that remains beyond the empirical verification of our sciences. Otherwise, anyone could find access to it and evidence for it. It is a suprasensory world, insofar as it is not perceptible except by the imaginative perception, and insofar as the events that occur in it cannot be experienced except by the imaginative or imaginant consciousness. Let us be certain that we understand, here again, that this is not a matter simply of what the language of our time calls an imagination, but of a *vision* that is *Imaginatio vera*. And it is to this *Imaginatio vera* that we must attribute a *noetic* or plenary cognitive value. If we are no longer capable of speaking about the imagination except as "fantasy," if we cannot utilize

it or tolerate it except as such, it is perhaps because we have forgotten the norms and the rules and the "axial ordination" that are responsible for the *cognitive function* of the imaginative power (the function that I have sometimes designated as *imaginatory*). For the world into which our witnesses have penetrated-we will meet two or three of those witnesses in the final section of this study-is a perfectly *real* world, more evident even and more coherent, in its own reality, than the *real* empirical world perceived by the senses. Its witnesses were afterward perfectly conscious that they had been "elsewhere"; they are not schizorphrenics. It is a matter of a world that is hidden in the act itself of sensory perception, and one that we must find under the apparent objective certainty of that kind of perception. That is why we positively cannot qualify it as *imaginary*, in the current sense in which the word is taken to mean unreal, nonexistent. Just as the Latin word *origo* has given us the derivative "original," I believe that the word *imago* can give us, along with *imaginary*, and by regular derivation, the term *imaginal*. We will thus have the *imaginal* world be intermediate between the *sensory* world and the *intelligible* world. When we encounter the Arabic term *jism mithali* to designate the "subtle body" that penetrates into the "eighth climate," or the "resurrection body," we will be able to translate it literally as *imaginal body*, but certainly not as *imaginary body*. Perhaps, then, we will have less difficulty in placing the figures who belong neither to "myth" nor to "history," and perhaps we will have a sort of password to the path to the "lost continent." In order to embolden us on this path, we have to ask ourselves what constitutes our *real*, the *real* for us, so that if we leave it, would we have more than the imaginary, utopia? And what is the *real* for our traditional Eastern thinkers, so that they may have access to the "eighth climate," to *Na-koja-Abad*, by leaving the sensory place without leaving the real, or, rather, by having access precisely to the real? This presupposes a scale of being with many more degrees than ours. For let us make no mistake. It is not enough to concede that our predecessors, in the West, had a conception of the Imagination that was too rationalistic and too intellectualized (Rafati,1998) .If we do not have available a cosmology whose schema can include, as does the one that belongs to our traditional philosophers, the plurality of universes in ascensional order, our Imagination will remain *unbalanced*, its recurrent conjunctions with the will to power will be an endless source of horrors. We will be continually searching for a new discipline of the Imagination, and we will have great difficulty in finding it as long as we persist in seeing in it only a certain way of keeping our *distance* with regard to

what we call the *real*, and in order to exert an influence on that real. Now, that real appears to us as arbitrarily limited, as soon as we compare it to the real that our traditional theosophers have glimpsed, and that limitation degrades the reality itself. In addition, it is always the word *fantasy* that appears as an excuse: literary fantasy, for example, or preferably, in the taste and style of the day, social fantasy. But it is impossible to avoid wondering whether the *mundus imaginalis*, in the proper meaning of the term, would of necessity be lost and leave room only for the imaginary if something like a secularization of the *imaginal* into the *imaginary* were not required for the fantastic, the horrible, the monstrous, the macabre, the miserable, and the absurd to triumph. On the other hand, the art and imagination of Islamic culture in its traditional form are characterized by the hieratic and the serious, by gravity, stylization, and meaning. Neither our utopias, nor our science fiction, nor the sinister "*omega* point"-nothing of that kind succeeds in leaving this world or attaining *Na-koja-Abad*. Those who have known the "eighth climate" have not invented utopias, nor is the ultimate thought of Shi'ism a social or political fantasy, but it is an eschatology, because it is an *expectation* which is, as such, a *real Presence* here and now in another world, and a testimony to that other world (Amanat,1981).

9. The nature of Imaginal world

First, let us what the nature of imaginal domain is which Suhrawardi, considers to be ontological origin of the corporeal world. Suhrawardi considers the existential cause of the archetypal world to be" accidental intellects" which have come to be in a variety of forms. Although these intetllectual entities are subject, quality, quantity and many other accidental attributes, they are independent of matter. It is imperative to know that for Suhrawardi these "suspending archetypes" (muthuul mu'allaqah) are different than Plato's forms or archetypes which he regards to be in the fixed world of archetypes. The suspending archetypes which are between the corporeal world (alam-i barzakh) and the angelic world (alam-i qahriah) are not only numerous but also independent of place and time which explains why the external senses are unable to see them except in rare and small glimpses . The imaginal world in the spiritual topography of a domain that can only be seen by those who have turned away from the sensus communis and rely on spiritual hermeneutics (ta'wil), a profound issue which he discusses both in the al -Talwihat and Alwah- i imadi. Seeing the archetypes requires transcending all obstacles in order to go beyond what Suhrawardi symbolically refers to as the Qaf mountain. The one reaches the mysterious cities of

the world of suspending archetypes where such spiritual entities reside.

10. Cities of Imaginal world

In the Hikmat al-ishraqi, Suhrawardi mentions several cities of the imaginal world, all which belong to the eighth domain. They are Jabilqa ,Jabirsa and Hurqalya, the cities which are "nowhere". According to Suhrawardi ,in the last one, wonders exist. As he states: "And there are eight domains therein, Jabilqa, Jabirsa and Hurqalya, the substance of wonder . For Suhrawardi, Hurqalya represents the archetypes of the heavenly bodies whose harmonious functioning produces a sublime music that only those who are discoverers and seekers of truth can hear. In fact, the beauty of the wonder of Hurqalya which those who have purified themselves can only experience through the inner senses, represents the sacred world of the Sufis whose journey has reached its climax. Suhrawardi analogizes statue of this perfect man with God since both the Sufis master and God can create archetypes, a state of being Suhrawardi calls "Be (kun), referring to the Quranic verse in which God creates the world by saying, "Be" and it was (Kathleen, 1972).

And the brothers in purity have a special status in that they are able to create archetypes that are self dependent, and that state is named "Be". Suhrawardi concludes by saying that the outward beauties, shapes and forms of this world their ontological roots in the mundus imaginalis, a world which is real but accessible only to few. Nowhere land, therefore, is the place which transcends the world of forms,, time and apace. It is a land only reached by the seeker of truth who has suffered on the path and whose psyche has been opened to be unseen.

10. Conclusion

In this manuscript, the critical viewpoint toward Shaykhiyya was discussed concerning the non existence of coincidence between Hurqalya and the Imaginal World. The imaginal world in the spiritual topography of a domain that can only be seen by those who have turned away from the sensus communis and rely on spiritual hermeneutics (ta'wil). Seeing the archetypes requires transcending all obstacles in order to go beyond what Suhrawardi symbolically refers to as the Qaf Mountain. Finally, the Sheikhis' view of resurrection was reviewed and analyzed from the point of view of exalted theosophy. The result was that there is definitely no mention of Hurqalya in the either Quran or its exegesis by the Holy Prophet (pbuh) and the Holy Imams (as). These were obviously a figment of the imagination of Shaykh Ahmed Ahsai.

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Models for Controlling and Replenishing of Inventories in a Supply Chain
(With Particular Reference to Robustness versus Forecasting Errors of Demand)

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Abstract: This article investigates robustness for supply chain. After reviewing the supply chain, and the basic concepts of supply chain robustness, we survey the uncertainty descriptions considered in the Model Predictive Control (MPC) literature, and the methods proposed for robust constraint handling, stability, and performance. The article concludes with some comments on future research directions as input to robustness and Model Predictive Control module.
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1. Introduction

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes the manufacturer, suppliers, transporters, warehouses, retailers and customers. And supply chain includes each function involved in receiving and filling a customer request. A supply chain is dynamic and involves the constant flow of information, product, and funds between different stages.

In our example, Wal-Mart provides the product, as well as pricing and availability information, to the customer.

The customer transfers funds to Wal-Mart. Wal-Mart conveys point-of-sales data as well as replenishment order via trucks back to the store. Wal-Mart transfers funds to the distributor after the replenishment.

The distributor also provides pricing information and sends delivery schedules to Wal-Mart. Similar information, material, and fund flows take place across the entire supply chain.

In another example, when a customer purchases online from Dell Computer, the supply chain includes, among others, the customer, Dell's Web site that takes the customer's order, the Dell assembly plant, and all of Dell's suppliers and their suppliers.

The Web site provides the customer with information regarding pricing, product variety, and product availability.

Having made a product choice, the customer enters the site to check the status of the order. Stages further up the supply chain use customer order information to fill the order. That process involves an additional flow of information, product, and funds between various stages of the supply chain. (Chopra S, and Meindl, 2007) There are two interconnections between supply chain stages: information flows and material flows. Information flows include replenishing and order requesting. And material flows including physical interconnections of goods between supply chain stages.

Material flows are forward movement among supply chain whereas information flow is backward flow of information.

Information sharing like inventory levels, orders, production, and delivery status has important role in supply chain. Supply chain stages must participate to competing with another supply chains and attain maximum of value generated that is the main objective of supply chain. The purpose of this paper is to survey the uncertainty and the techniques proposed for robust constraint handling, stability, and performance.

2. Supply chain

The Council of Supply Chain Management Professionals (CSCMP) defines Supply Chain Management as follows: "Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement,

conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers.

External and internal changes lead to uncertainties in supply chain stages. Hence the design needs to consider the dynamics of the enterprise and the related market.

There are various external changes such as demand changes, environmental factor changes, bank rates fluctuation, changes in political situation changes and others.

Internal changes such as material do not arrive on time, production facilities failure, supply routes failure, workers absence and falling sick, changes in customer orders o cancels order, and others. Such problems will increase the uncertainty and instability of each stage of the supply chain, and these problems spread and pass from one stage to another; both upstream and downstream.

The impact will spread like a domino and entire chain will cease to perform. Supply Chain designer have to consider and prepare for these uncertainties within the organization and across the organization, which cause the design task extremely difficult and challenging.

In essence, supply chain management integrates supply and demand management within and across companies. Supply Chain Management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance and information technology.
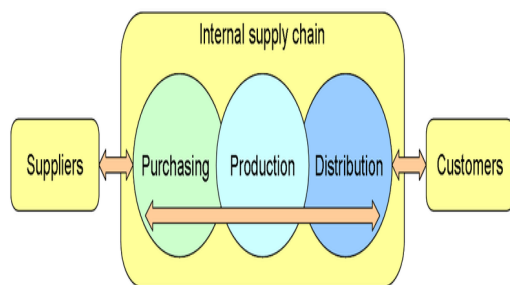
Fig1: An illustration of a company's supply chain; the arrows stand for supplier-relationship

management, internal SCM and customer-relationship management (cf. Chen/ Paulraj, 2004)

3. Bullwhip effect

One of the most significant current discussions in supply chain is Bullwhip effect. Researchers try to identify and analyze main causes of this phenomenon and reduce it.

"The bullwhip effect occurs when the demand order variabilities in the supply chain are amplified as they moved up the supply chain.

Distorted information from one end of a supply chain to the other can lead to tremendous inefficiencies. Companies can effectively counteract the bullwhip effect by thoroughly understanding its underlying causes. Industry leaders are implementing innovative strategies that pose new challenges:

1. Integrating new information systems,

2. Defining new organizational relationships, and

3. Implementing new incentive and measurement systems.

Not long ago, logistics executives at Procter & Gamble (P&G) examined the order patterns for one of their best-selling products, Pampers. Its sales at retail stores were fluctuating, but the variabilities were certainly not excessive.

However, as they examined the distributors' orders, the executives were surprised by the degree of variability.

When they looked at P&G's orders of materials to their suppliers, such as 3M, they discovered that the swings were even greater. At first glance, the variabilities did not make sense.

While the consumers, in this case, the babies, consumed diapers at a steady rate, the demand order variabilities in the supply chain were amplified as they moved up the supply chain. P&G called this phenomenon the "bullwhip" effect. (In some industries, it is known as the "whiplash" or the "whipsaw" effect.)

When Hewlett-Packard (HP) executives examined the sales of one of its printers at a major reseller, they found that there were, as expected, some fluctuations over time.

However, when they examined the orders from the reseller, they observed much bigger swings. Also, to their surprise, they discovered that the orders from the printer division to the company's integrated circuit division had even greater fluctuations.

What happens when a supply chain is plagued with a bullwhip effect that distorts its demand information as it is transmitted up the chain?

In the past, without being able to see the sales of its products at the distribution channel stage, HP had to rely on the sales orders from the resellers to make product forecasts, plan capacity, control inventory, and schedule production.

Big variations in demand were a major problem for HP's management. The common symptoms of such variations could be excessive inventory, poor product forecasts, insufficient or excessive capacities, poor customer service due to unavailable products or long backlogs, uncertain production planning (i.e., excessive revisions), and high costs for corrections, such as for expedited shipments and overtime. HP's product division was a victim of order swings that were exaggerated by the resellers relative to their sales; it, in turn, created additional exaggerations of order swings to suppliers.

In the past few years, the Efficient Consumer Response (ECR) initiative has tried to redefine how the grocery supply chain should work.

One motivation for the initiative was the excessive amount of inventory in the supply chain. Various industry studies found that the total supply chain, from when products leave the manufacturers' production lines to when they arrive on the retailers' shelves, has more than 100 days of inventory supply.

Distorted information has led every entity in the supply chain – the plant warehouse, a manufacturer's shuttle warehouse, a manufacturer's market warehouse, a distributor's central warehouse, the distributor's regional warehouses, and the retail store's storage space – to stockpile because of the high degree of demand uncertainties and variabilities.

Causes of the Bullwhip Effect

Perhaps the best illustration of the bullwhip effect is the well-known "beer game." In the game, participants (students, managers, analysts, and so on) play the roles of customers, retailers, wholesalers, and suppliers of a popular brand of beer.

The participants cannot communicate with each other and must make order decisions based only on orders from the next downstream player. The ordering patterns share a common, recurring theme: the variabilities of an upstream site are always greater than those of the downstream site, a simple, yet powerful illustration of the bullwhip effect.

This amplified order variability may be attributed to the players' irrational decision making.

Indeed, Sterman's experiments showed that human behavior, such as misconceptions about inventory and demand information, may cause the bullwhip effect.

In contrast, we show that the bullwhip effect is a consequence of the players' rational behavior within the supply chain's infrastructure.

This important distinction implies that companies wanting to control the bullwhip effect have to focus on modifying the chain's infrastructure and related processes rather than the decision makers' behavior.

We have identified four major causes of the bullwhip effect:

1. Demand forecast updating
2. Order batching
3. Price fluctuation
4. Rationing and shortage gaming

Each of the four forces in concert with the chain's infrastructure and the order managers' rational decision making create the bullwhip effect. Understanding the causes helps managers design and develop strategies to counter it.

Demand Forecast Updating

Every company in a supply chain usually does product forecasting for its production scheduling, capacity planning, inventory control, and material requirements planning. Forecasting is often based on the order history from the company's immediate customers.

The outcomes of the beer game are the consequence of many behavioral factors, such as the players' perceptions and mistrust. An important factor is each player's thought process in projecting the demand pattern based on what he or she observes. When a downstream operation places an order, the upstream manager processes that piece of information as a signal about future product demand. Based on this signal, the upstream manager readjusts his or her demand forecasts and, in turn, the orders placed with the suppliers of the upstream operation. We contend that demand signal processing is a major contributor to the bullwhip effect.

For example, if you are a manager who has to determine how much to order from a supplier, you use a simple method to do demand forecasting, such as exponential smoothing.

With exponential smoothing, future demands are continuously updated as the new daily demand data become available.

The order you send to the supplier reflects the amount you need to replenish the stocks to meet the requirements of future demands, as well as the necessary safety stocks.

The future demands and the associated safety stocks are updated using the smoothing technique. With long lead times, it is not uncommon to have weeks of safety stocks. The result is that the fluctuations in the order quantities over time can be much greater than those in the demand data." (Lee, H., Padmanabhan, P., & S., W., 1997b)

The first recognition of bullwhip effect in supply chain management has been done by Forrester (1958,1961). He presented some evidences of bullwhip effect phenomenon and discusses the causes of this phenomenon.

Lee et al.(1997 a,b) identified five main causes of bullwhip effect, including demand forecasting, lead time, batch ordering, shortages and price fluctuations. They considered AR(1) demand process in a simple two stage supply chain.

Chen et al.(2000a) quantified the bullwhip effect in a simple two stage supply chain with AR(1) demand process observed by the retailer. The retailer uses moving-average forecasting technique to predict future customer demands. They have derived a lower bound for the bullwhip effect.

Chen et al.(2000b) extend their results to a case where the downstream retailer use exponential smoothing method. They measured the bullwhip effect and found that it depends on both the nature of customer demand process and the forecasting technique used by retailer.

They concluded that if mean and variance of demand is known exactly, i.e. no forecasting method need to be used, there would no bullwhip effect. Furthermore bullwhip effect increases by increasing the lead time.

There are methods to reduce bullwhip effect. The main methods to desire this target are centralizing information to reducing uncertainty, reducing demand fluctuations, and lead time reduction.

4. Models for controlling and replenishing of inventories in a Supply Chain

Because of demand fluctuations over time, holding inventory during low demand is necessary in anticipation of future periods peak demand. This buildup inventory avoids or reduces overtime, lost sales and backorders during peak demand periods. Inventories carried because of anticipated changes of prices and uncertainties. Uncertainties occur because of demand request time, number of commodity requested, lead time length, revenue and cost factors.

To avoid uncertainty, an extra inventory named "safety stock" is hold to protect against actual demand exceeds the forecast. Inventories types exist at every stage of the supply chain are raw materials, semi-finished or finished goods.

Models for controlling and replenishing of inventories determine order quantities and replenishing times to minimize total inventory costs that are excess inventories and shortage costs.

Today use of IT systems improved inventory management and has contributed much of cost savings. The first service of IT is changing rules of thumb to historical demand.

It also makes the ability to analyze and change inventories in response to changing in demand. IT lead to manage product varieties, decrease in product life cycles, demand fluctuations, inventory level updates, coordinate and integrate with other IT systems via supply chain.

5. Forecasting methods in Supply Chain

Forecasting has an important role in the efficient operation of a supply chain, as it presents valuable information of future time.

Forecasting methods are classified as: Qualitative, Time series, and causal. Qualitative methods are subjective and are appropriate when a little historical data or experts may affect the results.

The sequence of demand is called time series. Time series use historical data and are appropriate when significant fluctuations don't occur. Causal methods assume demand forecast is correlated with environmental factors.

There is risk of forecasting error in forecasting methods. To avoid this risk we can reduce time responsiveness, for example reducing lead time of suppliers, and pooling of demand that try to smooth out lumpy demand by bringing together sources of demand. Various forecasting methods can compare by forecast error measures. Small forecasting errors are difficult to be detected.

Large errors detection is usually easy. By plot demand against time, we can detect long-term trends, cyclic variations or other reasonably patterns. There are some rules of forecasting: the forecasting is always wrong, the longer the forecast horizon, the worse is the forecast and aggregate forecasts are more accurate.

6. Supply chain uncertainties

External and internal changes lead to uncertainties in supply chain stages. Hence the design needs to consider the dynamics of the enterprise and the related market.

There are various external changes such as demand changes, environmental factor changes, bank rates

fluctuation, changes in political situation changes and others.

Internal changes such as material do not arrive on time, production facilities failure, supply routes failure, workers absence and falling sick, changes in customer orders o cancels order, and others. Such problems will increase the uncertainty and instability of each stage of the supply chain, and these problems spread and pass from one stage to another; both upstream and downstream.

The impact will spread like a domino and entire chain will cease to perform. Supply Chain designer have to consider and prepare for these uncertainties within the organization and across the organization, which cause the design task extremely difficult and challenging.

Furthermore, the lack visibility and understanding of the downstream process in the supply chain has increased the uncertainties, and weaken the design of the supply chain.

Finally, the supply chain design required validation before implementation. As the implementation required the involvement many resources horizontally and vertically in the chain, an invalidated design has high risk of de-proving the productivity and injecting more uncertainty into the chain.

7. Robustness analysis

Robustness analysis is used to support decisions under uncertainty about future. Application of robustness analysis is when uncertainty avoids confident decision; decisions must be or can be staged, or the first decision assumptions do not necessarily define completely the future state of the system. The main robustness criterion is that, other things being equal, an initial commitment should be preferred if the proportion of desirable future situations that can still be reached once that decision has been implemented is high.

Sterman (2006) states that "Supply chain instability is a pervasive and enduring characteristic of market economies.

Production, inventories, employment, revenue, profit and a host of other indicators fluctuate, irregularly but persistently, throughout the economy, in industries from A to Z—Aircraft to Zinc (e.g., W. Mitchell 1971, Zarnowitz 1985, Sterman 2000). Supply chain instability harms firms, consumers, and the economy through excessive inventories, poor customer service, and unnecessary capital investment.

Instability in employment erodes skill and worsens labor management relations. Volatility in revenue and profit increases risk and raises the cost of capital.

Instability diverts leadership attention from the design of successful new products and strategies to firefighting and crisis management.

Despite the undoubted benefits of the lean manufacturing and supply chain revolutions of the past decade, supply chain instability continues. Examples include record inventory write-offs,

excess capacity, price cuts, layoffs, and bankruptcies in computers, semiconductors, telecommunications, and other high-tech industries after 2000, and waves of zero-interest financing, employee discounts for all, and cash-back incentives accompanying surplus inventory in the automobile market."

Company indicators such as demand forecast, employment rate, led time, prices, and inventory level show an irregular and constant fluctuation. Instability in supply chain is costly because it creates "excessive inventories, poor customer service, and unnecessary capital investment" (Sterman 2006).

Disney et al. (2000) optimize the performance of an industrially design inventory control system. They use GA to quantify five characteristics of a production distribution system in classical control techniques.

They show their procedure can improve the performance of a production or distribution control system by trade-off between inventory levels and factory orders. Riddalls and Bennett (2002) study the stability of a continuous time version of the Beer Distribution Game.

They demonstrate the robust stability, i.e. stability for a range a production and distribution delays, and how inventory in lower stages can create vicious circle of unstable influences in the supply chain. Nagatani and Helbing (2004) analyzed several production strategies to robust supply chains, which is expressed by different specifications of the management function controlling the production speed independence of the stock levels.

They derive linear stability conditions and use simulations for different control strategies. Ortega and Lin (2004) use control theory for the production-inventory problem to address issues such as reduction of inventory variation, demand fluctuation, and replenishment rules optimization.

8. Model Predictive control (MPC)

Model Predictive Control (MPC), also referred to as Receding Horizon Control and Moving Horizon Optimal Control, and has been widely adopted in industry as an effective means to deal with

multivariable constrained control problems (Lee and Cooley 1997, Qin and Badgewell 1997).

The first idea of model predictive control is from the 1960s (Garcia et al. 1989). The name MPC come from the idea of employing an obvious model of the plant to be controlled which is used to predict the future output behavior. This forecasting capability allows solving minimizing difference between the predicted output and the desired reference. It has constrains on the manipulated inputs and outputs.
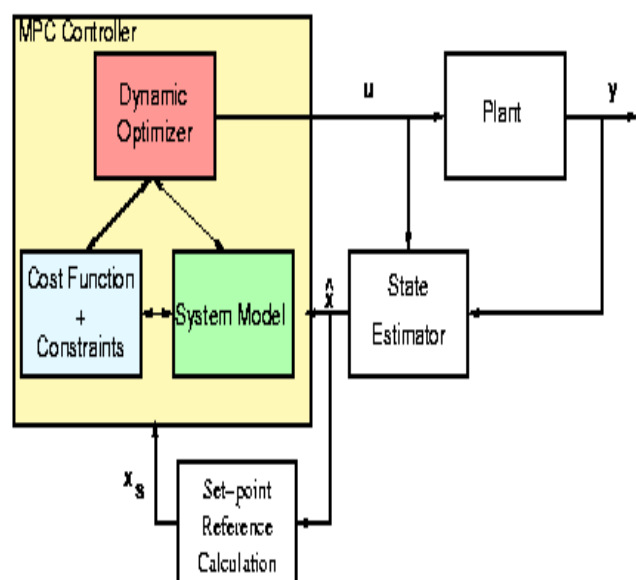
Fig: Basic MPC Loop

9. Conclusions

This review is not complete in the state of the art. There are various uncertainties in supply chain such as demand fluctuation, lead time fluctuations, price changes and other internal and external cause in supply chain.

Trying to desire stable supply chain and get robust model is difficult and also big improvement in scope of the supply chain. Every supply chain include and involve various stages, suppliers, manufacturers, etc, that cause different uncertainties.

In this paper we studied supply chain. Bullwhip effect and its causes are distinguished. Forecasting methods in supply chain, robustness and finally MPC method is considered in this paper.

The benefits of forecasting methods and robustness the supply chain can be important for future studies.

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Terrorism political development and national security

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Abstract: As, the terrorism, nowadays, is an important and effective matter that affects different problems especially national security, it is tried to study an important aspect of interaction fields between national security and political development in developing countries and Iran. An important point in this study is to consider terrorism as an strategic phenomenon that follows the procedures including three operational phases (creating mental agitation by frightening people-encouraging governor system to responding and transferring legitimacy) to obtain their owns aims and affect on countries national security. They administer a space interaction and oppositional in related to the people and political governor system so that they can get to their own political aims, too.
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Keywords: Security; national security; terror; terrorism; political development

1. Introduction
National security of each nation/ state has a special sanctity. Because achieving other national and international goals such as (political, economic, social and cultural) power development, authority, stability, legitimacy, and ... somehow depends on achieving national security. On the other hand, one of the main and always affecting factors in internal and external dimension of national security is the complex phenomenon of terrorism which was used to be a threatening factor to national security but in today's world it is subject to change under the effect of globalization. Therefore, designing its national security strategy, the government of Islamic republic of Iran like other governments should consider today's threatening factors whose one of the most important is strategic terrorism. So in this study the first and the main step are to answer the fallowing question:
Dose terrorism effect on the national security structure and function of Islamic Republic of Iran?
The important point is that governments establish their policies and their national security strategies based on their national interests. Thus a phenomenon such as terrorism can certainly effect on the performance of national security. Therefore the main hypothesis of this study is that:
It seems that the operational axis of terrorism as a strategic phenomenon is based on strategic weaknesses of national security. Since the strategic terrorism is a national and global phenomenon, governments, establishing their security policies, have to fully consider the process of threats and the

arrangement of strategic terrorism. According to above hypothesis, terrorism is considered as the independent variable and national security as the dependent variable. As a result, this research emphasizes on national and local dimensions of national security. Because today internal factors such as lack of political development, more than the external factors may threaten national security. In addition this study, from the dual aspects of terrorism, only investigates the internal dimension and among the different fields of terrorism only pays attention to the political field. Therefore since dependent and independent variables are abstract concepts, to make them operational and to limit the sub- field of study one sub-question is considered to be specifically answered in this study. That is: Is there any relation between terrorism and political development and also between these two and national security? Considering that more studies and researches about security, national security and even terrorism have done within the state-centered and positivistic theories and it was under the dominant of a kind of realistic and new realistic thought within the frame of positivism. This studied, considering positivistic methodology and time of the studied topics, chooses the theoretical framework. In other words, this study investigates state- centered theories, modern theories and postmodern theories based on local and national dimension

2. Methodology
This study fallows positivistic methodology, which means the researcher collected the information by

adopting librarian methodology and indexing cards. In order to answer the main question, during the research, we try to answer this question:

Is there any relationship first between terrorism and political development and second between these two and national security?

Terrorism, as the independent variable of the study, is a complex and multidimensional phenomenon that is an effecting factor in both international and local dimensions and may create crisis in different national issues including national security. On the other hand, national security, as the effecting and dependent variable of this research, has a similarity in this respect with the phenomenon of terrorism. This means that national security as a traditional and classical approach was always considered as an external issue related to foreign policy, but in this study its local and national dimensions are focused. It is obvious that terrorism was and is one of the issues affecting on national security (both in foreign and local dimensions) but what is focused on in this research is its internal effects. The third variable of this study is political development [In fact the purpose of political development is to provide necessary bases in the arena of political interactions. These bases determine the atmosphere and the relation of different sections of the society according to the fallowing 6 factors: 1. obtaining and legitimizing legal framework of political compromise and competition; 2. freedom of political competition and participation for all; 3.creating the mechanism of dispute resolution organizationally and within the political structure; 4. applying secularization to politics and political competition in order to strengthen political stability; 5. organizing and categorizing political parties and social forces; 6. quelling violence from political life (Bashiriyeh, 15:1380)] Indeed the goal is to show the relation of terrorism, political development and national security. Therefore the sub-hypotheses of this part of the research is that: it seems national security, political development and terrorism make a triangle in such a way that enhancing the political development increases the coefficient national security and consequently reduces terrorist provocations and ignoring the process of political development increases terrorist provocation.

3. Strategy of terrorism and political development
In general belief terrorism is usually considered as a blind and violent move such as an explosion or a homicide or suicide move. According to this definition of terrorism in this research (terrorism means using excessive fear for achieving the political goals) (Nuemann, 2008:2) terrorism is, in fact, a strategy, a process of campaigns and a style of fighting which begins from a point (creating fear) and eventually terminates with the propose of reaching the goal. Terrorism is a completely logical phenomenon fallowing a strategy which has political and military aspects. Its military aspect (violence) is in fact the beginning of terrorist strategy and is followed by a political move. As a result terrorism should never be considered merely as an armed act because committing terror and armed terrorist act is the beginning of combating terrorism and it is followed by other terrorist actions to gain victory on the struggle and the fight being started. Therefore in combat terrorism it should not be considered only to prevent from terrorist and armed actions but also from creating terror. These tactics and decision makings are primarily to increase superiority over the opponent in the struggle and certainly can have different results and achievements according to the time and place. Clauswitz believes that achieving victory in the war is not always related to tools and weapons but is more related to psychological environment and accurate war calculations. Indeed the war is a scene for confrontation of wills (Clauswitz, 1984:88).

Terrorist is a strategic and continuous activity which is based on a set f special variables, some of which are taken from weaknesses of the society and the government which governs it. It should be noted that when a society contains defects in the process of political development, it has the greatest weak points towards terrorist activities, since the lack of the factors of political development, especially in developing countries, eliminates the factors of making national alliance. In addition, the lack of political development will cause many ruling regimes in developing countries, despite having high coefficient of military and security, seem vulnerable and fragile against the slightest criticism (Zibakalam, 1372:302). Besides making plans for weaknesses of governments, another way that terrorist groups fallow is getting their desired reaction from the governments. In other words, they try to force the ruling government to do illegal actions and break the dignity of law after doing armed actions. Of course violence has an important role in this planning since this reaction provides the chance and background for terrorist groups. Their efforts go into achieving the appropriate reaction from the ruling government, which is making it to do what they want. Basically, in terrorist movements there are two asymmetric fronts: the weak one which are terrorists and the strong one which is the ruling government. In terrorist actions what is the tool of reaching the goal is creating terrible quiet fearful temporal violence (of course in this action, violence and fear caused by it is not the goal but a tool to reach the goal). Mao, the leader of

the communist revolution of China, believed that the pattern of guerrilla wars was based on three stages: first defending guerrilla warfare, second strengthening and stabilizing and third which is called active expansion (Mao, 1963:97).So if we consider guerrilla wars as terrorist movements, it can be consider that a terrorist operation also has three phases to gain victory and reach the goal: the first one is alienation or mental disturbance. At this point the terrorist group tries to fully progressively eliminate the authority of the government by gradual reduction of its influence over people. The main cause which is the major tool in creating this mindset and mental disturbance is the fear created by an armed violent movement. The second phase can be called meaningful response; at this stage (which is committing a terrorist act) the purpose and strategy of the terrorist group is to make the government to show an inappropriate respond. Here the structure of political development shows its role and importance. The third phase of the strategy of terrorism is obtaining legitimacy. The purpose of this stage is to get benefit from the emotional effect of violence in order to a political message, in a way that by reducing the legitimacy of the government it is transferred toward terrorist groups. At this stage mass media has a very sensitive and important role to spread the message of terrorists (Neumann, 2008:52). As noted, the first step to start the terrorist movements in any society is to create a mental disturbance, and the cause of these mental and emotional disturbances is a horror violent armed terrorist act. Similar actions were designed by the MKO organization after the Islamic Revolution. after a period of almost two years logomachies (1979-1981), This terrorist group eventually turned its position to armed terrorist attacks and started to do targeted assassinations of prominent people among the Islamic regime such as senior officials, leading and influential clerics, the relative to the system and even shopkeepers and ordinary people; consequently they made several big explosions and much damages. So obvious goal of this group of doing terrorist acts in the assassination, bombing and hijacking, that were quite extensive in the country, was not merely to kill several people but to create a kind of mental confusion and mental alienation among people which could primarily make a mental suspension in people. However, in confrontation with this widespread wave of terror and violence, the factor of legitimacy consequently could make the government and the ruling system victorious and successful.

What had been predicted by this group only came true in one case, the widespread wave of terror and violence that just involved masses in mind, but their prediction about the way people judge on creating legitimacy turned out to be wrong. Contrary to their expectation, however, the government with the help of mass support and by mobilizing them could restore security to the community. Not having created fully modern political structures yet, the political systems of the third world should come to be able to move towards strengthening the foundation of their authority which is the permanent support of the masses by strengthening and accelerating the process of expanding political development. The most important principle of continuity of life in the political system is the support masses in all circumstances, especially in times of crisis and challenges of terrorism and what guarantee this important issue to be sustainable and systematic not randomly and temporary is the process of political development. More than four centuries ago Thornton believes that the reduction of loyalty to the ruling power is proportional to the reduction of governmental authority. (Thornton, 1964:74). This theory shows the existence of a strong psychological relationship between people and their government and the majority will of the community knows the government as the symbol of continuity and stability of society. But what is very important is that these events and changes in support structures and elimination of social freedom as the rule of law and security is not what people ask. Based on what Thornton says, we can conclude that first, the most important and the most urgent objective for terrorists and rebel groups is that the reference provider of social stability and security is changed with a growing sense of fear and widespread panic in a way that masses the masses are unable to identify the sources creating fear and panic and gain another chance to restructure the masses of people and prioritize their values and taste. It means by doing violence, they force the government and the rule to respond and produce a reaction (of course the government has to be responsible) but those inappropriate ones from which the terrorist can benefit. Perhaps this process and program Planning appears exaggerated but u can find many fully objective and social concrete examples for it. For example, in July 2004 a bomb exploded by terrorist groups in a police station in Iraq. First Americans were blamed mistakenly, but it was quickly brought about that it was carried out by terrorist groups who are against the Iraqi government to prevent people from joining the Iraqi army. This issue was announced and people knew that the bombing had not been carried out by Americans; hence they were not willing to accept. This matter quickly speeded this massage that Americans were not able to provide security in Iraq. It means that people usually believe what they like to believe (Neumann, 2008:35).

Occupied their country by Americans, Iraqi people are not satisfied with Americans and do not accept their claims easily and do not support them. It can be exemplified by the Algerian National Liberation Front. Supporting the Nationalists who has been united the French army forces, about 300 people of a village near Mloza were killed by the Algerian National Liberation Front; however, when the news spread they refused to accept its responsibility and denied it. They announced that French government had done this and then attributed it to them to discredit them. Algerian people accepted their claim despite knowing that it was a lie and the Algerian National Liberation Front itself committed this genocide. It was all because Algerian people were not satisfied with French since the French army and the government believed that they had to be cruel with the people of Algeria (Ibid: 25). This examples shows that terrorist groups aim to dominate the masses' heart and they do violence and terrorist to turbulent the atmosphere in order to confuse people's minds and ultimately reduce the regime's authority and eliminating its legitimacy; hence the type of the violent act is neither specified nor predictable.

4. Legitimate terror targets

Another terrorist issue is determining legitimate targets for terror. But they try to differentiate between undue violence and legitimate violence. In most of terrorist groups legitimate targets are those which are the embodiment and symbol of the government. For example among the victims of terrors committed by MKO there were very ordinary people, such as selling fruit, grocer, local tradesman and the assassination of officials, even journalists and university professors, and in general all classes of society could be a victim. In the definition of legitimate targets for assassination of his team, Osama bin Laden, the leader al-Qaida, specified a wide range and said all who pay taxes to the U.S. government are included in our target (Numann, 2008: 37). Thus we can say that the legitimate target of terrorist groups is very diverse and different and it is rarely possible to limit it. But this much is certain that factors such as the type of beliefs and opinions can play an important role in determining legitimate assassination targets. For example, the Russian group of the People's Will (narodanaya volya) says to prevent from unnecessary bloodshed is a goal to which they strongly adhere and respect (Hoffman,2006: 6).Of course this kind of opinions and believes may not be popular among other terrorist groups and some of them may not respect to such restrictions. However terrorist groups believe that by terrorist attacks against authorities and the ruling bureaucracy they will be able to create

considerable mental disturbance in the target population and groups of people and also make them feel insecure, but if they specify the range of intended targets for attack to a particular group, firstly they are much more likely to be suppressed by the government, secondly the domain of fear will be limited. Therefore one of the most important actions performed by terrorist is to keep the legitimate targets of assassination a secret and to announce that it is widespread among people. Therefore being successful in the first stage of terrorist actions greatly depends on setting accurate political target which means knowing attacked targets. It seems what disappoint terrorist from achieving their goals is high level of legitimacy of the political system.

5. Terrorism, government and political development

In fact the indicator of the success or failure (for both sides) is the level of legitimacy of the political system. When the level of legitimacy is low and ruling authorities do not pay attention to this issue or, because of any reason, do not do anything to increase it, terrorist groups can achieve their desired goal so easily and even spread this idea that opposing forces (terrorist groups) will be able much better to establish security and peace and protect political rights. It is obvious that the tools which can increase or decrees the level of political system legitimacy can help to this situation or hinder it. For example, failure in government policy development, failure to control corruption, economic problems, feelings of injustice and discrimination, inadequate political distribution ... can be a Catalysts or the inspirator of people to escape from the circle of government supporters and enter the circle desired by terrorists. Therefore the legitimacy achieves consistency and stability by political development. Terrorist groups hope to attract the masses' support through the process of terrorist strategy and this is the precise issue that the government and the ruling system have to rely on.
Terrorist groups never rely on their physical facilities and features tool, so the way of dealing with them is not just harsh and sever repression by physical tools. On the other hand trying to prevent them completely from any action is impossible for the government and no system, even the most political developed one, is able to do this. The way of dealing with terrorist attacks is to dominate people's heart and mind. Therefore to establish security is the first the most important goal of the ruling system to deal with terrorist attacks. However it is not attainable just through physical measures but through establishing psychological security and strengthening the intellectual power and potential of the masses. If terrorist can distract people's attention from the cause

of terrorist incidents, they almost achieve their most important goals which mean people do not discover the real cause of terrorist attacks. This may happen when the ruling system, in reaction to terrorist attacks makes a mistake and respond to it in a harsh illegal way which is against the accepted norms of the society. In this case a kind of confusion occurs in defining the cause of events among the people in the community. In these circumstances the government firstly should respond to terrorism by using its intelligence, secondly should not lose its spirit in the face of political actions of terrorists, thirdly while training the police and security forces, briefs them about the situation, fourthly removes the realm of terrorist acts from the life of the people through crisis management and fifthly, by quickly turning the situation to its normal way prevents this idea to be spread that the government is unable to control the situation. On the other hand, such actions and probable mistakes made in response to terrorist acts and operations can be a good pretext for media of anarchist groups. Since spreading it in media increases the realm of its influence and expends the mental confusion among the people. Carlos Marighia believes that an extreme reaction of the government in response to terrorist operations is precisely what the terrorist wants. In his opinion extreme reactions like a military government regulations, inspecting homes or cars, closing roads, uncontrolled and widespread arrests, illegal interrogations and arbitrary executions lead to autocratically ruling the country and make the life difficult for ordinary people and cause them to distance themselves from the government. The presence of military and police on the streets shows that society has entered a critical stage and entering the community to the critical situation can provoke people and spread this opinion that the government is unable to manage the community; because of this it quickly suppresses the opposition. The presence of security forces exacerbates this thought that they come to identify and arrest the people ˙(Marighia, 1969:43). Political systems usually show three types of reaction against the measures of political groups: the first one is violent and extreme reaction, since they emphasize on this point that all those who disturb the present situation should be suppressed immediately because they are harmful. Such reactions are so abundant in some Latin American governments in the decade of 60 and 70 AD. For example, in Uruguay where Tupamaros communist group launched a series of kidnapping operations through bloody killings. In Argentina the group People's Revolutionary Army and Montoneros, with its terrorist actions ultimately caused the military group launched a great extend of blood murders through pulling off coup in the

country which, because of the depth of violence, was known as dirty war. The second type of reaction of governments is that of dictatorial regimes against which bends to terrorist movements and extremely accepts the demands of political groups. in totalitarian systems the government is captured a sense of late loyalty and fully hopelessly Seeks legitimacy, and trays to correct its actions and also to prevent from the peak terrorist movements by doing justified actions advertising on it . One of the good examples of this style of behavior is related to the Pahlavi regime in late life. At that time, the second half or 1977, Mohamad Reza Shah, through a TV program announced "I've heard voice your, Iranian people, revolution and I promise to behave according to conditioned constitution. With these words, while acknowledging past mistakes, Mohammad Reza promised to behave in accordance with the law in the future which means he tried to compromise with the revolution. Usually gradual descent of power and the reduction of ruling authority is the problem of many undemocratic societies and even democratic societies especially those in which there is no legal way for political participation. In these societies with occurring terrorist movements many people tend more security to be established, but elites in universities, media and policy have a tendency to enjoy a higher level of freedom and political rights. However government's harsh dealing with them and repressing them make them extremely averse and violent or at least increase this possibility that they support terrorist groups. Barry believes that the most reasonable cause that makes governments pursue policies of repression is the fear of unity and coalition between reformers and extremists. These governments still think that their capacity to support people have not lost ... (Neumann, 2008:42). Of course in this field, some have different opinions and generally opposed any negotiations and compromise with the opposition groups including Robert Tabran who believes that any reform and negotiations with insurgents somehow mean surrendering to them and lead to higher scores In the future. He believes the government is the only legitimate source and element to create a stable social situation and the only reference to establish security in the society (Taber, 1970:24). In fact according to this belief if the government does not repress oppositions and terrorist groups with full power and authority, this prepare the ground for terrorist to follow terror Business as a game in order to take point from political system. As one of the leaders of Hamas calls by the Mossad surveillance has been said: Let's do terror business and then try to destroy Israel. (Neumann, 2008:45). It can be said that this problem also exists in the first kind of government response to terrorist movements,

which is the policy of suppression. In fact, if the government decides to suppress terrorist movements it should be able to do it completely. The inability of the government in suppression (to a low extent) will make opponents to add to their members and gather them and increase their power and seek to terrorist and more violent solutions. For example, after the ninth presidential elections in Iran, we saw the alliance of opposition including the groups which are entirely separate from each other in terms of beliefs, the ways to fight and many other factors. But they quickly forgot their quarrels and united in a single front against the regime. Besides, there is a third solution, the policy of deepening expansion of lawful political partnerships which ultimately leads to the increase of legitimacy and people's support for the policy of government and the ruling system. History has proved that the policy of suppress never solve the problem because it is not to suppress all the oppositions. The policy of tolerance also is not suitable at the time of crisis. Therefore we should consider a third solution in which people political partnership and the mode of presence in political power should de lawful and orderly. Good example of this situation in Iranian history is the second Pahlavi era. Relying on notorious power of SAVAK, Mohammad Reza Shah began to suppress the opposition by arresting, imprisoning and executing them. The policy of opposition suppression made underground armed groups to be formed and emerged from the reformist groups such as *National Party of the Masses of Iran,* etc and the number of their supporters were added every day. Despite all the repressive policies of the day, opponents of Shah united and spread the weave of their attacks to the stage of revolution. Achieving legitimacy is the third step in designing terrorist movements. In the third step the most important element is transmission the message of political groups in the society and among masses people. Obviously the mass media play an effective role at this stage. So even if the terrorist groups succeed in the first and second stage it does not mean a complete victory because it's the third stage that determines their complete success or failure. Restoring security to the society at the national level requires the ability to create acceptable and legitimate opportunity for the masses, so that it can encourage them again to advocate the government and guarantee their presence in support of the political system. Those systems that can restore their lost security are also able to deal with terrorist operations. Maintaining and achieving this step is possible when people of society have enough strength and stability to control their willing and thinking against the challenging attack of terrorist messages and also are able to manage the created confusion and

mental disturbance of thought. Otherwise the support of people from the ruling system gradually transfers towards terrorist groups. Therefore, as you see, this space is fully political and interactive which is systematically dependent on merits of both sides and also their ability of management and policy making. So one very basic and important point in the fight against programmed terrorist movements is that the system should be already prepared for terrorist movements and should design its strategy of national security towards prompting the intellectual ability of masses of people. Terrorist groups rely on the serious weaknesses of the system.

As noted in the fight against terrorist movements, the two main factors are masses of people and legitimacy of the system; so long that people distinguish the system as a legitimate one no terrorist program can challenge the system and conspire to overthrow it. It seems that from the masses' point of view in political systems the most important factor to create legitimacy is the process of political development that with emphasis on religious and Islamic culture of the Iranian community is fully able to inject elements of unity to national security.

Today, terrorist groups through satellite channels, Internet, news websites and private networks and also through traditional ways such as the press and other existing legal ways spread their views. Meanwhile how should we deal with all these effective tools influencing masses' sprit and thought? It seems that the best way of confrontation is ignoring the tools and relying on thought. What should be dominated over is the belief of the masses. Nothing can challenge this dominance as long as mastery, integrity and good thinking rule it and it always increases the legitimacy of the system. On the other hand there are other ways to support the political system against terrorist movements such as the formation of political parties. It is evident that political parties are good communication channels between the government and the people and can channelize people's thoughts and ideas and gather them systematically and legally (Kazemi, 1379:447). Parties are able to coordinate similar ideas and reduce individual differences, which leads to the unity of similar ideas that are at the same time dispersed. This issue protects community from political and social storms and leads it towards a convenient rout which is political development (Dvvrzhh, 1357:397).

Terrorist groups usually transform demands and expectations of the people into political messages or slogans. It means they try to transform what the people want to hear or to have into a message and return it to the society and mobilize people around it. So if the government does not receive their demands or does not have ability to answer an appropriate

space is prepared for opposition groups and this is the same opportunity that these groups are looking for. Therefore the most useful state for the terrorist groups is when the alternative beliefs and ideologies (which belong to them) find opportunity to be spread in the society especially during outbreak of political insurgency and emergent of political programs and alternative beliefs. This will encourage those people whose demands are rejected to reach their demands through political insurgency. If the political messages of terrorist groups are supported from sources such as expansion of political rights and liberties, it is more difficult to deal with it. So terrorist groups in their efforts not only should pay attention to material resources and political attention of the people but also should be able to adapt and change these beliefs and goals with demand and manage it into a legitimate political message that can be replaced with the legitimacy of the regime. Thus politicians the ruling regime and confronters of the terrorist movements must be professional and manager in their work. Confrontation with terrorist movements should be done at a macro-level and designed and used through the present national security strategy. As it can be seen, managing a terrorist operation is a very difficult process and requires the existence of necessary and suitable factors which at least includes first operational unity policy, second creating, developing and deepening the process of the complete and stable political development. And it seems that these factors and capabilities do not exist at least in opposition to the Islamic Republic of Iran. They even do not have this minimum, it means none of these groups accepts the others, and there is no unity practice, their beliefs do not coordinate with the beliefs of the masses. However, there are weaknesses and dangerous factors in the Islamic society which opposition forces can exploit and the Islamic Republic should try to eliminate these weaknesses. These efforts should be continuous and according to an accurate planning, towards strengthening and deepening the legitimacy of the system based on the needs of transitional societies, which means relying on comprehensive and sustainable political development.

6. Conclusion

Terrorism is in fact a strategy or a way of fighting which begins from a point (creating fear) and eventually terminates to achieve the goal (to power). Terrorism is a continuous and strategic activity that is based on specific variables. Terrorists rely on the weaknesses of society and government policies, and certainly a society that suffers from shortcomings in the process of political development is the biggest weakness in front of the terrorist movement.

Furthermore, lack of political development makes politicians not to identify their weaknesses.

It was said that strategic terrorism has three steps: the first step is alienation or mental disturbances in society. The main tool to create these mental disturbances is the fear of mental confusion made by a movement of armed violence. The second step is meaningful response. The purpose of terrorist groups in this step is to make the government show an inappropriate reaction. The third step is the step of achieving legitimacy. The purpose of this step is the application people's emotional judge in response to the first and second step in a way that with reducing legitimacy of the system, people are transformed towards terrorist groups. At this step, the mass media play a sensitive and important role.

Therefore, it should be said that although the initial cause of a terrorist strategy is a military action, but what leads them towards the success is political actions. In other words, the first, the most important and the most urgent objective for terrorists is to change the pattern of social system by isolating people from the government.

Consequently this situation is a completely interactive environment and the result depends on how the operation and capabilities of both sides, especially the political system, is. In order to enjoy popular support, political system should already be responsible to demands of the people and achieve the adequate legitimacy and be successful in creating a fully interactive field between itself and people and what can prepare an interactive environment between the state and the society is to provide, deepen and expand the six structures of political development. Political systems can take three strategies against terrorist movements.

The first one is extreme and violent behavior. Meanwhile, in response to terrorist attacks the political system should strongly prevents the occurrence of two issues, the first one is violence and the second one is inappropriate and unreasonable responses. The second type of reaction is Unconditionally Accepting the demands of radical political groups that often takes place in dictatorial regimes at the point of political crisis. This behavior reflects the weakness of the government and radicalizes the opponents. Third way which is the correct one is the policy of deepening and expanding regulated partnerships that ultimately leads to the increase of political legitimacy and also popular support of the policies of the government and the regime. We should dominate on thinking and beliefs of humans and the masses and it never breaks down as long as mastery, integrity and good thinking rule it and always create legitimacy. Certainly the development of this capacity in the political system

requires careful and continuous planning towards political development. Considering the above it is clear that the national security strategy the parameter of terrorism should always be considered as a threat creating factor; meanwhile the most important principle is to justify people psychologically to resist against the tricks of terrorism not just being prepared to deal with the risk of explosions and bombs etc.

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The human factors of sustainable design in urban constructions
(With emphasize on Residents' psychological Behaviors)

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Abstract: The intention of sustainable design is to "eliminate negative environmental impact completely through skillful, sensitive design". Manifestations of sustainable design require no non-renewable resources, impact the environment minimally, and relate people with the natural environment. This manuscript highlights the human factors of sustainable design in urban constructions. While numerous technical progressions have allowed for the reduction of resource consumption, not much study have addressed the reaction of occupants to these appliances, or the degree to which prosperity in achieving sustainability objectives is dependent upon user behavior. This manuscript reviews investigation in related fields and recommends ways in which psychological, behavioral and social issues might be significant to sustainable design, as same as how ways attending to psychological requirements could enhance the success of meeting these and other objectives. Applied behavior and social psychological analytical approaches are surveyed as methods to answer to conservation and recycling objectives. The physiological and psychological profits that green constructions confer on their inhabitants are also notified, as are fields for future investigation, and steps that the building industry could take to develop more sustainable and holistic building practices which incorporate inhabitant behavioral requirements.
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1. Introduction

Sustainable architecture is a general term that describes environmentally conscious design techniques in the field of architecture. Sustainable architecture is framed by the larger discussion of sustainability and the pressing economic and political issues of our world (Randolph, John and Gilbert, 2008).

Every day, developers are searching to construct more sustainable constructions, including mega-structures similar to the much expected redevelopment of the WTC (World Trade Center). While there is growing technological awareness on how to complete this objective, there is yet limited investigation on the connection between such progressions and individual building occupants and users. Since social factors are essential parts of sustainable development, it is significant to comprehend the connection between technological promotions in sustainable constructions and the attitudes of, and influences, on building occupants. The primary identified meaning of sustainable development was presented in 1987 as that which "encounters the requirements of the present excluding compromising the requirements of the future". Sustainability was also expanded and conceptualized at the International Earth Summit (IES) conference in Rio de Janeiro in 1994, to merge

considerations for economic, environmental, and social well being. (World urbanization prospects, 1998) The concentrations of this manuscript is on sustainability in the built environment`s context with primary focus on consumption of natural resources, wherein a sustainable construction is one that enhances occupant performance and health, minimizes material and energy consumption, and motivates a healthy ecosystem. There is little investigation on human social and behavioral reactions to themes of sustainability in constructions generally, and even less so for high-rise constructions, which for the aim of this manuscript are limited to buildings over ten or more levels high. Even so, tendencies over the last one hundred years recommend increased building of such structures (Gonchar, 2002) The world-wide event of migration between urban and agricultural communities and intensified awareness of environmental issues related to urban sprawl prepared the impetus for progression of urban projects in large scale. This inclination towards high-rise constructions is supported by technological improvements which have made their building less costly and easier. Traditionally, high-rise constructions consume a large number of resources. These huge structures are dependent upon large quantities of construction materials during building, need respectable amounts of energy to

function, and produce much of waste at the time they reach the end of their life cycle and are ruined. Over seventy-five percent of the energy consumption in high-rise constructions is allocated for ventilation, air conditioning and heating. In the past time, the low cost of technological improvements and energy in HVAC and lighting have discouraged building engineers and designers from making more utilization of passive temperature control apparatuses, such as shading techniques and operable windows. (Wallace, 2005). But current considerations about the growing cost of energy, restricts on availability of drinkable water, and awareness of difficulties with material utilization and waste disposal are likely to affect designers to form a corporation for more sustainable factors into high-rise buildings. While there is growing attention paid to sustainable construction techniques, there has been comparatively limited discussion about the behavioral and psychological points of sustainability and how occupants interact with such structures. This manuscript would discuss psychological, social and behavioral factors that require to be noticed in high-rise facility management, as same as the potential for sustainable constructions to ameliorate some of the difficulties in those domains traditionally related to high-rise constructions. It concludes by distinguishing future investigation steps and topics which the building industry could utilize to develop more sustainable and holistic building exercises (World Commission on environment, 1987).

2. Overview

Building construction and operation have extensive direct and indirect impacts on the environment. Buildings use resources such as energy, water and raw materials, generate waste (occupant, construction and demolition) and emit potentially harmful atmospheric emissions. Building owners, designers and builders face a unique challenge to meet demands for new and renovated facilities that are accessible, secure, healthy, and productive while minimizing their impact on the environment. Considering the current economic challenges, retrofitting an existing building can be more cost effective than building a new facility. Designing major renovations and retrofits for existing buildings to include sustainability initiatives reduces operation costs and environmental impacts, and can increase building resiliency (WBDG Sustainable Committee, 2004).

3. Sustainable building materials

Some examples of sustainable building materials include recycled denim or blown-in fiber glass insulation, sustainably harvested wood, Trass,

Linoleum, sheep wool, concrete (high and ultra high performance roman self-healing concrete), panels made from paper flakes, baked earth, rammed earth, clay, vermiculite, flax linnen, sisal, seegrass, cork, expanded clay grains, coconut, wood fibre plates, calcium sand stone, locally obtained stone and rock, and bamboo, which is one of the strongest and fastest growing woody plants, and non-toxic low-VOC glues and paints (Randolph and Gilbert, 2008).

4. Sustainable constructions` behavioral requirements

Several studies have been carried out showing that sustainable technology does not automatically lead to sustainable user behaviour. Derijcke and Uitzinger (2006) describe a case study in which they studied the behaviour of residents regarding some sustainability related issues in housing. They found that a 'reasonable share of the residents did not know that their toilet had a flush stop, and therefore did not use it'. They also found people misunderstanding a mechanical ventilator with settings 0, 1, and 2. As people believed that 0 meant 'off' (which is not true) they operated the ventilator unnecessarily at higher levels, thereby wasting energy. On the other hand Völlink and Meertens (2006) found that installing prepayment gas meters, creates a form of repetitive feedback that caused a 4% reduction in gas consumption; an example where a technological intervention did lead to more sustainable consumption.

Several authors have discussed how product design can influence users. For instance, Jelsma and Knot (2002) applied (as one of the first) the idea of 'scripting' to sustainable product design. They defined scripting as the design of a product-layout guiding the behaviour of the user, in a more or less forceful way, to comply with values and intentions inscribed into the product by the designer. If it would be the designer's intention to inscribe increased likelihood of sustainable usage into the product, this would mean designing products in such a way that unsustainable behaviour is made difficult or impossible, while sustainable behaviour is made easy or easier, or even automatic. Jelsma and Knot (2002) applied their concept of scripting to sustainable service systems, in particular to clothing care systems (Wever, Renee, 2008).

A part of the oft-cited ecological profits of green constructions are dependent upon the capability to correctly predict occupant behavior. All occupied constructions are designed around implicit or explicit assumptions about inhabitant decisions, behaviors and answers. From a psychological and environmental aspect, constructions are physical forms which, in Bechtel's words, 'enclose behavior'.

That is, constructions prepare facilities and shelter from the components to support people activities. They are planned to provide for occupant behavior, social, psychological and requirements. Whether or not they are prosperous, depends in great part upon the degree to which architects accurately predict and comprehend which activities are likely to occur and needed, and their ability to utilize this knowledge to make facilities and space to uphold their predictions. If the space is to be utilized as a school, it should uphold likely class size, lighting and acoustical needs, staff meetings, private student-teacher discussions, different teaching methods, etc. If it is a factory, it should provide space for manufacturing processes and equipment, but also attend to lighting and acoustic requirements, facilities for employee meetings, meals, and breaks (Dunlap, 2004). When designers are determining the needed technical size and performance of construction systems, they should make reasonable estimates of items such as how much water and energy would be consumed, and how much solid and liquid waste would be produced. These are, in large scale, behavioral factors since occupants activity shapes the utilization of these resources and thus the costs involved and amount of savings probable due to conservation. People make behavioral selections that influence these systems, such as when to increase their personal console by closing or opening windows, adjusting thermostats and raising or lowering drapes and blinds. Behavioral determinations are involved in these actions as the amount of water utilized for washing dishes, the amount of showers, whether or not to use up recycled water, what products to buy and whether and how to recycle. These selections by residents could be critical in determining how efficiently and well construction systems perform. Green constructions are typically designed to be particularly efficient in these respects, but there are as still not sufficient anecdotal knowledge or formal appraisal of sustainable high-rise constructions to decide how effectively they react to variations in human requirements (Miodonski,1999). Environmental effect projections of a sustainable construction might be based upon expectations of consequential levels of recycling participation and water and energy conservation, requiring very careful utilization of construction systems by tenants. Such a facility may be so sensitive to changeability of occupant behavior and can suffer greatly if the substantial usage varied meaningfully from that predicted in the planning levels. If tenants were unable or unwilling to match to high standards, same as taking short showers, turning down thermostats in the winter, or purchasing minimally packaged products, the construction's performance can fall well below predictions. One of

the reasons passive solar designs could not become more widely utilized by the end of the twentieth century might be the perceived requirements they made on user effort and time. The sensitivity of construction performance to user behavior is illustrated in the study of a green factory construction in the USA (Yeang, 1999).The building was considered to be operating sub-optimally in various respects. For instance, energy consumption was clearly higher than forseen, in part as workers kept huge bay doors open for the clean pure air and for the views that these doors prepared. While the original plan had allowed for good views and more effective ventilation and high shelving was deduced after initial occupancy which blocked the views and vents, encouraging users to open the bay doors. In some of the cases, sustainable constructions may be less sensitive to variations in occupant activity, if, for example, they relied upon smart technology or heavy insulation which controls temperature, lighting, and windows to keep energy.

Such a building may be called sustainably robust if it was able to resist important variations in behavior and still preserve optimal performance. The robustness, or sensitivity, of the building in responding to user behavior might be an major dimension in determining the ability of a sustainable building to meet its aims throughout its operational lifelong. It is also vague at this point what level of knowledge or training may be needed of occupants in sustainable buildings. Will structure systems in these facilities be technical, complex, and require careful maintenance and monitoring? and will they be, in the vocabularyof marketing, 'automatic and carefree'. These are major questions for future research. The potential for sustainable structures to arrange efficiently depends to a certain extent upon response to conservation technologies. For instance, even if builders install low-flow showerheads, water consumption might remain high if people bathe for an extremely long time (Schmidt, 2004).Likewise, early production low-flow toilets did not always result in the anticipated water savings due to public perceptions of problems with their use. Response to (and success with) later production low-flow toilets appears to be better. Increasingly, developers are integrating recycled water into their houses. Different policies for preserving water have been developed which include recycling of 'grey water' (domestic water from sinks, bath or water washing machines) or 'black water' (water containing animal, human or food waste), and here, psychological- and culturally-based responses might be especially important. The success of these dimensions is significantly relying on user perceptions and response. What remains most controversial is the utilization of recycled water for

drinking goals (the so-called 'yuck' element). Some of this hesitancy is due to vague scientific knowledge of its long period safety as part of the drinking supply. Scientific uncertainty is because potential hazards from micro contaminates that are not currently observed in wastewater sewage. Findings from an investigation accomplished in the USA on recycled water suppliers and users show that individuals are concerned about water reuse due to salinity, microbiological elements, and aggregate components such as nutrients, PH, varying quality and organic components. The majority of water recycling plans incorporates grey water utilization into toilet flushing water or lawn care. One instance is the Oakland's East Bay shore Recycled Water program (Case FD, 1984) .This plan will supply 3.5 million gallons of recycled water per day to businesses, industries, and residents across the region for use in toilet flushing, irrigation, and industrial uses, wetlands restoration. As part of this program, a new building was built with a dual pipe system that allows 30,000 gallons of recycled water provided by the utility district to be utilized in the toilets throughout the building. While this kind of water recycling is typically agreed with the general public, some users do declare fear of unknown issues and potential negative effects on children. These uncertainties could be mitigated through organizational commitment, increased public outreach, and well-managed information, trust, and decision making. In some respects, water recycling is not novel since different communities have long drawn on each other's water resources. For instance, New Orleans gets its drinking water from the Mississippi River and asserts that this water has already been used seven times before it is accessed by the City. It might be, then, that confirmation of recycled drinking water must depend on the implementation of suitable technologies to address potential contaminates as well as public awareness campaigns. Some water utility officials believe that negative public comprehensions of recycled drinking water will alter in time but further application of social psychological study might be suitable in easing these transitions.

5. Improving sustainable behaviors

Most programs to foster sustainable behavior continue to be based upon models of behavior change that psychological research has found to be limited. Although psychology has much to contribute to the design of effective programs to foster sustainable behavior, little attention has been paid to ensuring that psychological knowledge is accessible to those who design environmental programs. This article presents a process, community-based social marketing that attempts to make psychological knowledge relevant and accessible to these individuals. Further, it provides two case studies in which program planners have utilized this approach to deliver their initiatives. Finally, it reflects on the obstacles that exist to incorporating psychological expertise into programs to promote sustainable behavior (Doug McKenzie, 2000).

Many of the behavioral issues encompassing sustainable design have been explained in existing study on the effect of human behavior on water and energy conservation, and on recycling that was stimulated by the 1970 s energy crisis. Sustainable structures might differ from these earlier conservation policies in the method that many or all of these issues are declared collectively to try and produce a 'no-impact' building (Pope, 1998) Psychological study on conservation issues has taken two broad methods: social psychological researches, which concentrated upon efforts to change and understand attitudes; and applied behavioral analyses, which evaluate critical behavioral possibilities. Efforts to alter or strengthen pro-environmental attitudes are usually based upon the intuitive notion that attitudes underlie behavior, and, thus, by altering the previous, the latter will follow. While this seems reasonable, it is not certainly supported by research. Social psychological researches over many decades have indicated that there is usually little correspondence between behaviors and attitudes and that in some cases attitudes follow behavior changes rather than preceding them (Heerwagen, 1998). There is some proof that conservation education can be effective, although more researches have presented no impact or a very weak one. On the other hand, there are researches that propose that policies which try to draw out a personal and public commitment to a particular pro-environmental action from people could lead to remarkable and even lasting alteration. As Stern emphasizes, the relationship between behavior and environmental attitudes might not be a simple one. The behaviors in query, he explains, typically "lie at the end of a long causal chain containing a variety of contextual and personal elements," such as demographic and social elements, constraints and incentives, values, knowledge, and commitment. Altering any one component might not be sufficient to influence behavioral change. For effective strategy change it might be necessary to address and assess the specific situational constraints that inhibit change, as demonstrated by McKenzie-Mohr who used a combination of psychological methods and marketing polices to decrease water consumption (Brown, 2001).

6. Conclusion

Climate change and degradation of the environment are global problems associated with many other challenges (e.g., population increases, reduction of glaciers, and loss of critical habitats). Psychological science can play a critical role in addressing these problems by fostering a sustainable environment. Multiple strategies for fostering a sustainable environment could draw from the diversity of topics and areas of specialization within psychology. Psychological research on fostering environmentally sustainable behaviors is rather well developed, as illustrated by interventions focusing on education of the public, message framing, feedback, decision making, the media, incentives and disincentives, and social marketing. Other sciences and professions as well as religion and ethics are actively involved in fostering a sustainable environment. Psychology ought to be more involved directly, systematically, and visibly to draw on our current knowledge and to have palpable impact. We would serve the world very well and in the process our discipline and profession (Kazdin, 2009).

From this short review it is obvious that the behavior of occupants and tenants of a sustainable facility is likely to play a major role in determining the degree to which the building 1 Kats found productivity to increase on the order of 1–1.5% in LEED— Gold, Silver, and Platinum buildings. These various kinds of buildings indicate how the US Green Building Council defines the energy and environmental efficiency of a structure with Platinum buildings having the least effect. It is necessary for planners to make the systems and strategies that make it easy for users to engage in recycling and conservation; they are designing for human behavior as well as for engineering and physical systems. A number of questions remain concerning occupant behavior and sustainable design: What types of behaviors are expected and/or required of occupants in a sustainable building? How 'sustainably robust' are technologies? How much behavior change is tolerated before a building falls below its stated sustainability aims? It is also obvious what level of training or knowledge may be needed of occupants in sustainable buildings. Will building systems in these facilities be technical, complex, and require careful maintenance and monitoring, or will they be 'automatic and carefree'? These questions all require to be addressed by applied environment behavior researches. Mega-structures might have particular benefits of economies and centralization of scale, but they come with built-in challenges concerning the psychological and social needs of building users. Users within mega-structures lose a factor of personal control over their life safety and conditions. Once within these structures, occupants become

remarkably dependent on technology for light, air, and even the shortest of trips. In addition, as explained, the larger the structure, the more those in it are disengaged from natural components. There is increasing proof that such segregation has negative results for psychological states and behavior resulting in poor health and efficiency loss. The green skyscraper, by contrast, has the potential to promote upon this position by addressing all of these results. It could approach zero-impact in part by giving control back to the individual and by being designed to support fundamental behavioral requirements. It could help modify the lost connection with nature that most high-rise tenants suffer by giving greater access to and contact with natural components in the form of vegetation, suitable ventilation, non-toxic materials, day lighting and views to the outside.

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Investigating the Aspects of Urban Tourism in Developing countries
(With particular reference to Kohgoliyeh and Boyer Ahmad Province in Iran)

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Abstract: Tourism industry puts a lot of influence on the development of cities. The experts of European society emphasizes that because of an increase in the speed of information, an increase in culture level of citizens, and an increase in their level of living, the tourism in next years will belong to urban tourism. Based on a principle and a general definition, urban tourism is a kind of tourism which takes place in geographical limit of the city. Urban tourism is one of the most important sections in tourism industry which attracted the attention of tourisms and travelers. In this article, the position of tourism in developing countries is investigated with particular reference to the tourism aspects in Kohgoliyeh and Boyer Ahmad Province in south-west Iran.
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1. Introduction

The emergence of urban tourism through a process when tourism was seen as a danger in 1970 is described by Ashworth (1989) as a defensive approach to tourism in the city.

However, the economic conditions after the 1970's were the most significant phenomenon in the city, which allowed tourism to a placed as an important urban function. The economic decline of the cities in the UK, Western Europe and Northern America in the late 1970's highlighted the role of tourism as a catalyst to boost urban economies. Therefore, tourism is suggested as a mean to manage the change and transition of city functions, and then is expanded to become the principal sector in the city economies. In parallel with this, tourism and urban regeneration started to become important activities and received greater attention in the 1980's related to the problems that exist in the city. Tourism industry puts a lot of influence on the development of cities. According to Kazes (2003), the experts of European society emphasizes that because of an increase in the speed of information, an increase in culture level of citizens, and an increase in their level of living, the tourism in next years will belong to urban tourism (p.1941). Based on a principle and a general definition, urban tourism is a kind of tourism which takes place in geographical limit of the city. The major elements of this industry include urban transportation, urban green space, urban services, night clubs, urban structure and organizations, etc (Mahmoud Sohrabi, 2004, p.5).

2. Tourism

Tourism is travel for recreational, leisure or business purposes. The World Tourism Organization defines tourists as people who "travel to and stay in places outside their usual environment for more than twenty-four (24) hours and not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited." Tourism has become a popular global leisure activity. In 2008, there were over 922 million international tourist arrivals, with a growth of 1.9% as compared to 2007. International tourism receipts grew to US$944 billion (euro 642 billion) in 2008, corresponding to an increase in real terms of 1.8%. As a result of the late-2000s recession, international travel demand suffered a strong slowdown beginning in June 2008, with growth in international tourism arrivals worldwide falling to 2% during the boreal summer months. This negative trend intensified during 2009, exacerbated in some countries due to the outbreak of the H1N1 influenza virus, resulting in a worldwide decline of 4% in 2009 to 880 million international tourists arrivals, and an estimated 6% decline in international tourism receipts. Tourism is vital for many countries, such as Egypt, Greece, Lebanon, Spain, Malaysia and Thailand, and many island nations, such as The Bahamas, Fiji, Maldives, Philippines and the Seychelles, due to the large intake of money for businesses with their goods and services and the opportunity for employment in the service industries associated with tourism.

In fact, urban tourism is a part of spending the leisure time of citizens which places between spending leisure at home and out of the place of residence (national and foreign tourism). In other words, urban tourism is the part of spending leisure time which can be realized at the area of citizens' residence and in urban and regional open spaces and it is considered as a part of permanent leisure needs and activities of all citizens such as daily, weekly and weekend activities (Mahdizade, p.126).

Urban tourism includes an inseparable part of city services which are necessary for temporary and permanent citizens, and based on this principle, is defined in the area of planning and city management. On the other hand, with respect to this fact that there is a close relationship between urban tourism and the values of natural environment and cultural and historical heritage, it is necessary to pay attention to this area during the urban development and construction plans (Akbarzade Ebrahimi, 2007, p.78). One of the spaces which is visited by tourists in different countries is urban space. The influence of tourism on cities and urban structure is so high that nowadays a new area in tourism, entitled "urban tourism", has been come into existence. Urban tourism causes the renovation of cities, the creation of a beautiful sightseeing, the creation of information and tourism centers, and the creation of the necessary facilities for tourist in cities such as guesthouses, hotels, and places for recreational purposes which pave the way for providing a lot of income for cities (Stephen, 1998, p.137).

3. Etymology

Theobald (1994) suggested that "etymologically, the word tour is derived from the Latin, 'tornare' and the Greek, 'tornos', meaning 'a lathe or circle; the movement around a central point or axis'. This meaning changed in modern English to represent 'one's turn'. The suffix –ism is defined as 'an action or process; typical behavior or quality', while the suffix, –ist denotes 'one that performs a given action'. When the word tour and the suffixes –ism and –ist are combined, they suggest the action of movement around a circle. One can argue that a circle represents a starting point, which ultimately returns back to its beginning. Therefore, like a circle, a tour represents a journey in that it is a round-trip, i.e., the act of leaving and then returning to the original starting point, and therefore, one who takes such a journey can be called a tourist." In 1941, Hunziker and Krapf defined tourism as people who travel "the sum of the phenomena and relationships arising from the travel and stay of non-residents, insofar as they do not lead to permanent residence and are not connected with any earning activity." In 1976, the Tourism Society

of England's definition was: "Tourism is the temporary, short-term movement of people to destination outside the places where they normally live and work and their activities during the stay at each destination. It includes movements for all purposes." In 1981, the International Association of Scientific Experts in Tourism defined tourism in terms of particular activities selected by choice and undertaken outside the home.

4. Urban tourism in developing countries

Maybe the first question ought to address is the main features of urban tourism development in developing countries. It might be difficult to be answer without more studies since urban tourism or even overall systems of tourism in developing countries still receive limited attention (Oppermann, Din and Amri, 1996; Oppermann and Chon, 1997). Moreover, Oppermann and Chon (1997:62) noted that in developing countries 'compared to seaside resorts, city tourism and urban models have attracted less attention'. However, there are some attempts by a few tourism and urban/geography researchers that directly try to examine more detail related to (1) how the urban tourism concept should be applied (Singh, 1992), and (2) the evolution of urban tourism space (Weaver, 1993) with specific reference to case studies in developing countries.

According to Singh (1992), in the case of cities such Lucknow in India, tourism should exist in the city as part of a concern to secure its heritage assets. In addition, the increasing population and migration to the city has forced those responsible to takes tourism as the means to (Sigh, 1992):

Secure open spaces and buildings from illegal construction through the creation of greenbelts or buffer zones for leisure activities. Battle against pollution by reinforcing the effort to increases the quality of the urban landscape especially in the highly populated downtown area. At the same time, Weaver (1993) introduced models of urban tourism space in Carribean Islands, which also reflect an example of developing countries. It focuses on the evolution of small island space in providing tourism activities, and how it then influences the urbanisation from port or dock areas, which can be compared to larger cities especially in geographic or spatial structure, size and different size of population. At least, one can be determine from here that tourism has strong influences in the process of urbanisation beginning in the port or dock area. Firstly, as a node of tourist development area that changes and influences the urbanization of the whole island especially in creating tourist sites, which consist of individual attraction features and tourist business district (TBD). Secondly, it played a role at a regional

level as a gateway or hub that allowed tourism activities to exist and then distribute tourists to the whole area of the Caribbean island.

Mullins (1999:246) notes that most of the largest cities in developing countries in Southeast Asia have realised that they could take tourism as a way to 'expand consumption opportunities' and therefore, contribute to the growth of their economies.

Related on this, three characteristic that influence urban tourism and tourism urbanization in Southeast Asia can be seen, which are (Mullins, 1999): Tourist as demand for tourism product. Economic supplier as those who manufacture, market and sell good and services to tourist. These involve transnational corporations as leader in the tourism industry, and local producers and merchants that sell goods and services directly to tourist. Political actors that use 'political means' in projecting urban development. Moreover, international tourism is the central development for this region and for growing cities in Southeast Asia especially principal countries of tourism destination in the middle 1990's such as Malaysia, Singapore and Thailand (Mullins, 1999). In addition, Mullins (1999:250) found that in Southeast Asia, 'the more dynamic and capitalist the economy, the more urbanized the country and the greater the likelihood of having the infrastructure and facilities to cater to international tourists'.

5. Urban Tourism in Iran

Tourism attracted 2.3 million people to Iran in 2009. Iran plans to have 20 million tourists annually by 2015 (including domestic tourism). The landscape of Iran is diverse and beautiful, providing a range of activities from hiking and skiing in the Alborz mountains, to beach holidays by the Persian Gulf and the Caspian Sea. Over the next five years a number of tourism-friendly infrastructure projects will be undertaken on the Persian Gulf island of Kish, which at present attracts around 1m visitors per year, the majority of whom are Iranian. In general, Iranians are warm, friendly and generous individuals with a strong interest in foreigners and other cultures.

Before the Iranian revolution and the subsequent Iran–Iraq War, tourism was characterized by significant numbers of visitors travelling to Iran for its diverse attractions, boasting cultural splendours and a diverse and beautiful landscape suitable for a range of activities. Tourism declined dramatically during the Iran–Iraq War in the 1980s. Since the Iranian revolution in 1979, the majority of visitors to Iran have been religious pilgrims and businesspeople. Official figures do not distinguish between those travelling to Iran for business and those coming for pleasure, and they also include a large number of diaspora Iranians returning to visit their families in

Iran or making pilgrimages to holy Shia sites near Mashhad and elsewhere. Domestic tourism in Iran is one of the largest in the world. Despite the international tensions, the government continues to project strong rises in visitor numbers and tourism revenue over the forecast period, and to talk of projects to build an additional 100 hotels, for example, to expand its currently limited stock.

6. Urban tourism in cities of the Kohgoliyeh and Boyer Ahmad Province

Kohgoliyeh va Boyer Ahmad Province is situated in southern-west of Iran in the limit between Khozestan, Boshehr, Fars, Isfahan and Charmahal Bakhtiari Provinces with an area of 15517 square kilometers including 5 cities and 16 towns. It includes a lot of attractions and other backgrounds for tourism activities. This Province has a tropical and cold climate and each region has its own special potentialities for tourism. With regard to vast vegetation in cold regions, the ecotourism dominating on the region at the south of Iran is unique and untouched. Therefore, it needs a planning for tourism sustainability. The major cities of this Province which are the centers for the cities have their own characteristics and potentialities for regional tourism.

Generally, urban areas of Kohgoliye va Boyer Ahmad Province, unlike the rapid growth of their population have been encountered with many restrictions in all areas. The major problem of the cities of the province is that, due to an increase in population and without regard to economic and social infrastructure or based on political decisions, they have changed from the village to the city. Thus, their social structure is still rural, while they are all service cities in terms of economic performance. In other words, while the structure of beliefs and life in these cities and towns are rural, they have lost their own productive aspects and economic activities. Another urban development bottlenecks, is related to a lack of long-term comprehensive plans by which we can present the mid-term and short-term plans of developing and constructing the cities based on these plans. It should be noted that this bottleneck is not only limited to the province but it also exists around the country. Most projects that are performed in the cities of the province except the three cities including Dehdasht, Yasouj and Dogonbadan are related to the development of the physical fabric of the cities whose detailed plans have not been approved due to lack of attention to the economic performance of the city (past, present and future) and not to pay attention to the role of city in social, economic, political and administrative system of the province and country.

Some of the effects of urban tourism development in these cities include as follows:

Creating direct sources of income for municipalities

Creating employment and new income for citizens

Helping to develop handcraft industries, arts and national and regional products

Developing the economic and social partnership of citizens

7. Conclusion

Urban tourism development similar to that seen in the cities of developed countries, which is based on the tourist historic city. This form of tourism development comes with the trend of tourism development worldwide and tourist demand, which come either through well planning programmes or 'boosterist' plan by city government.

Urban tourism emerges as a result of intensive development of tourism infrastructure and product that allows a process of urbanisation in the place originally known as a peripheral area. This form of tourism development comes with specific plans from government at all levels, and an economy that is fully generated by tourism activities. Kohgoliye va Boyer Ahmad Province, despite having the important tourism capabilities, has not been recognized as the Province for attracting tourism in comparison to other provinces and big towns of the country. In this respect, extensive and important efforts are in progress by the tourism custodians and we will observe the growth and prosperity of this industry in the field of development and job creation in Kohgoliye va Boyer Ahmad Province in a near future. The unique characteristic and development of such cities in developing countries give a different perspective on how tourism has been adopted. Therefore, these three forms of urban-based tourism require further studies related to the concept of urban tourism that applies in developing countries. It should be address in order to understand the phenomenon and the complexity of urban function, which allow tourism to been accepted.

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Effect of condensed tannin on controlling faecal protein excretion in nematode-infected sheep: *in vivo* study

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Abstract: The main propose of this study was to investigating the short term effects of different levels of wattle tannin to protein excretion control during a naturally acquired nematode infection in Moghani sheep. Twenty Moghani ewes (aged 7-12 months and body weight 32±3 kg) were selected randomly and divided into 4 treatment groups. The animals of the experiment had not received any anthelmintic drugs for 4 month. During the study all animals fed *ad libitum* on Moghan plateau and free access to water. Group 1 received placebo. Animals in groups 2, 3 and 4, were drenched 1, 1.5 and 2 gr per kg body weight (BW) wattle tannin (WT) as water solution for one day, respectively. At 0, 24 and 48 hours after drenching WT from each animal faecal sample was taken and stored in individual containers less than 4°C carried out to laboratory as soon as possible. Faeces nitrogen (N), dry matter (DM), organic matter (OM), Ash and Wet levels determined following the standard procedures. Data were analyzed as a complete randomized design for repeated measurements using SAS (9.1) software and the least square means compared with Tukey multiple range tests. According to our result there was a significant difference between the groups. Twenty-four hours after drenching highest amount of faecal crude protein execration observed in group 4 (*P< 0.0001*). Additionally, Forty-eight hours after drenched WT there was a significant difference in Group 4 compare to the other groups which has lower FCP execration (*P< 0.0001*). There was no significant difference in faecal OM, DM, Ash and Wet content between groups (*P > 0.05*). In conclusion it is observed that administration of 2 gr WT per kg BW leads to decreasing faecal protein excretion and so resulted in nitrogen retention in animals.

1. Introduction

Tannins are the secondary shrubs and trees metabolites and can found in various species of plants (Waghorn, 2008). Previous studies have demonstrated tannins can defense plants against insects and Herbivores by Astringent taste (Hagerman and Butler, 1991; Rosales, 1999) which usually divided into two Major Groups: Hydrolysable tannin (HT) and condensed tannin (CT). These components have differences in structure and Molecular weights. There is D-glucose in base structure of HT and there isn't any glucose in CT whereas CT has higher molecular weight and insoluble in water compare to HT (Mueller-Harvey and McAllan, 1992). Condensed tannin (poranthocyanidins, PAs) is composed by polyhydroxyl flavan-3-ol oligomers and linked by carbon-carbon bonds together (scholfield et al, 2001). Many varieties of fruits, vegetables and leguminous families have different levels of CT (Barry et al, 1984). Previous researchers have shown that tannins of various plant species have different nutritional effects on animals especially on ruminants (Mangan, 1988).

Condensed Tannin interacts with protein and polysaccharides in the rumen by formation hydrogen and covalent bonds (Mueller-Harvey and McAllan, 1992; Schofield et al., 2001; Waghorn, 2008). It could to reduce rumen protein degradation and increase dietary crude protein bypass or non ammonia nitrogen (NAN) and dietary amino acid flow to small intestine (McNabb et al., 1993; Waghorn, 2008). This mechanism is a pH-dependent manner (Jones and Mangan, 1977). Tannin-protein complex was formed at pH <3.5 in the abomasul. This complex is stable in this situation and can be deformed in alkali pH of the small intestine. Condensed tannins shift the site of protein degradation from rumen to the lower digestive tract and large intestine which in small intestine because of pH dissociated protein-tannin complex, caused to degradation protein by proteolysis enzymes which simultaneously increase amino acid absorption, live weight gain, reproductive efficiency and wool production. Researchers suggested high levels of tannins capable to inhibit proteolysis bacteria which these effects on the rumen bacteria, protozoa and fungi populations are variable. There are many reports indicating inhibitory effect of tannins on

rumen protozoa (Patra and Saxena, 2010). Recent studies have shown inclusion grazing sheep and goats with shrub species containing CT can reduce rumen fermentative protein, increase NAN flow to distal part of GIT, and improve N retention, methane production and finally improve animal performance (Waghorn, 2008). Likewise CTs has anti-parasitic effects on small ruminants (Herva's et al, 2000). Recently has been proven that consuming forages containing CT could be considerable reduce in worm burden and nematode egg hatchability in sheep and goats (Athanasiadou et al, 2001). Several studies have shown that consumption tannin-reach plants due to significantly reduction in egg excretion and worm burdens in nematode infected goats and sheep. Max et al (2009) and Sadaghian et al (2011) indicated a significant reduction in Nematode faecal egg counts after drenches different levels of Wattle tannin. They suggested WT drench had significant anthelmintic activity against important nematodes in sheep. Researchers believe CT could increase the flow of essential amino acids (E. A. A.) to small intestine thus, indirectly could enhance immune system of GIT against nematodes, thus decrease endogenous protein execration and improvement sheep performance (Coop and Kyriazakis, 2001). Also, tannins interact with proteins, structural enzymes and ion channels on glycoprotein cuticle membrane of the nematodes which inhibit substrate receiving to the parasite (Waghorn, 2008). The main propose of this study was to investigate the short term effects of different levels of WT to control of protein excretion during a naturally acquired worm infection Moghani sheep.

2. Material and Methods

The experiment was carried out in summer 2010 Moghan plateau, Ardabil province Iran (30°24'35.47" N and 48°18'12.36" E) and 98M above see level. Twenty Moghani ewes, (aged 7-12 months and body weight 30-35 kg (none of them was pregnant or lactating) were identified to naturally acquire gastrointestinal nematode infection using McMaster flotation technique (Urquhart et al., 1987). Animals were identified by number, divided to 4 groups and raised ad libitum during the study on the Moghan plateau natural pastures and free access to water. The animals of the experiment had not received any anthelmintic drugs for 4 month. Wattle tannin powder was provided form the Tanzania leather company LTD. According to the manufacture WT powder contain 62.5gr/kg CT, 21.35gr/kg of simple phenolics. Group 1 was control and received tap water for placebo. To animals in groups 2, 3 and 4 were drenched orally 1, 1.5 and 2 gr WT per kg of BW (Max, 2010) as water suspension in tap water for one day, respectively. To all experimental animals

were given 7 ours fasting period then at 0, 24 and 48 hours after drenching CT faecal samples was collected directly from the rectum of each animal and kept in individual sampling containers under 4 C until used. Faeces protein (CP) dry matter (DM), organic matter (OM), Ash and Wet were determined in Feed Analyses laboratory using following the standard procedures of (AOAC, 1990) in Azad University Shabestar Branch. The majority size of the obvious gastrointestinal eggs in the examined faecal samples using scaled microscope were between 70 - 90 μm. These eggs size were consistent with ones of *Trichostrongylus, Ostertagia, Haemonchus* and *Nematodirus* genus.

Amount of nitrogen as follows:
N (% of sample) = (Volume of acid used in sample titration – Volume of acid used in blank titration) x (acid molarity x 0.014 x 100) / (weight of sample in gram x 1000). Crude protein (%) = N % x 6.25

The dry matter, Om, Ash and Wet content was then calculated using the formulas:
$$DM (\%) = \{(W2-W0)\}/ \{(W1-W0)\} \times 100$$

$$OM (\%) = \{(W2-W0)\}/ \{(W1-W0)\} \times 100$$

$$Ash (\%) = \{(W2-W0)\}/ \{(W1-W0)\} \times 100$$

$$Wet (\%) = \{(W2-W0)\}/ \{(W1-W0)\} \times 100$$

Data were processed in excel and were analyzed as a complete randomized design for repeated measurements using SAS (9.1) software and the least square means compared with Tukey multiple range tests.

3. Results

Composition of WT is showed in table1. Effect of Wattle tannin drenches on faecal protein and other execration components are shown in table2 and 3. In this study, what is clear from our results there is a significant difference between administrations of different levels of WT on faecal protein execration in gastrointestinal nematodes infected ewes. According to the faecal egg count (FEC) examination using McMaster flotation technique after 4 month no drenches to experimental animals all of the ewes were infected to gastrointestinal nematodes and average faecal egg was 486 ± 21. According to the result, Drenching WT to all animals at first 24 hours increased faecal protein execration content in all treatment groups compare to control group ($P < 0.0001$). Forty-eight hours after drenching, group 2 that drenched 2gr WT per kg BW has significantly reduce faecal protein execration content compare the

other groups ($P < 0.0001$) (fig.1). Additionally, there were no significant differences in faecal DM, OM, Ash and Wet content between all treatment groups during the study ($P > 0.05$).

Table1. Composition of Wattle tannin

Substance	Percent
Condensed Tannin	62.5
Simple polyphenols	21.35
Insoluble	0.2
pH	4.9
Ash	1.2
Moisture	16
Acid	30mg eq/lit

Table2. Faecal nutrient execration 24 hours after Wattle Tannin drenching to ewes (mean ± SE)

(%)	Control	Group1	Group2	Group3	P value
CP	13.57 ± 0.15 [c]	14.35 ± 0.12 [b]	14.26 ± 0.15 [b]	15.5± 0.14 [a]	0<.0001
DM	33.87 ± 0.11	33.93 ± 0.10	33.94 ± 0.11	34.17 ± 0.11	0.99
OM	77.24 ± 0.006	77.24 ± 0.005	77.24 ± 0.006	77.24 ± 0.006	0.50
Ash	22.75 ± 0.006	22.75 ± 0.005	22.75 ± 0.006	22.75 ± 0.006	0.49
Wet	66.03	66.03	66.03	66.23	1.00
N	5	5	5	5	Total =20

Table3. Faecal nutrient execration 48 hours after Wattle Tannin drenching to ewes (mean ± SE)

(%)	Control	Group1	Group2	Group3	P value
CP	13.33 ± 0.15 [c]	13.12 ± 0.14 [c]	13.56 ± 0.14 [c]	11.06 ± 0.14 [d]	0<.0001
DM	33.86 ± 0.12	33.88 ± 0.10	33.86 ± 0.12	34.13 ± 0.10	0.99
OM	77.24 ± 0.006	77.22 ± 0.005	77.24 ± 0.006	77.24 ± 0.005	0.50
Ash	22.75 ± 0.006	22.74 ± 0.005	22.75 ± 0.006	22.75 ± 0.005	0.49
Wet	66.03	66.02	66.02	66.23	1.00
N	5	5	5	5	Total =20

Control: received tap water as a placebo.
Group1: received 1gr per kg body weight WT.
Group2 received 1.5 gr per kg body weight WT.
Group 3: received 2 gr per kg body weight WT as water suspension for one day.
CP = crude protein, DM = dry matter, OM = organic matter.*Different letters indicate significantly differences between groups ($P < 0.05$). SE: Standard Error.

4. Discussions

Tannins with their specific structure can produce tannin-protein complexes in the rumen (Waghorn, 2008). This complex caused to reduce microorganism's digestibility ability in the rumen, increase bypass protein and cause to improving

microbial protein synthesis. Amount of this execration is dependent to level of consumed tannin. The reduction of protein degradation in the rumen may occur due to the formation of tannin–protein complexes in the rumen pH and inhibition of the growth and activities of proteolytic bacterial populations. Our findings in beside of WT drenches positive effect on reduce faecal protein execration in nematode infected sheep. Additionally, considering the short time of study (up to48 hours), it can be concluded that the mechanisms of protein supply related to inhibitory effects of tannins against the microbial degradation of diet protein in forestomaches and also too short time for the animals to have elevated immunity response against the worms, were not at work in present study and the only probable mechanism is the direct toxicity of WT for naturally acquired gastrointestinal nematodes (GIN). Similar findings have been reported previously after feeding tanniferous plants experimentally infected animals (Patra and Saxena, 2010). Maximum protein-tannin connections performed within weight tannins 500 to 2000 Dalton. If level of consumed tannin was high this complexes weren't dissociated in small intestine alkali pH and caused to increase protein execration. The greater faecal N excretion has shown in many studies. Also, decreasing in protein degradation can be observation in inhibiting proteolysis enzymes (Coop and Kyriazakis, 2001; Patra and Saxena, 2010). Whereas level of consumed tannin was low it could increase bypass protein which this complex dissociated in small intestine and proteins were depredated by proteolysis enzymes and absorbed.
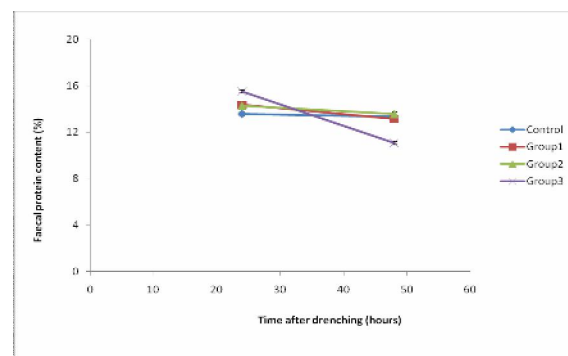
Figure 1. Effect of Wattle tannin drenches to all treatments animals during the study.

Also, Urea cycle performance may give rise in the rumen (Patra and Saxena, 2010). Gastrointestinal blood sucker parasites lead increase in protein execration by lesions in small intestine, decreasing serum albumin and overall total serum protein content (Athanasiadou et al, 2001). In these animals

consumed tannins have 2 benefits. Condensed tannins can directly inhibit phosphorilation oxidative; link to glycoprotein and ions in membrane structures of nematodes. Previous researches showed Wattle and Quebracho tannins capable to decrease nematode infection in sheep (Sadaghian et al 2011). Low levels of WT are efficiency for grazer sheep (Max, 2010). Poncet and Rémond (2002) were demonstrated feeding animal with tanniniferous plants could increase non-Ammonia nitrogen flow to duodenum. Simultaneously, previous researchers were observed fed dairy cows with chestnut tannin for 8 week could reduce 50% in faecal execration protein (Sliwi´nski et al, 2004). In this study drenching WT can decrease protein execration in during a naturally acquired nematode infection after 48 hours. It seems CT reduced infection in these ewes and subsequently improved protein absorption. However, the inclusion of high levels of the Quebracho tannin in diets of cattle and feeding legume shrubs to sheep reduced feed intake and apparent protein digestibility (Patra and Saxena, 2010). Previous researchers have been shown feeding chestnut decrease protein execration in dairy sheep and cows (Kriaa and Thewis, 1999; Sliwi´nski et al, 2004). Execrated protein has two sources: Endogenous and diet base protein. The ability of tannins to protect protein degradation in the rumen are well documented, but it's too difficult demonstrate kind of this protein (Patra and Saxena, 2010). Finally, our result was illustrated that drenches WT had reduced faecal protein excretion and improved nitrogen retention in Nematode infected sheep.

5. Conclusion

Tannins interact with proteins predominately via hydrogen and covalent bonds, forming tannin–protein complexes and thus preventing degradation of protein in the rumen. These tannin–protein complexes are dissociated in the abomasum, releasing protein and increase non-ammonia N flow in the intestine for absorption. Moderate concentrations (depending upon the type of tannins) of tannins in diets improve body weight and wool growth, milk yields and reproductive performance. While tannins may shift N metabolism from rumen to intestine, the effects of tannins on large intestinal protein metabolism and microbial populations are not known. Tannins can exert beneficial effects environmentally by shifting N excretion from urine to faeces and decreasing methane output. Not all types of tannins produce beneficial nutritional and environmental responses. There is evidence that the structure of tannins may influence physiological effects such as nitrogen metabolism, rumen microbial populations, intake and performance of animals, which has not been studied well in ruminant nutrition (Patra and Saxena, 2010). Many studies are requiring to identifying clear advantage of tannins on the ecology of rumen.

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11/5/2011

Absorbing Foreign Investment in a Developing Country: an Application of Balanced Scorecard Model Case Study: Iran

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Abstract: Capital accumulation is one of the principle prerequisite in economical growth process. Theoretically capital injection is done through this idea, and the economists believe that capital is the engine of economy growth. Financial provision for capital is possible through two ways of internal resources and external resources. In twenty year vision and the absorption law and supporting foreign investment, the fifth laws of economy development and also cultural and social development in Iran for absorbing the foreign investment, suitable regulations have been devised for improving the business environment, and this case leads to suitable growth in absorbing foreign investment in recent years. But due to high potential and rich natural resources such as petrol and gas, expected economy growth in fifth program, there is an urgent necessity for absorbing foreign investment. Different econometric models have been processed in different studies for identifying the effective factors on investment and developing the investment, but the balanced Scorecard pattern has not been used. In this article, we try to suggest necessary measures and programs for development and absorbing foreign investment by using this method and designing suitable strategy and action plan, using SWOT method and also preparing action plan, that it has big effect on absorbing foreign investment and suitable development in country investment. [Mohammad Doudangi, Amir Mansour Tehranchian, and Masoud Behravesh. Absorbing Foreign Investment in a Developing Country: an Application of Balanced Scorecard Model Case Study: Iran. Journal of American Science 2011;7(5):901-906]. (ISSN: 1545-1003). http://www.americanscience.org.
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Key words: Absorbing Foreign Investment, Balanced Scorecard Model (BSc).

1. Introduction

Capital accumulation in terms of theory is one of the principle prerequisite in economy growth. Theoretically, capital flow is done through this idea that, capital is the engine of economy growth. Financial provision for capital is possible through two ways of internal resources (savings and governmental resources) and foreign resources (foreign debts and foreign capital absorption). In twenty year vision of Iran for achieving the first economy level, science and technology in area, the booming growth of economy has been emphasized, for this reason it is necessary to pay attention to foreign and internal investment resources. Also suitable preparations have been expected, with attention to laws and regulations in Iran and the fifth program Law of economy development for as the action plan of absorbing and supporting and developing foreign and internal investment, improving the business environment. the complete performing of whole politics of 44 basic of principle law for supporting private sector, increasing the efficiency of production factors (work, capital and

energy),increasing the rate of open economy (goods and capital),and it is expected that we have growth in foreign and internal investment by hardworking and taking way the internal and external barriers or problems. In the field of effective factors of internal and external investment in Iran, many studies have been done, and in many studies measurements pattern have been used, but by examining that has been done, the balanced Scorecard has not been used for identifying the strategy and problems and also presenting action plan for absorbing and developing investment. This article tries to present specified suggestion for investment development by using new methods and the Balanced Scorecard Model (BSC), and this method will have some problems since it is a new method, that we try to solve these problems by helping of professors and researchers.

2. A Short Brief of Foreign and Internal Investment Trend in Iran

In investigation of net investment trend(net capital accumulation)in Iran and the investment trend and based on data issued by Central Bank (CBI,2010)

of Islamic republic of Iran the net capital (to stable price of 1997) in 1974 has been 388864 billion Rial that by growth rate of annually 4/65 percent has reached to 1745489 billion Rial. The rate of net capital growth shows that, the increase or decrease of capital has direct connection with price of petrol income, in such a way that in 1974 the exporting of petrol by Arabic countries was stopped, the petrol incomes of Iran have been increased 4 times more than before and this trend continued till the Islamic revolution in Iran, and the rate of net capital growth has been in high level and in 1988 and 1990 the petrol price decreased ,the rate of net capital growth has even been negative. In other years, this rate of growth had positive average growth of 2 to 4 percent in a year and in recent years (from 2001 t0 2007) due to suitable petrol price the government special attention to support the private sector and also giving bank facilities for performing employment plans and supporting investment for rate of unemployment, we can expect increasing rate of growth in net capital. By changing the Rial value to dollar's value and due to high rate of fluctuation for dollar price in recent years, we observe instability in growth rate trend and the amount of net capital, in such a way that the amount has been decreased from 5718 billion dollars in 1974 to 186.5 billion dollars in 2007, that this trend does not have adaptation with ability of buying investment which has been done and the analyzing of capital trend should be done base on Rial value. Also the statistics show that, trend of gross fixed capital formation in respect to constant prices (1997), in 1960 the gross fixed capital formation has been 12123 billion Rials in 2007, with the growth average rate of 5,9 percent has reached to 181029 billion Rial, which during 47 years the amount of gross investment 150 times increased, that this variant has been effected by petrol price fluctuation and petrol income and the positive or negative shocks of petrol the same as net capital variant. Regarding to changing the Rial investment to dollar and with attention to dollar rate of fluctuation, it is clear that the gross fixed capital establishment in 1960 from 159,5 Billion Dollars has reached to 19,3 billion dollars that, this decrease in dollar investment is due to dollar rate increase from 76 Rial to 9357 Rial (for each dollar)in 2007. The foreign direct investment absorption trend (FDIinflows) in Iran also show that the foreign absorbed investment from 105 million dollars in 1982 has reached to 1658 million dollar in 2007, which has had average annual 11, 7 percent during the studied period, which is not a big amount in regard to the whole investment in Iran and there is a big capability is country for absorbing foreign investment.
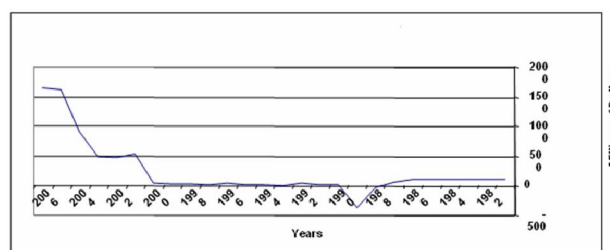
Figure 1. Trends of Net Capital Stock (at constant price 1979) in Iran
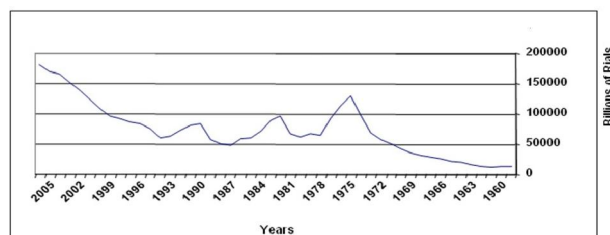
Figure2. Trends of Gross fixed Capital formation (at constant price 1979) in Iran
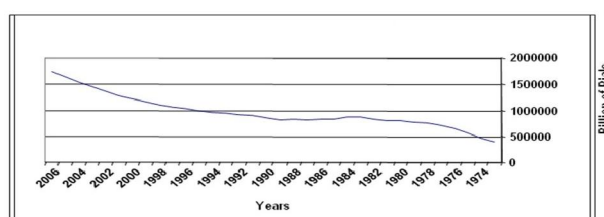
Figure3. Trends of FDIinflows in Iran

3. A Brief Explanation about BSC Model

The Balanced Scorecard model was recommended Kaplan from Harvard University for the first time, and this model tries to present a method to reach the processed vision through processing suitable vision and choosing the major directions to achieve the vision in different levels and presenting action plan to achieve the goals. The balanced assessment model is a technique for changing the strategy to action, in other words the above model is a technique for making the goals operative, and also the strategies and mission of organization not just for controlling and its criteria is not used for the past functions, but these criteria are devices for determining the strategy of the organization, that by coordinating the activities in different levels of organization makes it possible to achieve the organizational goals. This method has seven steps of actions which are briefly in the following:

- ***First step***: processing the vision and choosing the main directions for achieving the

vision which should be done by SWOT methods based on analyzing and assimilation the weakness and strength points, the opportunities and threats.

- **Second step**: Specifying the important perspectives which are the result of analyzing and assimilation of critical success factors.
- **Third step**: drawing the strategy map specifies the goals for every vision
- **Fourth step**: We should determine the critical success factors for every goal.
- **Fifth step**: Setting up performance measurement for every critical success factors.
- **Sixth step**: determining the numerical targets
- **Seventh step**: for achieving the numerical targets we should prepare action plan

It has to be mention that, we should follow different steps which in not possible to present in this article.
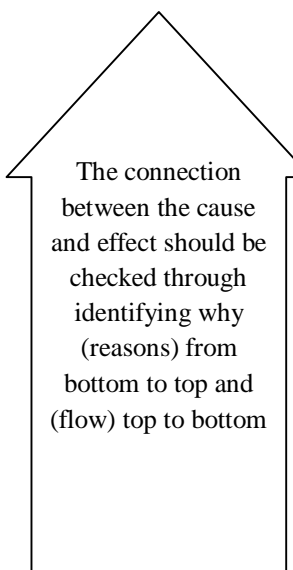
4. Applying the Balanced Scorecard for Developing the Foreign Investment in Iran

For applying the pattern, the seven step levels in tables are organized which needs to process the vision for this case, and by emphasizing in different laws, we can consider supporting the foreign investment as the significant vision for government and for gaining this goal, significant measures have been done by Iran government or it is doing, also in this way there are many opportunities and threats, weakness and strength, which are mentioned in table, and they are achieved through studies and viewpoint of expert in this field. Since the topic is very expansive, we try to mention some of the most important points.

Table1. Build the vision and Set up the strategies

External environment analysis	Build the Vision		Internal resources Analysis
1-The economy and political sanction against Iran 2-Negative propaganda against Iran 3-economic and trade counselor in Iran embassy 4-high risk of country in risk category 5-lack of cooperation by world bank and IMF to Iran 6- Iran's strategic position in the region 7-competitor countries for absorbing investment. 8-Low motivation for foreign investors in Iran 9-The economy crises of world and its effects 10-The capital input and output flow in the world 11-increasing world price of petrol 12-electronic trade improvement 13-investment variation and changing to other kind of investment 14-high cost price in big capitalistic countries 15-possibility to transfer modern technology beside capital 16-different tariffs and bilateral agreement and different dimensions among countries 17-security threats and terrorism actions in the world 18- lack of multinational companies activity in Iran 19-conflicts and low securities areas 20-Economic recession in many countries		Supporting and absorbing foreign investment	1-Free and economy areas 2-Having industrial zones 3-Having investing organization and defining investment opportunities 4-Having suitable regulation for supporting investment 5-To be fresh and virgin country to accept new project 6-High profitability of investment designs 7-Delay in issuing warrant in executive offices 8-not suitable business space 9-Negative idea of people and some governors to foreign investors 10-Lack of substructures in some areas 11-Rich petrol resources. 12-cheap labor force 13-The fluctuation of stock price and inflation rate 14-economy stability 15-suitable motives for investment 16-dominant governmental economy 17-problems related to job law 18-the number of centers for making decision 19-high interest rate of banks 20-Lack of entrusting for provinces to solve problems.

(The table's middle column as rendered below)

(Strength)	(Weakness)
1- Free and economy areas 2- Having industrial zones 3- Having investing organization and defining investment opportunities 4- Having suitable regulation for supporting investment 5- To be fresh and virgin country to accept new project 6- High profitability of investment designs 7- Rich petrol resources 8- cheap labor force 9- economy stability 10- suitable motives for investment	1- Delay in issuing warrant in executive offices 2- not suitable business space 3- Negative idea of people and some governors to foreign investors 4- Lack of substructures in some areas 5- The fluctuation of stock price and inflation rate 6- dominant governmental economy 7- problems related to job law 8- the number of centers for making decision 9- high interest rate of banks 10- Lack of entrusting for provinces to solve problems
(opportunities)	(threats)
1- economic and trade counselor in Iran embassy 2-Iran's strategic position in the region 3- The economy crises of world and its effects 4- The capital input and output flow in the world 5- increasing world price of petrol 6- electronic trade improvement 7- investment variation and changing to other kind of investment 8- high cost price in big capitalistic countries 9- possibility to transfer modern technology beside capital 10- Economic recession in many countries	1- The economy and political sanction against Iran 2- Negative propaganda against Iran 3- high risk of country in risk category 4- lack of cooperation by world bank and IMF to Iran 5- Competitor countries for absorbing investment. 6- Low motivation for foreign investors in Iran 7- different tariffs and bilateral agreement and different dimensions among countries 8- security threats and terrorism actions in the world 9- lack of multinational companies activity in Iran 10- conflicts and low securities areas

Set up the strategies
- absorbing foreign investment
- improving business space
- neutralizing the economy and political sanction

Table2. Define the important perspectives

The major vision and directions (mean):	The important perspectives which are effective through main direction(reason)	Optional visions (by obeying succession order):
-Supporting the foreign investment -improving the business environment -neutralizing the economy and political sanctions	1-Decreasing the useless bureaucracy 2-suitable activities in international Level for neutralizing the sanctions 3-Changing the negative viewpoint of foreign 4-improving the business environment in IRAN 5-Suitable interaction with different countries 6-Improving suitable situation for absorbing capital 7-providing necessary substructures for absorbing capital 8-high advertizing on international levels for introducing opportunities and investment packages 9-suitable advertizing for introducing the security on international level 10-developing free economy areas 11-cultural activities for changing people view to foreign investment 12-controlinng inflation rate 13-Supporting economy and trade section of embassies 14-decreasing the risk level in international level 15-supporting the responsible official in investment 16-creating informing sites 17- Supporting economy for neutralizing economy and political 18- supporting and Strengthening capital institutes 19- Extend guarantees and insurance for foreign and domestic investors 20- Introducing appropriate incentives for investors	1-developing investment and absorbing investment 2-improving the business environment in IRAN 3-Supporting economy for neutralizing economy and political 4-Introducing suitable motives for investment 5-changing the negative view of foreign investors to Iran The connection between the cause and effect should be checked through identifying why (reasons) from bottom to top and (flow) top to bottom

Due to following the planed step levels in Balanced Scorecard (BSC) and with attention to fifth program assumptions of the economical and cultural development and the 44 major policies which was submitted to support the private sector and absorbing the investment, also supporting foreign investment and designed perspective, goals, the condition of Iran in the category for business environment, Some executive designs and programs that can be effective for reaching to goals and perspective in a five year program, are as follows. It has to be mentioning that, these executive programs are recommended as a part of programs and by expanding the tables in every step, there is a possibility for other recommendations.

1-Laws and regulation reformation for decreasing the time for giving the warrant for business activities and executing investment designs such as: entrusting suitably to provinces fir omitting useless levels in receiving warrant and decreasing the number of inquiry and decreasing the time for answering the inquiry, determining a custodian institution and the warrant owner for issuing warrant, to active united trading and investing window in provinces and investment organization for issuing warrant in one place along with executive custodian offices, mechanizing demand inquiry and issuing warrant for preventing from wasting the investor's time, reforming the work and insurance and trading laws and…

2-Continous observation on suitable execution of 44 laws basic for supporting the private sector and making government small.

3-Finding the problems of governmental institution offer for transferring to private section and solving the problems in these units.

4-Supporting the private sector for company with foreign investors to execute the investing designs.

5-allocating some percentage of credits from governmental executive for supporting the credit of custodian investment

6-Verifying the foreign investment which has been done in country

7-Providing a part of substructure costs from foreign investment

8- Creating order and security in money markets for preventing from fluctuation of inflection rate and foreign rate and foreign exchange rate in internal markets.

9- Mechanizing of companies registering process by decreasing the executive time of registering of companies and defining the maximum amount of time for registering the companies.

10- Setting up the comprehensive electronic system for registering the properties and movable properties.

11- Confirming and executing of protecting ownership rights and intellectual

12- Executing the value added tax in all economical sections and transpiercing the laws and regulations.

13- Suitable decreasing of tariffs for goods and services import charges with suitable support of internal goods production.

14- Simplifying the input and output process of goods and making the tariffs logical for decreasing the good smuggling amount.

15- Simplifying and competing the presenting of facilities for business activities of private sector.

16- Simplifying in giving activity warrant to bank and insurance, the financial institution of private sector and foreign sector for increasing the competition for suitable presenting of services

17- Decreasing the time of issuing the goods imports and exports, transpiercing the laws and regulations, simplifying and convenient in trade with structural reformation in customs.

18- Supporting and developing the free areas of economy for absorbing the internal investors and foreign ones, and Iranian out of Iran.

19- Creating industrial cluster for supporting production units and establishing the production chain.

20- Providing executive program for justice supporting of investment.

21- Giving suitable subsidy by government to investors for investment and creating employment.

22- Preparing investment packages by providing necessary substructures for performing the investment designs and defining of motives for investors.

23- Simplifying firms closure process and informing the institution bankruptcy.

24- Setting up information sites for introducing investment opportunities.
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25- Holding Special seminars and meetings for absorbing investors presenting investment packages in and of country

26- Active attending of Iran in international constitutions for combating with economical and political sanctions.

27- Drawing up cooperative economical and commercial parallel contracts with countries of goal for decreasing the effects of sanctions.

28- Decreasing the expenses of investment designs execution in every step of the performing design from issuing the warrant step to revenue step (from permit stage to operation license stage)

29- Organizing the stock and negotiable paper market and making possibility for entering the foreign investors to stock.

30- Simplifying the process for transferring the governmental institution to private section.

6. Conclusion

In the 20 years perspective or vision and law for absorbing and supporting the investors and the fifth development program law of Iran(2011 to 2015),Due to significance of investment ,for absorbing foreign investors and improving the business environment, suitable laws have been devised, and this case led to suitable growth in absorbing foreign investment ,that in this article we try to use balanced credit foreign investment, that in this article we try to use balanced Scorecard and following the executive levels, having suitable goals and vision, collecting capability and facilities, limitation, opportunities and threats (SWOT) and suggesting the designs and executive program, it is tried to recommend a method for absorbing investment, improving the business environment and decreasing the degree in international category , and it is expected that by performing these suggest we reach high level of foreign and internal investment. We have to mention that, with attention to sanctions against Iran, and negative propagandas and showing Iran situation very unsecure and unstable, there is high percent of profiles, many neutralizing measures are necessary for these activities so that Foreign investors are motivated for activity in the country and the statistic trend of investment in country show and prove this case, but the absorbing ability from resources in Iran is more than the present trend.

5. The Action Plans and Programs (The Seventh Step)

Table3. Determining the perspectives, critical factors, indexes, numerical targets in five year program (2011 to 2015)

perspectives title(the second step)	goals(the third step)	The critical success(the fourth step)	indexes(the fifth step)	The numerical targets(brief 6 step)
perspective 1 developing investment and absorbing investment	-Suitable performing of privatization policy -Supporting the executive offices related to investment	-The problems of companies that are transferring -Complexity of laws and regulation in the privatization trend	-absorbing rate of foreign investment -Time of transferring the institution to private sector	9.7 percent growth annually (ideal state of 20 billion dollars in year) 6 month for transfer
perspective 2 improving the business environment	-creating united trade and investment window -increasing the open economy rate	-Laws and regulations that are restricted for creating united window -Barriers for investment	improving the business environment of Iran in the world	decreasing the Iran degree from 129 to 100
perspective3 supporting the economy for neutralizing sanction	-creating stable politic -Increasing the production	-The economy and political sanction -The competition strength of productive companies which are lower than foreign companies	-economy growth	8 percent of annually
perspective4 Introducing suitable motives for investment	-Introduction the investment opportunities -Decreasing the cost for performing investment	-Lack of cooperation between responsible offices in introducing the investment opportunities -The tariffs , and imposed expenses on production	-Time of issuing the primary and last warrant for business	The first warrant to 10days and the last warrant to 30 days
perspective5 changing negative view of foreign investors to Iran(in term of investment)	-transparency and informing -Increasing domestic and foreign investors confidence	-Negative propaganda against Iran -Negative belief in regards to Iran from different countries	-The rate of absorbing foreign investment -non petrol exports	annual growth of 9.7 percent (ideal state 20 billion dollars every year)

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Development Model Based on Value Chain in Bam's Date Industrial Cluster

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Abstract: In this study, we review the development of value chain of industry clusters. At first we benchmark Bam Date Industrial Cluster with sample firm of cluster. Then we benchmark Bam Date Industrial Cluster with Tunes as a successful country. As a result we observe pressure points of Bam Date Industrial Cluster; lack of pricing, lack of grading and undesirable packing. And finally we suggest obeying two strategies about market expansion and quality promotion.
[Setareh Rezaee, Armin Rajabzadeh and Nayere Karegar. Development Model Based on Value Chain in Bam's Date Industrial Cluster. Journal of American Science 2011;7(5):907-914]. (ISSN: 1545-1003). http://www.americanscience.org.

Key words: Value chain, Value chain analyze, Industrial cluster, Bam Dat.

1. Introduction

For a considerable part of the countries of the world, making connections to the global networks of economy is faced with new challenges. Such challenges originate from two main resources:

a)   Weakness as the business agencies level

b)   Deficiency of the working environment

It is obvious that improvement of the current conditions is subject to the global economy and needs interaction in both the above-mentioned areas. However, the reality is that in accordance with the experimental evidences, there is generally a starting point of improvement process within the business agencies which they take measures for finding and creating opportunities through examining of the global situations and followed by them, the governments take facilitating this process into account with the goal of businesses in their minds. There also exists another direction which certainly is the growth of inequality among the countries as a result of both using and disusing of the globalization opportunities. Such disequilibrium can be observed in various personal, family, institutional, civic, regional and country levels. During the recent years, a vast amount of resources has been allocated to various social, cultural, and… aspects of the globalization. Many issues have been made available within the areas of economy and management. But one question is still aroused that which pragmatic method can lead toward gaining more share of the globalization trend? Previously, there existed some linear attitudes regarding connecting different business rings to each other which are still tracked by the very familiar term of the chain of supply. This attitude is the result of a one-dimensional attention to the products and services of the production chains. As the result of globalization and the spread of a generalized look into the social-economical phenomena, the issue of management of the supply chain also affected by this generalized look gradually and was affected by other areas and systematic applications led toward a more comprehensive idea named as the value chain. The subject and concept of the value chain later turned into a new thinking method, not merely a technique in arena of policy making; in such a way that managers and policymakers achieved new capabilities by utilizing from this idea and innovation in thinking and the performance methods. In other words, the approach of chain of value was able to assist the agencies in finding some industrial pragmatic and realistic solutions and directed the development policymakers toward the implementation of new developmental and highly ambitious plans. From the view point of policymaking of development, the value chain has now turned into one of appropriate, systematically functional frameworks in order to develop both the industry and the business. The current study attempts to study the processes for the production of cluster products by the application of the analysis of value chain of Bam's date cluster and comparing it with a successful sample inside the cluster and a similar industrial sample at the international level.

2.   Literature review

Cluster refers back to a series of business units (enterprises) which has been centralized in a defined or determined geographical region and/or an industrial branch or orientation and it provides for or offers some products and services via cooperation and supplementation of each other's activities and encountering with challenges and utilizing from some common opportunities. Recently, considering the successful experience of the industrial regions in the developed countries, a new solution with respect to the small industries in developing countries have been stated and the potential of the clustered small companies is economically efficient and strongly affect the mechanism of growth and development in the industrial regions. This case has drawn the particular attention of researchers while studying about growth and development (Rasmussen, 1992; Pederson, 1994). The study of the industrial clusters is increasingly a general type of the economical analyses applied for the regions. (Feser and Luger, 2005). Isserman (2005) discusses that it is necessary to study clusters for the basic studies of the social economics. The analysis of clusters of the region usually includes the widespread analysis of the characteristics and industrial foundational infrastructures, regional interactions with the national and global economy and the official and unofficial network behaviors are conducted by means of the local businesses. (Feser, 2005). Feser and Luger (2002) both discuss that the analysis of regional clusters must be looked at as the flexible model of the research rather than a unique methodology. The qualitative and quantitative diversity of the research plans and possible analysis of the specific techniques may be proportionally dependant on the available policymaking and planning procedures. It means that the diversity noticed in the methodology should not indicate the conceptual nonconformity of the clusters meaning or should not be imagined as a failure of the academic associations regarding the development of an optimized method (2005). One of the main rings of the cluster studies is the study of the chain of value. The chain of value refers to a series of value generating activities regarding conversion of a concept and idea into a disposable product or service to final consumer via different phases of design, production, marketing, and sale and sometimes through the recycling process. The analysis of value chain is defined as a method by which, the generated values or those values with the potential to be generated within each of the segments or rings of the chain are evaluated and analyzed. Among the applications of the chain value analysis, one can

mention the analysis of all processes mentioned during chain of supply and production and distribution and identification and evaluation of the amount of contribution of each process in the final value of product, comparing them by the similar products and processes and determining the strengths and weaknesses of each process during the formation of final value of the product, so that by eradicating weaknesses and reinforcing strengths, a more appropriate condition could be provided for the product within a competitive atmosphere. The optimization of the value chain is a process during which, the value of this generable maximizing in a ring/segment of the chain at which the target industry has presence, can be traced by applying some specific methods. The maximization process of the generable value can be performed at the one or more than one segment level or can be performed through the total chain. Policymaking and planning based on the value chain is the method of policymaking which refers back to procedures where it is possible to implement development plans by creating mutual interactions between "optimization of value chain", "regional development", "improvement of business development services" and "the economic policies". There are various models in order to develop small and average sized businesses. The value chain analysis model at corporate and cross-corporate levels, is one of the most capable models based on which, one can extract some reliable quantitative data for the decision making. This model was presented in year 1985 by Michael Porter, one of Faculty of Management's professors in Harvard University and it has been applied for more than 30 years through all developed and developing countries and also organizations like UNIDO (United Nations Industrial Development Organization), UNDP (United Nations Development Program), OECD (Organization for Economic Co-operation and Development) and ILO (International Labor Organization).

The chain of value model is a model which is based upon networking of industries which can be applied both at internal local agencies' internal level and several agencies level. Activities included in the manufacturing organizations can be divided into two main activities and logistic activities the aim of which, is to provide a value level to the customer and not only covers the expense of activities, but it can bring about a suitable profit margin. In this model, on one hand, there are suppliers and on the other hand, there is consumer and segments of marketing, design, construction, sale, distribution and after sale services which are working cooperatively.
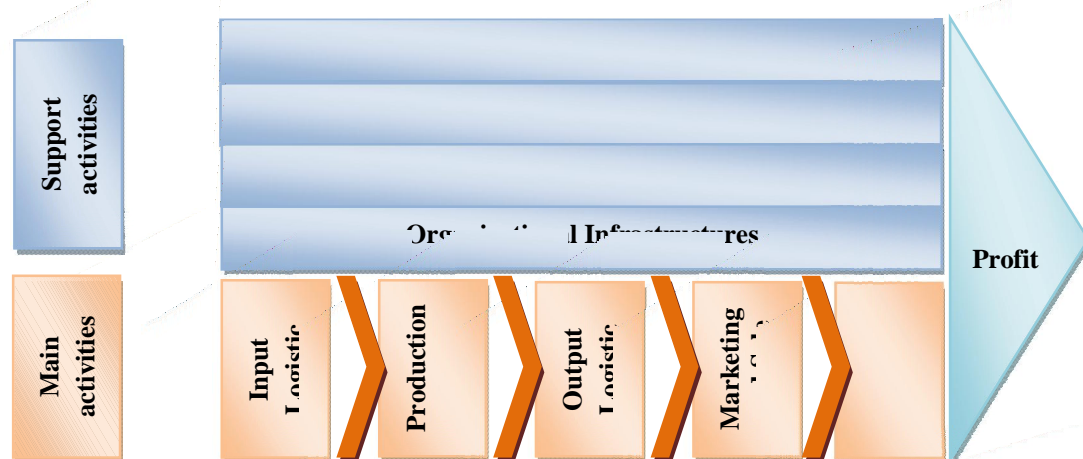
Fig 1. General model for intra-corporate value chain
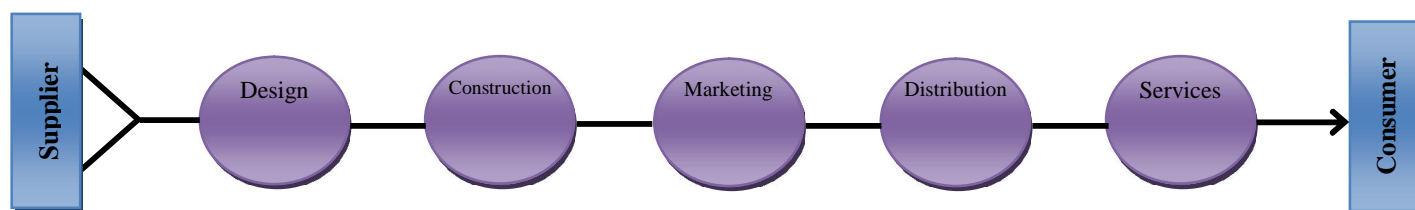
Fig 2. General model for cross-corporate value chain

3.   Methodology

The methodology in this study is of a field type. The method for studying the development model based on Bam's date industrial cluster value chain is of comparative analytical method. It means that the value chain of an agency has been selected as a successful sample taken from inside of cluster and/or a successful industry at the international level and through the comparison of Bam's date industrial cluster with the selected sample and the successful sample of Tunisia, the

Pressure points are determined and all decisions and formulation of later strategies are made in accordance with such points.

4.   Comparison of Bam's date industrial cluster value chain

Bam's date industrial cluster is located in Bam city of Kerman province having 130 industrial units. Among other working units of this cluster are 18 logistics departments, 45000 people who supply raw material, 2 units which supply machineries. Under the current situation, this cluster has 5825 employees, annual sale value amount of 1450000 million Iranian Rails, and an amount of 26 Million dollars of the annual export value. In order to compare the value chain of Bam's date cluster with other production centers and/or countries, the information available from both the inside and outside the country has been used that the accessible data of inside the country was that of the sample unit of inside of the cluster and the country of Tunisia's date information was available from the outside of the country which are going to be compared in here.

a) Comparison of Bam's date chain of value with the sample unit in the cluster

We compare the expenses of Bam's date industrial cluster in the local markets with the cluster dynamic sample unit. (Prices are in Iranian Rails).

Now, in order to evaluate and compare the value of each phase, we divide the costs into the sell amounts and divide each one of the sumptuary components into the cost centers included here. The cluster's value chain is in the shape of following diagram for the first stage up to the last one for the first cluster (primary number) and sample unit (secondary sample):

Date
0.99180.99

Plastic containers
0.0023-0.0022

Transport
0.0058-0.0077

Raw materials
0.5356-0.4545

Disinfect, grading and packing
0.1018-0.0960

Maintenance
0.0343-0.0325

Marketing
0.1312 -0.1140

Transportation
0.0218 -0.0175

Packing
0.6625-0.6510

Quality
0.0306-0.0520

Labor
0.2760-0.2604

Transport
0.0306-0.0364

Disinfect
00 00

Grading
100-100

Marketing
0.0476-0.1228

Distribution
0.4761-.04385

Sale
0.4761-0.4385

Print & Design
0.2380-0.3333

Box file
0.7142-0.60

Plastic
0.0476-0.0666

Buying dealer
100-100

Brand
0.40-0.3571

Advertisement
0.10-0.1071

Attending exhibitions
0.50-0.5357

Selling agency
100-100

Fig 3. Value chain diagram of Bam Dates Clus.   .plary unit within the cluster

Table1. Calculation of the value chain of Bam Dates Cluster and the exemplary unit within the cluster

Product	Industry	Raw material	Grading & Packing	Maintenance	Marketing	transport	prime cost	Sell	profitability	Profit Ratio
750 grams of File box	Bam Cluster	8570	1630	550	2100	350	13200	16000	2800	17.5
		0.5356	0.1018	0.0343	0.1312	0.0218				
	Sample Unit	9090	1920	650	2280	350	14290	20000	5710	28.55
		0.6510	0.0960	0.0325	0.1140	0.0175				

Resource: Research findings (based on report data of analytical study of Bam's date industrial cluster)

The expenditure or non-expenditure while comparing cluster with the sample industry can easily determine the problematic points of cluster for us. In accordance with the above diagram, the process of supplying raw materials at the cluster level owns the highest contribution in the value chain. If we try to divide this process into the related subsections, we will see that supply of date allocates more than 99 percent of the cost of raw materials for producing such a product (99.18 percent from 53.56 percent). The reason for costliness of this type of raw materials is the lack of presence of the trade associations, consistent bodies to purchase high amount and lack of the good quality materials by considering the unit's requirement. The other process, having a high contribution in the chain of value, is the marketing and sale cost which includes 13.12 percent of the sale price. This occurs as a result of some major reasons. Non application of mechanisms for distributing products in the local and foreign markets through establishment of some integrated trade associations and bodies of sale at shops and agencies of such trade associations, several disqualified or poor quality transportation vehicles used for delivery of product to be sold at the local and foreign markets, poor advertisements for presentation of a well-known brand inclusive of the cluster level in different places of the country and the world and the impossibility of return of money earned by sale of more products at the foreign market due to the matter of brokerage, all have lead to the increase of the contribution of this segment of the supply chain. Alongside the cluster's value chain, an amount of 10.18 percent is related to the production and packaging activities, which indicates the high level of value created during this process. This issue is the result of non application of washing and grading equipments due to the soft texture of the Mazafati date product in comparison with other varieties, lack of appropriate acculturation in order to change the habit of producers for replacement and making changes at the current packing systems at the cluster level and non application of skillful and trained labor for the purpose of packing. In addition, a major portion of packing is done in the gardens and/or at homes in

semi-traditional and semi-sanitary manner and this has lead toward the high contribution of this segment of the supply chain. According to Almas Porter, the comparison of 2 chains of cluster value with sample industry at the local market is entirely evaluated at 4 different areas. These areas include supplying raw materials, labor, production and the market.
- **Raw materials**
Regarding raw materials, the sample unit has higher quality raw materials (organic type) in order to offer at the local and foreign markets when compared with the cluster.
- **Production**
1- Grading and packing of sample unit in comparison with the cluster has better performance
2- Disinfection of none of the processes conforms to any specific standard.
- **Labor**
With respect to labor required for packing, none of the units use the skillful and trained human labor.
- **Markets**
With respect to marketing of the sample unit because of branding and more advertisements and attendance in the exhibition, this segment is enabled to better present its product.

B) A comparison of value chain made among Bam's cluster, sample unit in the cluster and Tunisia as a successful country in the export market

In this section, a general comparison has been made in the area of cluster's value chain of date of Bam, sample unit in the cluster and country of Tunisia as the successful country the result of which have been presented in the following diagram. Regarding the export markets, we compare cluster's expenses, sample unit and country of Tunisia as the successful country. It is necessary to mention that all expenses for this section relate to date exports.

The cluster's chain of value from the starting point till the end for the first cluster (primary number), sample unit (secondary number) and country of Tunisia as a successful country (tertiary number) will be presented as the following diagram.
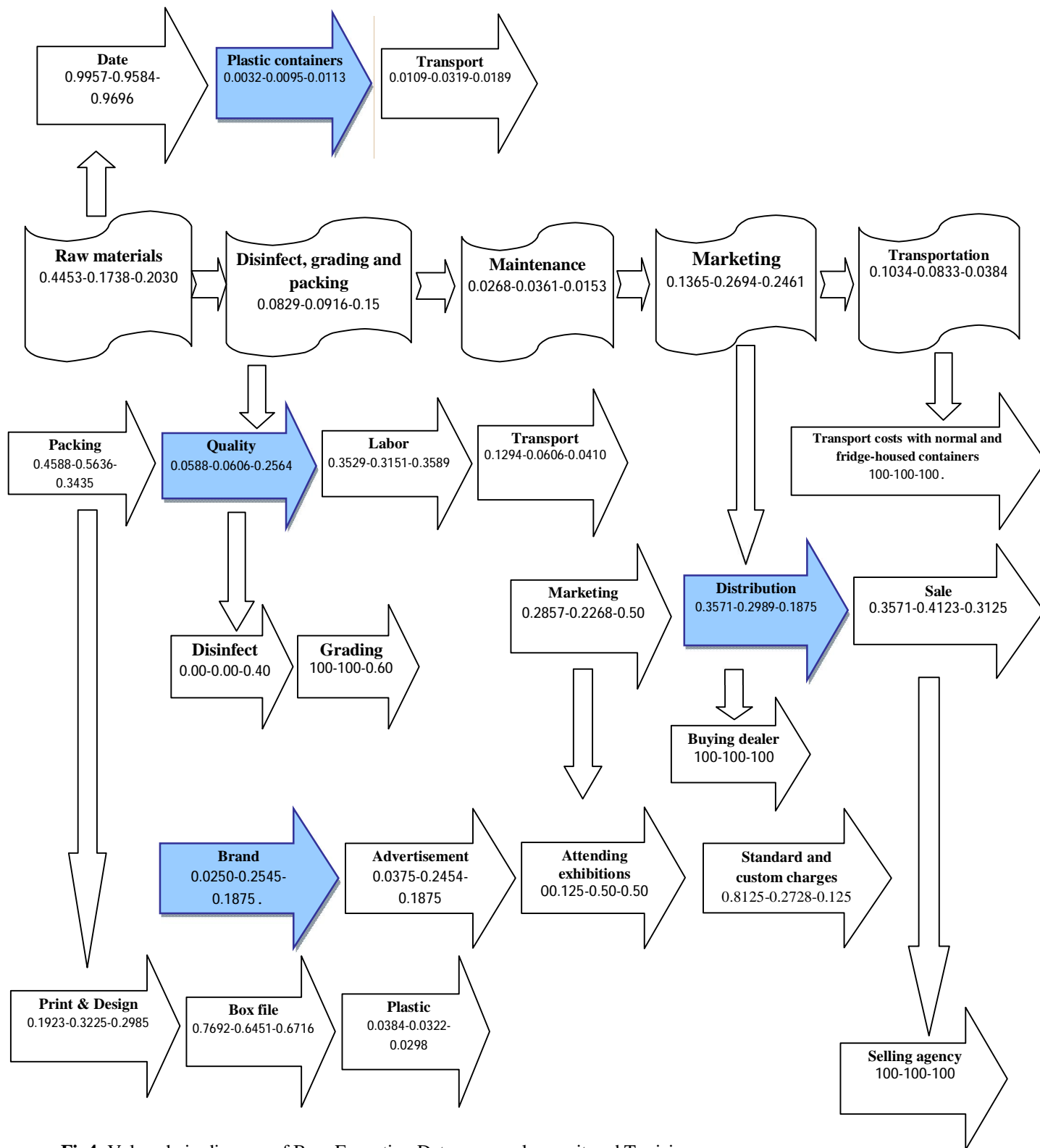
Fig4. Value chain diagram of Bam Exporting Dates, exemplary unit and Tunisia

Table2. Calculation of the value chain of Bam Exporting Dates Cluster and the exemplary unit within the cluster and Tunisia

Product	industry	Raw material	Grading & Packing	Maintenance	Marketing	transport	prime cost	Sell	profitability	Profit Ratio
750 gramms File box	cluster	9130	1700	550	2800	2120	16300	20500	4200	20
		0.4453	0.0829	0.0268	0.1365	0.1034				
250 gramms File box	Sample	3130	1650	650	4850	1500	11780	18000	6220	34
		0.1738	0.0916	0.0361	0.2694	0.0833				
250 gramms filebox	Tunisia	2640	1950	200	3200	500	8490	13000	4510	35
		0.2030	0.1500	0.0153	0.2461	0.0384				

Resource: Research findings (based on data of study report regarding Bam's date industrial cluster

Fig5. Comparing production expenses of Bam's cluster with Tunisia
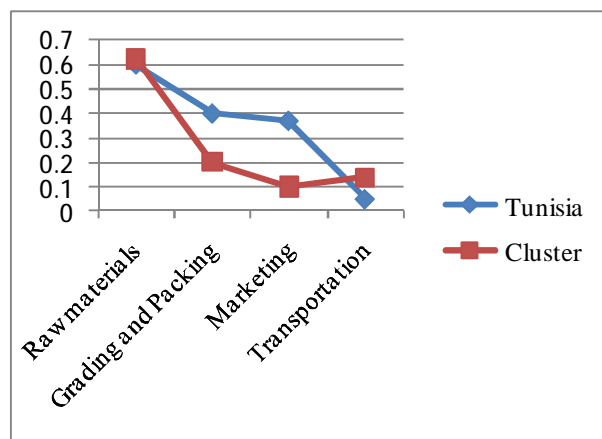
Based on the diagram and analysis of the cost centers according to Almas Porter, the following comparative results are gained:

- **Supply of the raw materials:**

Non existence of unified and integrated trade associations and bodies in order to purchase high amount and good quality raw materials and determination of price of date by paying attention to its quality

Turning product into nonorganic item in a major segment of the cluster's level considering the conducted antitoxic sprayings for eradicating cricket pest and recent famines which have brought about the decrease of product quality.

- **Labor**

The labor applied at the cluster level consists of unspecialized and they lack the efficient and effective trainings who achieve most of their job mechanisms through case study by practice.

The lack of expertise and skills for sale and marketing at the cluster level

- **Production and packing:**

A major part of packing is done at workshops in the gardens and/or at homes in a traditional and semi- sanitary and semi-sanitary manner.

Incapability in applying washing and grading machineries due to the soft texture of Mazafati date product compared to other varieties

- **Marketing, distribution and sale.**

The lack of the final product's appropriate sale and distribution channels

Demolishing Bam's brand in the local and the foreign markets due to instability of product's quality

5- Discussion and conclusion and presenting suggestions

In this article, we dealt with the development model based on analysis of the value chain of Bam's date industrial cluster and for achieving this end; we made use of the comparative analysis. In fact, each phase of the chain of value of industrial cluster for Bam's date was first compared with the sample unit active at the international level. By considering analysis of the cluster's value chain which indicates the cluster's pressure points as non-expenditure in the market and nonexistence of appropriate grading and packing, it is suggested that two strategies should be followed in order to get rid of this situation:

a)   **Market development**

- Developing market at both the local and foreign markets of Asian, European and American countries.

b)   Increase quality

-    Establish a system for classifying products in proportion to the quality (grading) and product price

-    Increase quality and variety of packages of date in order to be consumed as a fresh product.

-    Conduct all activities of growing, cultivating and sanitary and standardized grading of dates.

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The Valid Derogation from a Fair Trial in States of Emergencies

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Abstract: Fair trial in the states of emergency especially after September 11, 2001 attacks is of a high importance. The goal of this article is to recognize the concept of the states of emergency and the determination of their applicability, the study of the mechanism of deviation from the principles and guarantees of fair trial under the said conditions and the recognition of the principles of deviation of the fair trial. For this purpose, the regional and international documents and the policy of control and legal institutions have been studied. Among, several international documents, the International Covenant on Civil and Political Rights and the protocols attached to the Geneva conventions and among the regional documents of the European convention of human rights has had the highest protection of the fair trial guarantees. The deliberative views of the International Court of Justice and the legal policy of the European court of human rights have allocated a special place for the reinforcement of fair trial in the states of emergency. The Human Rights Commission of The United Nations and the International Committee of the Red Cross have also played a strong supervisory role in this matter.
The most important result of this article is that the minimum rules of fair trial should not be deviated from any states of emergency. On the contrary, it should be reinforced. Valid derogation of other rules of fair trial requires certain procedural and substantial standards.
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1. Introduction

"Litigation is one of the results of mankind's competence for enjoyment" (Mahmoodi, 102, 2006) and it is the first achievement of man's civilization. The international community has been the witness of events that has revealed the importance of fair trial and its importance to everyone in the state of emergency. The importance of the necessity in the modern criminal law especially after the September 11, 2001 attacks has become more flexible and the exact conditions and standards for the limited capability of its use has been taken into consideration. Although recognition of the state of emergency belongs to the governing body and subject to internal laws, the declaration of the state of emergency on the surface follows the international rules and regulations and the domestic, comparative and multi-national laws have been in conformity as far as the urgency of domestic and international armed hostilities is concerned. The comparison of reports from the human rights organization indicates that multiple lawsuits have been brought before the international tribunal, The United Nation's Human Rights Council, Europe's Human Rights Court and United State's

Court of Human Rights about the non-compliance with the fair trial during the state of emergency. Although the principles of non-compliance, have important potentials for the legitimacy of governments' function in none of the declaration of the state of emergency has been fully respected on the surface. Therefore the noncompliance with the fair trial has not been credible in any of those conditions.

Important trials such as the ones against Mohammad Ata, Abdolghane Mozoodi and Motesadegh on February 2004 in Hamburg proves that the domestic courts' procedures during the state of emergency have been conflicting and even after the September 11 attacks, despite the tendencies of governments of the United States, England, India and Germany for co-operation in their domestic and modification of the laws, they did not trust the results of one another's state of emergency. However, the regional and international courts, find it necessary to follow the principles of the international human rights in general and the rules of non-compliance in specific.

By comparing the domestic laws, comparative laws and the multi-national documents, a clear list of

guarantees regarding the fair trial that have to be complied with will be calculated and proven (of course, these aspects include, the assumption of innocence having the right not to testify against oneself and not to incriminate oneself, having been present, public trail, comprehension of the crime and its reason, having the right to have a defense attorney and having access to him, having an interpreter, not being officially detained not having to be prosecuted and tried again and having the right to task for compensation for the lack of justice. Also certain conditions for the justifiable non-compliance with other fair trial guarantees that can be ignored under special circumstance will be proven. (The principles of the state of emergency being exceptional, necessity and appropriateness, lack of inconsistency, lack of discrimination and the principle of giving information). For this purpose, in this article, the standards of the criminal justice system for guaranteeing the fair trial during the state of emergency in 3 parts will be studied.

2. The study of the state of emergency in connection with the fair trial

State of emergency (emergency situation) is an ambiguous and flowing concept for which there is no clear definition or proof. In some documents and conventions for the international human rights which allows governments not to comply with granting people their rights and liberties, we can somewhat get a brief definition of the concept of the state of emergency. The alliance of civil and political law is the first document in which the state of emergency and non-compliance with the recorded obligations has been referred to by governments. In paragraph 1 of article 4, the first treaty explicitly indicates that, "The public state of emergency under which people and the nation's integrity are threatened and this it officially been announced that the governments which are the members of this alliance can take measures not to comply with the said obligations provided that the said solutions will conforming with other obligations of the government will be according to the international laws and the discrimination will not exist exclusively based on race, color, language, religion or the religious or social origin." Therefore, the concept of the state of emergency from the first alliance point of view means the danger of conditions that threatens the existence and life of a nation. According to paragraph 1 of article 15 the European convention of human rights the concept of the state of emergency means "War or other emergency situations that threatens the existence of a nation." Therefore, the European convention of the human rights makes a reference to the alliance between civil rights and politics. In addition to that, according to

the American convention of the human rights in paragraph 1 of article 27, non-compliance with the obligations during the war, public endangerment or other states of emergencies in which the independence or the security of a nation is threatened is justified. However, in the African charter of the human rights and nations, there is no mention of the concept or the definition of the state of emergency and it appears that the written rights and liberties in this charter cannot be violated or misled.

Despite that, governments' abuse of power has always existed and also the undeniable facts about the extraordinary situations or emergencies cannot be ignored. Therefore, there is a necessity for the creation of some kind of a balance between the rights of governments in taking care of the nation's immediacies on the one hand and the rights of individuals especially the right of having fair trail on the other hand (Fazaeli, 81, 2008). According to the international law, the state of emergency can be declared only if there is an exceptional and serious threat such as exertion of threat or threat from abroad or within the country to put the integrity of the government or the territory in jeopardy. Therefore, the definition of the state of emergency means the temporary reaction to such a threat (T and Ashrafi, 2007, 274). The human rights commission also in its general analytical view believes that for sights and measures based on the non-compliance and divergence from obligations of the treaty should have of an exceptional and temporary nature and any chaos or disaster cannot be considered as a general emergency that threatens the integrity of a nation. Anyhow, based on the presented interpretations of the concepts and proofs of the state of the emergency, we can study the proofs of the state of the emergency as follows:

3. International (foreign) confirmation of the state of emergency

In the present discussion, the proofs of the state of emergency which threatens the integrity of a nation from abroad will be discussed. Anyhow, the reasons that have officially been considered as the ones for non-compliance and diversion from the rights and obligations of governments, we can name war force majeure and national disasters. (T.V. Ashrafi, 269, 2007). The human rights commission also has considered armed hostilities as the domestic and international ones. Therefore, we will study and analyze the international proofs of the state of emergency under the two general topics of "International armed hostilities" (The war between one country and other countries or foreign invasion) and "The war against terrorism" of course from the

external dimension and as a result of unclear attacks that are organized against a country.

A. The conditions based on war or international armed hostilities

Generally, international armed hostilities appear when one nation resorts to force against another nation. This situation is true in all the partial or complete military occupation of a nation ever if the occupation comes face to face with the armed resistance. Of course, we should pay attention that merely resorting to armed resistance against individuals and groups will not be enough. Therefore, armed hostility depends on whether the parties in the hostility consider themselves being at war and also how the situation is described (Falak 71, 2008). Based on this, the international tribunal in its verdict Nicaragua's dispute versus the United States of America (2007) and it its description of "armed attack" declares that armed attacks are not merely disciplined military operations at the international borders but dispatching armed groups, groups, irregular forces or even mercenaries from any nation.[1]

Therefore, although the United Nation's charter has forbidden resorting to threats or force in paragraph 2 of article 4[2], we have to confess that even after the charter of the United Nations was ratified and the establishment of the United Nations Organization, the international armed hostilities did happen in different parts of the world and thus the rights and the liberties of the subjects of the hostile governments and even the neutral government, involved in the war have been terribly and seriously violated. Today, the international humanitarian rights as a developed and reinforced form of the traditional international rights of the war era (the rights of the war era) includes even those kinds of international armed hostilities that other parties do not consider being a war.

In fact, the international humanitarian rights include all the principles of the international rights that have been complied for dealing with people (including the military and nonmilitary, injured or healthy ones) in the international armed hostilities (Falak, 29, 2008). The fourfold Geneva Convention (1949) and the amended protocols (1977) include many of these international rules and regulations which should come to the attention during the emergency armed

hostilities especially the protection of the victims during the international armed hostilities.

Therefore, the conditions resulting from a war (international armed hostilities) can be the major proofs of the state of emergency when it comes to the fair trial. Despite that, the international rules and regulations of humanitarian rights (such as the principles of human rights) must be carried out under such conditions and this matter indicates the right connection between the principles of human rights and the humanitarian rights as such that both elevate the level of treatment of people and both deal with human rights. We should also maintain that from the pure human rights' point of view, war or any shape of using armed forces can, be itself violate human rights (Bigdeli, 7, 2004). The human rights commission in its number 13 public interpretive opinion maintains that during the armed hostilities (international or not international)

The principles of international humanitarian rights will be capable of being implemented and for the purpose of preventing it from abusing the powers related to the emergency conditions, they should be implemented along with other regulations of the treaty such as article 4 and 5.

B. The outcome of terrorism

Terrorism, as an unfortunate phenomenon, although it is not new, today its legal concept that is being referred to as the war against terrorism can be a new terminology at the international level. Anyway, the use or the application of the word war or combat against terrorism from the legal point of view is not pleasant and the extensive interpretation of this terminology can cause the violation of people's legal rights and freedoms for the pretense the state of emergency. The international Red Cross Commission while carefully strengthening its position against terrorism, gives warnings against the implementation of the international humanitarian rights against conditions that will read to war and call it dangerous and unnecessary (Cross, N.D, 8). On the other hand, although all the countries do not have a comprehensive definition of terrorism, the international law has explicitly forbidden terrorism.[3]

Therefore, the banning of terrorist activities against individuals knowing the existence of power in the hands of the enemy and also during the hostilities show that the international humanitarian rights will

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[1] - I.C.J. Reports 1986, P. 14, Para. 195.

[2] - Article 4 (Note 2) United Nations Charter: All members in their international relations must refrain from making threats or resorting to force against the territorial integrity or the political independence of another government by any means that are in contradiction with the goals of the United Nation.

[3] - Article 33 of the 4th convention in Geneva, article 4 (Note 2) the 2nd attached protocol and article 51 (Note 2) 1st attached protocol have referred to this ban.

become protectors of non-military personnel and their possessions against armed invasions and those that are accused of committing such terrorist acts will most probably be prosecuted by governments provided that granting legal immunities can be implemented (Ibid, 6)

Anyway, as to whether the said state of emergency in the treaty of civil and political rights includes fighting against terrorism too, some believe that the wording in article 4 of the said treaty points out to "the general emergency situation that threatens the existence of a nation and it is difficult to imagine that the situations related to the armed hostilities or terrorism not to include the ordinary meaning of these conditions. In fact, the armed hostilities and the violation resulting from terrorism were specifically discussed in the drafts of the treaty and during the discussions related to article 4 (schmid, 2009, 35) that is especially due to the fact that the subject of fighting against terrorism and its urgent conditions after the September 11, 2001 disasters with the United states of America at its center was followed up. The government of the United States in response to the inter-American commission of human rights over the lack of the legal basis for careful (cautionary) measures and strategies in the case of apprehended ones in Guantanamo Prison argued that it was the principles of humanitarian rights pertinent to the way the apprehended prisoners were being treated and not the principles of human rights. (Ibid, 34). In addition to this, the government of the United States in different instances in the fight against terrorism and its consequences has referred to it neither as one of the instances of implementation of the principles of the humanitarian rights nor as the principles of the human rights.[4] This government before the human rights commission has declared that after the terrorist attacks of September 11, 2001 has not breached the articles of the treaty because of the state of emergency threatening the existence of a nation. Of course, the fact that the Human Rights Commission has accepted such conditions, at the present time, as in the United States and her allied countries such as England as one of the instances of non-compliance of the treaty, is ambiguous (Schmid, 2009, 33). In contrast, some of the establishments such as the European commission for democracy through the law (known as the Venice commission) have declared that terrorism essentially can not be used as a justification to get out of the framework of the international laws in general and the regime of non-compliance with the treaty in specific.[5] In the case of

Lawless versus Ireland, "The European tribunal of human rights has emphatically said that the right to enjoy the benefits indicated in articles 5, 6 and 7 of the conventions include all people even if they are terrorists that have adopted hostilities towards the government that is a member of the alliance. In other words, the notoriety of the individual should not deprive him of getting fair trial. "(Ashoori et al, 330, 2004). Anyway, although terrorism as one of the international (foreign) proofs of the state of emergency has been studied, this phenomenon can be considered as one of the domestic proofs as well. In the future discussions the domestic proofs of the state of the emergency will be reviewed.

4. The domestic proof of the state of emergency

Generally, the principles of fair trial have been complied for implementation at the national level. Therefore, the existing domestic conditions in a country are a great importance to fulfill these standards because the existence of inappropriate domestic conditions causes the violation of principles and guarantees of fair trial and as a result they will jeopardize the individual rights and freedoms. Without a doubt, the state of emergency other than the influential foreign factors is possibly as a result of some domestic factors such as the occurrence of threatening events and disasters jeopardizing the national security of a country and or even other natural disasters.

A. The condition of international armed hostilities and domestic armed hostilities (civil war)

As it was stated before, armed hostilities will be divided into international armed hostilities and domestic ones. The Geneva fourfold conventions and the joint protocols, have not explained the armed hostilities and this was done on purpose because there was a hope that this terminology could expand more and will not go under the shadow of legal complications such as the definition of war (Falak, 2008, 72-3). In addition to that, domestic armed hostility includes confrontation between the state current authorities and groups of people who are subject to those authorities and it is done in the framework of the national country and it reaches the influence and the degree of importance of an armed chaos or a "Chaos and domestic tension such as scattered individual objections and other measures having the similar nature can not be considered as domestic armed struggle" (Kitty Shiazeri, 2004, 347). It the domestic armed hostility, both parties are

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[4] -Available at: http://www.asil.org.

[5] - European commission for democracy through law, (Venice commission), Opinion on the protection of Human

Rights Emergency Situation, Adopted at 66th Plenary Session, Venice, 17-18 March 2006, CDL-AD (2006) O15, Para. 30.

required to carry out the least number of basic regulations for the international humanitarian rights that is recorded in the Geneva's fourfold (1949) convention of protection of cultural possession (1954) and the second attached protocol (1977) (Falak, 2008, 79-80). Therefore, in the document and treaties related to the humanitarian rights domestic armed hostilities were of importance and even the second attached protocol was allocated to the protection of nonmilitary people and possessions in the domestic armed hostilities and the rules in all these hostilities should be respected. According to article 3 shared with the 4 Geneva treaty in 1949 and article 1 of the 2nd attached protocol - even in armed hostilities with the domestic specification, some of the minimum guarantees should be respected (Tamooshat, 2007, 440). All any rate, the occurrence of an armed hostility at the domestic level of a country which is the subject of a more limited and different legal regime compared to the international hostility, can be one of the examples of the state of emergency according which fair trial and its principles and guarantees have been subject to damage and the legitimate rights and freedoms of the citizens of a government under the current conditions will be subject to violation or infraction.

B. The situation of threat against the national security of a country

National security was one of the commonly used concepts in the international relations of countries and one of their most important goals. This concept the same as many of the social science concepts is ambiguous, multi-meaning and flowing. Therefore, there are many differences of views about its meaning and applicability. For example, the National Defense College in Canada describes the term "National security as follows": National security means maintaining an acceptable method of living for all the people according to the legitimate needs and wishes of them. This matter includes getting rid of attacks or military pressure, domestic coup d'état and the destruction of social, economical and political values which are necessary for the quality of life (Mondale 2000, 52-3). Based on the definition of some of the political science experts and international relations, a nation can have security only if it can maintain it even by preventing from having a war (Boozan, 1999, 31).

On the other hand, the national security has always been referred to as one of the basic limitations in the field of human's basic rights and freedoms in the documents of international treaties related to the human rights. The ambiguity of the concept of the national security has caused a lot of governments to consider any threat against their national security as

new conditions and consequently calling for the state of emergency. The Human Rights Committee, in this direction and in one of its final observations, while it has shown concerns over the detentions in the country of Sudan because of national security reasons, it has recommended that the concept of "National security" should be defined by the law and the police and security authorities are required to render the reasons for detention in writing and this matter should be done overtly and should be appeasable to the court (TAHA and Ashrafi, 2007, 50). In addition to this, the Human Rights Committee has always emphasized over the least amount of interpretation of all the limitations especially the national security one. Of course, we should pay attention that the domestic applicability of the state of emergency is not limited to the domestic armed hostilities and threat against the national security of a country and instances such as the occurrence of disasters and natural calamities can also cause a state of emergency in a country. Based on this, the severity of the above mentioned situation should be as such that in order to maintain public order and eliminate the threats against the integrity of the government, resorting to the terminology of emergency is inevitable. (Momtaz and Taraz Koohi, 1999, 96). Still, taking advantage of the concession "emergency" and deviation of obligations by governments needs conditions and standards that any government should pay attention to. In the future discussion, compliance or non-compliance of the fair trial in the state of emergency and also its standards and criteria will be reviewed.

5. The conditions of non-compliance with the fair trial

The conditions of non-compliance have been mentioned in many documents of human rights. In fact, these instances have been the safeguard of the national sovereignty right in dealing with the public state of emergency and based on them, the member nations are allowed to some how carry out the non-compliance and the deviation from some of the requirements and obligations predicted in the treaty. The said conditions with the goal of preventing the emergency measures and stopping governments from using the term of state of emergency is to justify the lack of implementation of the human rights. Article 4 of the international treaty of the civil and political rights determines as to when and how a government is allowed not to comply with the rules and regulations of the treaty. The provisions for non-compliance and deviation from the rules and regulations of the treaty can be divided into two sections of what they look on the surface and what they really are. Therefore, at first the conditions the way they look and then they way they really are as

far as non-compliance and deviation from the standards of the treaty will be examined.

A. The superficial conditions of the non-compliance of the fair trial

We can discuss the conditions of non-compliance with the fair trial by referring to the contents of article 4 of the treaty of civil and political rights (notes 1 and 3) and also article 15 of the European convention of human rights and article 27 of the American Convention of human rights. Among the conditions and criteria mentioned above, some are related to the criteria of the nature of judiciousness and adopted measures by a certain government and in contrast, some of these conditions deal with the rule and figure of the non-compliance and deviation from the obligations. In here, the *** conditions of non-compliance with the fair trial will be discussed.

- Formal declaration

In note 1 of article 4 of the treaty it is declared that, "during the general state of emergency when people's lives and the integrity of a nation is threatened and it is officially declared the member governments…". Therefore, the general state of emergency should officially be declared. Some believe that this declaration should in the legal framework and especially the country's constitution be taken into consideration. Of course, not all the laws of the national constitution have their own emergency condition. For example, in the constitution of the United States nothing has been mentioned about this. However, in other constitutions, such as the German one, detailed criteria have been mentioned about it. (Schmid, 2008, 25-6). At any rate, what is important in article 4 of the treaty is that a country that declares to be in a state of emergency, should, indeed, be in that state. Of course, it should be paid attention that in the European and American conventions of the human rights, nothing has been mentioned about the official declaration of the state of emergency.

- Provisions of legal procedure

In addition to the official declaration as one of the nominal conditions, especial criteria for legal procedure during the state of emergency such as declaration of the state of emergency, the declaration of the non-compliance cases and their reasons can be considered as other nominal conditions in the field of non-compliance with the fair legal procedures. These conditions have been taken into consideration in article 4 of the treaty of the civil and political rights and the European and American convention of human rights. At any rate, these treaties and documents allow governments non-compliance with the fair legal procedures under completely defined conditions and by merely respecting these conditions, governments can justify deviation or non-compliance.

The conditions of legal procedures are regarded as follows:

-Declaration of the state of emergency: Based on not 3 in article 4 of the first treaty, any member country that intends to use the right of non-compliance according to the regulations of the treaty, should promptly inform other member states through the secretary general of the United Nations of its intention. There are 2 separate obligations mentioned: 1) The member country of the treaty should inform the member states of the treaty of civil and political rights and 2) is obligated to render information about the state of the emergency (Ibid, 31). The human rights commission, in this direction, believes that when the member states resort to adopting non-compliance based on the article 4; consider themselves obligated to the mechanism of giving news. Therefore, a member state should immediately inform other member states through the Secretary General of the United Nations.[6]

However, if a government fails to do so, can we assume that the non-compliance with the rules of the treaty is totally invalid. The human rights commission has announced in its public interpretive view that the responsibility of the watchdog committee over the rights and the function of the member country of the convention in following the article 4 of the treaty is not related to giving information or the lack of it (Ibid). Some believe that policy of the human rights commission in this matter is not very clear and this way of interpretation of the committee in its public interpretive view has, certainly, been the result of giving information by a few of the member states of the treaty (Joseph, 2006, 96). In other words, the committee does not have any belief in the lack of credibility in the non-compliance of the rules of the treaty because of not respecting such a nominal guarantee.

Also, in the regional documents, there has been a reference to the observation of (sending information) regarding the state of emergency. In the European convention, of support for the basic or essential rights and liberties it has been established that the member state should merely inform the Secretary General of the European council of its intentions and the decisions it has adopted (note 3 of article 15 of the convention). Therefore, based on this convention, a member state for breaching the contents of the convention does not need to inform other member states and merely informing the Secretary General of the European council will be enough. In contrast the American convention of the human rights has required that the government asking for non-compliance with the regulations of the convention

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[6] - HRC General Comment No. 29, Para. 17.

must inform the other member states the Secretary General of the Organization of American States[7] of the decision and the adopted foresights.

-Declaration of non-compliance cases:
Every government while asking for non-compliance with the contents of the treaty including asking for the right of fair trial and principles or guarantees related to it should explicitly mention the rules for non-compliance in the announcement of the state of emergency. Note 3 of article 4 of the treaty of civil and political rights and note 3 of article 27 of the American convention of the Human Rights explicitly requires that the member government requesting the non-compliance with the criteria (standards) of the treaty should inform other member states its reasons for non-compliance as required by the treaty. Of course, such rules and regulations have not been observed in the European convention of the Human Rights. Therefore, declaration of the reason of non-compliance is important which can lead to unpleasant results because if a government informs (the convention) of some criteria and not of others, that country would not, later on, would not benefit from non-compliance with other standards especially if the condition of informing (the convention) will not be a separate condition for non-compliance. In that case, it will not be fair that a country that has not informed to practically be allowed not to comply with all the criteria of the treaty (Schmid, 2008, 35-6). The Human Rights Commission has also explicitly emphasized on announcing the rules of non-compliance with the rules of political and civil rights treaty.[8]

- Reasons of relinquishment
The human rights commission has stated in its public interpretive theory that in addition to announcing the cases of relinquishment and non-compliance with the criteria of the treaty including the right to a fair trail, the government asking for having the right of non-compliance must explicitly announce the reasons for the relinquishment. The committee believes that such a report is not only important for the committee's performance of its duty especially the assessment of whether the adopted measurements by the member state is precisely (completely) in conformity with the circumstances (necessities) of the situation, but also this matter gives the member states the permission (opportunity) to have control over following and obeying the rules.

Also the committee based on the information and reports that it has received in the past, emphasize that the report by the member states should guarantee the complete information about the measures and

foresights that have been adopted and a clear explanation of their reasons (adopted measures) and also their own complete legal documents that have been attached (Ibid).

The announcement of the reason for relinquishment (non-compliance) of the criteria of a treaty at the time of non-compliance of a country is the instances that have clearly been mentioned in the trans-national legal documents. Note 3 of article 4 of the treaty requires that the country that wants to use the right mentioned in not one of article 4 should inform other governments of its relinquishment (non-compliance) through the Secretary General. In addition to this, it has been mentioned in the European and American conventions of the human rights that countries taking advantage of the right of non-compliance must inform the Secretary General of their reasons for relinquishment and non-compliance. (Of course, the word Secretary General is a reference to the S.G. of the European Council in the European Convention of the human rights and the Secretary General of the Organization of the American Countries in the American convention of the human rights.)

-Reasonable period: In general, the non-compliance of governments with regulations and standards of a treaty can never have a permanent aspect because this matter is in contradiction with the goals and will be the subject of all the treaties and human rights documents. This matter in the human rights documents in which the right of non-compliance and relinquishment has been mentioned, has seriously been emphasized on. The international treaty of civil and political rights in relation to this matter has required that the government that has implemented the right of non-compliance with the regulations of the treaty should inform the other member states the termination of the measures and adopted foresights by the means of a new announcement the same way that it did with the beginning of these measures and foresights. Article 15 of the European convention of the human rights has also declared that "also when such foresights are stopped and the regulations of this convention are once again carried out; it (the member state engaged in practicing non-compliance) should inform the secretary general of the European council." In this direction, Note 1 of article twenty seven of the American convention of the human rights has explicitly announced that a government can merely because of the existence of the state of emergency and exceptional conditions take advantage of the regular right of non-compliance of the convention. Also in Note 3 of the mentioned article it has been required that the government that does not comply should inform the other member states of the desired date for the termination of the related non-

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[7] -(O.A.S)

[8] - HRC General Comment, Op. Cit.

compliance through the Secretary General of the Organization of American Countries.

Therefore, from the contents of these documents and treaties, we can conclude that the non-compliance (relinquishment) of the rules of these conventions should be a decent period of time and requiring such conditions. In note 1 of article 4 of the treaty it is emphasized that the adopted measures should be as such that they are precisely needed and require such conditions. The Human Rights Committee in relation to this matter, in its general interpretive opinion believes that measures based on the non-compliance of the rules of the treaty should have the exceptional and temporary nature.

Every country that wants to deviate from the rules and regulations of legal and trans-national documents than can be deviated from should observe the procedural guarantees and conditions. Some believe that the said conditions should be perceived as an independent standard in ignoring the treaty. Therefore, whenever a government refuses to carry them out, the observing organizations, repeatedly, hold that country responsible for the treaty and the members of the international community should officially respect these conditions (Schmid, 2008, 36). In the next discussion, the substantial conditions related to the deviation of the rules and regulations of the treaty for the states of emergency will be discussed.

B. The Analysis of the Substantial Conditions

In the previous discussion, the procedural conditions and guarantees for deviation from some of the fair trial rules were discussed. In the present discussion, conditions and guarantees that are related to the essence of the state of emergency and also measures and foresights that were adopted will be reviewed. Without a doubt, the existence of the essential conditions relatively has more importance and substance compared to the procedural conditions and conveying information. The most important of these substantial conditions that have been mentioned in the legal trans-national documents is as follows:

- The existence of the state of emergency (the real exceptionality):

By reviewing the trans-national legal documents such as the treaty of civil and political rights or the regional convention in which the right of deviation and relinquishment of the obligations and the contents of the treaty that have been considered for the member states, we realize that the first and the most important condition of deviation from the obligations of the treaty and taking advantage of this legal right for the governments, is the existence the state of emergency or in other words the exceptionality of the conditions as such that in Note 1 of article 27 of the American Convention of the

Human Rights has explicitly has put emphasis on "the exceptionality of the situations". The Human Rights Commission also, as it was stated believes that this condition should essentially be exceptional and temporary. Without a doubt, the situations of deviation are, merely, justifiable in exceptional cases. Of course, there are some evidence that indicate this important and essential condition has often times not been respected and the emergency measures have often been indeed a common method for delaying the principles of the Human Rights (Marks, 1995, 86). However, some believe that ordinary meaning of "the public state of emergency that threatens the national support" in the treaty of the civil and political rights is understood as such that deviation can merely take place in situations that are extremely critical and this criteria can be discussed under the conditions of an armed struggle or terrorism situation if it is happening in a very dangerous condition for the targeted countries (Schmid, 2008, 23-4)

- The principle of necessary and conformity

Measures based on the deviation or relinquishment should, in particular, be necessary and in conformity with the said conditions in the treaty of the civil and political rights. So that the limitations that are not very severe will be assumed as threats (Ibid, 26)

In other words, any deviation of the fair legal justice by the government should precisely meet those conditions. The principle of conformity requires that deviation from the obligations taking into consideration what is needed for the emphasis on the state of emergency that threatens people's lives with stipulation and it also requires that the necessity for deviation should, in certain periods, be studied by the judicial and executive powers (T.V. Ashrafi, 2007, 272).

Also, in the legal trans-national documents, while deviation or relinquishment of the rules and the regulations are allowed, there is an emphasis on the necessity and the conformity of the measures and adopted foresights with the public state of emergency. Note 1 of article 4 of the civil and political treaty has taken advantage of the phrase, "up to the point that it is precisely necessary for the situation" and Note 1 of article 15 of the European convention has required that every obligated member can merely adopt foresights for the purpose of deviation from obligations based on this convention up to the point that the circumstances of the mentioned situation require. "The Human Rights Commission, also, in its common interpretive view believes that", an essential requirement for any measures concerning deviation from the contents of the treaty based on Note 1 of article 4 that such foresights precisely because of the circumstances of the state of (emergency) to have been required. This requirement depends on the time

period, the extent of geographical inclusion and the main territory of the state of emergency and any measures depend on the deviation because of emergency and conditions derived from it[9]." Also the committee explicitly points out to the "principle of conformity in this field.

- The principle of consistency

The principle of the lack of contradiction, in general, requires that relinquishment (deviation) from the criterion and the contents of the treaties and international conventions should be in accordance with all the other obligations of that country according to the international laws including the customary international laws, international humanitarian laws and the treaties of human rights not to be breathable (Schmid, 2008, 27). The said principle was suggested the first time in 1950 by the American representation. The said delegation suggested a replacement for Note 2 for deviation article 4 of the political and civil rights treaty based on which, some rights should not be complied with during the state of emergency. The purpose of this suggestion of the United States was to replace the principle of the fact that some of the rules and regulations of Human Rights can not complied with and such criterion explicitly declares that no deviation of the treaty by any country should be done based on the international law and or in accordance with an international treaty. In order to clarify the transparency of this criterion, the representation delegation of the United States offered a suggestion to recognize which one of the criteria related to the human rights in the state of emergency should not be breached and should be referred to the war rights. Basically, the said delegation of representatives based on the principle of the lack of contradiction was against providing any list of cases that in violation of fair trial and considered it to be completely unnecessary (Oraa, 1992, 191-2).

At any rate, the principle of the lack of contradiction as one of the substantial conditions for the violation of the rights of fair trial in the legal trans-national documents has been into consideration. In Note 1 of article 4 of the political and civil rights of the treaty for the adoption of foresights and measures based on violation, the conditions of conformity with other obligations of the country that is in violation has been determined based on the international laws. Such a condition in the European condition of the human rights (Note 1, article 27) has explicitly be mentioned. The considerable point in this relation is that the human rights commission in its common interpretive opinion has declared that the said committee does not have the duty to assess the behavior of governments

based on other sources of international law. This committee states that the eligible country (the country asking for breach or non-compliance) should, considering all the other international obligation decide whether the treaty allows the member state not to comply with the special regulations and criteria of the treaty[10]. Still, some believe that the principle of lack of contradiction can be an essential and pivotal tool for the recognition of cases that are not can be heard.

- The Lack of Discrimination

The criteria and regulations of legal trans-national documents about the deviation from some essential liberties and rights and also rights related to the fair trial are always requiring governments to stop discrimination based on race, color, language, religion, etc. Note 1 of article 4 of the treaty of civil and political rights and Note 1 of article 27 of the American convention of human rights explicitly states that emergency measures and foresights should not bear any discrimination based on race, language, religion or the social or religious origins.

The non-discrimination act or principle should be assumed as a supplementary to the principle of equality in the enjoyment of rights and liberties[11]. However, in the area of the lack of discrimination in the states of emergency, some believe that for as long as other provisions of article 4 of the treaty of civil and political are carried out, discrimination based on political opinion or the national origin will not be banned in emergencies (Nowak, 1993, 86). Of course, we can perhaps agree with this idea to a certain degree, but at any rate, government, are required to destroy any discrimination regarding the implementation the right of deviation from the rules and the standards of fair trial.

Despite that, we should pay attention that in the interpretation of the criteria related to the deviation from the right to a fair trial, there should not be an interpretation that will be a guarantee for creating a right for any government, group or individual based on which, in order to weaken any of the recognized rights and liberties that have been recognized in the documents of conventions for the protection of the human rights or limiting them more than what has

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[10] - HRC General Comment No. 29, Para. 10.

[11] - The principle of equality and the enjoyment of Respectability and rights in article 1 of the Human Rights charter, Note 1, article 2 of the political and civil law treaty, article 1 (Note 1) American Convention of the Human Rights and article 2 of the African charter of the Human Rights has been mentioned.

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[9] - HRC General Comment No. 29, Para. 4.

been predicted in the documents and treaties, no action will be taken.[12]

In spite of this, the standards of deviation from a fair trial and the conditions of deviation from the rights related to the fair trial have not exclusively been mentioned in the trans-national law documents and the human rights treaty, but it can be referred to these standards in the international legal verdicts and policies.

6. Legal Policies and International Control over Deviation from Fair Trial

Along with compiling treaties and trans-national documents of human rights, international legal or controlling institutions in the documents and international treaties have been anticipated to supervise the claims and complaints resulting from the breaching of obligations and requirements of legal, trans-national documents and also the international common law and also control over the performance of these documents at the national level by the member states. Therefore, the current discussion is allocated to studying the legal procedures and control over these legal institutions and supervision over the execution of the standards of deviation from the rights of the fair trial.

A. The analysis of legal procedures of international institutions

In general, the current legal institutions in the international arena which are responsible for the hearing the lawsuits (legal proceedings) and or complaints (criminal procedures) can be divided from the wide view and the qualification inclusion for hearing the cases that will be divided into legal institutions with international jurisdiction (common) and the legal institutions or regional jurisdiction.

-Legal Authority with the International Jurisdiction

In this section, the legal procedure of the International Court of justice and the international criminal court including the international criminal court (ICC) and the special Ad Hoc Tribunals of the old Yugoslavia and Rowanda or mixed such as the special court of Sierra Leon or special court of Cambodia and special branches of Eastern Taymoor will be reviewed.

-Legal Procedures of the International Court of Law (Advisory opinions)

The International Court of Justice (ICJ) as the main legal institution of the United Nations[13] in its verdicts and advisory opinions which is the most important source of international legal procedures hears legal disputes.[14] The court in its two advisory opinions in 1996 and 2004 discussed the standards of deviation from fair trial specially if there were the states of emergency.

The International Court of Justice in its advisory view regarding the legality of threat or the use of unclear weapons which was discussed in 1996 at the request of the World Health Organization (WHO) has explicitly rejected the theory that human rights is merely good only in peacetime.[15] In this advisory view, the foundations of the court's decision making are based on a few principles. Firstly, the rules and the regulations of human rights during armed hostilities should also be respected. Secondly, the only way that some of the special or specific standards can be ignored is if a country deviates from them properly and these conditions have been included in article 4 of the treaty. The said rights in article 4 (Note 2) can not be deviated from.

In addition to that, the International Court of Justice in its "advisory view in connection with the legal ramification regarding the wall surrounding the occupied Palestine emphasizes on its belief regarding the previous advisory view (advisory view regarding the legitimacy of threat or the use of atomic weapons.[16]

Despite the fact that the court believed that the human rights documents on a territory outside the borderers of a country are applicable, it clearly affirmed its result and accomplishment in the advisory opinion of the unclear weapons.[17] The court in this view repeats that the protection or support of human rights treaties about armed conflicts can not be stopped unless it is done through carrying out the standards that are not breathable and was mentioned in article 4 of the International Covenant on Civil and Political Rights .[18]

- International Criminal Courts

In the charter and procedures of international military courts of Nuremburg and Tokyo regarding the fair trial and its principles and guarantees, there are a lot of doubts and discussions. However, in article 20 and 21 of the international criminal court of justice in a

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[12] - Article 5 (Note 1) of the political and civil rights treaty, article 26 of the American Convention of the Human Rights and also article 17 of the European Convention of supporting human rights and political liberties contain such regulations.

[13] - Article 92 of the United Nations charter
[14] - Article 36 of the Constitution of the International Supreme Court
[15] - Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, ICJ Reports 1996, Para 24, P.226.
[16] - Legal Consequences of the Construction of a Wall in the occupied Palestinian Territory, Advisory Opinion, ICJ Reports 2004, P.136.
[17] - Advisory Opinion (Wall Opinion), ICJ Reports 2004, Para 105
[18] - Ibid, Para 106.

country used to be called Yugoslavia, more attention was paid to the right fair trial. The international criminal court allocated for Rwanda was similar to the criminal court of a country used to be called Yugoslavia. The articles 64-67 of the chart of the International criminal court (ICC) indicate that special attention has been given to respecting the international standards of fair trial. In the constitution of the new generation of international criminal courts (mixed criminal courts) such as the special court of Sierra Leon and the extraordinary branches of Cambodia's and East Timor courts, there is an emphasis on the rights of the accused and guarantees for hearing. In spite of that, deviation from the fair trial is in contradiction with the philosophy of establishing international criminal courts and such a mechanism does not exist in the constitution of these courts (Stapleton, 1999, 578-9). As an exception, the subject of protecting victims and the witnesses has been considered to be supposable.

In this direction, "The branches of Criminal Courts especially Yugoslavia and Rwanda have always declared that the witnesses and their families being fearful of their lives can limit the rights of the accused to an open hearing and public's should, of course, be limited to what is needed and should not hurt the right of the accused for a fair trial. Certainly, these measures can not mean suspension (breaching) of a fair trial (Fazaeli, 2008, 91-94).

Summarily, we should say that the international criminal courts and on the top of them the International Supreme Court can not become the subject of a "state of emergency" which, in general, threatens the integrity of a nation and this matter is in contradiction with the supplementary jurisdiction of the supreme court and on the other hand, there is no mechanism for appealing the decisions of the supreme court in regards to deviation from the fair trial (Stapleton, 1999, 605). Therefore, in the international criminal courts, the national interest were not much taken into consideration but, exceptionally, it was the private interests of the parties involved in the dispute and the interests of justice that were important.

- Legal Authorities with Regional Jurisdiction

In the analysis of regional legal procedures of legal authorities on the subject of standards of deviation from the fair trial, we will merely study the supreme court procedures of the European Supreme Court and the American Supreme Court of human rights and the legal procedures of the African Supreme Court of human rights will not be discussed because in the African charter of human rights, there is not any deviation and divergence of the rights in question in the charter in regards to the states of emergency is not anticipated and, naturally, it is not possible to rely on the legal procedures of the African Supreme Court regarding the deviation of fair trial.

-The European Supreme Court of Human Rights

The European Supreme Court of human rights in the case of Lawless versus Ireland[19] in regards to the explanation of the states of emergency believes that emergency should be real and about to happen any moment and it should affect the entire nation and threaten people's lives and cause some other limitations. In this case, the way the European Supreme Court has stipulated, it is as if, in the eyes of the Supreme Court, generally the diagnosis of the national government in the determination of the emergency situation is more suitable.[20] Furthermore, the Supreme Court has emphasized in one of its verdicts that the international institutions involved in the analysis of legalization of the states of emergency should conduct this study and research according to the prevailing conditions at the time of proceeding and its next application.[21]

Basically, the Supreme Court believes that article 15 (Note 1) of the European convention of the human rights has granted a bigger scope[22] of its assessment and decision making to the domestic authorities.[23]

The European Supreme Court of human rights has always emphasized on the principle of the lack of contradiction as a basic natural condition in making decisions based on deviation from the rights and obligations of the convention. According to the European convention of the human rights, the deviation from the fair trial should not be in

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[19] - Case of "Lawless V. Ireland", Judgment of 1 July 1961 (series A, No.3), Para. 107. available at: http://www.echr.coe.int

[20] - In this case, the plaintiff who was a citizen of Ireland and a member of the Irish Republic Army (IRA) claimed that article 5 (the right to freedom), article 6 (the ban precedent to the criminal law) and article 7 (the right to fair hearing) of the European Convention of Human Rights had been violated by the government of Ireland and he had spent 5 moths without hearing in detention. The government, the defendant responded that the detention had not been a violation of the convention and even it was the state of emergency in Ireland Valid derogation from the obligations based on the convention. The court, at the meantime that refers to some examples of violations by the government of Ireland, it justifies the natural and common meaning of the state of emergency that effects the entire population and creates a threat to the organized living of a country.

[21] - Case of Iran V. the United Kingdom, 18th January 1978, Para. 214.

[22] -Margin of Appreciation

[23] - Case of Ireland V. the United Kingdom, Op Cit. Para. 207, also: Brannigan and McBride V. United Kingdom, 26 May 1993, A 258-b, Para.43.

contradiction with the obligations of a country based on the international law.[24]

The European Supreme Court of human rights rendered a verdict that an individual from one of the autonomous states in Georgia who was illegally detained was against articles 5 and 6 of the convention and the emergency situation cannot justify it. However, although the situation was emergency and considered to be of an exceptional matter, the Supreme Court asked the respondent government to free the plaintiff as soon as it can be guaranteed (Zamani, et al, 2007, 129). This legal verdict of the Supreme Court can be an appropriate guideline for the European governments that were the members of the European convention of human rights in the field of deviation from the obligations. In many of the cases, the Human Rights Commission of the United Nations which has a worldwide jurisdiction in this field, in order to justify its verdicts and opinions made a reference to the legal procedures of the European Supreme Court of human rights.

- The Inter-American Court of Human Rights

The inter-American Court of Human Rights which has the jurisdiction in matters related to the execution and the implementation of obligations by the member states of the American Convention of Human Rights (Stapleton, 1994, 605) because of being new and the limitation of its jurisdiction has not demonstrated much of any legal procedures.[25] In spite of that, the said court in some of its annual reports[26] and also in its interpretive opinions[27] in regards to the subject of deviation and divergence of the member states from the obligations of the convention in the states of emergency has paid attention. Also, this court insists on the confirmation of adopted measures and

foresights in emergency states by an impartial and independent legal institution. Of course, while the court offers interpretations of the standards for deviation from the obligations in this opinion, has insisted that some of the rights of fair trial can not be deviated from[28].

Also, the court in an advisory opinion regarding the legal guarantees in the states of emergency[29] believes that effective legal regulations to support the rights that cannot be deviated from in the states of emergency should be paid attention to and should be implemented within the framework of the principle and the guarantees that have been established in article 8 of the American convention of human rights (the article related to the right of fair trial) to be implemented and carried out. [30] This court has announced in another interpretive opinion that "the issue of stopping the detention of an accused without cause and longer than 24 hours and his quick transfer to the court room and the legal authorities and similar actions cannot be suspended in the emergency situations.(Mehrpoor, 2004, 224)

B. the Procedures of International supervisory Institution

Some of the international supervisory institutions that have an important and special place in the system of international human rights are European Commission of Human Rights (ECHR)[31], American Commission of Human Rights and also International Committee of Red Cross (of course, in the humanitarian section). Among these (institutions) without a doubt, the Human Rights Committee and its policy is more important.

-Human Rights Committee

The Human Rights Committee which is established based on (articles 28-45) of the International Covenant on Civil and Political Rights is responsible

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[24] - Case of Brannigan and Mcbrid V. U.K, OP. Cit. Para. 67-73.

[25] - The organization, the duties, the jurisdiction and the procedures of the American Court of Human Rights in cases 52-73 of the American Convention of the Human Rights have been mentioned and based on that, the court has the jurisdiction of hearing cases coming from the governments which are the members of the American Commission of American Human Rights. It also issues verdicts regarding the compensation of damages to the plaintiff and paying the cost.

[26] - The American Court of Human Rights based on article 65 of the American of Human Rights is required to give a report of its activities in the previous year to the organization of American States (O.A.S.).

[27] -Based on article 64 of the American Convention of the Human Rights, the American Court of the request of the member states of the Organization of American States (O.A.S.) and also the said organizations in the 10th principle of the organization's chart of the said organization will issue interpretive opinions.

[28] -"Habeas Corpus in Emergency Situations", Inter-American Court of Human Rights, Advisory Opinion, OC-8/87, 30 January 1987.

[29] -"Judicial Guarantees in States of Emergency"

[30] - Inter-American Court of Human Rights, Advisory Opinion, OC-9/87, October 1987, OAS/Ser. L/V/III/19. doc13. 1988.

[31] - The European Commission of Human Rights which is established 19 of the initial text of the European Convention of Human Rights and has been active next to the European Court of Human Rights based on protocol No. 11 attached on the European Convention of Human Rights about renewal of the supervision mechanism prescribed in the convention was deleted from the European Convention on May 11, 1994 and the European Court of Human Rights adopted all the duties of the commission. Despite that, the said commission during the time of being active, was able to have a positive impact.

for maintaining and supervising over the execution of its contents by the member states. The committee, in its common interpretive views has offered different interpretations and guidance about the deviation from fair trial in the states of emergencies.[32] In addition, the Human Rights Committee has studied the principle of conformity in deviation from the obligations in some cases including the report of the government of Columbia (since most of the information asked for was regarding the expansion of military jurisdiction) the report of the government of EL Salvador (that deviation from the basic rights of the fair trial seems to be unnecessary) and also the report of Uruguay (which the committee had learned that the measures and foresights adopted against specific groups were repressing and out of conformity with threat, (Schmid, 2008, 23). Although in this direction, the committee has offered not much guidance regarding the number of emergencies and crises in its verdicts and opinions, yet it has emphasized on the need of governments on being more cautious in their decision making as far as the common state of emergency at the absence of armed hostilities (either domestic or international) (Stapleton, 1999, 519-3)

The Human Rights Committee has announced that "if the member states of the treaty in the common emergency conditions violet the said common fair proceedings in article 14 of the treaty in the way it was required in article 4 of the treaty, they should guarantee that such cases of deviation have not gone beyond the scope of the state of emergency and also, other conditions of Note 1 of article 14 have been observed. Of course, it should be not that recently the Human Rights Committee knowing that the rules and regulations of fair trial recorded in the treaty of political and civil rights can not be deviated from, states that governments do not have the right to detain, arrest or setting people free willfully and they also do not have the right of stipulation in regards to the right of fair trial and its principles and guarantees (T.V. Ashrafi, 2007, 271).

- The European Commission of Human Rights
The European Commission of Human Rights has officially identified the (objective) aspect of human rights (Pradel and Corstner, 2007, 19). This commission in one of the well-known cases versus Greece[33] concluded that such a condition does not

justify deviation from fair trial and other rights and liberties.[34]
The government of Greece because of the conditions that were created had declared martial law and when the case was being reviewed at the commission, a few countries objected to this declaration. The commission reached the conclusion that the reasons for the breach of convention were not justified as the announced public emergency situation did not have the specific requirement for deviation. According to the commission's opinion, instable political conditions and tension mixed with the increasing communist activities and public disorder can not create a public state of emergency.
The European Commission of Human Rights has been cautious to determine and recognize the public state of emergency as the principle condition of deviation from the rights and obligations of convention. This commission has even announced explicitly in some of its verdicts such as the case of McBride versus England its opinion regarding the state of emergency[35].

- The American Commission of Human Rights
American Commission (the same as the American supreme court of human rights) does not have much connection with the states of emergency and deviation from the obligations of the convention in said conditions. In spite of that, this commission in a case versus Nicaragua has explicitly emphasized on the principle of the lack of contradiction as one of the substantial and essential conditions of deviation in the states of emergency.
In the said case, the question was whether the mandatory settlement of 8500 of the inhabitants of Miskitos in 5 camps outside of their homeland was a legal action in deviation from the right of settlement stated in the American Convention of Human Rights (article twenty two) or not. However, that is if it does not contradict with other obligations of the government of Nicaragua in accordance with the international laws and the right of commuting and settlement immediately after the state of emergency is rendered to the said natives (Schmid, 2008, 28).

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[32] - HRC General Comment No.13: Article 14 (Administration of Justice), 1984; and also: General Comment No.29: Article 4 (Derogations During a state of emergency)

[33] - Greek Case, European Commission on Human Rights, Year Book of Eur. Conv. On H. R. 12, 1969, Para. 165.

[34] -The said case was as follows: In 1967 a military power in Greece replaced the legitimate government in this country and declared martial law. It suspended many of the articles in the Constitution and took control of government. In this process, the military power put many leaders of the opposition group in jail. Also, at the same time in Greece the state of emergency was declared and it was claimed that this situation gave the new government, the authority to deviate from respecting some specific rights.

[35] - Casa of Brannigan and McBride V. United Kingdom, OP. Cit., Para. 45.

7. Conclusion

The reaction to the September 11, 2001 attacks has once again brought up the deviation from fair trial during the state of emergency. According to two advisory opinions of the international court except for the function of mechanism in deviation that have been mentioned in some international human rights documents, fair trial during the continuous armed hostilities. The conditions of deviation recorded in the documents of human rights allow a country to defend its nation against threats towards its national existence. At the meanwhile these conditions determine how much legal authorities can temporarily reduce human rights.

The provision of deviation from the treaty and also the regional documents of human rights determine that if deviation from other obligations of the country based on the international rights are in contradiction, they are not credible. The form and content of mechanism in deviation or relinquishment is an inseparable section of the legal foundation in the state of emergency and it is always preferable if the countries are convinced that they are in a situation that deviation from the criterion is an appropriate substitute for the lack of care and disrespecting the law.

The principle of the lack of contradiction determines which aspects of the fair trial criterion can not be deviated from. If a country claims that it is in the state of emergency, but does not announce the armed conflict, it should, at least, implement the applicable guarantees in both kinds of armed conflict. Some aspects of fair trial that are common between the legal systems in connection with international armed hostilities and domestic armed conflicts should in all kinds of the states of emergency even those that are of less importance and about to enter into legal armed conflict be implemented. Any deviation from these aspects is in conflict with the traditional rights and therefore such deviation is not justified. By gathering the rights recorded or mentioned in article 15 of the first attached protocol and article six of the second protocol attached to the Geneva Convention, a list of fair trial guarantees will be gained that should be executed in all situations ant there should be no legal impasse where these regulations can not be executed.

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The Contribution of Rural Cooperatives Development in Building Sense of Community in Iran

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Abstract: The purpose of this paper is to determine the role of rural cooperatives in building sense of community in Marvdasht, Iran. Capacity building for rural development requires a range of sense of community. Hence, it is expected that the rural cooperatives contribute to building sense of community. The paper is based on the survey questionnaire carried out among 250 rural cooperatives members in rural areas of Marvdasht, Iran. The findings revealed that rural cooperatives have a little contribution in building sense of community for rural development. [Fatemeh Allahdadi. **The Contribution of Rural Cooperatives Development for Building Sense of Community in Iran**. Journal of American Science 2011;7(5):926-929]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: sense of community, participation, rural cooperatives, rural development

1. Introduction

Sense of community is considered as an important factor for successful and prosperity of capacity building. A Sense of community is a necessary condition for rural development. A key term used in rural development and community capacity building is "sense of community". The concept of "sense of community" began with Hiller (1955) identifying various components of a process by which community members work to establish a sense of community. Sense of community is a sense of belonging to a community in which it entails interaction with other members of the community (Buckner, 1988). Without community sense of community, there are obviously no accountability, no development, and no program (F. Aref, Ma'rof, & Zahid, 2009). Sense of community plays a crucial role in developing rural development as well as promoting rural and agricultural cooperatives. This is basically reflected in the attempts of international agencies to enhance people participation. This study attempts to highlight the contribution of rural cooperatives to building sense of community for rural development.

2. Literature Review
2.1. Sense of community

Sense of cmmunity is a sense of belonging to a community in which it entails interaction with other members of the community (Buckner, 1988). The sense of community plays an important role in fostering support for rural development (Aref et al., 2010). Saraon (1974) defined sense of community as the interdependence between an individual and community. Sense of community can be seen as the

capacity of the local people to participate in development activities (Cupples, 2005). Sense of community is the extent to which any member feels connected to and committed to others in the community, which bears on a sense of security and belonging (Rogers & Sukolratanametee, 2009). The feeling of obligation and commitment of an individual towards other members in the community develops over time through mutual understanding of collective values, beliefs and interests among community members (Bowen et al., 2003).

Bopp et al. (2000, p. 113) defines sense of community in the following way: "sense of community refers to the quality of human relationship that makes it possible for people to live together in a healthy and sustainable way". Sense of community also helps people feel they are a part of something larger than themselves. Developing a sense of community contributes to rural development by enabling people to feel connected and motivated to live in harmony and work together towards common goals. Rural developers often like to encourage a sense of community among rural community residents as a way of contributing to building community capacity. In relation to this, rural leaders, stockholders, and local development practitioners should regard the concept of sense of community as a refinement of community members (F. Aref et al., 2009). While there is a substantial body of literature on the definition and conceptualization of sense of community (Chavis & Wandersman, 1990; Davidson & Cotter, 1989; McMillan & Chavis, 1986), only a few literatures discuss the practical application of approaches that have been successfully used to measure sense of

community in different cultural contexts. Rural communities for building capacity in rural cooperatives development requires strengthening of sense of community (Conway & Hachen, 2005). The lack of sense of community has been reported as one of the reasons as to why people do not participate in development activities (DeNeui, 2003).

According to McMillan & Chavis, (1986) there are four different components of sense of community, including; membership, influence, integration, and shared emotional connection (Aref et al., 2010). Table 1 outlines the components of sense of community as developed by McMillan & Chavis, (1986).

Table 1: The dimensions and elements of sense of community

Domains	Elements
Membership	Need to belong
	Shared history
	Common symbols
	Family rituals
	Emotional safety
	Personal investment
	Social responsibility
	Citizenship
Influence	Trusting relationships
	Freedom of expression
	Empowerment
	Collective well-being
Integration	Status
	Social integration
	Resilience
	Shared values
	Youth subcultures
Shared connections	Participation
	Shared event and narratives

Source: Adapted from McMillan& Chavis (1986)

2.2. Rural cooperatives

The International Cooperative (ICA) (1995) defines a cooperative as "an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democraticallycontrolled enterprise"(ICA, 1995). Rural cooperatives are the groups of people who work together voluntarily to meet their common economic, social, and cultural needs (Tanzanian Federation of Cooperatives, 2006).

Rural cooperatives are generally considered as a tool for rural development. Many developed countries such an England, France, German and United Stated largely depend on incomes earned through rural cooperatives (Aref A, 2011). Rural cooperatives have played an important role in the development of agriculture in industrialized countries as suppliers of farming requisites, marketers of agricultural commodities, and providing services such as gain storage and transport. It appears that many of these agricultural cooperatives are adapting their operations to the rapidly changing economic environment characterized by technological change, industrialization of agriculture and growing individualism (Ortmann & King, 2007). Rural cooperatives and people participation in local areas reinforce each other and also contribute towards promoting the rural development.

3. Research Methods

This study is based on quantitative method to investigate the level of sense of community through rural cooperatives. This study was carried out in rural areas of Marvdasht, during the March and April 2010. Marvdasht is one of the northern cities and also counties of Fars province. The county has an area of 3687 square kilometers. Marvdasht as a county is divided into four districts: Central, Kamfirouz, Doroudzan and Seydan. Marvdasht has a cold weather in the hilly areas and moderate climate in other regions (Wikipedia, 2011). Agriculture is the major development sector in Marvdasht (Allahdadi, 2011). Marvdasht is among the foremost city which established rural cooperatives in Iran. The study used survey design, where a questionnaire was used to collect the data. The questionnaire was structured around a Likert scale. The respondents answered each statement based on five scales. Each statement was situated on a 5-point scale as recommended by Dong-Wan and William (2002), and Aref (2010) with 1 representing a response of "strongly disagree" and 5 representing "strongly agree." The respondents were 250 cooperatives member where each respondent was chosen based on cluster sampling. The respondents were asked to answer these questions which were constructed to gauge their level of sense of community by rural cooperatives. The questionnaire was piloted tested to have its contents validated. Statements for level of participation were tested for their validity using Cronbach's alpha. Descriptive analysis was employed to determine the level of sense of community by rural cooperatives.

4. Results

This study determines the level of sense of community through rural cooperatives. The result showed in Table 2 the differences in the levels of sense of community through rural cooperatives. Generally, the findings reveal that the level of sense of community in rural areas by the cooperatives is low. This means that rural cooperatives are not involved in the building sense of community.

Table 2: Mean of indicators of sense of community through rural cooperatives

Indicators	Mean
1. Rural cooperatives generate a sense of pride among the rural residents?	0.90
2. Rural cooperatives are care what happens to farmers in thier rural?	1.20
3. Rural peolpe feel that rural cooperatives can make a significant contribution in rural development?	1.90
4. Rural cooperatives have sense of responsibility for improving community participation?	0.80
5. Rural cooperatives in your community often come for help with problems of rural peolpe?	1.08
6. Rural community created sense of pride between local peolpe with support thier production	0.30
Total of **s**ense of **c**ommunity	1.03

For rural residence to be effective in rural cooperatives, they should come together and interact with governing bodies collectively. Local residence should be more involved in rural activities and influence decision-making processes that affect their communities. They need to interact with the rural cooperatives and foster active relationship with local organizations. However based on descriptive results, it was revealed that the level of local participation in rural cooperatives is low.

In sum, based on the mean scores of sense of community, it could be concluded that rural cooperatives do not have significant contribution towards building sense of community and rural development as well.

5. Conclusion

Sense of community is an important dimension of rural capacity building for rural development. In this study, the contribution of rural cooperatives for building sense of community was examined. The basic argument was that impacts of rural cooperatives for building sense of community. Sense of community is considered as an instrument for rural cooperatives and a foundation for empowerment of local people. In addition, sense of community in rural cooperatives is essential for rural development activities, as, it strengthens the relationship between rural areas and local organizations and provides the space for their partnership. From the findings of this study, it is noted that the level of sense of community by rural cooperatives is low.

In other words, rural cooperatives do not participate at the building sense of community. Hence, it could be concluded that they have limited contribution towards rural development. The findings of this study imply that sense of community might be a factor for underdevelopment of rural development in Marvdasht. It is expected that the findings of this study could be utilized by the rural leaders for future follow-up and reassessments of building sense of community for rural development in their cooperatives.

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The importance of lesson plan in adult education

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Abstract: Every good course design begins with a needs assessment. For our purposes here, we're going to assume you've completed this assessment and you understand what your students need and what your objectives are for the course you're designing. If you don't know your objectives, you're not ready to design your course. With your objectives in hand, course design can be easy. Like any gathering of people for any reason, it's good to begin at the beginning and address who is there, why they've gathered, what they hope to accomplish, and how they'll accomplish it. Design an activity that gives your students an opportunity to practice what they just learned. Activities that involve breaking into small groups to complete a task or to discuss an issue are good ways to keep adults engaged and moving. It is also a perfect opportunity for them to share the life experience and wisdom they bring to the classroom. Be sure to build in opportunities to take advantage of this wealth of relevant information. Activities can be personal assessments or reflections that are worked on quietly and independently; they can be games or role playing; or they can be small group discussions. Choose your activity based on the best way to provide the adults in your class with an opportunity to experience what you just taught.
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Introduction:
Short-term crises include the imperative to keep helping welfare clients make the transition from welfare to work within the constraints of federal and state mandates and the need to train workers for immediate employer demands. Long-term prevention must address the underlying, persistent problems of the state's economic structure as well as the low awareness--if not appreciation--among segments of the population of the vital connection among education, employment, and improved standards of living.

The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills

necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients. Examples include workplace literacy (combining both basic academic skills and workplace skills), and family literacy (combining basic academic skills and other skills essential for successful parenting).

2. "Education attainment" usually refers to the numbers of years of schooling completed or the level of credential (e.g., high school diploma or associate degree) an individual has obtained. Despite concerns about the meaning of credentials, there is a strong correlation between educational attainment and literacy.

3. "Literacy initiatives" often are defined in terms of the needs of a particular target group. These may be parents of young children, youth who have dropped out of high school without earning a high school diploma, welfare recipients, persons with limited English-speaking ability, incarcerated adults, or adults in the workforce.

4. Other literacy initiatives are defined in terms of a particular educational service, strategy, or means to address a target population's literacy problems.

"Adult basic education" and "family literacy" are examples. These initiatives are often defined in terms of a particular configuration of services for the target population (e.g., assessment and information and counseling services).

5. The term "lifelong learning" is often associated with "literacy." Lifelong learning is a means to the goal of maintaining necessary levels of literacy throughout one's lifetime. The goal of lifelong learning has implications for both individual adult's learning behavior as well as education policy and the design of the education system.

Goal six of the National Education Goals illustrates a broadly stated goal that incorporates expectations about both adult literacy and the kinds of policies and services that should be in place to improve literacy. Goal six, "Adult Literacy and Lifelong Learning," states that, "By the year 2000, every adult will be literate and possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship." The objectives related to this goal touch on several of the common elements of definitions listed above, for example:

- Different dimensions of literacy (e.g., academic and workplace skills),
- The level of education attainment (e.g., increasing the number of persons who complete postsecondary degrees),
- The needs of target groups (e.g., parents, minorities, or part-time learners),
- The need to increase the availability of particular educational services, strategies or means (e.g., accessibility of libraries to part-time learners or opportunities for parental involvement), and
- The importance of lifelong learning, both in the learning behavior of individuals and in the educational system's responsiveness to the needs of adult learners.

Lesson Plans for Adults:
Lesson plans for adult education don't have to be difficult. Follow these easy steps and see how effective you can be.

Every good course design begins with a needs assessment. For our purposes here, we're going to assume you've completed this assessment and you understand what your students need and what your objectives are for the course you're designing. If you don't know your objectives, you're not ready to design your course. with your objectives in hand, course design can be easy. Like any gathering of people for any reason, it's good to begin at the beginning and address who is there, why they've

gathered, what they hope to accomplish, and how they'll accomplish it.

Build in 30 to 60 minutes at the opening of your class to conduct introductions and review your objectives and agenda. Your beginning will look something like this:

1. Greet participants as they arrive.
2. Introduce yourself and ask participants to do the same, giving their name and sharing what they expect to learn from the class. This is a good time to include an ice breaker that loosens people up and makes them feel comfortable sharing.
3. Write their expectations on a flip chart or white board.
4. State the objectives of the course, explaining why certain expectations on the list either will or won't be met.
5. Review the agenda.
6. Review housekeeping items: where the restrooms are, when the scheduled breaks are, that people are responsible for themselves and should take a restroom break early if they need one. Remember, you're teaching adults.

Module Design:
Divide your material into 50-minute modules. Each module will contain a warm-up, a short lecture or presentation, an activity, and a debriefing, followed by a break. At the top of each page in your teacher's guide, note the time needed for each section and the corresponding page in the student's workbook.

Warm-Up:
Warm-ups are short exercises (5 minutes or shorter) that get people thinking about the topic you are about to cover. It can be a game or simply a question. Self-assessments make good warm-ups. So do ice breakers.

For example, if you're teaching learning styles, a learning-style assessment would be a perfect warm-up.

Lecture:
Keep your lecture to 20 minutes or less if possible. Present your information in full, but remember that adults generally stop retaining information after about 20 minutes. They will listen with understanding for 90 minutes, but with retention for only 20.

If you're preparing a participant/student workbook, include a copy of the primary learning points of your lecture, and any slides you're planning to use. It's good for students to take notes, but if they have to furiously write *everything,* down, you're going to lose them.

Activity:

Design an activity that gives your students an opportunity to practice what they just learned. Activities that involve breaking into small groups to complete a task or to discuss an issue are good ways to keep adults engaged and moving. It is also a perfect opportunity for them to share the life experience and wisdom they bring to the classroom. Be sure to build in opportunities to take advantage of this wealth of relevant information.

Activities can be personal assessments or reflections that are worked on quietly and independently; they can be games or role playing; or they can be small group discussions. Choose your activity based on the best way to provide the adults in your class with an opportunity to experience what you just taught.

Debriefing:

After an activity, it's important to bring the group back together and have a general discussion about what was learned during the activity. Ask for volunteers to share reactions. Ask for questions. This is your chance to make sure the material was understood. Allow for 5 minutes. It doesn't take long unless you discover that learning hasn't happened.

It's important to get adult students up and moving every hour. This takes a bite out of your available time, but it'll be well worth it because your students will be far more attentive when class is in session, and you'll have fewer interruptions from people who have to excuse themselves.

Tip: While breaks are important, it's crucial that you manage them well and begin again precisely on time, regardless of stragglers, or chatter will get carried away. Students will learn quickly that class begins when you said it would, and you'll gain the respect of the entire group.

Evaluation:

End your courses with a *short* evaluation to determine whether or not your students found the learning valuable. Emphasis on the short. If your eval is too long, students won't take the time to complete it. Ask a few important questions:

1.   Were your expectations of this course met?
2.   What would you have liked to learn that you didn't?
3.   What was the most helpful thing you learned?
4.   Would you recommend this class to a friend?
5.   Please share comments about any aspect of the day.

This is just an example. Choose questions that are relevant to your topic. You're looking for answers that will help you improve your course in the future.

Conclusion:

Additional material for the next stage of learning often means to be expected when developing your learning skills Learners to increase awareness and enjoyment of reading and studying to operate.

To improve the quality of life, learning materials should reinforce the skills they acquired previous. This material should have access to information and provide new technology. should also have to make learning more fun. Additional materials should provide opportunities for literacy skills to read and to strengthen their cognitive awareness.

Track materials (continued) which increased literacy skills and knowledge gained is also effective in enriching learning environment for learners are important. Participatory materials to ensure the participation of learners in the learning process and codification are included out of class activities, dialogue, role playing, etc.

In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.

Learning activities such as activities outside the classroom, dialogue, role playing and ... Another type of content is presented. Duties are placed on the learner, a resource for developing knowledge, skills and insights he considered.

Curriculum content only from the training provided to learners or not, but put together their learning through activities that can inform or does, skills and attitude to achieve. In this case, apart from learning that the assays taught learners directly to sustainable and effective learning occurs in his.

Another way of providing content that is educational activities outside the learning environment possible for learning more and better enables adult learners. For example, hits, field trip experiences for learners or transfer is provided, develop knowledge, insight and skills they will.

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning

Some research findings that can be a learning process for the Guidelines for training operations are applied, is given below:

1- - Preparation for adults to learn how much he depends on previous learning. Knowledge that has accumulated because of an ability to absorb new information more person is. Past educational experience features a diverse group of adult learners, the starting point of any activity on the diversity training is emphasized.

2- intrinsic motivation, learning a deeper and make them sustainable. When the need is met directly by the learning itself, what is learned, but is complementary learning. Creating a training activity in adult learning needs, learning ensures stable

3- Positive reinforcement (reward) learning to reinforce the negative (punishment) is more effective. Many adults because of negative experiences at the beginning of schooling, are weak and afraid. Feeling of success in adult learning for continuous learning and adult participation is essential.

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Adult learning: Features and functions

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Abstract: A distinguishing characteristic of adult education programs is that program content and language must be suitable and respectful of adult clients. For example, instead of using the word "student" which may imply a traditional teacher/student relationship where a student is subservient to the teacher, all state program materials use the word "learner" or "customer." Using this type of language acknowledges the adults' existing knowledge and real-world experience and makes them the focus of the program. The Pennsylvania Adult Basic and Literacy Education Indicators of Program Quality emphasize the importance of customer satisfaction and learner progress on individualized goals. One quality area explicitly states that "program staff and learners jointly develop, regularly evaluate, and update an instructional plan that incorporates the individual's learning styles and preferences". This is just one example of how learners and staff are equals and collaborate on the learners' participation in the program. Successful adult education programs recognize that adult learner needs and learning styles may require non-traditional methods of teaching and accommodate them whenever possible. This means holding classes and sessions outside of typical working hours for adults that work, providing one-on-one tutoring, group classes, and other methods of delivering services that are flexible. It is also important to hold the classes where it is convenient for adult learners to attend, such as local houses of worship, residential facilities, libraries, or other community centers. Understanding this key principle is difficult sometimes for organizations that have worked in child education, but not in adult education.

Introduction:

The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients.

Examples include workplace literacy (combining both basic academic skills and workplace skills), and family literacy (combining basic academic skills and other skills essential for successful parenting).

2. "Education attainment" usually refers to the numbers of years of schooling completed or the level of credential (e.g., high school diploma or associate degree) an individual has obtained. Despite concerns about the meaning of credentials, there is a strong correlation between educational attainment and literacy.

3. "Literacy initiatives" often are defined in terms of the needs of a particular target group. These may be parents of young children, youth who have dropped out of high school without earning a high school diploma, welfare recipients, persons with limited English-speaking ability, incarcerated adults, or adults in the workforce.

4. Other literacy initiatives are defined in terms of a particular educational service, strategy, or means to address a target population's literacy problems. "Adult basic education" and "family literacy" are examples. These initiatives are often defined in terms of a particular configuration of services for the target population (e.g., assessment and information and counseling services).

5. The term "lifelong learning" is often associated with "literacy." Lifelong learning is a means to the goal of maintaining necessary levels of literacy throughout one's lifetime. The goal of lifelong learning has implications for both individual adult's learning behavior as well as education policy and the design of the education system.

Goal six of the National Education Goals illustrates a broadly stated goal that incorporates expectations about both adult literacy and the kinds of policies and services that should be in place to improve literacy. Goal six, "Adult Literacy and Lifelong Learning," states that, "By the year 2000, every adult will be literate and possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship." The objectives related to this goal touch on several of the common elements of definitions listed above, for example:

- Different dimensions of literacy (e.g., academic and workplace skills),
- The level of education attainment (e.g., increasing the number of persons who complete postsecondary degrees),
- The needs of target groups (e.g., parents, minorities, or part-time learners),
- The need to increase the availability of particular educational services, strategies or means (e.g., accessibility of libraries to part-time learners or opportunities for parental involvement), and
- The importance of lifelong learning, both in the learning behavior of individuals and in the educational system's responsiveness to the needs of adult learners.

Concept of adult education:
Several definitions of adult education has been done Community

- Adult Education is a⌉in the following examples are given of them. conscious effort by public institutions or voluntary organizations to promote community awareness comes action.
- adult education teaching is typically specific age group above the legal age⌉ limits as formal and informal, voluntary and at different levels of time, place
- Adult Education is a process in which people who⌉and education is presented. somehow been cut course they consciously to change

or advance their skills in information and do organized activities.

- Adult education includes all formal and informal training and volunteer after⌉ school, which by experienced educators and aware of the system.

Educational materials on adult education with daily life, needs, goals, aspirations and past experiences of adults and their relationship helps to results learned in life and career are used.

Key Characteristics of Adult Education and Literacy Programs:

1- Staffing:
Successful adult education programs have staff members who are committed to adult learners and know how to make the most of available resources with limited budgets. Staff must be flexible and work hours that are more convenient to adult learners. Additionally, staff must be trained in principles of adult education and should attend professional development courses.

2- Volunteers:
Volunteers are critical to the success of adult education programs, as they often provide valuable one-on-one tutoring sessions with adult learners outside of a formal classroom. Volunteers must be trained in principles of adult education and literacy programs, as well as methods to monitor their learners' progress. Having a volunteer coordinator is important, as this person trains the volunteers and serves as their point of contact during the tutoring sessions. If volunteers need advice on how to work with their partners or need new materials to cover during their sessions, a volunteer coordinator is an invaluable resource. Without a coordinator, volunteer retention would be very low. It is important that learners be paired with volunteers for a certain period of time, as it is difficult for adult learners to make progress if their tutor partner changes constantly. Clear expectations should be established for how often and how long tutors will meet with their learners. Congregations often can serve adult learners through tutoring programs, as congregations have easy access to a steady stream of volunteers. It may be easier for congregations to operate an informal tutoring program versus a comprehensive adult education program, since those programs need a higher level of staffing.

3- Respect for adult learners:
A distinguishing characteristic of adult education programs is that program content and language must

be suitable and respectful of adult clients. For example, instead of using the word "student" which may imply a traditional teacher/student relationship where a student is subservient to the teacher, all state program materials use the word "learner" or "customer." Using this type of language acknowledges the adults' existing knowledge and real-world experience and makes them the focus of the program. The Pennsylvania Adult Basic and Literacy Education Indicators of Program Quality emphasize the importance of customer satisfaction and learner progress on individualized goals (see Appendix A). One quality area explicitly states that "program staff and learners jointly develop, regularly evaluate, and update an instructional plan that incorporates the individual's learning styles and preferences" (p.7). This is just one example of how learners and staff are equals and collaborate on the learners' participation in the program.

Successful adult education programs recognize that adult learner needs and learning styles may require non-traditional methods of teaching and accommodate them whenever possible. This means holding classes and sessions outside of typical working hours for adults that work, providing one-on-one tutoring, group classes, and other methods of delivering services that are flexible. It is also important to hold the classes where it is convenient for adult learners to attend, such as local houses of worship, residential facilities, libraries, or other community centers. Understanding this key principle is difficult sometimes for organizations that have worked in child education, but not in adult education. Congregations that have held learning programs for children may feel that they are suited to take on adult education without realizing the differences in program structure and content. It is important that congregations research training opportunities before embarking on an adult education program.

4- Practical program content:

 Related to the program quality area of "respecting adult learners," curriculum should be practical and relevant to the individual learner's goals. Many adult learners are interested in advancing their careers, starting a new career, transitioning into post-secondary school, or attending other educational or training programs. Program content should help learners work on their personal educational or vocational goals. Materials from their current or future job can be utilized as part of the curriculum to make it hands-on and practical for the older learner. Some programs that have provided educational programs for children may have learning materials and textbooks that they think they can use with older learners. However, this is not an effective way to teach adults and participants may be turned off from

a program that uses children's books for their teaching materials.

5- Assessment and evaluation:

To have an effective adult learning program and demonstrate program success, learners' progress must be monitored during their participation. There are many official assessments that state funded programs use for standard programs, such as the adult diploma program or GED classes. However, informal measures should also be used to monitor learners' progress and help learners' view their improvement. Seeing concrete improvement over time is important to keeping learners motivated and committed to the program.

6- Space:

The learning environment where an adult education program takes place should be well-lit, clean, and suitable for adults. Additionally, having computers available is useful for learners and staff to access online resources. Many learners want to improve their computer literacy as well as language or numerical literacy, so having a computer lab is valuable.

7- Community relationships:

It is important for adult learning programs to have working relationships with libraries, local businesses, work-ready programs, and other community resources. Since many learners attend adult education programs to advance their career goals, it is important that programs be able to refer them to job readiness or placement organizations. Libraries are also a valuable resource for organizations that are looking for materials that are appropriate for adult literacy programs. The Philadelphia Free Library has a program called the "Reader Development Program" which gives away two free library books a year to adult learners who have a library card.4 Books cover topics such as reading, writing, math, job skills, parenting, biography, fiction, GED and ESL. Program staff can also access these books for their own classes.

Conclusion:

Curriculum content only from the training provided to learners or not, but put together their learning through activities that can inform or does, skills and attitude to achieve. In this case, apart from learning that the assays taught learners directly to sustainable and effective learning occurs in his.

Another way of providing content that is educational activities outside the learning environment possible for learning more and better enables adult learners. For example, hits, field trip experiences for learners or transfer is provided, develop knowledge, insight and skills they will.

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning The task force's policy recommendations are guided by these principles:

- Shift from an emphasis on programs and pilots to a focus on systemic impact on adult literacy in all counties of the Commonwealth.
- Focus on all adults who are in need of significant improvement in their knowledge and skills to be full participants in Kentucky's workforce and society, to develop and maintain healthy families, and to continue their education and training as necessary throughout their lifetimes.
- recognize multiple dimensions of the issue and, consequently, the importance and efficacy of multiple, separate but coordinated strategies aimed at the needs of different target populations, including, but not limited to:
    - Parents of young children.
    - Adults in the workforce, including those with secondary education credentials, for basic literacy and workplace skills and for retraining and upgrading of knowledge, skills, and competencies.
    - Youth from 16 to 18 who drop out of school or are not well served by traditional secondary programs.
    - Adults with significant learning disabilities that limit their ability to take advantage of further education and training.
    - Adults with limited English language literacy.
    - Incarcerated adults.
    - Adults whose access to further education is severely restricted by geography, transportation, technology, and other economic and social barriers.
    - All Kentucky adults who will need lifelong learning opportunities from basic literacy through postsecondary education to succeed in the changing society and economy.
- Emphasize both continuity and development of basic human and physical assets to provide services as well as performance in serving client, community, and Commonwealth needs and priorities.
- Recognize the current and traditional roles and strengths of public schools, postsecondary institutions, employers, and other providers; as a corollary, avoid assigning to key players responsibilities that are inconsistent with their strengths.

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Importance of women's participation in rural programs especially micro-credit

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Abstract: One of the raised strategy , in order to accelerate investment process and reinforcing financial foundations , and saving , at deprived and rural areas , has been empowering and eradicating poverty of rural societies through efficiency with emphasize on applying micro-credits. Micro-loans as useful tool to fight against poverty and starvation, has proven its capabilities and values to develop these areas. These tools have ability to change and improve human's life, especially poor peoples. Micro loans , saving accounts , and giving various bank services , cause this belief in low income and poor family that , by accessing to these services , their income will increase ,so they can protect themselves against barriers of unexpected problems and their current level of life and also invest on nutrition , housing and their children's education. Accessing to these conditions is among main goals of third millennium program.

Keywords: participation, micro-credit, rural women

Introduction:
Aforementioned plan, due to containing special advantage such as giving accessible loan with low commission fee and no interest rate and also long-term repayment, could provide chances for many farmers to release from dealers and broker jobbers. In this approach, giving micro-credits to rural women seems more effective. because alongside agricultures activities that needed more investments , women by enjoying of very micro-credits not only could create remarkable creativities in rural productions but also gained worthy economic and social abilities , and even improved their field of social presence , well .(Lahsaeizadeh, 2000).

If rural women can work through receiving credits , loan and others finance facilities at favorite jobs and live through earned income (as it called "self-reliance and independence") , so undoubtedly we would see changes in social, economic and cultural relations of village.

Here, Basic issue is that if changes happened following of these events in villages, have positive aspects or negative? Naturally, every change in institutions and social phenomena has both positive and negative dimensions. (Farghdan, 2001)

Being high and low of each one is depended on various conditions and terms so it is varied from one society to another society. In Iranian rural societies, cultural and social context is such that, consequences of these phenomena maybe being different and sometimes contradictory. However these actions caused that women stand in good economic condition and also gain self reliance and rely themselves with no help from husbands, but dominant cultural space

on villages may create some disorders. At most of villages in Iran, patriarchal with all features dominate and women's financial self reliance may not being pleasant for some human and rural groups. When women gain financial independence in villages, impacts and social and cultural consequences would emerge. (Chabokru and etal, 2005)

Increasing Suffrage, lack of relying on vast patriarchal families, increasing cultural acknowledgment, relation with newer institutions, having intellectual independence, making decision for marrying, occupation, emigration and etc are those rights that they gain. gaining aforementioned rights by women in context of cultural and social framework followed some changes that maybe lead to disfunctions and even create disorders and abnormalities at traditional , familial and kinship relations that dominated on villages (Fakhraee 2002). What that performing credits programs, has made in recent years, was on broad outlook with purpose to access to same results as above findings.

Thus, in one inclusive outlook , it is possible to use micro-credits programs to solve those issues which involved with rural women's economic limitations , so that lead them toward social empowerment, in the context of economic growth(Rahmani andalibi, 2001) .

Importance of women's participation:
It's not possible to reach rural development goals without understanding the present situation of society and its groups. Meanwhile identifying the groups with critical roles in the rural area development program will be of importance. Women, as a rural group, due to

numerous reasons have always received the least attention while their activities in non-monetary sector play a certain role in rural household economy. As most men leave the village to work in town, women provide much of the agriculture force in the area. In recent years the situation has been more considerable as rural migration to town is getting more. In most Iranian villages women's population is more than men. According to FAO's reports, in some African regions, for 60% of families, women are responsible for supervising family. Even for cases that men are the direct responsible of production affairs, women's role in family economy can't be denied just because they don't get paid. Although these efforts appear to register in none of official statistics, they easily replace some other activities with significant financial value.

Studies by FAO show that more than half of the world's crops are collected by women. According to estimates, 1.3 billion of world's poor are women, thus the slogan "poverty has a feminine face" is spread worldwide.

Given that in many parts of the world, the production potential of women is not used properly, a cost-benefit study by the World Bank shows that investing on women in developing countries will be more profitable than any other investment. In addition to financial benefits of this huge force, its ancillary results will also be useful. The ancillary benefits of women's employment include: lower population growth and children mortality rates (Navab Akbar, 1997).

Rural women are a big part of productive force and in developing countries third to half of them are supervising households; as a result they face numerous problems, such as:

-Lack of access to social and health facilities
-Various daily chores inside and outside the home
-Men's skill and increase of women's responsibility
-Lack of professional to educate women

Around the world and in Iran, the issue related to female employment, especially in rural areas (which is a manifestation of participation), is not unemployment but unpaid employment; because all the unpaid work done by women at home, such as cleaning, washing, nursing, social affairs, agriculture and livestock,... are encountered as non-economical activities; While visible economic sector cannot continue to exist without this invisible sector's goods and services. On the other hand, rise of industrial system and expansion of factory job all over the world, attracted men to these economic systems and this has given men an objective vision; Whereas, the majority of women, due to working alone at home have got a subjective vision. Now, as women enter labor market and start to participate, they'll become objectified; because the work system will encourage them to think like men. Being more around the house and their local area will

help both men and women in terms of subjectivity and objectivity (Arab-Mazar and Jamshidi, 2005).

Thus the issue of women's participation has important effects, including:

-Acceleration of plans implementation
-Realization of people's every day needs with cooperation and consultation
-Increasing efficiency and reducing functional expanses of projects
-Creating opportunities for talent realization and scientific activities
-Creating sense of solidarity and cooperation
-Increase social and personal awareness
-Women, sharing ideas in decision-making and determining their own destiny
-Participation of women as an important factor and a major power to achieve development

Therefore, according to preceding discussions and importance of women's participation in future plans, it's of great importance to study and recognize the factors affecting their participation in social activities of rural area (Fakhraee, 2002).

Major obstacles to women's participation:

Considering society's current conditions and the issues mentioned above, major obstacles which result in women's less participation can be classified as follows.

1- Educational barriers

Apparently, one essential factor for development is education. Studies indicate that compared with men and boys women and girls do not have sufficient access to education. Some of the factors effecting women's access to education are:

1. Great need of parents to their daughters as labor force
2. Lack of access to educational experts and planners
3. Lack of schools or proper places for girl's education
4. Mixed classes for boys and girls and rural bias on this issue
5. Education expenses
6. Lack of attention to the importance of girls' roles
7. Social, cultural and traditional beliefs about girls
8. Early marriage
   Report by UNICEF, claims that literacy rate of women in developing countries is two third of men's, and of about 860 million illiterate adult worldwide, 640 million are women who never had the possibility to go to school or have left school unfinished(Bakhshoodeh and Salami, 2005).

2- Social and cultural barriers

Sociologically, women in third world countries-especially in rural areas- believe to be dependent on men.

The thought is deeply attached to their historical beliefs. Thereupon they never share ideas while decision-making or planning. As some sociology and politic experts stated, it's the reason they have developed "the silence culture" and they never let themselves to comment on, or participate in planning.

In addition, customs and prejudices that they have been trained with, indirectly affects women's participation. Such ideology of knowing a sex to be lower than the other is a crippling disease that causes a big part of mental and power sources of community remain disadvantaged. These are all prejudice emphasizing on men's value and denying those of women (Changizi Ashtiani, 2003).

3- Structural barriers

In fact, in most countries, governing power, marketing and production conditions and some values related to them, create serious structural barriers to women's participation. According to United Nations' research institute of second development program, these structures are anti-participation; because they lead to unequal access to the control of wealth and social status. They cause failure of many national-regional innovations encouraging participation, and finally make a small group be responsible for everything and we won't have the beneficial results associated with women's participation. The structure determines the conditions of participation and reacts strongly to any renovation. Its objective is to keep women in their position as a labor. Labor market divides the jobs in workshops and factories in a way that some occupational fields are only for women and some other only for men. Men are chosen to be the administrator in all professions and it's assumed that women are not interested in or not able to handle these positions. Thus, in practice the world of production and work is subject to gender discrimination.

4- Political and organizational barriers

In third world countries, women face with many obstacles for participation in decision making, planning, implementation, and evaluation of projects related to country's developing plans. Although, the structure of the country play an important role in making suitable conditions for participation in different areas, but because they have focused plans and such decisions are made by public organizations and official systems, usually the potential force of participation in society will be palled and in practice, participation will face serious obstacles and problems. A focused government always encourages focused official structures. Such a structure is a major barrier to women's participation. They control structures and systems resource allocation and information and knowledge people need to participate in social activities, besides they never let people and especially women control all these. So it's apparent that such programs are either not comprehensive or it's facing problems because designers are not aware of the realities in their community.

5- Barriers related to wife-mother role

UNICEF reports indicate that women's work hours is 25% longer than men's; because a large number of them work at home to produce livelihood products without payment.

The main role of all women in each society is the role of mother and wife; therefore every other matter such as their employment is subject to these roles. Possibility of finding a job (as administrator or in a lower rank) for a girl is affected by various factors including educational level and their socialization method as a child. They have always been thought that they are not identical to boys in terms of social privileges or social status. Emphasize on the roles of mother and wife may make women think there is no need to promote their social status and in the other hand society will not provide necessary facilities for their development. In this situation they are prevented from studying and schooling. This issue will still be a problem after they are married. It should be noted that with women getting paid, total household's welfare improves; because field studies claim that all women earning money, spend their income on their family and particularly children's needs.

So we should mention that not only participation is a woman's civil right but also it will make her more autonomic, and she'll become more creative and innovative.

6- Economical barriers

One of the factors indicating development progress is how and how much different classes of society participate in vital activities. Although importance of women's participation has always been completely apparent, the appropriate balance between men and women in different fields is not yet established in our country. As women can only posses a limited sort of jobs and also they always have the smaller share of each job

opportunity, they are not able to compete in labor market. What's more, mostly they do not own the capital needed for economical participation, so providing personal credits can solve their problem in some extent.

Results:
Many studies have proven that women's access to mentioned facilities may improve their conditions in family and society; it also helps them feel more self-confident and makes them aware of their own abilities. Thus providing micro-credit services for the poor in society is a powerful tool to reduce poverty and so that they are able to create assets, earn more money and become less vulnerable against the economic pressure. Of about 1.3 billion poor in the world there are 900 million poor women, this obviously shows that poverty has a feminine face. According to UN's development fund, 10% of world's income and less than 10% of world's assets belongs to women. While a majority of them never posses the capital needed for their activities, women still play an important role in the economic development of country. Therefore women draw the micro-credit policy maker's attention more than others. Choosing women as the main target of micro-credit plans is an effective strategy to eradicate poverty; because their income will upgrade the family welfare; furthermore earning money improves their social status. In some countries this choice is influenced by society's attitude and culture (Araghzadeh, 2002).

Women's access to micro-credits have shown that their income benefit to improve their family and provide livelihood. In addition to all these another reason of women being the target of micro-credit plans is that women have higher loan recovery rates. Totally, expanding women's access to micro-credits may lead to many useful results which in economy is mentioned as "virtuous spiral"; because their access to micro-credits results in family welfare and in a broader point it'll improve community's welfare and shall be increased welfare this process is repeated.

In researches that conducted by Nanda (2004) became clear that women participation in credits programs had positive effects on their demand about health care.
Fiona Steele and et al (2008) in researches that conducted as called " influences of credits programs on empowering women at Bangladesh , found that women who joined to credits programs , have participated in more educational programs and have married with more educated men and also they have saved more and they had more cash .

Shahnaj and Chaudhury(2009) in research as "credits and its role on empowering women " concluded that there is meaningful relation between attending in credits

programs and empowering women , at economical dimensions .

Maybe the main challenges that threaten credits associations , is lack of necessary emphasizes on social dimensions and on reinforcing their basics , that practically cause that this social foundations lose its efficiency soon and practically changed to unsuccessful institution .

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Ellen and her Colleagues (2009) used approach called it "credits and education at Bolivia, Ghana, Honduras, Mali and Thailand". This approach looks for empowering women through financial services with education. In this approach, women get familiar with importance of credits through education and extension and also familiar with ways to access it through establishing different groups.

Ruhal Amin and others (2010) found that those who joined credit funds had more ability rather than those who didn't.

Jameela (2010) presented that credit programs has shown lot of affects on empowering women so that has increased their social, politic and economic ability.

Thus it is obvious that credits programs and its educational and empowering programs can be affective on social, humane and economic development or rural society, if it be associated with proper and gradual practices and base on reciprocal communications principles and apply opinion of local society.

A study conducted by Chabokru et al (1384) shows the crucial importance of micro-credits for farmers who do not possess physical financial assets (land, building, livestock, well…) and work in agricultural sector because of environmental conditions (such as living in a village) or because it's their ancestral occupation.

So today, women's participation in sustainable economic, social, and cultural development in rural areas is not optional but an essential matter. Those communities that have not seriously considered the necessity of participation faced failures and delayed community's development, welfare and security process. In any community, village, or social group, broad participation of every women in decision-making and any other matter related to national or local development programs, is a key variable in social sciences and in the last few decades, it has interested many scholars of socio-economic and

especially cultural issues, and is considered as one of the most fundamental democratic rights of women in a society. As we know in a popular participation, all people are given the opportunity to participate in planning and decision making for their society and for their own future. When in practice women feel that they can be involved in planning, policy making and deciding or solving problems in the society certainly they'll feel more solidarity and become more interested in social, economic, and cultural development programs.

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Utilization Information and communication technologies (ICT) in rural people education

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Abstract: An important factor influencing the adoption of any new technology is an individual's perception of that technology. It is hypothesized by this research that one of the key perception aspects influencing the adoption of IT is the level of trust that the potential adopter has in the IT system and in those who use IT. Trust can be defined as "an individual's optimistic expectation about the outcome of an event" (Hosmer 1995). There are different aspects of trust related to IT. An individual must first trust that information technologies will work and that IT will be beneficial in accomplishing his/her goals and in completing his/her tasks. An individual must also trust that the information they obtain via IT is accurate and the information they send via IT will not be tampered with and privacy levels will be maintained.
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Introduction:

The internet and mobile networks have the potential to provide agro-information services that are (i) affordable, (ii) relevant (timely and customized), (iii) searchable and (iv) up to date. Large sections of the farming community, particularly the rural folk, do not have access to the huge knowledge base acquired by agricultural universities, extension-centers and businesses. While telecenters are beginning to dot the rural landscape [1], one of the big barriers remains the lack of agro-content that (i) is in the language of the farmers (ii) is relevant to their needs and (iii) is delivered in a form that is of immediate use to them. Information Technology, more precisely the Information and Communication Technology (ICT), has emerged world over as a technology of the new millennium. By augmenting the process of information exchange and reducing the transaction costs, this ubiquitous technology is instrumental in increasing productivity, efficiency, competitiveness and growth in all spheres of human activity. The potential benefits of, however, can be harnessed only if the technology diffuses across the different sectors of the society. Unfortunately, we are living in a world of 'digital divide' wherein half of the world population have never made a telephone call . The digital divide is not only an international problem, but for most developing nations including is also a national phenomenon. Nonetheless, it has been argued that in an era of globalization, the ability to harness this technology for the 'rural' improves the capability of the developing country.

Information technology (IT) has connected the world globally and is now changing our lifestyle and social consciousness dynamically. Of late, it has emerged as a best tool for information sharing and mutual communication. None of the walks of life have been left untouched by the IT sector be it grain threshing or global business. Agriculture has also been greatly influenced by IT in the present era though the share of IT in agriculture is only 1.3%.

Information Technology and its Components

Induction of IT as a strategic tool for agricultural development and welfare of rural requires that the necessary IT infrastructure is in place. The rapid changes and downward trend in prices in various components of IT makes it feasible to target at a large scale IT penetration into rural. Some of the broad factors to be noted with respect to various components of IT are listed below :

1. Input devices :

Radical improvements are witnessed with respect to the means of communication by human beings with computers such as key boards, mouse devices, scanners. The advent of touch screen monitors that allow users to give input to computers by touching on the appropriate location of the monitor has made it possible to develop user-friendly interface for farmers which is easy, intuitive, circumvents language barrier and at the same time provides a relaxed environment to the users. The present day digital cameras make it possible to capture and store good quality graphics and large video clips. The small size and low weight of these digital cameras,

which are increasingly becoming affordable, open up the possibilities of providing computer based demonstration clips to educate the farmers.

2. Output devices :

Monitor screens, printers & plotters, data projectors support high resolution and good quality output. The quality of these output devices have the potential of generating renewed interest in the farmers in using IT based services. The light weight portable data projectors can be easily carried by the agricultural extension personnel for serving larger audience. Similarly, speakers can also be attached to the computers to incorporate voice based trainings for farmers.

3. Processors:

The processing speeds of computers have gone up. At present, Intel P-IV based processors @ 1.5 Ghz are available in the PC range which makes it possible to undertake substantial processing of data at the client side.

4. Storage Devices :

40GB and even higher hard disk drives have become common in PC range of computers. This makes it possible to store substantial information at the local level which facilitates faster access. Similarly, high capacity floppy disk drives, CDs make it possible to transfer large volumes of data to locations which can not be connected to networks immediately. These storage devices are also used for backup of crucial data. As a precaution, many corporates store their backups at locations away from the place of work.

5. Software :

Various operating systems are available which act as interface between the user and the machine. The graphic user interface (GUI) has become an accepted prerequisite for end users. Microsoft's 'Windows' continues to be a favourite. Application softwares which can support complex user requirements are available. Of the shelf solutions for office automation packages, groupware applications, complex database solutions, communication products, solutions based on remote sensing & geographical information systems are available. In addition, solutions based on some or all of these are also readily available. The present downward trend in the IT industry provides an opportunity get customised application for any specific task developed at an affordable price. Rapid Application Development and Deployment (RADD) is a popular model for quick development and deployment of applications. Development environment itself is simplified with tools that quicken the pace of software specialists. Project management and monitoring software are available that facilitate efficient execution of large and complex applications that are required for rural.

6. Networking devices :

The capacity of modems, used to convert the data from digital to analog and vice versa, which are popularly employed to use telephone lines have increased. Internal modems are available integrated into the computer so that they are not exposed to outside environment. The capacities of other networking devices such as routers have also gone up which makes it possible to create large networks with smooth data transmission.

7. Transmission Media

: The media through which the data transfer takes place has also undergone revolutionary change. Telephone lines are still the popular source although the reliability and low bandwidth are still major issues. High capacity cables, optical fibre, radio, wireless local loops, satellite transmission and various solutions based on a combination of these are already being used in many parts of the country.

8. Other accessesories :

Uninterrupted Power Supply (UPS) devices are crucial to ensure the

longetivity of the IT equipment as well as provide backup mechanisms. The potential of solar

power packs to provide a feasible solution to shortage of power in the rural areas needs to be

exploited.

Role of IT in Agriculture

In the context of agriculture, the potential of information technology (IT) can be assessed broadly under two heads : (a) as a tool for direct contribution to agricultural productivity and (b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted.

Precision farming, popular in developed countries, extensively uses IT to make direct contribution to agricultural productivity. The techniques of remote sensing using satellite technologies, geographical information systems, agronomy and soil sciences are used to increase the agricultural output. This approach is capital intensive and useful where large tracts of land are involved. Consequently it is more suitable for farming taken up on corporate lines.

The indirect benefits of IT in empowering farmer are significant and remains to be exploited. The farmer urgently requires timely and reliable sources of information inputs for taking decisions. At present, the farmer depends on trickling down of decision inputs from conventional sources which are slow and unreliable. The changing environment faced by farmers makes information not merely useful, but necessary to remain competitive.

Problems faced is that:

- The population of the earth is burgeoning every minute and there is sufficient evidence of impending food

crisis, especially in the developing countries even after attaining self-sufficiency.

- Even the major powers in the world are finding it difficult to balance the agricultural productivity with the

environmental requirement and meet the expectation of the millions round the world.

- The politics and economics in any country and the world trade mechanism are now dependent on the balance of supply and demand of the food.
- Inefficient recording and storage of data in spite of huge data collection.
- Lack of timely forecasting of weather and agriculture productivity.

In the current scenario, the role of IT assumes great importance and only with proper integration of IT with agriculture, the problem of food crisis can be solved and the world can move towards a sustainable production.

Integration of IT with agriculture must be done with following main objectives in mind:

- Develop multi-level decision support models for synergising the natural resource system with economic and social imperatives.
- To develop indicators of sustainability for agricultural production system.
- Based on the above scientific assessment, suggest alternatives to conserve and improve the health of natural resource system.

Two fundamental steps exist in establishing an innovation as a valuable, readily used tool: diffusion and adoption. Both diffusion and adoption must occur in order for an innovation to successfully reach its target user and be implemented (Mahajan, et al.). First, diffusion, the process by which an innovation "is communicated through certain channels over time among the members of a social system" (Rogers), must occur. In this study, the StratSoy project was a major factor in the IT diffusion process in state soybean organizations. Other factors that influenced diffusion included the media, word-of-mouth, and experiences of friends, associates and family members.

In addition to individuals having access to a new technology, adoption must also occur, which means individuals accept the innovation as valuable and use it. Numerous factors could influence IT adoption and use in agricultural organizations and can be grouped into five categories: access to IT, demographic, IT

training/education, trust, and time. It is possible for adoption factors to fit into more than one category.

In the case of IT, access to the technology means an individual must have access to a computer equipped with IT such as e-mail and access to the WWW. The category "access to IT" would not only include the use of a computer with IT ability, but would also include the ability to upgrade computer hardware and software to facilitate IT use. The price of needed computer equipment and the expense of Internet use are also related to access to IT. It is predicted that the higher the level of access to IT, the higher the level of IT use by an individual.

The demographic category includes adoption factors such as age, education level, gender, and income level. It is hypothesized that factors in the demographic category will not significantly influence IT adoption and use. Although previous literature suggests that IT use will be higher for younger, more educated individuals (Batte, et al.), 1997 survey results suggest that demographic factors have little influence on IT adoption and use. This may reflect that demographic factors may influence the decision to adopt a new technology, but once that decision to adopt is made, demographic factors may have little influence on use.

Another category of IT adoption factors is IT training/knowledge. This IT adoption factor can be measured with variables such as type of IT training, days of IT training, and the level of knowledge on IT use. It is hypothesized that as the quality and level of IT training increases, the use of IT will also likely increase.

Trust proves to be a difficult variable to measure. Factors included in the trust category include an individual's perception of the ease of use of IT as well as the benefit of IT. In this study, trust is measured by variables such as helpfulness of IT for work-related communication, problem solving ability, and banking and shopping via the Internet. Some individuals, either due to their background or current environment, have a fear of IT and feel that it is difficult to use. It is hypothesized that an individual will use IT more if they have a positive perception or high trust level in IT.

The final IT adoption category proposed by this research is the passage of time. It is hypothesized that individuals will increase their use of IT over time, as access to IT becomes more commonplace. In this study, the same group of people were surveyed twice to evaluate their changes in IT use over time. Time was measured by establishing a dummy variable where each survey response from the 1997 survey was assigned a value of zero and each survey response from 1998 was assigned a value of one. Time-interaction variables were also created for each

variable by multiplying the original variable by the time variable. For example, the "days of training" variable (tdays) was multiplied by the time variable and became the "timeinfluenced days of training" variable (tdayst).

Conclusion

The key players involved in this process such as industry, government and educational institutions and research centers are required to make contributions in this endeavour. The initiative to develop necessary IT based agricultural services need to be developed immediately. Parallel steps to develop necessary IT communication infrastructure are to be taken up along with the utilisation of fiber optic network whereever it is passing through the rural segments.

Information and Communication Technologies (ICT) has the potential to change new and old forms of economic activity. This can result in e-literate groups, low skilled or low paid workers, unemployed people, sole parents, and those with disabilities that do not have access to these ICTs. However, it is likely therefore that assisting people to improve their access to and skills in ICT will be an important means for a Government to grow an inclusive, innovative economy for the benefit of a country. Therefore the ICT-Hub model or mechanism for integrated service delivery to rural communities may be applied for this purpose.

It is necessary for the industry related to agriculture, in particular fertilizer companies, to review their present I.T. infrastructure with respect to marketing function and undertake measures to strengthen the same. Online integrated systems, well developed executive information systems, applications to enhance the productivity of the field personnel and efficiently serve the requirements of channel partners & consumers are to be taken up at the earliest. Marketing field personnel need to be provided with the necessary hardware, software, training and brought on to Internet so that smooth integration is possible. Internet based technologies can facilitate creation of applications which can be operated by the field personnel by using simple browsers. Customer support services can also be partially provided over the Internet which will increase the reach of such programmes. The state and central governments should initiate urgent measures to jump in to IT bandwagon for effective e-governance.

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Adult education implications and differences with children education

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Abstract: adults, social experiences, many have already learned different values and beliefs in their pronouns have stabilized, so changes in the new act very cautiously. The idea of such a manner that skill and applying them older and longer life is, Similar resistance to accept new ideas will be more and more severe. Thus, the adult criteria for the built and paid for their ideas and beliefs that are forming. Because of these criteria and the beliefs that they are afraid of failure, Therefore, to prevent it, sometimes against the resistance of new phenomena are only the material taught and its face that make reinforced concrete and tangible interference situation is. Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture.
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Introduction:
Adult illiteracy feeds the state's unemployment, its welfare rolls, and the correctional institutions. Adult illiteracy severely hinders the life chances of young children, undermines school reform, and limits the opportunities for postsecondary education.

Despite landmark reforms in public schools, too many Kentuckians continue to drop out of school, thereby perpetuating the chronic problem of adult illiteracy. Too many young Kentucky parents are unable to read and lack the basic literacy necessary to provide the necessary stimulating, supportive family environments for young children. It is known that children's literacy levels are strongly linked to the educational level of their parents and that children of parents who are unemployed and have not completed high school are five times more likely to drop out.

Only the negative consequences are obvious: getting more education often means leaving one's family and community for jobs and opportunities for advancement somewhere else. The future of Kentucky depends on uplifting the quality of life and economy of all of Kentucky. The social and economic costs of neglect of large parts of the state will drag down the rest of the state and seriously hinder its capacity to compete in the global economy. Much like strategies to curb epidemic, strategies to reduce illiteracy and raise the educational attainment of Kentucky's population must include both short-term efforts to face the immediate crises as well as long-term strategies to get at the underlying causes. Short-term crises include the imperative to keep helping welfare clients make the transition from welfare to work within the constraints of federal and state mandates and the need to train workers for immediate employer demands. Long-term prevention must address the underlying, persistent problems of the state's economic structure as well as the low awareness--if not appreciation--among segments of the population of the vital connection among education, employment, and improved standards of living.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills

necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients. adult who is able to recognize their needs. He is who knows what will. Refers to individual adults in their lives cross and understand their responsibilities and has accepted the role is social. Adult learners are often those that distinguish each other and have many different targets at the same time and will follow a common challenge to fulfill the goals of building self motivation vectors as educational materials to learn and use the forge.

Concept of adult education:
Several definitions of adult education has been done
Community

- Adult Education in the following examples are given of them. conscious effort by public institutions or voluntary organizations to promote community awareness comes action.
- adult education teaching is typically specific age group above the legal age⌋ limits as formal and informal, voluntary and at different levels of time, place
- Adult Education is a process in which people who⌋and education is presented. somehow been cut course they consciously to change or advance their skills in information and do organized activities.
- Adult education includes all formal and informal training and volunteer after⌋ school, which by experienced educators and aware of the system.

Educational materials on adult education with daily life, needs, goals, aspirations and past experiences of adults and their relationship helps to results learned in life and career are used.

Literacy goals include:

- Providing primary education in childhood that adults were deprived
- raising awareness for adults;
- knowledge bases and adults about their cultural heritage;
- increase confidence in adults.

Professional education goals include:

- Equipped with the necessary skills to adults living;
- providing the necessary manpower for the country's goals;
- achieving social equality and equity and eliminate the existing differences between different classes.

Adult Education Features (compared to regular education) :
1 - Flexibility in time:
 the sense that a religion course in hours and days of the appeal.
 2 - Flexibility in place:
people can live without taking their training to take place. (Transfers): a case for training in various locations will provide access to individuals.
   3- Flexibility of age:

the curriculum will be developed for different age range.
 4 - Flexibility in accepting
 5 - along with being able to adult education and job responsibilities:
 during that time working in the training classes to attend. In other words, they are part of their training to be considered.

Issues Beyond the Department of Adult Education and Literacy
Beyond the issues relating directly to DAEL(Department of Adult Education and Literacy), the task force heard a number of concerns about the Commonwealth's overall approach to adult literacy.

- Lack of coherent statewide leadership and coordination among multiple complementary initiatives aimed at the same problem.
- Lack of continuity in state leadership. Cited in particular was the difficulty sustaining a high level commitment to the issue long enough to make a difference because of changes in priorities of the state's political leaders. A high level of turnover in the leadership of the Department of Adult Education and Literacy has also contributed to the instability.
- Tendency to think of adult education as a separate categorical program rather than a strategy that cuts across the mission and responsibility of multiple Commonwealth programs and initiatives (e.g., early childhood education, welfare reform, economic development, and corrections).
- Multiple uncoordinated categorical federal initiatives that tend to drive (and fragment) policy for an overall state effort that is largely funded by Kentucky.
- A tendency to commingle and confuse different functions. The most important distinction is between functions focused on the needs of clients (adult learners, employers, communities, regions, and the Commonwealth as a whole) and functions associated with the operations and performance of providers. It is important that each of these functions receive attention, yet the tendency is for one (e.g., overseeing a network of providers) to drive out attention to overall system strategy.
- Inadequate coordination of services to meet the needs of individual adults, communities, employers, and regions is hindered by:

- Vertical financing and regulatory relationships between separate federal and state programs and local providers and administrative units. These vertical relationships can hinder the horizontal coordination of services for individual adult learners, communities, and employers.

- Turf wars among providers, local politics, and long-standing conflicts among neighboring counties.

- Inadequate links with and leverage of other public and private initiatives and investments to reach the target population. Major sources of help include employers, postsecondary education, and workforce development.

- Lack of a state financing policy and strategy for provider performance incentives and collaboration, and tax and other employer incentives for leverage of non-state resources.

- Lack of programmatic and administrative flexibility to meet the rapidly changing needs of adult learners, employers, regional economies, and communities.

Adult characteristics:
to understand the characteristics of adult learners, their mental and physical condition should be considered in the following referred to some of them.

Operating speed:
slow reaction in adults is natural that necessarily means reducing the logic and practice skills, not due to weakness and increased awareness of natural forces and their skills.

Consciousness:
no stimulus and incentives encouraging, despite inhibiting stimuli, slow transfer rate, mental, and weak inhibitors of natural forces (mostly visual and auditory) are factors that slow reaction affect individual mental and cognitive activities, but never able to understand, understanding and learning ability (which varies with the speed of learning) is not relevant.

Health:
what is most age, longer duration is necessary to be heard by listening issue. Why is that when elderly people and old could not hear well, their confidence and vulnerable to the possibility that negative beliefs about their find, they are great. Visual abilities can be like other people, usually decreases with age.

Background of knowledge - skills and beliefs of adults:
adults, social experiences, many have already learned different values and beliefs in their pronouns have stabilized, so changes in the new act very cautiously. The idea of such a manner that skill and applying them older and longer life is, Similar resistance to

accept new ideas will be more and more severe. Thus, the adult criteria for the built and paid for their ideas and beliefs that are forming. Because of these criteria and the beliefs that they are afraid of failure, Therefore, to prevent it, sometimes against the resistance of new phenomena are only the material taught and its face that make reinforced concrete and tangible interference situation is.

Conclusion:
Teaching adults can be very challenging, but also very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture.

Adults in agriculture use a number of sources to gain new information that can be used to help them solve problems. Persons employed in agriculture utilize newspapers, magazines, newsletters, radio, television, government publications, internet, and meetings to gather information which can be directly utilized in their business activities. In many communities, the agriculture teacher is the primary source of agricultural information.

Successful adult education programs develop and utilize an Agricultural Education Program Advisory Committee to assess the informational needs of adults in the community. Agriculture teachers should utilize the expertise and communications link, which an effective advisory committee provides. Specifically, the advisory committee should be asked to provide advice regarding planning, conducting, and evaluating the adult education program in agriculture. Adult education programs in agriculture should emphasize practical application of the information presented. Topics and information included in adult programs should be provided which fulfills needs of the local community. Providing information which cannot be applied to solve a local problem or address a local issue will generally be viewed as frivolous and over time will result in decreased interest (i.e. participation) in the adult education program.

The role of the agriculture teacher should be as a facilitator of the learning process. Most adults reject the traditional teacher-student relationship, which is necessary to maintain in secondary programs. Teachers should be encouraged to view themselves as partners with adult participants in the learning process. The democratic philosophy of shared responsibility for planning, conducting, and evaluating adult education programs distinguishes adult education from secondary education.

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Employment of rural women and its effect on empowerment

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Abstract: Rural women constitute about half of the world's population and in the world production supply they have energetic communion and constitute a great part of agriculture workforce. They constitute% 50 of the workforce and they participate in the production of half of the foods in the agriculture section. As an example the rural women constitute about 70 to% 80 of agriculture workforce in sub-Saharan Africa, %65 in Asia, %45 in Latin American & Caribbean, %80 in Nigeria & Tunisia and %80 in India, but their role in production system is the men's supplements roles and this causes a big responsibility inside their mother & wife duties and it takes a great time and energy of them. Studies in this field show that women spend about two thirds of their time for production, management & organize of their house as the men spend only one third of their time for such things. Although we are familiar with the rural women's role in the village and family's economic, but they direct & indirectly start a new economic relation, with finding modern jobs & financial independency. Catching loan from financial organizations has forced them to have economic schematization for loan reimbursement and to have intellectual economic behaviors. So after that rural women become active in economic activities. In rural traditional economic, women only have productive role and they don't have any role in economic planning, providence and they don't pay any attention to profits and losses. But in this new condition, for managing affairs in best way, the women have to be active in all of the affairs from production to dispense and also in others economic aspects. In other words, women will not be a productive only; they will contribute in managing of economic activities and will find various economic behaviors.

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Introduction:

Importance of women issue at Iran especially rural area, at one side face with fast population growth and mass of unemployed at process of access to rural growth and development, and at other side with limitation of facilities and productive resources. Rural women at all production level of agriculture products and livestock productions work alongside men and generally, development is multidimensional process and contains different economic, social, cultural and political dimensions. Women's participation at this process is active and affective participation, and main aspect of this participation was its economic dimension for rural women. Rural women have key role as a producer at agriculture activities, rural sources and services at rural area. rural women most efficient women of society and among people who are active at productive occupations, so it is obvious that attention to rural women as a strong arm at rural development can follow positive and undeniable affects, in this purpose (Lahsaeizadeh, 2000).

Rural women are considered either directly by producing livestock and agriculture products and rural industries and either by help to agriculture part as workforce and their share at third world countries is far more than other countries. Usually statistics about women's share at agriculture productions is less than real extent because largely, at these statistics seasonal job, part time job, no wage and housekeeping activities sere not considered. Nevertheless, they are forces for creating revolution and potential resources to progress rural economy and increase growth rate of food production (Nawab Akbar, 1997).

Women form great part of total workforce that needed for agriculture part at universe, as one of the intangible factors at agriculture economy. So, statistics that was represented in relation to extent of women's activity is very lower than real extent. Because in this statistics, mostly, seasonal jobs, part time job, no wage job and their housekeeping activities, aren't considered. rural women, have different roles and duties such as husband, mother, crops producer , participate at ranching activities , planting ,maintaining, harvesting, processing, marketing and preparing food. Rural women maybe venturing to culture cash products, while cultivating subsistence products and if they have no farm land, they have to work for others instead receiving wage.

We can consider such women as agriculture propagator, production expert and even in some case as policy maker. Other than activity at agriculture field, women's participation at rural development is critical and is considered in order to supply adequate and needed food.

Women's productive activities has affective role to increase revenue, rural family welfare, and its consequents is: foods status improvement, health, preventing irregular migration, literacy enhancement and development of rural family social status. Despite clearness of affective women's role at production, economy of village and country, they don't enjoy proper social base and they were deprived of educational and welfare programs especially at rural and nomadic area(Banihashem, 1999). Thus women and their roles should be considered particularly in order that they would find that first they are important and efficient; second they have educational needs and many technical gaps; third they shouldn't forget efforts for enabling themselves. As girls and women's discussion and solving their historical lag and restoring their social right are important and necessary, it is sensitive and accurate equally, because dominant patriarchal cultures at rural societies, put women at lower status. So that at some societies, women's duties are just upbringing and reproduction and maybe they are considered as workforce, and they are deprived of decision making and opining at family and society environment. (Samadi Afshar, 2004).

Global researches show that women played critical and important role at agriculture and now at most countries, they form major workforce of this part. In spite of importance of women workforce at different systems of agriculture, they have fewer access to development resources, compare to men. although during past two decades , various programs has been performed to enable women at agriculture , but due to different problems , gained success was very fewer than required extent . One of major problem in this filed is inadequate and inappropriate access to extensional services. Low efficiency of agriculture extension systems to provide services for rural women dosen't just refer to structure and function of these organizations and systems, but refer to other issues including research and cultural barriers in this field. However, one of essential needs to extend agriculture is, determining appropriate ways and approaches to educate women at every region or country (Fami 2000). at many past decades , significant global efforts were done to provide educating how to access information , appropriate and effective technology for female farmers that led to positive effects on producing agricultural crops

and consequently increasing family welfare (Janice Jiggins and et al, 2003) .

Indeed, at many development programs, women couldn't apply theories and their own basic concepts. Problems such as lack of women's access to farm, credits, suitable educational and extensional services, exist at many areas, yet. (Paknazar, 2000).

In recent years, the point was well clear that a major share of the income of rural households are obtained through the women activity, and sometimes even share of women income in the household economy is more than the share of men. For example, in 2000, about 854 million women that include 32 percent of the workforce of the world are active economically and their major activity in third world countries are in the agriculture sector and 60 percent of cultivated rice, 90 percent produce vegetables and, 50 percent cotton and oilseeds, 30 percent had affairs and gardens, 90 percent silkworm related activities and 65 percent of rearing livestock-related activities and handicrafts have the highest proportion (Emadi, 2001). This shows that the role of women as agricultural work force, not only isn't less than men but they have greater share in the process of planting, cropping, and more importantly in the sale of crops and livestock and a research specialized that 50 percent of food global production activities were owed to women .

difference at levels of policy making, investing and receiving salary for equal activity, are universal phenomena. extent of women's participation at economic activities, extent of women's activity at economic activities, is confirmation on lack of adequate attention to women's affair and their added value, because rural women work alongside men, at all levels of producing agriculture crops and livestock products and generally all affairs, and also spend their little leisure time for handicrafts such as rugs and carpets and etc. so it is necessary to establish self acknowledgement fields, directing women's economic and social ability and programming to attract their participation at different activities. At rural area, women have more significant role on family economy and inside activities and cause economic prosperity of society. yet, women couldn't gain their real position as active citizens who have talent for participation at economic, politic, social and cultural arena at most countries, especially developing country, and still their activities in economic calculations aren't considered, and they be considered as intangible workforce. Disappointing estimation about number of active rural women and underestimate about extent of their participation at economic activities is confirmation on lack of adequate attention to women's affairs and their added value. they are major force to create revolution and

potential sources to progress rural economy and increasing extent of growth rate of producing food productions, although traditionally, farming and ranching, has been male profession, but women's role was never restricted to house and family, so they are active outside (farming, ranching, forestry and …) other than inside activity (Balali, 2005).

since , rural women take different responsibility and roles such as producers of crops , ranching and keeping poultry , children education , housekeeping , supervising family economy and managing it , collecting firewood , weaving carpet , so illiterate women who haven't possibility to utilize mass media properly too , wouldn't able to do their duties and roles and also wouldn't be affective to develop rural societies . So importance of education is very critical for rural women especially extensional educations. Approximately in most UN reports, women has been considered as greatest deprived group at human societies, while at global level, about two third of all affairs is done by women. But only one third of all recorded affairs relates to women. And also just 1% of proceeds of estates and assets of world belong to women and two third of illiterates of world are women, however they form 50% of workforce at agriculture part and they produce half of foods at all over the world. So, educating women is important because of these reasons :

1- women's historical roles at agriculture development
2- rural women as mother and manager of home
3- rural women as decision maker at home and outside activities such as agriculture and …
4- rural women as productive factor at agriculture part and rural industry
5- rural women as affective member of society for participation at rural development

since , goal of extension base , is empowering human of society and also this issue that women have basic role at producing different agricultural productions and rural industries , it is impossible to develop rural societies without considering rural women.(Deputy of extension and system operation Ministry of Agriculture jahad, 2000).

Aside from the economic role of women that clearly has been made in the past decades, the vital role of women in social and cultural dimensions of development process in rural areas has remained hidden from the polls. They train the next generation of farmers and teach them the next generation necessary knowledge. A Chinese proverb says, "If training a man, just training a man but if you teach a woman you teach a family." Women are local knowledge and local educators themselves, in

preparing and providing food, health treatments and cultural values are the next generation (Fami, 2001). Women as the first group are known to have paid agricultural work, and evidence shows that women farmers have been the first. Important factor causing women's participation in agricultural activities has been, among them we can mention the following (Fami, 2001):

A - Seasonal agricultural employment, and intensified the need for labor in certain seasons.

B - Men migrate to find better jobs and to assume responsibility for home and farm and agricultural work and its management by women:

In some countries men migrate to cities, or on bringing those to wage jobs have led to women's responsibility for 30 to 40 percent of agricultural plants and are responsible, in some areas this figure reaches 70 percent (lahsaeizadeh, 2000).

C - Effect of cultural - social conditions on women work:

Sociological experience shows that kinship networks status and community practices determine that who and in which areas women can have activity and employment. Several Kinship networks provide different economic roles for women based on age, marital status and their place in father and husband family (Movahedi, 2005).

Importance of Empowering rural women:

Empowerment is capacity that woman can obtain in cultural and social environment, for economic independency and self reliance, by controlling over emotional decision making and far from violation. Empowering means, evolution and developing activities through non governmental organizations (NGOS) that lead empowerment to improve economic dimensions. (Amiri, 2000)

Enabling is process that, during it, people of society do activities to overcome barriers of advancement that finally cause their domination to determine their own density. The term "enabling" means overcoming fundamental inequalities. So it is different from self-reliance.

Enabling, enables individual to overcome any problematic condition and consider barriers and problems as part of life and positive campaign. Finally, enabling provides energy to overcome most intellectual barriers and external problems at private life(Balali, 2005).

Thus, among all what have been said, it is possible to present suitable definition of enabling women, as follows:

"Process of explaining women about themselves (and also men about them) for instances that they must or want to do, and growth of their willingness and

courage until they reach to needed competency "(management of rural and tribal women).

it should be noted here , that major factor which should be considered about women's ability , is eliminating individual and social barriers , and finally preparing field of economic and social participation for women at all fields . purpose of women's participation , is because of their dominance on all affairs of village including decision making process , organizations , forums , enterprising posts and … that involve , participation at all social and economic dimensions (Moazami and Heidari, 2005).

Conclusion:

Giving the right that women make decision, independency to their family, increasing the cultural knowledge among them& making relation with new institutions, having independency in making decision about marriage, occupation, migration & something like this are the right that women have got it. One of the issues that government should pay attention to is rural development issue especially at undeveloped countries. in this countries due to lack of proper policy making to improve quality of people life level of these areas, villagers migration to cities has increased considerably and led to urbanization growth and emergence of problems and also psychological, social, cultural and economical abnormalities especially at agriculture and ranching part. Also method for growth and rural development growth, require research at this field which can help government in order to economic, social and cultural programming and policy making. Creating local organizations and regional institutions with affective women's attendance and villager participation to solve problems are among important and affective substances that should be considered in regional programming. at developing and changing process of developed economy system of agriculture, value of women's activity changed as form of money which previously was as no wage workforce at family , and was given to her. Other than agriculture part (i.e. industry and public services) which are main field of women's work, rural women's participation is very important. The most important issues about women's social and political participation are participating at programming, decision making, performing decisions and valuing results.

Women at most countries, have low access to economic resources at the field of economic activity. They should reinforce them at this field by supplying economic facilities. Another part that changed women's attendance at economic affairs is agriculture activities. Opportunities which they gain at this part can have important impact on economic function and related social relations.

Same discussions were presented about identifying women's role on environment changes (especially in preserving natural sources) that related to women's life and job. Women's access to agriculture credits, because increasing and improving their efficiency at agriculture. Women's membership at cooperatives, also help them to receive facilities in order to supply needed inputs of agriculture, sale productions and make some production with aim of increasing efficiency. Most of researches found that women's education is related to their agriculture efficiency. Indeed, years which women used educational programs, related to their productions meaningfully. So, by identifying their needs, demands and interests and also by determining their issues, resources and preferences, we should prepare proper extensional and educational programs for them.

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Micro-credit for rural women

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Abstract: Rural women are among those major groups at society who previously were considered less by planners, due to specific reasons in the past. And this problem is more observable at developing countries. While, by looking at women's history of economic and social life, we can find that this great group, continuously have played basic role in forming economic condition of country. This great group consistent with men have had active role at areas of social-economic activities and always have had major part on economic production of society. Nowadays, supporting family supervisor women is adopted by universal society, as politic, economic a social concern and nearly all countries applied related approaches, and however these efforts have resulted in failure, in so many cases . paying part of cost of life by government or charities , establishing forums to analyze family supervisor women's problems , supplying necessary facilities to grow and improve child's life quality and paying facilities to provide sustainable employment , are among most important approaches to support family supervisor women . Paying credit facilities to access sustainable employment with easy terms at limited time, is one of the most important approaches to support family supervisor women. Because alongside supplying their continues needs, their esteem wouldn't be marred. Currently, this approach is used at many countries and positive results have emerged.
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Keywords: Micro-credit, rural women

Introduction:

Nowadays micro-credits and supplying micro financial resources, has changed human's life and cause to revive different societies at poorest and richest countries of world, so that we can see growth in human's power to access to common financial services. By accessing to wide range of financial tools, families according to their priorities, invest on cases such as costs of education, healthcare, healthy and good nutrition or housing. Applicants for Microfinance resources mostly involved family supervisor women, pensioners, homeless people, frugal workers, small farmers and micro entrepreneurs. These people are divided into four groups: Poor, very poor, relatively poor and vulnerable poor. Whenever repayment afford , bond terms and accessing to data , in this classification will change , in order to supply sustainable financial needs of various clients , procedures and operation structures will be develop .Generally, in most countries, micro finance sources are considered for poor women. By women's access possibility to finance services, they committed to loan and ensure its repayment and preserve their saving accounts and also enjoy insurance cover. Supplying programs for micro financial resources have strong message for families and societies. Most of qualitative and quantitative studies and researches have proven that accessing to financial services; will improve women's conditions in family and society. Women's

confidence has increased and they are aware of their abilities.

A glimpse to previous planning about rural development in the world shows that from 1950 many developing countries understood that the main reason for making their economic growth (development) slowly in their countries is the weakness of investment in the agriculture part. Although many countries by patterning from developed societies have proceeded to improve & develop their industrial agriculture part and by this action not only had irreparable damages to many traditional farmers but also the main problem (the lack of capital sources) is also remained in the rural regions. (Rahimi, 2001).

From 1970, the waves of thought about micro-credits and run of small activity in villages was one of the suitable way get increased for invest improvement in rural occupations.

The said plan because of special grants such as giving loan with low wage and no interest and with long reimbursement could give farmers this opportunity to don't rely usurers and jobber intermediaries. Indeed giving micro-credits to rural women was more effective. Because along agriculture activities which need more investments, the women with using micro-credits couldn't only show their talent in rural production, but also could improve their economic & social empowerments and

they could also participate in social activities. (Chabokru et al, 2005).

Women's self-reliance and independency were the outcome of giving credits to women and in some cases were the obstacle of receiving credits by women which is necessary to explain about them shortly.

Micro-credits:
One of the raised strategy , in order to accelerate investment process and reinforcing financial foundations , and saving , at deprived and rural areas , has been empowering and eradicating poverty of rural societies through efficiency with emphasize on applying micro-credits (Shahnaj and Sajedur, 2009).
Micro-loans as useful tool to fight against poverty and starvation, has proven its capabilities and values to develop these areas. These tools have ability to change and improve human's life, especially poor peoples. Micro loans , saving accounts , and giving various bank services , cause this belief in low income and poor family that , by accessing to these services , their income will increase ,so they can protect themselves against barriers of unexpected problems and their current level of life and also invest on nutrition , housing and their children's education.(Varzgar and azizi, 2001)
Accessing to these conditions is among main goals of third millennium program (i.e. eradicating absolute poverty of human societies).

Nowadays micro-credits and supplying micro financial resources, has changed human's life and cause to revive different societies at poorest and richest countries of world, so that we can see growth in human's power to access to common financial services. By accessing to wide range of financial tools, families according to their priorities, invest on cases such as costs of education, healthcare, healthy and good nutrition or housing.
Applicants for Microfinance resources mostly involved family supervisor women, pensioners, homeless people, frugal workers, small farmers and micro entrepreneurs. These people are divided into four groups: Poor, very poor, relatively poor and vulnerable poor.
Whenever repayment afford , bond terms and accessing to data , in this classification will change , in order to supply sustainable financial needs of various clients , procedures and operation structures will be develop .(Fami, 2001)
Generally, in most countries, micro finance sources are considered for poor women. By women's access possibility to finance services, they committed to loan and ensure its repayment and preserve their saving accounts and also enjoy insurance cover. Supplying programs for micro financial resources

have strong message for families and societies. Most of qualitative and quantitative studies and researches have proven that accessing to financial services; will improve women's conditions in family and society. Women's confidence has increased and they are aware of their abilities. (Banihashem, 1999)
Thus, it has proven that supplying financial services for poor peoples is powerful tool to decrease poverty so that make them able to establish finance, increase income and decrease vulnerability against economic pressures.
In micro-credits programs other than offering and distributing micro loans, there are also small savings and deposits so that they are designed as form of saving-credit programs. The existing term in phrase "micro-credits" points to two basic concepts that is due to dominant perspective on this approach. First term (i.e. credits) points to rural areas and lack of access for many villagers to formal resources that are one of their major problems. And at system of micro-credits, are tried to decrease poor families' access barriers to credit sources and also to increase effectiveness of these markets. Second term (i.e. micro) emphasize on deficiency of development, according to classic economist's method. Emphasizing on concept of "micro" means revising recommendations of market economy at rural society's development.
Generally, goals of micro-credits programs are: (Moazami 2005)

- a- increasing access coefficient of low income rural women to credit facilities
- b- considering and focus on low income rural women groups
- c- empowering rural women to enjoy needed job skills
- d- empowering rural women to deal with group works and cooperative activity
- e- equipping non-productive villager's saving (women) to effective and productive investment
- f- planning in order to perform projects that are based on capacities and facilities of that area
- g- breaking poverty cycle and saving rural family
- h- Developing employment and stabilizing jobs which faced financial crisis

Micro-credit characteristics:
 1- Empowerment

Empowerment is one of the major goals of micro-credit and it's considered as a proper index to evaluate it. Creating self-reliance and self-confidence in people, empowerment is one of the

important factors to deal with poverty. It also creates social capacity.

Empowerment plans include:

1. Forming financial groups and creating social capacity
2. Education as a supplementary factor of credit-saving
3. Assigning management of credit plans to members

2- Stability

Stability is a fundamental characteristic for a comprehensive development program and leads to continuance of the program and makes credit-saving plans different from others.

Stability indicators:
-reduce dependence on external financial resources
-reduce trading expenses
-cut the loan subsides (Banihashem, 1999)

3- creating and expanding income generating activities

A study conducted by World Bank about micro financial institutions highlights three most frequent goals:

1. Creating employment opportunities for members
2. Increasing vulnerable groups' income and productivities
3. Reduce family's dependence on agriculture in droughts' prone areas

The role of micro-credits in poverty eradication:

The first application of micro-credit was about 20 years ago with the establishment of Grumman Bank in Bangladesh. This bank, providing credit for the poor (particularly women as 94% of its clients are them), has managed to increase income and economic welfare. Now the program is running in most parts of world especially Asia, Africa and Latin America. One interesting point is that unlike prior perceptions, the poor covered by micro-credit programs has been very successful in paying back their loans.

In the countries that credits are provided in a proper financial manner, not only it has increased production and income but also it has encouraged poor to save a part of their income. These savings can be an important support for the institutes providing micro-credits and can be a financial base for more loans and all these result in institutes' financial dependence.

With the new way of micro-credit payments, in addition to covering poor's financial needs, a combination of other services and facilities are available for them; such as saving accounts, educational services, and cooperation possibilities (Goetz and Sengupta, 2003).

If rural women could provide a job for them by getting credits, loan and other financial convenience, through their income they can get self-reliance or financial independency and we will see social, cultural & economic change in village. The question here is that if these changes have positive or negative aspects in the village? It's natural that every change in social phenomenon has both positive and negative aspect, but which is Important here is that which aspect is more than the other and it depends to different condition in various societies. In our rural society there is an especial social & cultural kind that it's outcome maybe different and in some case inconsistent. With these actions rural women could be in idealistic economic condition and they could live with out dependency to their husband's income. In most of the villages in Iran there is patriarchy in the families which is not acceptable for the most of the rural people and groups. When rural women became financially independent, it's acceptable to see its cultural & social outcomes.

Giving the right that women make decision, independency to their family, increasing the cultural knowledge among them& making relation with new institutions, having independency in making decision about marriage, occupation, migration & something like this are the right that women have got it.

Discussion and results:

Many studies have proven that women's access to mentioned facilities may improve their conditions in family and society; it also helps them feel more self-confident and makes them aware of their own abilities. Thus providing micro-credit services for the poor in society is a powerful tool to reduce poverty and so that they are able to create assets, earn more money and become less vulnerable against the economic pressure. Of about 1.3 billion poor in the world there are 900 million poor women, this obviously shows that poverty has a feminine face. According to UN's development fund, 10% of world's income and less than 10% of world's assets belongs to women. While a majority of them never posses the capital needed for their activities, women still play an important role in the economic development of country. Therefore women draw the micro-credit policy maker's attention more than others. Choosing women as the main target of micro-credit plans is an effective strategy to eradicate poverty; because their income will upgrade the family welfare; furthermore earning money improves their social status. In some countries this choice is influenced by society's attitude and culture (Araghzadeh, 2002).

For instance founder of Grumman Bank of Bangladesh, Mohammad Yunes, has stated that: "women have plans for themselves, their children, and their family life; they always have an overlook while men just look for fun" to explain why 94% of their clients are women.

Women's access to micro-credits have shown that their income benefit to improve their family and provide livelihood. In addition to all these another reason of women being the target of micro-credit plans is that women have higher loan recovery rates. Totally, expanding women's access to micro-credits may lead to many useful results which in economy is mentioned as "virtuous spiral"; because their access to micro-credits results in family welfare and in a broader point it'll improve community's welfare and shall be increased welfare this process is repeated.

In researches that conducted by Nanda (2004) became clear that women participation in credits programs had positive effects on their demand about health care. Fiona Steele and et al (2008) in researches that conducted as called " influences of credits programs on empowering women at Bangladesh , found that women who joined to credits programs , have participated in more educational programs and have married with more educated men and also they have saved more and they had more cash .

Shahnaj and Chaudhury(2009) in research as "credits and its role on empowering women " concluded that there is meaningful relation between attending in credits programs and empowering women , at economical dimensions .

Jameela (2010) presented that credit programs has shown lot of affects on empowering women so that has increased their social, politic and economic ability.

Thus it is obvious that credits programs and its educational and empowering programs can be affective on social, humane and economic development or rural society, if it be associated with proper and gradual practices and base on reciprocal communications principles and apply opinion of local society.

A study conducted by Chabokru et al (1384) shows the crucial importance of micro-credits for farmers who do not possess physical financial assets (land, building, livestock, well…) and work in agricultural sector because of environmental conditions (such as living in a village) or because it's their ancestral occupation.

So today, women's participation in sustainable economic, social, and cultural development in rural areas is not optional but an essential matter. Those communities that have not seriously considered the necessity of participation faced failures and delayed community's development, welfare and security process. In any community, village, or social group, broad participation of every women in decision-making and any other matter related to national or local development programs, is a key variable in social

sciences and in the last few decades, it has interested many scholars of socio-economic and especially cultural issues, and is considered as one of the most fundamental democratic rights of women in a society. As we know in a popular participation, all people are given the opportunity to participate in planning and decision making for their society and for their own future. When in practice women feel that they can be involved in planning, policy making and deciding or solving problems in the society certainly they'll feel more solidarity and become more interested in social, economic, and cultural development programs.

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Importance and role of rural women in rural activities

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Abstract: a positive relationship between women's participation in agricultural and non-agricultural employment of men can be seen, so that in some countries men migration to cities or bringing them on a day wage jobs has led them responsibilities in the absence of their husbands take charge of 30 to 40 percent of work related to home and agriculture. In some areas this figure reaches to 70 percent. Number of factors also led to a kind of common gender division of labor, especially in rural societies and one the most veteran of these factors is a particular power and ability of women to provide sustenance. Means participation of women in all stages of development, evaluate needs, identify problems, planning, management, implementation and evaluation is. Equity participation in a patriarchal society was not easily achieved, such matter requires the participation of women, especially rural women in projects is the way that they are concerned. Rural population of Iran always different roles in the production and distribution have been responsible. Agricultural sector, supplier of about one third of employment, food needs of more than Chharpnjm country, half of exports, do not need the agricultural products industry and one-fifth of GDP countries. [Mehdi Nazarpour, Mohammad Reza Rezaei. **Importance and role of rural women in rural activities.** Journal of American Science 2011;7(5):964-968]. (ISSN: 1545-1003). http://www.americanscience.org.

Keywords: Rural women, Agriculture

Introduction:
Considering the role of women in the family play, as the main axis can development be considered according to the tangible realities of the world unfortunately women have adverse effects on international level. For example, differences in policy, investment and receive equal rights for the work phenomenon is universal. Participation rate of women in economic activities sufficient to confirm the lack of women's affairs and their added value, because rural women in all stages of agricultural production and livestock production, and general affairs of all men to work alongside, and often pay a small the mere production of handicrafts such as carpets.

Women form great part of total workforce that needed for agriculture part at universe, as one of the intangible factors at agriculture economy. So, statistics that was represented in relation to extent of women's activity is very lower than real extent. Because in this statistics, mostly, seasonal jobs, part time job, no wage job and their housekeeping activities, aren't considered. rural women , have different roles and duties such as husband , mother , crops producer , participate at ranching activities , planting ,maintaining , harvesting , processing , marketing and preparing food . Rural women maybe venturing to culture cash products, while cultivating subsistence products and if they have no farm land, they have to work for others instead receiving wage. We can consider such women as agriculture propagator, production expert and even in some case as policy maker. Other than activity at agriculture

field, women's participation at rural development is critical and is considered in order to supply adequate and needed food.

Macroeconomic view of employment of different aspects such as creating income, production and entrepreneurship, science and technology development, etc. is important,and gives the dignity, status and social position and a sense of confidence from the social viewpoint of man. Working and use of inherent forces, skills and knowledge and personal management to begin to work and to accomplish the activity, are not specific to particular groups. Men and women can work in a community and yet affect it with job situations that are provided to them or they themselves create.

Employment rate, like any social and economic variables directly or indirectly are affected by many factors among which can be reported the production rate, investment, wage levels, price level, government policies and foreign trade. Each of these factors may be positive or negative effects to be followed. Such factors and how they impact on employment rates, have a great influence in planning and policy and making coherent and efficient policy formulation

According to women's role at family, they can be considered as base of development and progress and unfortunately according to universal tangible realities, they possess unfavorable position at international level (Changizi Ashtiani, 2003).
 For example, difference at levels of policy making, investing and receiving salary for equal activity, are universal phenomena. extent of women's participation at economic activities, extent of

women's activity at economic activities, is confirmation on lack of adequate attention to women's affair and their added value, because rural women work alongside men, at all levels of producing agriculture crops and livestock products and generally all affairs, and also spend their little leisure time for handicrafts such as rugs and carpets and etc. so it is necessary to establish self acknowledgement fields , directing women's economic and social ability and programming to attract their participation at different activities . At rural area, women have more significant role on family economy and inside activities and cause economic prosperity of society. yet , women couldn't gain their real position as active citizens who have talent for participation at economic , politic , social and cultural arena at most countries , especially developing country , and still their activities in economic calculations aren't considered , and they be considered as intangible workforce . Disappointing estimation about number of active rural women and underestimate about extent of their participation at economic activities is confirmation on lack of adequate attention to women's affairs and their added value. they are major force to create revolution and potential sources to progress rural economy and increasing extent of growth rate of producing food productions , although traditionally, farming and ranching , has been male profession , but women's role was never restricted to house and family , so they are active outside (farming, ranching , forestry and …) other than inside activity (Balali, 2005).

while assessing historical flow of development , we find that trends to human dimensions after failure to fast industrialization , forced programmers and policy makers to revise their thoughts and consider occupation , population and adequate employing of workforce especially women who form half of population , as major goals of development(Fami, 2001).

Government and national organizations attention to this issue began from mid 1970's. After world conference in Mexico, year 1975 was named as "woman year" and after that year from 1975 until 1985 was named as "women decade", and their certain needs were considered.

In this regard, vast studies were performed and it became clear that most of development programs including Green Revolution and high yielding varieties, as caused increasing productions, had negative affects on women's occupation and has increased their duties. At 1997, world conference on rural development (WCARRD) was held by participation of 145 representatives from different counties in Roma and identified problems which women faced with. Main goal of this conference was:

to support rural women as producers and their certain preferences at access to productive sources especially technologies that be able to decrease extent and hardship of their duties and lead to increase their efficiency (FAO, 1998).

Growing women's participation at labor market is one of development indexes of each society and represents increase of women's favorites to different aspect of participation at economic-social activities. Women's activities at its different dimensions at developed countries which rapidly changing by modern technology and difference at role and their functions is obvious even among poor countries. Attending to this point that women are at basic center of development, is very important. Because they control most of non-monetary economy by rearing generation, providing workforce and managing and performing family affaires and also subsistence agriculture. While always, women's productive role at agriculture has been introduces as concealed form and rarely manifested economically and socially, and maybe be most intangible participants at economic process (Emadi, 2001).

Although at all societies, rural women were introduces as one important factor for achieve to rural development goals but base on different economic, social and cultural reasons, they were considered less by programmers and practitioners, practically. Women as one intangible factor at agricultural economy, form great share of all human workforce needed for agriculture part, across the world (Ghaffari, 2000).

Economical-social studies have proven that various obstacles are at them way of women's role that majors are as follow (Samadi Afshar, 2004)   :

1- individual obstacles :

1-1 - Low literacy that further numerous problems, lead to lack of self confidence, inferiority feeling and resignation.

1-2 - high extent activities and increased work inside and outside due to various reasons including men seasonal migration and seasonal variation of rural women's activity (nursery , home affaires , farming , handicrafts and ranching)

1-3 - Having low information , knowledge and their applied scientific knowledge

1-4 - Malnutrition and low coefficient health and low individual health (Rivera, 2001).

2- family obstacles :

2-1- lack of knowledge about how to behave with girls and women

2-2- family biases and husband and father disagreement with women's attendance at social and economic activities due to various cultural reasons and even unwillingness to loss house workforce

2-3- negative attitude and belief about their abilities

2-4- gender discriminations

2-5- economic poverty of family (Varzgar, 2001).

3- social obstacles :

3-1- bad customs and traditions such as superstitious and fatalism and …

3-2- patriarchy and disagreeing with women's attendance at group activities

3-3- low women's access to credits and facilities, inputs and production factors

3-3-being far of accessibility of extensional services and or orienting social activities and participatory programs toward men

5-3- limited number of female experts to educate rural women

6-3- problems of access to services and social and health facilities

7-3- low extent of rural women's wage compared to men

8-3- low attendance of women NGOs to track their issues and problems

9-3- low women's attendance at rural management (Banihashem, 1999)

Conclusion and discussion:

in undeveloped countries due to lack of proper policy making to improve quality of people life level of these areas , villagers migration to cities has increased considerably and led to urbanization growth and emergence of problems and also psychological , social , cultural and economical abnormalities especially at agriculture and ranching part . Also method for growth and rural development growth, require research at this field which can help government in order to economic, social and cultural programming and policy making. Creating local organizations and regional institutions with affective women's attendance and villager participation to solve problems are among important and affective substances that should be considered in regional programming. at developing and changing process of developed economy system of agriculture, value of women's activity changed as form of money which previously was as no wage workforce at family , and was given to her. Other than agriculture part (i.e. industry and public services) which are main field of women's work, rural women's participation is very important. The most important issues about women's social and political participation are participating at programming, decision making, performing decisions and valuing results.

Aghaee in on research as "rural women's role at economy of agriculture and their success at agriculture development programs " further assessing their status at different countries and also emphasis on their participation at production activity of family , has expressed factors that led to ignorance of their role at economy of agriculture .

Lahsaee Zade at research as "assessing Iranian rural women's role at economy arena: first assessed their position at occupation structure then has compared it with rural men's occupation base. He expressed that rural women have equal importance compared to men.

Safiri, in his doctoral dissertation as "assessing quantitative and qualitative women's occupation ant its relation to economic development" has considered some of their problems of occupation due to obstacles which refers to structure of countries. And some contain social-economic and cultural obstacles.

Rasool Purarabi , in his thesis as "assessing women at economic activities in rural area of Ramsar " has shown that more than 96% of rural women , at least had participated at economic activity that was supplement for family income . But they don't participate at basic decision making of family, in spite of their affective role and vast attendance at economy of family, and also they enjoy owning production factors, less.

Development Realization is impossible without women's participation at different social-economic aspect. Therefore, to understand unknown, researchers should strive and take basic step in this regard. Some programs should be provided at national level as long term projects at the field of education and Cultural Revolution in order to create needed knowledge in society and in women to identify their rights, education and extending modern techniques, creating infrastructure facilities and also rural development.

 Since, village is suitable place for agriculture and additional related activities, so it can be said that women's role at village and possibility to institutionalize proper infrastructure, we able to have suitable perspective toward development process.

Agriculture part as one of the most important productive parts of country have critical responsibility in preparing needed food security that can help this part to access its major goal according to efficiency of workforce up to proper level . In this regard, women play critical role. Nevertheless, they couldn't represent their abilities at this field, due to various limitations which women face. Among this especial attention to this group of society and preparing them supporting, educational and extensional services for them can help to remove their vast future problems , according to major role of this forgot group at agriculture activities and finally lead to increase and improve their efficiency about agriculture and consequently lead to increase welfare and comfort of rural society .

In order to be able to remove obstacles and problems of women's activity at villages , we should reinforce stamina if women's work by one exact and codified programming in order to be able to progress at one correct direction.

villager access to education at different level , possibility to enjoy suitable occupation opportunities and also industrial , technical and healthcare equipment has caused that cities go out from concentration and attraction of inside and outside capitals , and so possibility of fair distribution of resources and facilities between city and village be provided , and government instead of bear heavy cost of urban population , spend these costs for rural development and support rural women whom get more damage while face lack of facility and compared to men enjoy less migration rate and also have to adopt existing conditions and use available facilities . In today world, it is impossible to achieve development goals without applying abilities of half of people of society (i.e. women).

Women at most countries, have low access to economic resources at the field of economic activity. They should reinforce them at this field by supplying economic facilities. Another part that changed women's attendance at economic affairs is agriculture activities. Opportunities which they gain at this part can have important impact on economic function and related social relations

Same discussions were presented about identifying women's role on environment changes (especially in preserving natural sources) that related to women's life and job. Women's access to agriculture credits, because increasing and improving their efficiency at agriculture. Women's membership at cooperatives, also help them to receive facilities in order to supply needed inputs of agriculture, sale productions and make some production with aim of increasing efficiency. Most of researches found that women's education is related to their agriculture efficiency. Indeed, years which women used educational programs, related to their productions meaningfully. So, by identifying their needs, demands and interests and also by determining their issues, resources and preferences, we should prepare proper extensional and educational programs for them.

 Also literacy programs and generally their basic education should be considered specifically with aim of better women's enjoyment of extensional and educational programs. And also access opportunities to different resources and needed inputs at agriculture activity should be provide for them. Development programs for rural women mostly have certain importance that should be considered at extension activity.

Empowering women is one of principal discussions of development process for many countries of today world. existing factors contain women's education , their ownership sample , their occupation opportunities and function of labor market but if we go beyond this rather classic variables , these factors also contain occupational relations nature , how to behave family and generally society with economic women's activity and economic and social conditions which encourage or prevent change at these moods .

Last conclusion is that men and women, play role at agriculture programs and rural development but each has different needs and knowledge base on kind of their activities, since total people activities were done to supply their needs and so governments should consider regional programming in their policy making and programming. This issue dose not achieved unless by identify climate, population, cultural, economic and politic constituents of each region and also kind of relation of these constituents with constituents outside village and region.

These kinds of study and recognition have provided causes of better programming and adopted with needs of region, and prevent loss of investment. If education, health, occupation, cure and … facilities be provided in village and improving rural life level be considered, so migration would be regulated. At the other hand, protecting agriculture and livestock products and local industry, and attracting well condition markets for it, by governments, can be affective for villager's interest about rural life. Finally, positive attitude of development programmers, would help significantly to improve condition of one benefited rural family, and would act as a factor to diminish gap between urban family and rural family.

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Evaluation of energy consumption and special energy required for drying of *Hypericum perforatum L.*

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Abstract: Drying is one of the most important post harvest processes which convert decaying products to resistant preparations so that it increases the storage duration and keeping product quality (food stuff shelflife). *Hypericum perforatum* L. is an important kind of herbs which its Iranian species characterized by high percentage of Hyperisin as the most important substance of its leaves and flowers. It has an important role in curing some of diseases. In this research, the energy consumption and special required energy for drying of *Hypericum perforatum L.* were investigated by using hot air drying method. The experiments were done at four levels of the temperature (40, 50, 60 and 70°C), air velocity at three levels (0.3, 0.7 and 1 m/s) and bed depth at three levels (1, 2 and 3 cm) on factorial experiment design based on completely randomized design with three replications. Based on results with increasing of temperature, air velocity and bed depth, energy consumption was increased. On the other hand, in constant temperature, with increasing of air velocity special required energy was increased but in constant air velocity, with increasing of temperature, increased.
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Key words: *Hypericum perforatum* L., energy consumption, special required energy

1. Introduction

Drying action by which water activity due to a food remove almost all the water in which there will stop. The main purpose of drying is increasing the storage period, weight, volume of material (for packing and transportation) and preventing biological activities such as microbial and enzyme (Koyuncu et al., 2007). During storage of agricultural products depend on two physical factors of temperature and moisture. With decreasing temperature or humidity or both can be significantly increased during this period. Factors affecting the time and energy consumption during the drying process are: 1-physical properties of product 2-The geometric shape 3-Relative humidity 4-Temperature (Air Products) 5- Equilibrium moisture content 6-Initial moisture content of the product 7-Original compositions. Each of the above mentioned factors have a direct effect on the speed, and rate energy consumption during the drying process (Aghbashlo et al., 2008). Akpynar (2004) studied the energy required for drying sheets of red peppers. He reported that with increasing temperature, the ratio of energy consumption will increase, but over time these indices decreased gain (Akpinar, 2004). In another study, during drying pomegranate seeds with a thin layer of dry warm air velocity drying time, energy consumption and specific energy requirements

decreased with increasing temperature (Aghbashlo et al., 2008). Nowadays most developed countries have done more studies on plant flora of their country and identify medicinal plants used in other countries. The major issue over the way such research has been extensive studies on factors herbs are used, the issue of recognition and preservation of active ingredients in plants, especially medicinal plants are different forms. The main reasons for short approach to medicinal plants are: 1- Side effects because of using synthetic drugs 2- Lack of affordable drugs, making some synthetic 3 - Exclusive treatment of some diseases with medicinal plants such as leprosy, leishmania and said Vitiligo Herbal treatments are only to be fourth - despite the valuable clinical experiences. One of the most useful medicinal herbs is St. John's Wort (*Hypericum perforatum* L). The property of the Iranian species of this crop is high level of Hypericin as the most important essential oil of its flower and leaves which plays an important role in the medical treatment of various diseases. Its annual trade level has been $ 210 m in USA and $ 570 m throughout the world (Sirvent et al., 2002). On the other hand this herb farm developed in Western Europe, for example in Germany the level of production during 1992 to 1997 is twenty times (Buter et al., 1998). The purpose of this study is to determine energy consumption and the specific

energy during the drying process of *Hypericum perforatum* L.

2. Materials and methods
2.1. Drying equipment
Three Kiln type laboratory dryers were utilized to conduct the drying experiments. Drying chamber is a 40×40×50 cm container located 70cm above the heating elements (Figure1).Each dryer has two electric elements to generate the required heat, one of them controlled by a digital thermostat and the other controlled manually. Hot air flow is produced by a blower located under the elements, providing an adjustable flow rate in the range of 180 to 220 m^3/h using a dimmer. Two sensors are mounted in the upper and lower parts of the dryer to measure the temperature of the drying air before and after the samples location.
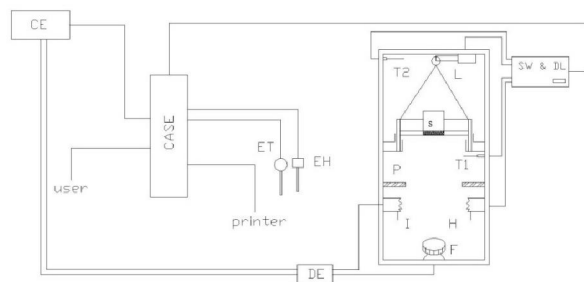
Figure1 Experimental dryer
(F) fan, (H) heat generator, (S) sample, (T$_1$) Lower thermometer, (T$_2$)Upper thermometer, (Sw) switches, (DL) data logger, (CE) control electronic system, (DE) electronic driver, (EH) environment relative humidity sensor, (ET) environment temperature sensor

Prior to starting of each experiment, air temperature was adjusted by the thermostat and the dryers were activated to reach the required temperature. Data collection for thin layer drying experiments was performed through weighing of samples at 5min intervals using a ±0.00lg digital balance (Sartorius, model PT210, Germany) .The mean value of the sample dry weight was used for calculations. Weighing of the samples continued until three consecutive readings showed the same value. Initial and final sample moisture contents were determined gravimetrically before and after the drying experiment. Moisture content of the samples was determined by drying in a vacuum dryer (model Galen Kamp) at 70ºC, 150 mbar, for 8hours (Tsami et al., 1990). The velocity of drying air was adjusted to the desired level by adjusting the blower motor and measured by an anemometer (AM- 4201, Lutron) with an accuracy of ±0.lm/s. During the experiments the ambient air temperature and RH variations in the laboratory were

measured to be between 25 to 29ºC and 31- 33%, respectively. Given the small size of the samples, 35 by 35 cm metal micro-pore meshes were used as tray to keep the samples in the dryers. Aluminum frames of 35 by 35 cm cross section with 1, 2 and 3cm height were placed on the porous plates to obtain the desired bed depths. The samples were placed in the frame while a metal mesh was used on the frame to avoid any sample skip by air current flowing.

2.2. Drying process
Samples of St. John's wort were obtained from the Medicinal Herb Research collection of Jahad-e-Daneshgahi in May and June, 2009. The plants were harvested just before flowering and the leaves were immediately removed from the stems. The leaves were cut and stored separately in plastic bags and refrigerated at temperature of 4±1ºC to prevent microbial activity. Moisture content of the leaves was found to be 61% db. In this study, the independent variables were drying temperature at 40, 50, 60, and 70ºC, air velocity at 0.3, 0.7, and 1 m/s and bed depth at 1, 2, and 3cm levels. Thus, there were 36 treatments replicated three times. Dependent variable was drying time needed to determine the proper model for thin layer drying of St. John's wort leaves. A factorial experiment design was laid out in completely randomized design with three replications. All data were subjected to analysis of variance and Duncan's multiple range test was used to compare the treatment means.

2.3. Consumed energy in every drying period
Total consumed energy (E$_t$) in every drying period is calculated from the sum of 1 and 4 relationships (Koyuncu et al., 2007).

$$E_a = A \, V \, \rho_a \, C_a \, t \, \Delta T \qquad (1)$$

Where:
E$_a$: total consumed energy in every drying period (kW.h), V: air velocity (m/s), A: Area on which the experimental sample put (m^2), ρ_a: air density (kg/m^3), t : total drying time of each sample (h), ΔT : the difference between drying temperature and ambient temperature (°C), C$_a$: air specific heat (kJ/kg C)
Equation (2) was used to calculate air specific heat (Brooker et al., 1992).

$$C_a = 1.88 \, \omega + 1.004 \qquad (2)$$

Where:
ω : humidity ratio. Relative humidity is converted to humidity ratio with equation of 3(Brooker et al., 1992).

$$\omega = 0.662 \, [\phi \, p_{vs} / (p - \phi \, p_{vs})] \qquad (3)$$

Where:
P: air pressure (kPa), ϕ : relative humidity, P$_{vs}$: saturated vapour pressure (kPa).
Also required evaporation energy is obtained through equation (4) (Brooker et al., 1992).

$$Q = h_{fg} (m_w) \qquad (4)$$

Where:

Q: evaporation energy (kJ), h_{fg}: hidden evaporation heat (kJ/kg), m_w: water mass transferred to the air (kg)

2.4. Calculation of specific energy

Specific energy is the energy value required for drying 1kg of fresh product. Equity (5) was used for calculation of specific energy (Brooker et al., 1992):

$$E_s = E_t/W_o \qquad (5)$$

Where:

E_s: required specific energy (kWh/kg), W_o: sample original weight (kg)

The experiment was performed as a factorial completely randomized design with three replications

and Duncan's multiple range test was used to compare the treatment means by MSTATAC software.

3. Results and discussion

3.1. Energy consumption during drying

The result of analysis of variance of data obtained from the effect of three parameters, air velocity, bed depth and temperature on energy consumption based on factorial experiment with completely randomized design are presented in table 1. The effect of the said parameters on energy consumption is significant at $\alpha = 1\%$.

Table 1 Analysis of variance of data obtained from the effect of three parameters, air velocity, bed depth and temperature on energy consumption

Variable	df	SS	MS	F
Replication	2	642.56	321.28	3.42[*]
Temperature	3	9820.15	3273.38	34.90[**]
Air velocity	2	12542.11	6271.05	66.86[**]
Temperature ×Air velocity	6	2463.69	410.61	4.37[**]
Bed depth	2	3479.58	1739.79	18.55[**]
Temperature ×Bed depth	6	1975.27	329.21	3.51[**]
Air velocity ×Bed depth	4	1542.41	385.60	4.11[**]
Temperature ×Air velocity ×Bed depth	12	1024.23	85.35	0.91[ns]
Error	70	6564.78	93.78	

**Significant difference ($\alpha = 1\%$), *Significant difference($\alpha = 5\%$), ns: No significant difference

Means comparison of the effects of different drying treatments on energy consumption at $\alpha = 1\%$ is shown at tables 2-4.

Table 2 Means comparison of energy consumption resulting from the interplay of temperature and air velocity

Air velocity (m/s)	Temperature(°C)			
	40	50	60	70
0.3	3.58[b]	3.42[b]	2.14[a]	1.98[a]
0.7	9.90[h]	9.22[g]	5.45[e]	4.86[c]
1	14.38[j]	13.12[i]	6.04[f]	5.06[d]

Table 3 Means comparison of energy consumption resulting from interactive effect of temperature and bed depth

Bed depth(cm)	Temperature(°C)			
	40	50	60	70
1	8.61[g]	7.63[f]	2.30[b]	1.86[a]
2	9.38[h]	8.63[g]	5.17[d]	4.40[c]
3	9.78[i]	9.51[hi]	6.16[e]	5.27[d]

Table 4 Means comparison of energy consumption resulting from interactive effect of bed depth and air velocity

Air velocity (m/s)	Bed depth(cm)		
	1	**2**	**3**
0.3	1.92[a]	3.04[bc]	3.39[c]
0.7	2.7[b]	7.88[d]	8.73[e]
1	7.91[d]	9.77[f]	10.99[g]

Results show that as temperature as well as hot air velocity increase, drying time decreases due to increase in temperature gradient and consequently increase in velocity of evaporation of product humidity. The cause of this is that as air velocity increases, ambient vapor pressure decreases and consequently the humidity of the product faces with less resistance for exiting and evaporate quickly. On the other hand increase in temperature and the air velocity causes an increase in enthalpy of the incoming air, this in turn causes an increase in transfer of mass and warmth and consequently energy consumption. Other researchers obtained similar results in their observations (Aghbashlo et al., 2008; Koyuncu et al., 2007). As the diameter of the product layer in the dryer increased, the time and energy required for drying increased so that increasing the diameter of product layer resulted in an increase in the energy required for drying.

3.2. Specific energy during drying process

As described earlier specific energy is the amount of energy required for drying a given weight of the fresh product. Based on performed measurements, weight of the fresh plant for the depths of 1, 2 and 3cm equaled to 0.222, 0.364 and 0.510 kg respectively. In this regard, the specific energy was calculated by division of the consumed energy for each depth on the respected plant weight. The results of analysis of variance of the data obtained from the effect of three parameters, air velocity, bed depth and temperature on the specific energy are presented at table 5. Results show that the effect of each element and their interactive effects on the specific energy are significant at =1%.

Table 5 Analysis of variance of the data obtained from three parameters, air velocity, bed depth and temperature on the specific energy.

Variable	df	SS	MS	F
Replication	2	892.43	446.21	3.91[*]
Temperature	3	10254.14	3418.04	29.96[**]
Air velocity	2	15263.23	7631.61	66.90[**]
Temperature ×Air velocity	6	4542.54	757.09	6.63[**]
Bed depth	2	5423.64	2711.82	23.77[**]
Temperature ×Bed depth	6	2519.34	419.89	3.68[**]
Air velocity ×Bed depth	4	2467.64	616.91	5.40[**]
Temperature ×Air velocity ×Bed depth	12	2415.87	205.32	1.76 [ns]
Error	70	7985.51	114.07	

**Significant difference (=1%), * Significant difference (=5%), ns: No significant difference

Means comparison of the effect of different drying treatments on the specific energy at =1% is shown at table 6-8.

Table 6 Means comparison of specific energy resulting from the interplay of temperature and air velocity

Air velocity (m/s)	Temperature(°C)			
	40	**50**	**60**	**70**
0.3	10.71[d]	10.08[c]	5.86[b]	5.43[a]
0.7	25.56[j]	23.12[i]	10.9[g]	9.49[f]
1	30.73[i]	25.60[k]	16.31[h]	12.29[e]

Table 7 Means comparison of specific energy resulting from interactive effect of temperature and bed depth

Bed depth(cm)	Temperature(°C)			
	40	50	60	70
1	38.47[j]	33.04[i]	9.39[d]	7.39[c]
2	21.26[h]	19.2[g]	9.66[d]	7.59[c]
3	13.28[f]	912.57[e]	6.01[b]	4.24[a]

Table 8 Mean comparison of specific energy resulting from interactive effect of bed depth and air velocity

Air velocity (m/s)	Bed depth(cm)		
	1	2	3
0.3	7.66[c]	3.84[b]	1.56[a]
0.7	23.64[h]	17.12[f]	11.05[d]
1	33.91[i]	21.33[g]	14.48[e]

Results showed that in constant temperature as air velocity increased, specific energy increased too. However in constant air velocity as temperature increased specific energy decreased. Based on tables 6-8 the least and the most specific energy required for drying *Hypericum perforatum* L. at the diameter of 1cm and at different air temperatures and velocities averaged 36.19 and 7.52 (kW.h/kg) respectively, at the diameter of 3cm averaged 13.88 and 2.9 kw.h/kg. The specific energy required for drying the said herb decreased due to an increase in the diameter of product layer from 1-2 and 2-3 so that in constant air velocity and temperature, the most specific energy required for the drying process was related to the diameter of 1cm. The cause is that as diameter increases so does the weight of the product in the dryer. Similar results have been reported by other authors (Aghbashlo et al., 2008; Koyuncu et al., 2007).

4. Conclusion

In this study was dealt with drying *Hypericum perforatum* L. results were obtained: 1- The amount of consumed energy was decreased by increasing temperature and was increased by increasing air rate and thickness of product layer in the dryer. 2- The amount of required specific energy was decreased by increasing temperature and thickness of product layer and was increased by increasing air rate.

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A survey in antecedents of cynicism about change in a judicial organization

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Abstract: Cynicism about change is defined as pessimistic viewpoint about change efforts being successful because those responsible for making change are blamed for being unmotivated, incompetent, or both. It may be caused by, According to researchers, either personality traits or situational factors. Based on this assumption, we selected 132 employees from a judicial organization and gathered necessary data by five questionnaires. Structural equation modeling (SEM) results showed that participation in decision making, organizational justice (all positively), hostile personality and psychological contract violation (all negatively), have significant impact on cynicism about change and they aggregately can explain 41 percent of its variance.
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Keywords: cynicism about change, antecedents, SEM, judicial organization.

Introduction:

Dogmatism is the symbol of pessimistic and cynic viewpoint to human nature and it was mentioned in ancient Greece as narrow- mindedness.

In the past this term was used for those who were pessimist about activities and bake-door motivation and behaviors of other people, but now this omen phenomenon has entered to the field such as; business; military and judicial institutions and clinic centers.

Cynicism means haring no faith; bad sense, and showing behaviors in the way of having negative belief or negative sense.

On the one hand cynicism may relate to a person, an occupation; change programs, or society. On the other hand such cynicism may be considered as a personal trait or an out game of environmental situation. According to the two aforementioned Viewpoints, this research tries to; besides paying to personality and environmental factors; predict cynicism to changes in a judicial organization. Important factors which through theoretical literature were identified as motivator of cynicism are: aggressive personality, equality, breaking psychological norms and taking part in decision making.

The question is that weather effective factors in showing cynicism are effective in plan of organic change too?

The assumption is that the first variable has appositive effect and three other ones have negative effects on phenomenon of organic change.

However the structure of this paper is this way: First different definitions of cynicism are analyzed in the view of psychological contract; viewpoint and social motivation. Then after identifying and describing motivation of cynicism; hypotheses are resulted. Besides explaining characteristics of the sample and research method gathered data through the method of structural equation modeling are analyzed. And finally, after explaining result, research and practical suggestion and concepts are referred to.

2_theorical literature of the research:

1-2- definition of cynicism:

Organization cynicism is a reflection of negative and distrustful view on official and organization [7] .While cynicisms are a new construct in organizational behavior, there are different ideas about its conceptualization and its measurement. Anderson defines cynicism as a general and an especial attitude that has unsuccessfulness, hopelessness, and disillusion's and also distrustfulness' to an individual, group, ideology, and social tradition are an institution as its traits [5]. General cynicism is indicative of a kind of permanent trait of character and a cynicism person can target his negative to everything. On the one hand, especial cynicism is a situation-based state. It means that an individual under some circumstances may be cynic to something or someone. Dean et al. define cynicism as a negative attitude to an organization [13]. And it has three aspects: 1) belief to the idea that an organization is void of trust worthy and trust fullness. 2) Negative sense about an organization and. 3) tendency

to humiliate and reproachful behaviors to an organization that certainly is in line with such beliefs and senses. And finally Eaton[15] through using the theory of attribution theory of motivations describes the way of occurrence of cynicism this way: when a negative event happens the persons attribution will be active about causative aspect of the negative event (locus of control, control ability and fixed procedure). Such attribution perception is cause stimulate states such as: angriness, compassion, and hope. According to stimulated excitements, an individual decides to do normal and abnormal behaviors. If the person knows an organization guilty and considers it a cause of negative event, and also according to previous a negative events, he won't have hope to ameliorate the situation by hauteur then becomes cynic to the organization [15].

Among different approaches, cynicism to change nowadays allocates to itself most of the research process and it tries to theorize personnel's behavior dating enacting ameliorating programs and changes of situation in different fields of the organization. Wanous et al. along with introducing structure of cynicism to organizational change (CAOC) describes it this way: pessimistic viewpoint to success attempts to change because of no motivation or irresponsibility of executive officials or the both of them [35]. Stanly et al. Wanous et al [30]. about cynicism to an especial change and Daniels after rely on dean et all's conceptualization suggest a new definition: cynicism to an especial change is a negative view to an organizational change and has three aspects: reorganization aspect that indicates distantness to implied and explode reasons of manages to change excitement aspect that explains about cynic sense of failure of attempts to change and finally behavior aspect that describes irrelevant and contemptuous behaviors about an especial organizational change[25].

3-2 stimulation of cynicism to an organizational change:

One way to control and manage cynicism of employee in every organization is identification of factors with strengthen occurrence, augmentation, and development of cynicism in individuals. Connecting with the issue breaking psychological contracts [19, 14, 5] trust to manages and colleagues [33, 31, 30, 27, 25, 21], taking part in decision making [35, 26, 25, 11], organizational equality [38, 27, 8, 5], style of leadership [29, 38, 27, 26], negative character[26, 13 7, 5], and commitment[33, 8], are considered by researches as the most important stimulators of cynicism to organizational changes. As a theatrical share of this research there it could said that there is almost no research that considers the four variables at the same time. Based on this after an abridged explanation about the variables we'll clarify the relation

of every one of them with cynicism to organizational change and then hypotheses are rendered.

2-3-1- Aggressive and negative character:

There are two out maturing thought among researches and scholars the phenomenon a of cynicism: Synicism as a permanent trait of character and cynicism as an especial structure related to the society, occupation, institution and organizational change [13, 15, 1]. Contradictory to the situational cynicism that refer to especial object [19, 4], character cynicism is general and embraces everything [5]. Those who are cynic to all of the people consider other tricky and distrustful and convict everything to unsuccessful. Probably they are cynic about changes because they think that those who seek executing changes programs are after their personal benefit (not the other), and secondary, they have not responsibility to execute changes programs and in one word, no one is trustworthy. So, it is assumed that:

Hypothesis 1: negative temper has a positive effect on the sense of cynicism to organizational changes.

2-3-2- organizational equality:

The point that through which ways there be interacted with the staff in order that they feel equality is a subject that is proposed under the construct of organizational equality. According to generally accepted division organizational equality is divided into three categories: distributive, procedural, and interaction. Distributive equality refers to considering and taking into account equality and equity in distributing remunerations, resources and advantages. And finally, interaction equality emphases on having equal and respectful behaviors of the organization toward individuals. Researchers [eq. 38, 27, 8] have found a negative correlation between interaction equality and cynicism to organization change. If during execution of programs of organizational change by rational reason and respect personal be treated equally they feel interaction equality and cynicism to the factor of change and as a result [time] of the program of organizational changes will be reduced. But since interaction equality is determined by the manager such kind of equality is in connection with negative cognitive, sensitive and behavioral reaction of the manager of organizational change [12]. So it is assumed that:

Hypothesis 2: interaction equality has a negative effect on the sense of cynicism to organizational change.

In addition to the abovementioned hypothesis, researches show that when changes are executed after considering primitive precautions and according to formal standards and scales most probably (main

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elements of procedural equality) will show creative reactions. On the other hand when leader's actions are not in accordance with equality principles there is a great probability of formation of destructive behavior and views (cynic reaction) [22]. A few researches [38, 27] have found a negative significant relation between procedural equality and cynicism to change. Even though Bernerth et al. couldn't find a significant relation based on different founding of antecedent researchers there is the purpose of experiment this relation in other environment so it is supposed that:

Hypothesis 3: procedural equality has a negative effect on sense of cynicism to organizational changes.

Adam's theory of equity [2] is based on inputs and out comes that theatrically must be balanced. If personnel have not had understood attempts to change or they feel that change will injure their outcomes then they may balance the equation by resistance or demolition. In this way in the viewpoint of cognitive discrepancies a bad experience will cause personnel to reduce pleasance. About change, discrepancies indicate revaluation of recognitions and if again personnel do not have a belief and an understanding of changes result they either resign or resist by cynicism. So it is supposed that.

Hypothesis 4: distributive equality has a negative effect on the sense of cynicism to organizational changes.

2-3-3- Taking part in decision making:

This construct refers to the level effectiveness of personnel on the process of decision making. Those personnel who are able to influence on effective decision most probably consider outcomes of decision important [9]. Abraham [1] believes that sense of inequality has caused cynic people from others and freely relation and cooperation may help to create sense of equality and equity. Furthermore personnel's experience of their organization is strictly under the influence of behaviors which their supervisor. Treadway et al. [32] believe that the rules of managers and supervisor are very important in reduction or development of cynicism. So stimulation of managers to choose cooperative management has the potential of having effect on the level cynicism. So it is supposed that:

Hypothesis 5: taking part in decision making has a negative effect on organizational changes.

2-2-4- psychological contract:

Organizations, by the time of recruitment give implied and explode promises about advantages such as insurance. Payment increases instruction settlement place and location etc. to their personnel. When an employee agrees that his action recommit that organization to decompensate there concludes a psychological contract. Mostly it is viewed that personnel do not receive what they had expected from their employ mental and occupational relations. Kanter and Mirvis[20] believe that three main factors in creation of cynicism are: 1) Creation of unrealistic high expectations. 2) Experiencing hopelessness in accomplishing such expectations. 3) Recurring failure, when suggested change of managers face a dead end fails to success and the sense of hopelessness to the future will be created in the mind of individuals [36]. In other word, if organizations do not accomplish their promises of the first time of recruitment and by the time of change promise to improve the situation and advantages then individuals referring to their antecedent unaccomplished expectations and generalize it to the future (after changes) they become cynic so it is supposed that:

Hypothesis 6: breaking psychological contract has a positive effect on cynicism to organizational changes.

3. Research method:

This survey research has been done in a judicial organization that during a few past years has executed a number of change programs and as it seems they want to execute many change programs in the close future. Research sample which was 132 individuals were from a universe of 380 individuals and they all were knowing chosen from mescaline's with B.A certification with experience range of 5 to 10 years. Process of data gathering was done through using five standard questionnaires with the range of seven choices (from1=completely agreed to 7= completely disagreed). And also cynicism to organizational changes with 8 choices [25].Breaking psychological contracts with 5 choices [28].Organizational equality with 20 choices [23]. Cynic character with 5 choices [30] taking part decision making with 8 choices [25] was done. Among scales of the questionnaire two choices of cynicism to change, a choice from breaking psychological contract, four choices from organizational equality, one choice from negative character and three choices from taking part in decision making (totally 11 from 44) were omitted because of non-considering psychological norms in an confirmatory factor analysis.

4- Analyze of data:

Technique of modeling of equation under statistic program of LISREL was used to establish a causative and conceptual experiment of the research.
Anderson &Gerbing [3] suggest that using the technique of modeling of structure equations is preferable to be done in two separate but related stages: model of measurement and model of structure. Founding of the first analytical experiment of emphatic factorial that was done in order to survey on psychological characteristic (acceptability and

permanency) of variables in measurement model showing that seven indexes had standard factorial probability of less than 0.7; and two choices have non-significant factorial probability. I on had the most remaining standard mount (8.5) which is biggest than maxim mum amount of 2 is allocated to the covariance between two indexes of interaction equality and also the highest suggestion of reducing chi-square (73.86) returns to the covariance of the two indexes. And finally estimation indexes of the model showed that in a few indexes necessities of estimation for the model had not been considered. However it was necessary to improve estimation model that 8 choices from the first measured model be omitted and again SEM be executed. Executing fiercely for the second time showed that in the measured model: first all factorial probabilities were bigger then minimum amount of 0.7 and second: all of them ham significant sizes.

Reliability and validity coefficient of the choice were measured and evaluated through suggestion Fornell&Larcker (17) and Bagozzi& Yi [6] and result were gathered in table 1- permanency coefficient in two levels of choices and compounded one and convergence acceptability based on a mound and significance of factorial probability and also average of deductive variance were measured. If choice permanency of each index (factorial probability by power two or r^2) was bigger than 0.5 and coefficient of compound permanency (CR) of each hidden variable be bigger than 0.7 than there we could be sure that table's number also certify this result. In one hand if index of deductive average variance or AVE (the variance percent that all of index clarify) to be bigger than 0.5 and on the other hand amounts of factorial probabilities in a significant way to be bigger than 0.7 than we can say that all of acceptability necessities have been considered and following table's values also certify this point too.

Table 1: Psychometric characteristics (validity and reliability) of the measurement model

Psychometric characteristics (validity and reliability)						INDEX	structure
CR	AVE	R^2	t-v	se			
0.864	0.514	0.52	-	-	0.72	Most programs designed for solving organizational problems doesn't prove good	Suspicion About change
		0.58	8.11	0.16	0.76	The head doesn't strive hard for solving organizational problem	
		0.50	7.53	0.17	0.71	Efforts for improving the situation of organization doesn't make good result	
		0.58	8.11	0.16	0.76	People responsible for creating improvement in organization don't know enough what should do	
		0.48	7.40	0.17	0.69	Suggestions for solving the problems doesn't make real noticeable change	
		0.51	7.65	0.15	0.72	People responsible for improving the organizational situation don't care about their careers	
0.854	0.593	0.57	9.50	0.11	0.75	Almost all of the organizations promises of the employment time are realized	the Violating agreement
		0.57	9.54	0.10	0.76	Apparently my organization tries to realize its appointments when my employment	
		0.62	10.12	0.10	0.79	My organization has done significant efforts to realize its appointments	
		0.61	10.01	0.12	0.78	My organization has violated many of its appointments even my primitive	
0.869	0.571	0.51	8.94	0.13	0.71	Work schedule considered for me is just and fair	Distributional Justice
		0.51	8.97	0.15	0.71	I think the amount of salary and fringe benefits is just	
		0.69	11.17	0.13	0.83	I think my work load capacity	
		0.61	10.20	0.14	0.78	Bonuses I receive form organization are completely	
		0.54	9.35	0.14	0.74	I feel responsibilities assigned to me are just	
0.928	0.649	0.64	10.92	0.12	0.80	the manager when adopting job decision behaved with me kindly and respectful	Procedural Justice
		0.70	11.72	0.12	0.84	When adopting job decisions manager behaved with me respectfully	
		0.63	10.73	0.14	0.79	When adopting job decisions manager showed a positive care and sensitivity about my personal needs	
		0.77	12.64	0.12	0.88	When adopting job decisions manager behaved me with honesty and sincerity	
		0.61	10.56	0.13	0.78	When adopting job decisions manager showed a	

						positive sensitivity about my salary concerns	
		0.67	11.33	0.12	0.82	Manager explains the reasons of the adopted decisions about my job	
		0.52	9.38	0.14	0.72	Manager gives enough justifications for decisions made about my job	
0.883	0.654	0.66	10.84	0.11	0.81	Most people tolerate to others to gain some benefits in future	Negative personality
		0.58	9.90	0.12	0.76	People pay attention to others to advance their own affairs	
		0.62	10.40	0.12	0.79	I don't allow anyone that I don't expect much friendship and warmth from him/her become close and intimate with me	
		0.76	11.97	0.10	0.87	I know some people that hide their real motivation of doing a work	
0.881	0.598	0.49	8.83	0.13	0.70	As yet I have had an active participation in organizational change	Participation in decision-making
		0.59	9.95	0.13	0.77	I have had many opportunities to express my opinions about organizational change and deliver them to decision-makers	
		0.68	11.11	0.12	0.83	My ideas and suggestions has been valuable and are considered in making changes	
		0.60	10.12	0.12	0.77	My share and role in implementing programming of organizational change is undeniable	
		0.63	10.49	0.15	0.79	I can convey my suggestions to management team of organization easily	
0.869	0.571	0.51	8.94	0.13	0.71	Working schedule considered for me is just and fair	Distributional justice
		0.51	8.97	0.15	0.71	I think my salary and fridge benefits are just	
		0.69	11.17	0.13	0.83	I think my work load is completely just	
		0.61	10.20	0.14	0.78	Bonuses I receive from organization are completely just	
		0.54	9.35	0.14	0.74	Responsibilities assigned to me are just and reasonable	
0.899	0.600	0.53	9.43	0.13	0.73	Decision are made by my manager without bias and discrimination	Interactional justice
		0.75	12.18	0.13	0.87	Manager makes employees sure that listens to their concerns before decision making	
		0.64	10.75	0.13	0.80	My manger collects correct and comprehensive information for decision making	
		0.70	11.51	0.13	0.83	My manager pays attention to making decisions transparent and clear and informing employees	
		0.49	8.91	0.13	0.70	All job decision are used equally among all relevant employees	
		0.50	8.99	0.13	0.70	Employees are allowed to change the decisions made by manager and ask explanations	

Attention: Landa is equal to standard factorial probability and means standard error.

After gaining confidence of permanency and acceptability of the measured indexes, there it could be paid to survey on relations between hidden variables that their result are shown at the table -1- number on lines show standardized coefficient, number inside parenthesis indicate significance of coefficients and existing number under the suspicion variable to organizational change is indicator of clarified variance number and this variable exists because of existence of sum of independent variables. According to this chart all of independent variables (distributive equality, procedural equality, interaction equality, breaking psychological contract, negative character and taking part in decision making) have significant effects on the dependent variable (cynicism to organizational changes). As it was excepted form antecedent studies and researches, taking part in decision making and executing organizational equality have a negative effect on cynicism of personnel to organizational changes and on the opposite side there is a positive relation between psychological contract, negative character and cynicism to organizational changes. Among them the most positive effect refers to breaking psychological contract and the most negative is allocated procedural equality. All of independent variables can predict only 41 percent of changes related to structure of cynicism to organizational change and 69 percent of changes related to structure of cynicism refer to factors out of factors which are considered in this paper. However a survey on estimation model (table- 2) showed that suggested theatrical model has a relatively admit able estimation with experienced data.
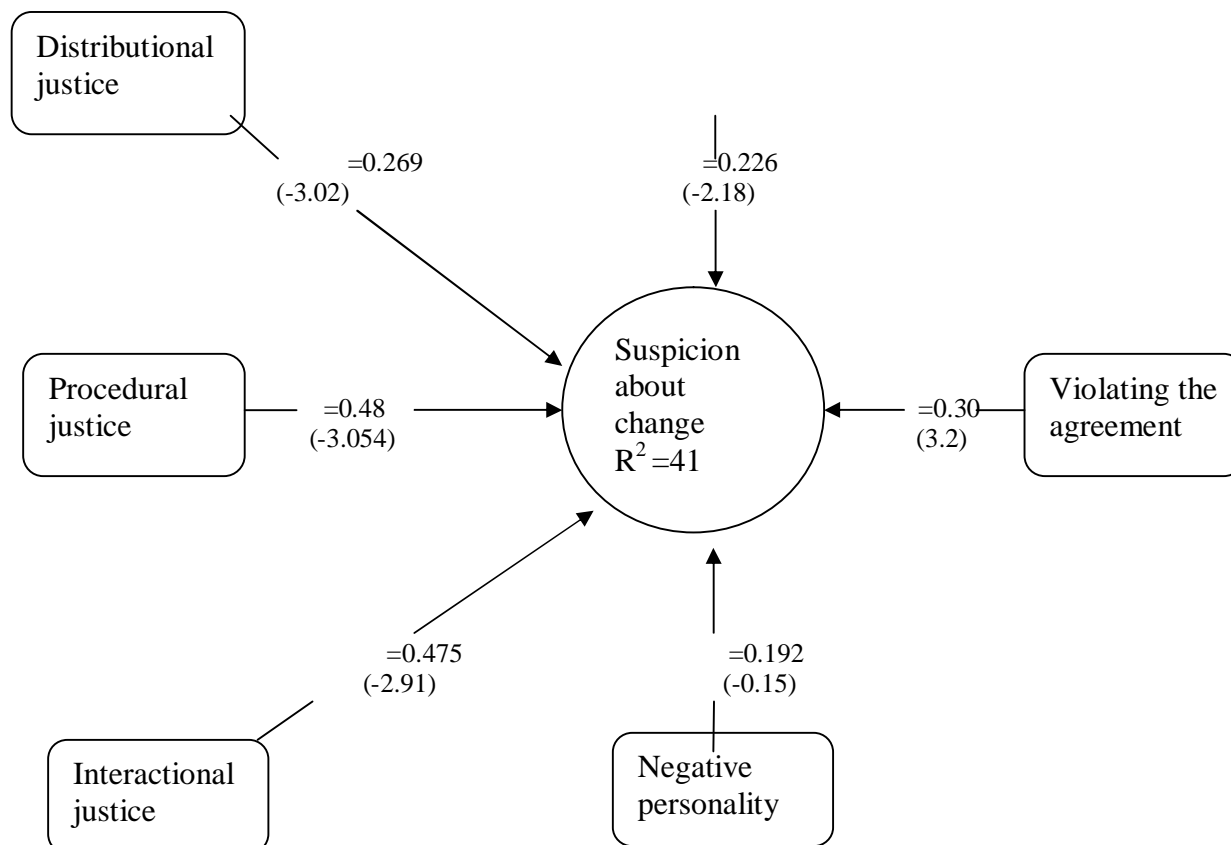
Figure 1: estimates of structural model of suspicion about organizational change

Table 2:
fitness indices of final estimation model

Indicator title	size	Acceptable range	Result
Square root of estimation of error approximation variance	0.065	0.06	fitness
Confidence interval for (RMSEA)	0.057-0.073	0.06-1	fitness
Ratio of chi-square to degree of freedom	1.559	2 or 3	fitness
Appropriate fitness index	0.72	0.90	fitness
Moderated index of fitness	0.64	0.90	Lack of fitness
Normalized fitness index	0.94	0.90	fitness
Comparative fitness index	0.94	0.90	fitness
Root of mean residual(RMR)	0.21	0	Lack of fitness
Standardized root of residual(SRMR)	0.074	0.08	fitness

5. Discussion and conclusion:

The purpose of this research was to clarify cynicism of personnel to program of change in view point of organizational changes breaking psychological contract, taking part in decision making, and negative character. Result of structural software model of LISREL shower that all of the four aforementioned variable have significant effects on cynicism to organizational change such a way that among them as it was expected, taking in decision making and three partite elements of organizational equality (viz. distributive, procedural, and interaction) has inversed effect and breaking psychological contract, and negative character have positive on cynicism on organizational changes. These variables, totally, could determine 41% of the variance of cynicism to organizational change. Findings also showed that the most negative significant effect on procedural equality goes to procedural equality and the most positive significant effect goes to the variable of breaking psychological contract.

Those people who have negative characters consider others egotists and careless and put other's motivations under questions and while interacting with other people take guard and an aggressive state can't trust in others [18]. Such people normally can't trust to others always imagine many negative thoughts. Improvise swears, and besides criticizing the company and mangers mock them too. Pessimists almost always do not have bong-term purposes and even they are not able to find their pleasant position in an organization. They always emphases on the point that they don't expect anything from the organization and do not believe in friendly and peaceful gestures because they consider such gestures as something indicative of weakness so they hate such relations [24]. Results of this research show that as some other researches has understood [35, 34, 30, 36, 10, 4] there is a positive significant negative character of individuals and their viewpoint especially their cynicism about organizational changes. This means increase in the number of those who every situation are cynic to other's motivation and action will cause increase of cynicism to suggested change's programs in their organizations.

In the viewpoint of distributive equality founding of the research showed that as some of other researchers have understood [27, 8, 5] there is a negative significant relation between distributive equality and cynicism to organizational changes. If individuals do not feel equality and justice in distribution of resources, payments and remuneration, their cynicism to the programs of change will reduce.If individuals consider it probable that after executing suggested change's programs their and justice and equality won't be regarded then their senses of distrust in officials of

changes and also their negative and hopelessness to the organization will be stimulated. And they incline toward showing ironic and ridiculous behaviors.

About procedural findings of the research showed that as some researchers have discovered [38, 27] that there is a negative significant relation between the two variables. Standardized estimation coefficient(48%) declare that per one unit change in individual's understanding of procedural equality, their cynicism will change to an amount of 48%. As more as there is sense of equality and justice between individuals during process of allocating remuneration, resources, processes and occupational duties their cynicism to programs of changes will reduce. In other word if people think that after execution of programs of change won't be equality in payment of resources and payment, then their negative view will form.

The target point of cynicism in personnel in case of not considering interaction equality is managers and officials in charge of change. According to documentary model of Winer those individuals who see managers and leaders of change as cause of in equality in interaction, there won't be any hope for them to omit such in equality after programs of change, based on formed prejudices of such [un success full] expectation and senses. They will prefer to resist against changes by pessimistic views such as cynicism.

Findings of the research showed that as some of researches also have shown [25, 11] there is an inverse and significant relation between the two variables of taking part in decision making and cynicism to organizational change. Reichers et al[26].reported that cynic individuals to change where those who had not significant changes to take part in decision making and they were unaware of processes and procedures of organization. It is necessary for individuals to be completely aware of necessity of change, progress, problems of suggested changes and result of programs of change. Presence at decision making meetings programs change, also, will cause that individuals to be committed about taken decision or at least do not resist or take party against that.

Finally, according to the viewpoint of breaking psychological contract, research's findings showed that as some researchers have admitted [19, 5] there is a positive significant relation between individual's perception of breaking psychological contract and cynicism to programs of change. If daring execution of programs of change contracted expectation won't be meted and a few diversion, happen then individuals through antecedent experiences deduct that future's procedure also will be as the past.

As a result negative behaviors and views such as: hatred distrust and haplessness will be made in personnel's mind. However according to research's result we can deduct that when a suggestion for a

program of organizational change is proposed and that organization had not been committed to its antecedent commitments and in fact its personnel's expectations had not been meet, then hopelessness and un success of personnel due to not achieving their expectation will cause cynicism to organizational changes.

6- Concepts and suggestions:

The concept of this research is appropriate for executive official especially judicial systems'. First when officials and responsible individuals propose suggestion to improve a change of an organization, the most important wish that they have is considering justice and equality in programs of change. Individuals are afraid that there may be after executing programs of change equality and justice in allocating duties, processes and even equality in interchanges and interactions won't be considered. Secondly if an organization had not yet committed to its antecedent commitments against its personnel, personnel also do not care about its promises about improvement and change and know them as previous ones lies.

Thirdly, if individual are not present at the meetings of taking decision for company's programs or they won't be given sufficient data be for executing programs, they always fill the gap of this unawareness and non-presence with cynicism to change. And finally, sometimes it may happen that personnel inheritably have a negative character and they are cynic. So during exertion of program of change such individuals must be controlled or their views must be adjusted because it is supposed that such kind of people always even at the best situation are at doubt and are suspicious to other's behaviors and their suspicion may issue to others.

For future researches and studies it is recommended that besides identified stimulators of this research other ones like trust to managers financial stimulators and motivations during execution of change, style of leadership (especial revolutionary and substitution of leader member) etc. may also be point of attention. But, considering cultural elements also can help significantly to thorough clarification of cynicism to organizational changes. Finally even though in this research generally paid to a collection of personnel's understandings about the whole of programs of change, in future researches it is better that an especial program of change be identified and cynic views of individuals to that especial program be determined.

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Correlation of MRP8/MRP14 and S100A12 with disease activity in rheumatoid and psoriatic arthritis

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Abstract: *Objective:* To evaluate myeloid-related protein MRP8/MRP14 (S100 protein) and S100A12 in the serum and synovial fluid of rheumatoid arthritis (RA) and psoriatic arthritis (PsA) patients and its relation to local and systemic parameters of disease activity. *Methodology:* Thirty RA patients (Group I), twenty five PsA patients (Group II) and ten controls (Group III) were included in the study. The patients were subjected to through history taking and clinical examination. Synovial fluid (SF) aspiration was done from twenty RA patients and ten PsA patients. ESR, CRP and synovial fluid analysis for white blood cell count, lymphocytes%, and acute phase serum amyloid (A-SAA) were performed. MRP8/MRP14 and S100A12 were assessed with ELISA technique in serum and synovial fluid samples. *Results:* Serum level of MRP8/MRP14 and S100A12 were elevated in Groups I and II in comparison to group III. The serum and synovial levels of MRP8/MRP14 and S100A12 in Group I and II showed no significant difference. The MRP8/MRP14 and S100A12 in group I showed significant positive correlation with disease activity score (DAS), ESR, CRP, SF MRP8/MRP14, SF S100A12, SF WBCs, lymphocytes% and A-SAA. The SF MRP8/MRP14 and SF S100A12 in group I showed positive significant correlation with ESR, DAS, SF-WBCs, lymphocytes and A-SAA. Group II showed a positive significant correlation of MRP8/MRP14 and S100A12 with ESR, CRP, DAS and psoriasis area and severity index (PASI). The SF- MRP8/MRP14 and SF S100A12 in group II showed a positive significant correlation with local inflammatory markers. *Conclusions:* The elevated MRP8/MRP14 and S100A12 in the serum and synovial fluids of patients with RA and PsA showed a significant correlation with local and systemic disease activity parameters. So, it can be used to monitor disease activity and patient's response to treatment.
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Key Words: Rheumatoid arthritis (RA), Psoriatic arthritis (PsA), Myeloid- related protein (MRP8/MRP14), S100A12.

Introduction:

S100 proteins are calcium-activated signaling proteins that interact with target proteins to modulate biological process (Broome et al., 2003). The myeloid related protein 8 [MRP-8(S100A8)] and 14 [MRP-14(S100A9)] are 2 calcium – binding S100 proteins expressed and released by phagocytes, which are markers for interactions between endothelial cells and macrophages in inflammatory arthritis. Both proteins are specially secreted by phagocytes at local sites of inflammation (Frosch et al., 2000). By interacting with specific binding sites on endothelial cells, extracellular complexes of MRP-8 and MRP-14 promote adhesion of phagocytes. In parallel MRP-8/MRP-14 activate the integrin receptor CD 11b/CD18 on phagocyte and modulate migration of leucocytes (Mantiz et al., 2003 and Roth et al., 2003).

MRP8 and MRP14 are secreted by monocytes during an interaction with inflammatory activated endothelial cells (Rammes et al., 1997), and complexes of both proteins exhibit direct pro-inflammatory effects (Donato 1999). MRP8/MRP14 heterodimers mediate the adherence of leucocytes to endothelial cells and promote subsequent trans-migration (Srikrishna et al., 2001). The extracellular MRP14 induces the up regulation of CD11b/CD18 integrin binding activity on neutrophils and monocytes (Eue et al., 2000 and Newton & Hogg 1998).

S100 proteins play a role in both intracellular functions, such as cell differentiation and cell cycle progression, regulation of kinase activities and cytoskeleton –membrane interactions, and extracellular functions such as inducing neutrophil extension, chemo-attraction, and the induction of adhesion molecule expression (Donato 1999) .

MRP8 and MRP14 are expressed in high concentrations in infiltrating granulocytes and monocytes and during the stages of early differentiation of monocytes, but are absent in lymphocytes and mature tissue macrophages (Kerkhoff

et al., 1998). The expression of MRP8/MRP14 in inflammatory synovitis points to a positive feedback mechanism by which the contact of phagocytes with activated endothelium leads to the release of MRP8/MRP14, which induces firm adhesion and transmigration of infiltrating cells to the synovial tissue (Kane et al., 2003).

S100A12 (EN-RAGE) is secreted by activated granulocytes and binds to the receptor for advanced glycation end products , which induces nuclear factor (NF) -kB- dependent activation of endothelium (Foell et al; 2003). Increased serum levels of S100A12, a proinflammatory protein secreted by activated neutrophils, have recently been shown in patients with active inflammatory diseases, such as RA and Kawasaki disease (Komatsuda et al; 2006). S100A12 is associated with coronary atherosclerosis plaque rupture as it is expressed in vascular smooth muscle accelerating atherosclerosis and plaque instability (Hofmann Bowman et al; 2011). Also it is extensively expressed at local sites of inflammation in cystic fibrosis (Foell et al; 2003) .

Myelomonocytic cells play a key role in the production and perpetuation of synovial inflammation in seropositive and seronegative inflammatory arthritis. The synovitis of rheumatoid arthritis is characterized by infiltration of macrophages and, to a lesser extent, neutrophils which contribute directly to joint inflammation and destruction through the production of proinflammatory cytokines and proteolytic enzymes, such as metalloproteinase (Burmester et al., 1997). Macrophage infiltration and metallo-proteinase production in the synovium correlates with the development of joint erosion (Cunnane 2001) and specific therapies targeted at macrophage products such as tumor necrosis factor (TNF) with anti-tumor necrosis factor (anti-TNF) (Van den Bosch et al., 2000) .

However, Psoriatic arthritis is characterized by less joint destruction than RA (Goldman et al., 1990) and Psoriatic arthritis synovium has been reported to have fewer infiltrating macrophages (Veale et al., 1993) and reducing TNFα production (Danning et al., 2000). This may be due to a reduction in myelomonocytic cell trafficking and activation in the synovium. Broome et al. (2003) studied the level of expression and cellular localization of S100A7, S100A8, S100A9, S100A10 and S100A11 in normal and psoriatic epidermis. They found that S100A7 and S100A11 were present in the basal and spinous layers in normal epidermis. These proteins appear in the nucleus and cytoplasm in basal cells but are associated with the plasma membrane in spinous cells. S100A8 and S100A9 are absent or are expressed at minimal levels in normal epidermis .

In involved psoriatic tissue, S100 A10 and S100A 11 levels remain unchanged, whereas, S100 A7, S100A8, and S100A9 are markedly over expressed. The pattern of expression and subcellular localization of S100A7 is similar in normal and psoriatic tissue. S100A8 and S100A9 are strongly expressed in the basal and spinous layers in psoriasis-involved tissue. They concluded that S100A7, S100A8 and S100A9 expression is markedly altered in psoriasis, suggesting a role for these proteins in disease pathogenesis .

Aim of the work:
The aim of our work was to evaluate the myeloid related protein MRP8/MRP14 and S100A12 in the serum and synovial fluid of RA and PsA patients and to evaluate their correlation with local and systemic parameters of disease activity.

Subjects and methods:
Thirty RA patients (Group I), 25 PsA patients (Group II) and 10 normal healthy subjects as a control group (Group III) were included in the study. They were recruited from Ain Shams University Hospitals over 6 months. RA patients met the American Colleague of Rheumatology (ACR) 1987 revised criteria for the diagnosis of RA (Arnett et al., 1988). PsA patients were diagnosed according to the Classification Criteria for Psoriatic Arthritis (CASPAR) (Taylort et al., 2006). This consists of established inflammatory articular disease with at least 3 points from the following features: current psoriasis (assigned a score of 2; all other features were assigned a score of 1), a history of psoriasis (unless current psoriasis was present), a family history of psoriasis (unless current psoriasis was present or there was a history of psoriasis), dactylitis, juxta-articular new bone formation, rheumatoid factor negativity and nail dystrophy .
All patients were subjected to:
Full history taking :
Duration of illness, morning stiffness, medical treatment received and its duration.
Thorough clinical examination :
Included general and musculo-skeletal examination of axial and peripheral joints with special emphasis on:
 -Ritchie articular index (Ritchie et al., 1968); number of tender joints (28 joints were examined including both shoulders, both elbows, both wrists, both knees, bilateral all metacarpophalangeal and all proximal interphalangeal joints.
 -Swollen joint count: the same 28 joints as tender joints were examined.
 -Patient's global assessment of disease activity measured by visual analogue pain scale (VAS) of 100 mm (Prevoo et al., 1995).

-Disease activity score (DAS 28) which measures disease activity (Van der Heijde et al., 1990). The activity was calculated as follow: DAS28 (4) = (0.56*sqrt (t28) + 0.28*sqrt (sw28) + 0.70*Ln (ESR) + 0.014*GH

t28 = number of painful joints from 28 joints
sw28 = number of swollen joints from 28 joints
ESR = erythrocyte sedimentation rate in mm/first hour
GH = general health by assessment on 0 to 100 mm VAS.

High disease activity >5.1, moderate > 3.2 and < or = 5.1), low disease activity <3.2, remission <2.6 (Pincus et al., 2000).

 -Psoriasis severity: this done by using psoriasis area and severity index score (PSAI) (Fredrikssen and Patterson 1978). The body surface area is classified into:

Head (H) which represent 10% of the total body surface area; Trunk (T) 30%, Upper extremity (U) 20%, Lower extremity (L) 40%.

The extent of area involved (A) is graded according to the following scale:
0=none   1=<10%   2=>10%-30%   3=>30%-50%
4=>50%-70% 5=>70%-90% 6=>90%-100%

Each area involved was checked for Erythema (E), Induration (I) and Desquamation (D), and given subjectively the score from 0-4 according to:

None (0), Mild (1), Moderate (2), Severe (3) and Very Severe (4).

The PSAI is then calculated with the following formula:
PASI= [(EH + IH + DH) x AH] x 0.1+ [(ET +IT + DT) x AT] x 0.3 + [(EU + IU + DU)] x AU] x 0.2 + [(EL + IL + DL)] x AL] x 0.4

The severity is considered mild if PASI value is less than 15, moderate if it is between 15-25 and severe if it is more than 25.

Laboratory investigations:
Sampling:
1- Peripheral venous blood samples were obtained from all patients and controls. One ml of blood added to tube containing sodium citrate for ESR measurement. The remaining blood sample was left for coagulation for 30 minutes, then centrifuged at 1000 Xg for 20 minutes to separate serum that, was aliquoted , labeled and stored at -80◦C until performing the MRP8/ MRP14 and S100A12 .

2- Synovial fluid aspiration from the suprapatellar pouch of the knee joint under complete aseptic condition from 20 RA patients and 10 PsA patients. The SF sample was tested for white blood cell count/ mm² (SF WBCs and lymphocytes %). The rest of it was treated by protease inhibitor (Roche Diagnostic, Meylan, France) and centrifuged at 1000 Xg for 20 minutes. The supernatant fluids were stored at -80◦C to

be used for assessment of MRP8 / MRP14 and S100A12 as well as synovial fluid acute phase serum myeloid A (SF A –SAA). Immediately before analysis, the synovial fluid were thawed and pretreated for 1 hour with hyaluronidase (Sigma, St. Louis, MO), and centrifuged for 10 minutes at 1000 Xg and the supernatant was collected.

Methods of laboratory investigations:
1-Erythrocyte sedimentation rate mm/hour (ESR) measured with Westergren method with vaccum blood collection tube.
2-C-reactive   protein   (CRP)   measured   with immunoturbidimetric method.
3-Intraarticular markers of inflammation were assessed by measuring synovial white blood cell count/ mm³ (SF WBCs and lymphocytes %) by diluting SF sample with isotonic 0.1% toluidine blue , then counting using Fuchs-Rosenthal ruled counting chamber. WBCs differentiated by examining leishman stained smear of sediment from centrifuged SF.   Also, Synovial fluid acute phase serum amyloid A (SF A–SAA) was measured with an enzyme linked immunosorbent assay kit (Life Diagnostics Inc., West Chester, USA).
4-Assessment of S100A12: Determination of serum and SF S100A12 were performed by enzyme linked immunosorbent assay (ELISA), using commercially available ELISA kit, provided from Uscn, Life Diagnostics Inc., USA, according to the manufacture instruction. Biotin-conjugated polyclonal antibody preparation specific for S100A12 was used. The assay has a sensitivity of 5.9 pg/ml.
5-Assessment of MRP8 / MRP14: Enzyme-linked immunosorbent assay (ELISA): Rabbit antisera against MRP8 and MRP14 were used for serum and SF then, the monospecificity of the antibodies analyzed by immunoreactivity against recombinant MRP8 and MRP14 , by Western blot analysis of lysates of monocytes   and   granulocytes,   as   well   as immunoreactivity   against   MRP8   and   MRP14 transfected fibroblastic cell lines. Different amount of MRP8 and MRP14 (0.25-250 ng/ml) were used for calibration. The assay has a sensitivity of 0.5 ng/ml and a linear range between 1- 30 ng/ml. MRP8 and MRP14 form   non-covalent   associated   complexes   in   the presence of extracellular calcium concentrations that are detectable by ELISA system. The ELISA then calibrated with the native MRP8 / MRP14 complex, and the data was expressed as ng/ml of MRP8 /MRP14.

Statistical analysis
    It   was   performed   using   statistical   software package (SPSS) version 15. Descriptive data of patients were expressed as mean ± SD. Student's t test was used to compare between two independent samples. While,

Pearson correlation coefficient analysis used in assessing the strength of association between two variables. P values less than 0.05 were considered significant. Also, Wilcoxon Rank Sum Test is used to compare non parametric variables.

Results:

This study was conducted on 30 patients (20 females and 10 males) with RA (Group I), their age ranged from 39 to 60 years with a mean age (48.56±5.16 years). There were 20 patients with knee effusion and the patients were receiving non-steroidal anti-inflammatory drugs (NSAIDS), cortisone and disease modifying drugs mainly methotrexate and hydroxyl-chloroquine in different combinations. Their descriptive data are shown in table (1).

The psoriatic arthritis patients (Group II) were 25 (15 females and10 males), their age ranged from 39 to 60 with a mean (47.84± 5.26 years). There were 10 patients with knee effusion, the patients were receiving, PUVA, methotrexate and or NSAIDS. Descriptive data of psoriatic arthritis (PsA) are shown in table (2) .

On comparing the patients and control groups as regard age; there was no significant difference between RA patients (Group I) and control (Group III) as well as between PsA (Group II) and control. There was a highly significant increase in the MRP8/MRP14 and S100A12 levels in RA and PsA in comparison to the control group (Table 3).

On comparing Group I and Group II, the Results showed no statistical significant difference between them as regard: age, duration of disease, level of MRP8/MRP14 and S100A12 in the serum or in synovial fluid, inflammatory markers in synovial fluids as white blood cell count, lymphocytes and acute phase amyloid A. There were a highly significant difference in the activity parameters as morning stiffness, DAS, RAI, swollen joint count, ESR, CRP between group I (RA) and group II (PsA) (Table 4).

Table (1): Descriptive data of group l (RA)

Parameter	Range	Mean±SD
Age (years)	39-60	48.56±5.16
Duration (months)	10-40	21.1±8.6
Morning stiffness (min)	10-90	40.5±19.8
RAI	6-26	13.86±4.84
Swollen joint count	8-22	14.33±3.48
ESR (mm/h)	38-100	63.26±18.69
CRP (mg/l)	40-90	59.06±15.73

DAS	3.1-7.2	5.2±1.37
MRP8/MRP14 (ng/ml)	11-17.41	14.79±2.04
S100A12 (pg/ml)	49-350	183±85.3
SF MRP8/MRP14 (ng/ml)	12.24-18.49	15.66±1.91
SF S100A12 (pg/ml)	325-1000	684±227
SF WBCs (mm³)	1300-2300	1705±348.6
SF Lymphocytes (mm³)	60-150	103.25±24.88
A-SAA (ug/ml)	49-98	70.85±15.17

Data: Range and Mean ± SD

Table (2): Descriptive data of group ll (PsA)

Parameter	Range	Mean±SD
Age (years)	39-60	47.84±5.26
Duration (months)	10-60	25.44±12.90
Morning stiffness (min)	5-30	16.6±7.73
RAI	2-18	5.68±3.72
Swollen joint count	1-16	4.92±3.43
ESR (mm/h)	10-60	34.44±12.00
CRP (mg/l)	10-50	29.6±10.98
DAS	2.4-6	4.01±0.99
PASI	8-30	19.96±6.58
MRP8/MRP14 (ng/ml)	12.17-17.98	15.59 ±1.51
S100A12 (pg/ml)	49-250	155±57.7
SF MRP8/MRP14 (ng/ml)	13.34-18.1	15.87±1.81
SF S100A12 (pg/ml)	195-921	526±217
SF WBCs (mm³)	1500-2300	1836±263.10
SF Lymphocytes (mm³)	80-150	111.5±26.14
A-SAA (ug/ml)	50-86	67±11.29

Data: Range and Mean ± SD

Table (3): Comparison of patients (group I and II) and control groups

		Mean±SD	Group III(Control)	t	p	Sig
Group I (30 RA)	Age MRP8/MRP14(ng/ml) S100A12 (pg/ml)	48.56±5.16 14.79±2.04 183±85.3	48±6.7 1.46±0.30 47±17.2	-0.243 -34.544 4.95	>0.05 <0.001 <0.0001	NS HS HS
Group II (25 PsA)	Age MRP8/MRP14(ng/ml) S100A12 (pg/ml)	47.84±5.26 15.59±1.51 155±57.7	48±6.7 1.46±0.30 47±17.2	0.067 -44.338 5.78	>0.05 <0.001 <0.0001	NS HS HS

NS=non-significant.   HS=highly significant.

Table (4): Comparison between group I (RA) and group II (PsA)

	GI (RA)	GII (PsA)	t	Z	p	Sig
Age (years)	48.56± 5.16	47.84± 5.26	0.514		>0.05	NS
DAS	5.2± 1.37	4.01± 0.99	3.700		<0.001	HS
MRP8/MRP14 (ng/ml)	14.79±2.04	15.59±1.51	-1.662		>0.05	NS
S100A12 (pg/ml)	183±85.3	155±57.7	1.36		>0.05	NS
SF MRP8/MRP14 (ng/ml)	15.66±1.91	15.87±1.81	-0.294		>0.05	NS
SF S100A12 (pg/ml)	684±227	526±217	1.82		>0.05	NS
SF WBCs (mm³)	1705±348.6	1836±263.10	-1.148		>0.05	NS
SF Lymphocytes (mm³)	103.2±24.88	111.5±26.14	-0.827		>0.05	NS
A-SAA (ug/ml)	70.85±15.17	67±11.29	0.781		>0.05	NS
Duration (months)	21.1±8.6	25.44±12.90		-1.126	>0.05	NS
Morning stiffness	40.5±19.8	16.6±7.73		-5.115	<0.001	HS
RAI	13.86±4.84	5.68±3.72		-5.340	<0.001	HS
Swollen joint count	14.33±3.48	4.92±3.43		-5.844	<0.001	HS
ESR (mm/h)	63.26±18.69	34.44±12.00		-5.340	<0.001	HS
CRP (mg/l)	59.06±15.73	29.6±10.98		-5.752	<0.001	HS
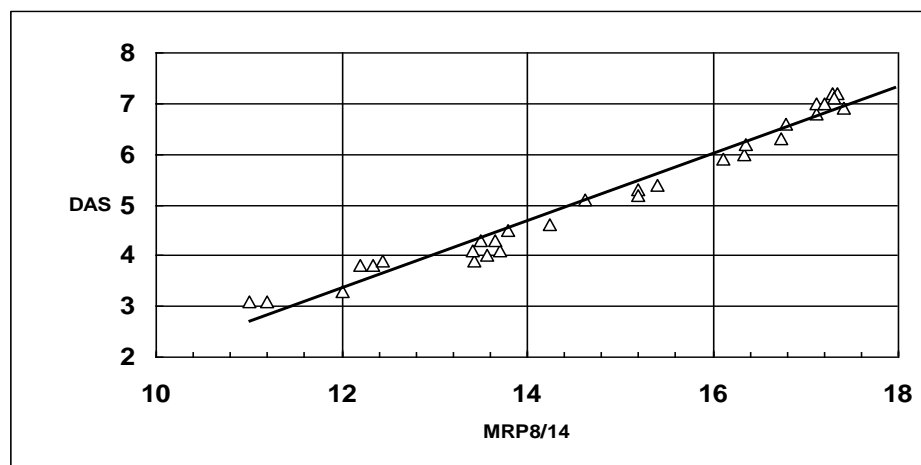
Figure (1): Regression analysis showing the correlation between MRP8/MRP14 and DAS among RA patients
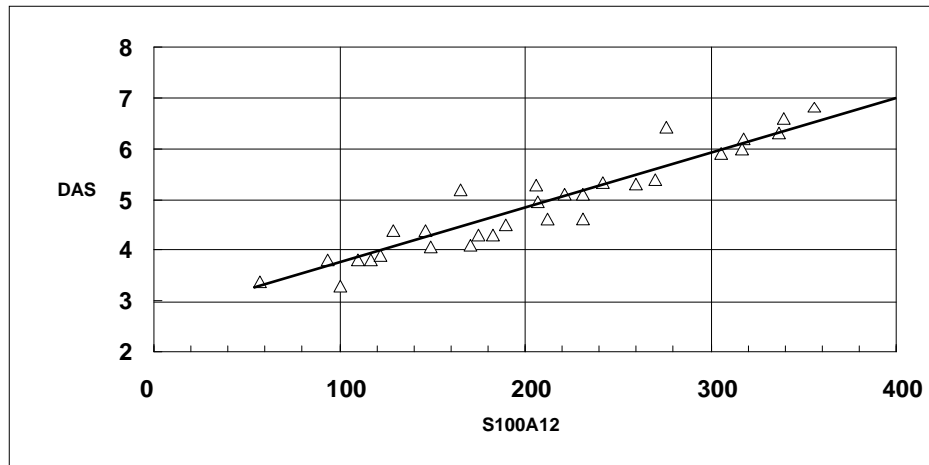
Figure (2): Regression analysis showing the correlation between S100A12 and DAS among RA patients
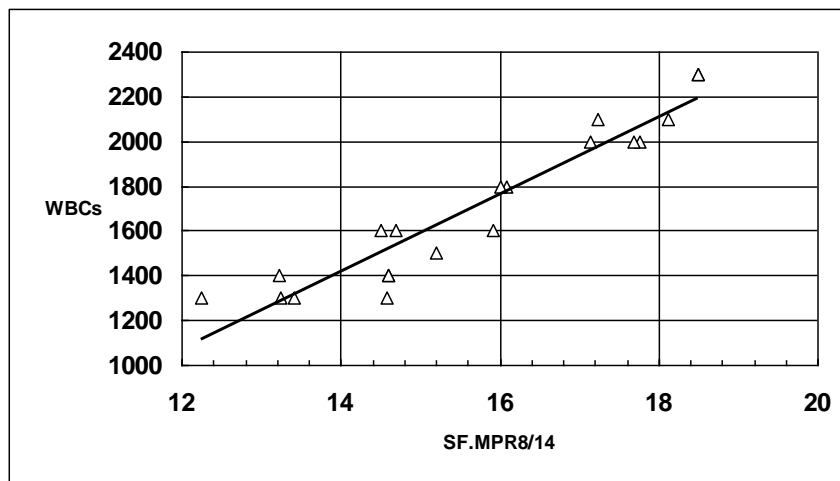
Figure (3): Regression analysis showing the correlation between SF MRP8/MRP14 and WBCs among RA patients
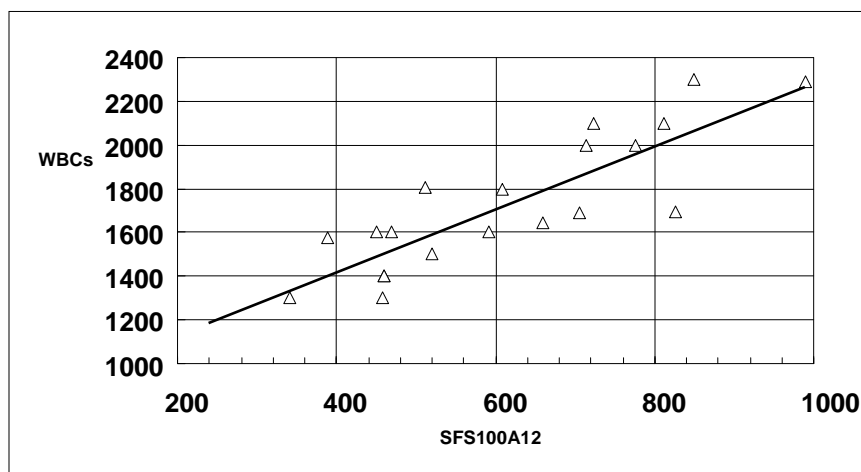
Figure (4): Regression analysis showing the correlation between SF S100A12 and WBCs among RA patients

The results showed a positive significant correlation of MRP8/MRP14 and S100A12 levels in the serum of Group I (RA) with ESR (r=0.84 & 0.81), CRP (r=0.70 & 0.82) and DAS (r=0.98 & 0.74) respectively with p<0.05 (Figure 1&2). Also there was a positive significant correlation of serum level of MRP8/MRP14 and S100A12 with SF level of MRP8/MRP14 and S100A12 (r =0.98 & 0.92), SF WBCs (r = 0.93 & 0.70), Lymphocytes (r=0.98 & 0.78) and acute phase serum amyloid A (r= 0.99 & 0.68).

The results showed a positive non significant correlation between serum level of MRP8/MRP14 and S100A12 of RA group with morning stiffness (r=0.20 & 0.14), Ritchie articular index (r=0.33 & 0.25) and swollen joint count (r=0.07 & 0.18).

The results showed a positive significant correlation of SF MRP8/MRP14 and SF S100A12 in Group I with ESR (R= 0.81 & 0.64), CRP (R= 0.57 & 0.81), DAS (r=0.97 & 0.61) and with local activity parameters as SF WBCs (r=0.93 & 0.51) (Figure 3&4), Lymphocytes (r=0.98 & 0.68) and ASAA (r= 0.98 & 0.97).

The synovial fluid level of MRP8/MRP14 and S100A12 in RA patients showed negative non significant correlation with morning stiffness (-0.01 &

-0.13) and swollen joint count (r=-0.07 & -0.17) and positive non significant correlation with Ritchie articular index (r= 0.27 & 0.09).

The results of Group II (PsA) showed that, serum levels of MRP8/MRP14 and S100A12 had a positive significant correlation with ESR (r=0.85 & 0.57), CRP (r=0.60 & 0.52), DAS (r=0.99 & 0.78) and PASI (r=0.53 & 0.68) (Figure 5&6).While, it had a non-significant negative correlation with morning stiffness (r=-0.12 & -0.09), RAI (r=-0.12 & -0.11) and swollen joint count (r=0.09 & -0.17).

The SF MRP8/MRP14 and SF S100A12 in group II (PsA) showed a significant positive correlation with local inflammatory parameters in the synovial fluid as WBCs (r=0.98 & 0.96), lymphocytes (r=0.95 & 0.89) and A SAA (r=0.98 & 0.98) (Figure 7&8).

Also, PsA patients results showed a non significant positive correlation of SF MRP8/MRP12 and SF S100A12 with morning stiffness (r=0.11 & 0.07), ESR (r=0.17 & 0.09), CRP (r=0.32 & 0.18) and PASI (r=0.21 & 0.7). The non significant negative correlation was with RAI (r=-0.35 & -0.23), swollen joint count (r=-0.35 & -0.19), DAS (-0.02 & -0.07) and MRP8/MRP14 (r= -0.02 & -0.11).
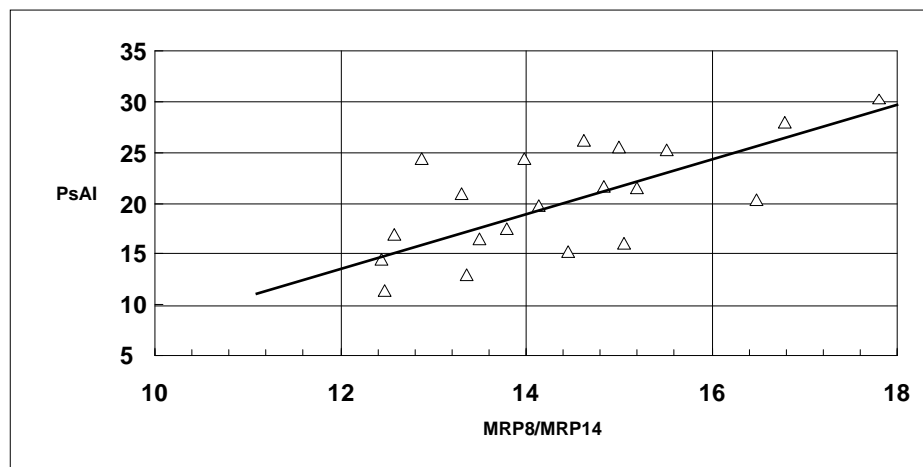
Figure (5): Regression analysis showing the correlation between MPR8/14 and PsAI among PsA patients
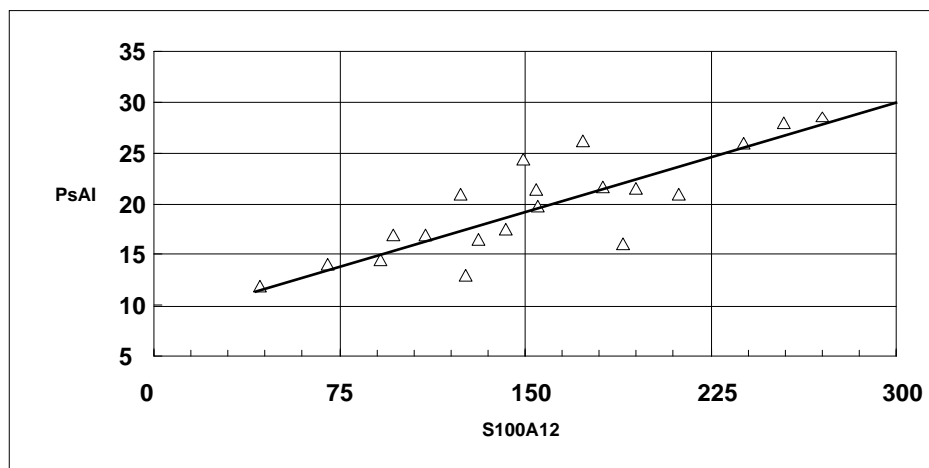
Figure (6): Regression analysis showing the correlation between S100A12 and PsAI among PsA patients
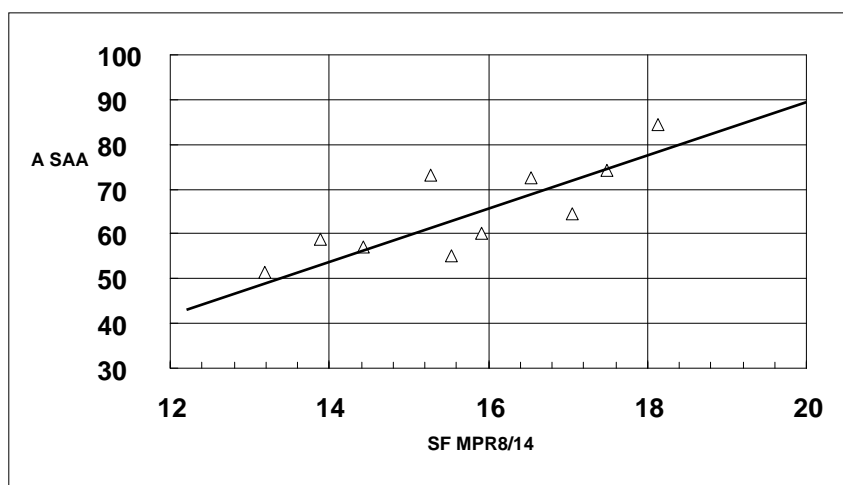
Figure (7): Regression analysis showing the correlation between SF MPR8/14 and A-SAA among PsA patients
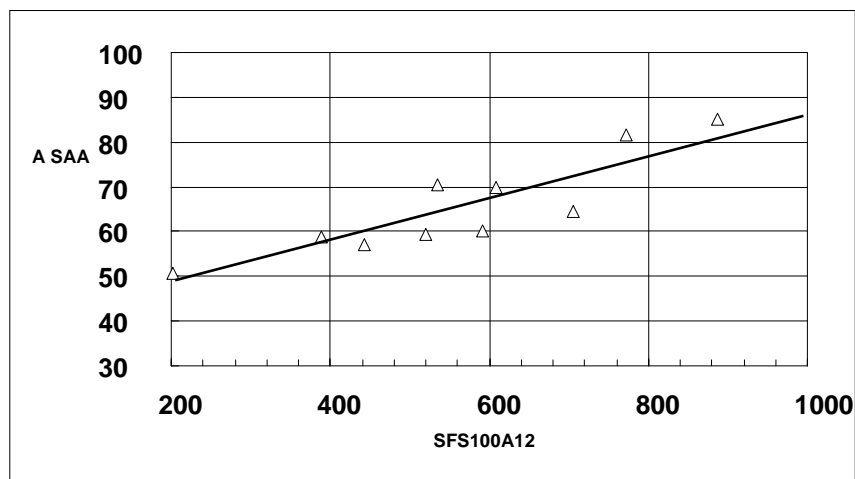
Figure (8): Regression analysis showing the correlation between SF S100A12 and A-SAA among PsA patients

Discussion:

The myeloid related protein 14 (MRP14), also known as S100 A9, calgranulin B (Healy et al., 2006), is a member of a family of proteins that have intracellular and extracelullar roles modulating calcium signaling, arachidonic acid metabolism, cytoskeletal reorganization and trafficking of neutrophils (Donato, 2003).

In humans, the most abundant form of MRP-14 is MRP-8/14, in which MRP-14 is bound to MRP-8 (Nacken et al., 2003). Although, MRP-8/14 is highly expressed in neutrophils, some authors found that platelets and megakaryocytes also contain MRP-14 mRNA and that; platelets express MRP-8/14 protein (David et al., 2008).

S100A12 (calgranulin C; extracellular newly identified RAGE binding protein, EN-RAGE) is more restricted to granulocytes (Vogal et al., 1999). S100A8, S100A9 and S100A12 are found in high concentrations in inflamed tissue, where neutrophils and monocytes belong to the most abundant cell types. They exhibit proinflammatory effects in vitro at concentrations found at sites of inflammation in vivo. Although, S100A12 binds to RAGE, at least part of the proinflammatory effects of the S100A8/S100A9 complex depend upon interaction with other receptors (Foell et al., 2007).

The results of this study, showed non-significant difference between patients and controls as regard age. However, there was a highly significant increase in the MRP8/MRP14 and S100A12 in patients groups in comparison to the control. The increase of MRP8/MRP14 and S100A12 were 10 fold higher in patients than the control. These results were similar to

the results of Frosch et al. (2003) where they found that the serum concentrations of MRP8/MRP14 were 120 fold higher in systemic onset Juvenile RA compared with healthy controls and approximately 12 fold higher when compared with patients with other inflammatory diseases. Foell and his colleagues study in 2003, showed significant higher S100A12 levels in patients with active arthritis (RA, psA) than healthy controls. Our results showed non-significant difference of MRP8/MRP14 between group I (RA) and II (PsA), These results were in accordance with Kane et al. (2003), they reported that MRP8/MRP14 were equally increased in PsA, RA and spondyloarthritis patients. Foell and his colleagues in 2003 found S100A12 serum levels were highest in RA, markedly elevated in PsA and less but still significantly elevated in seronegative arthritis compared with healthy controls.

Our results showed a significant positive correlation of MRP8/MRP14 and S100A12 as well as SF MRP8/MRP14 and SF S100A12 of group I (RA) with systemic parameters of disease activity (ESR, CRP and DAS). These results were similar to An et al. (2005) who concluded that MRP8/MRP14, serum amyloid A1 and A2 (SAA1/SAA2) and ubiquitin may play important roles in development of RA and their determination may benefit early diagnosis, evaluation of disease activity and investigation of new therapy targets.

Also; these results were similar to Kan et al. (2003) who found a significant correlation of MRP8/MRP14 and S100A12 of RA and PsA serum with systemic parameters of disease activity (ESR and CRP). They didn't investigate its correlation with disease activity score (DAS), which depends mainly on the ESR as

reported by Makinen and his colleagues in 2007 that ESR had the greatest effect on the components of DAS28 (tender joint count, patient's general health and swollen joint count) score. Once the MRP8/MRP14 and S100A12 were correlated with ESR; consequently it is correlated with DAS.

Our results showed a positive significant correlation of S100A12 both in serum and synovial fluid in RA patient with systemic parameters of disease activity scores (ESR, CRP and DAS). These results were similar to Foell et al., 2003 and Foell et al., 2007.

Our results showed a significant correlation of MRP8/MRP14 and S100A12 both in serum and SF in RA patients with the intra-articular activity markers as WBCs, lymphocytes and A-SAA. It was in contrast to Kan et al. (2003) as regard the correlation of MRP8/MRP14 in the serum but was similar to them as regard synovial level correlation with the local inflammatory parameters; where they reported a significant correlation of SF MRP8/MRP14 (and not its serum level) with local parameters of disease activity (WBCs, lymphocytes and acute phase serum amyloid A).

In our study, the correlation of SF MRP8/MRP14 and SF S100A12 with systemic disease activity parameters and MRP8/MRP14 with local inflammatory parameters found to be due to significant correlation of both MRP8/MRP14 and S100A12 in the serum and synovial fluid consequently both correlates with the systemic and local inflammatory parameters .On the other hand, Kane and his colleagues results in 2003; showed no significant differences in their levels in serum and synovial fluid with higher level in synovial so the serum level correlates with the systemic parameters and the synovial level correlates only with the local inflammatory parameters and not with systemic one.

Our results showed a positive significant correlation of serum level of MRP8/MRP14 and S100A12 in RA patients with its synovial level and this was similar to Frosch et al. (2000), Foell et al.(2003) and Foell et al. (2007) they found a correlation between serum and synovial level in patients with RA and PsA. On the other hand it was contrary to Kane et al. (2003) who found that, serum level of MRP8/MRP14 didn't correlate with its synovial level and even higher level of MRP8/MRP14 were found in SF of patients with RA and PsA; their explanation were made on the base of lesser contribution of MRP production by a single knee joint to the serum concentration in polyarticular disease.

The serum and synovial fluid of MRP8/MRP14 and S100A12 in our study showed non-significant correlation with morning stiffness, swollen joint count and RAI in RA patients and this was similar to

Makinen et al. (2007) where they considered ESR is the main factor for disease activity score.

The results of MRP8/MRP14 and S100A12 in the PsA serum showed a positive significant correlation with ESR, CRP, DAS and PASI; these results were similar to (Brun et al., 1994, Hammer et al., 1995 and Kane et al., 2003), they found significant correlation of serum level with the systemic parameters of disease activity (ESR and CRP). On the other hand, Benoit and his colleagues in 2006; found an elevation of serum levels of S100A8 and S100A9 in PsA compared to healthy control; which was correlated with the disease activity as reflected by the psoriasis area and severity index (PASI).

These data demonstrate that hyper-proliferation and abnormal differentiation of psoriatic skin is associated with a massive up-regulation and secretion of S100A8, S100A9 and S100A12, suggesting not only a prominent role of these molecules during intracellular calcium–dependent signaling but also implying distinct extracellular functions. Being into consideration that DAS proved to be considerably different in PsA compared with RA, therefore its application for disease activity assessment in patients with PsA is not recommended (Leeb et al., 2007). Also, the results of this study showed non-significant correlation of MRP8/MRP14 and S100A12 in group II PsA with morning stiffness, RAI and swollen joint count; these were partially similar to Kane et al. (2003) who found no significant correlation of MRP8/MRP14 with swollen joint count, but they found a significant correlation of it with RAI which was in contrast to our results, also they didn't study the correlation with morning stiffness.

Our results showed a significant correlation of SF MRP8/ MRP14 and SFS100A12 with local inflammatory markers (WBCs, lymphocytes and A-S AA). Also, the SF MRP8/MRP14 and SF S100A12 in group II showed non-significant correlation with morning stiffness, swollen joint count, RAI, ESR, CRP, DAS, PASI, MRP8/MRP14 and S100A12 in the serum; this was in accordance to Kane et al. (2003) who found that, no significant correlation between SF MRP8/MRP14 in PsA patients with any of the systemic parameters of activity or with the serum level of MRP8/MRP14 or S100A12 and only showed a significant correlation with the local inflammatory parameters in the synovial fluids.

Conclusions:
MRP8/MRP14 and S100A12 in the serum can be used to monitor systemic disease activity while, SF MRP8/MRP14 and SF S100A12 can be used to monitor local inflammatory markers. Being correlated

with disease activity parameters, can be used to monitor disease activity and response to treatment.

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Characteristics of rural women in third world

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Abstract: Women, especially in villages of fewer possibilities in terms of investment, credit and enjoy the power. Miran role of rural women more than men, influenced by various factors, conditions and economic, social, cultural and ecological is. Rural women, either directly (production of crops, livestock, handicrafts and rural) or in terms of helping the agricultural sector (as labor) considerable potential in the community are considered. About 5/6 million women in the production Iran's agricultural sector involved. Activities related to planting, and harvesting, processing and preparation of animal feed, preservation and care of livestock and poultry and some related activities including marketing and sales field role and participation of rural women to sue. One of the problems that governments and governments today should know the world should talk TVs? Especially in rural undeveloped countries. In these countries for lack of proper planning policies and improving quality of life of people in these areas, rural migration to cities has increased significantly is Urbanization and the incidence and growth problems and mental disorders, social, cultural and economic sectors especially in agriculture and animal husbandry provides guidelines and rural development requires a deep study and research in this field is that the governments can Planning and economic policy, social and cultural to help.
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Keywords: rural women, developing countries

Introduction:

Women at village have activity by help farming and other rural affairs such as ranching , nurturing poultry , gardening and … and recently by participating at related programs to rural development including organizing cooperative associations related to women , establishing handicraft factory at village and even marketplace for it , organizing occupation plan for inhibited girls and women , related activities to filling rural women's leisure , participating at rural affaires which previously managed by men and etc . Now, women alongside men attend at all rural affaires and even at some case it has be seen that programming related to provide different services, were done by women at villages. All we can say that women in current villages enjoy better freedom and they do rural affairs by managing not as their duties and obligation like in the past. Now, women are not seen as passive receiver of help to improve their welfare, but as active social propagators who can change women and men's life condition (Farghdan, 2001).

Aside from the economic role of women that clearly has been made in the past decades, the vital role of women in social and cultural dimensions of development process in rural areas has remained hidden from the polls. they train the next generation of farmers and teach them the next generation nessessary knowledge. A Chinese proverb says, "If training a man, just training a man but if you teach a woman you teach a family." Women are local knowledge and local educators themselves, in preparing and providing food, health treatments and cultural values are the next generation.

Since, village is suitable place for farming and additional activities, so it can be said that women's role at villages, has been toward this point and by developing agriculture part and possibility to institutionalized appropriate infrastructure, we would have suitable attitude toward development process. Agriculture part has critical responsibility, as one of the productive part of country for supplying needed food security, that it can assist this part to access this main goal up to proper level, in accordance with workforce efficiency. To achieve this goal, women play main role, too. In spite of that, they couldn't represent their abilities in this field, because of limitations that they face.

Means participation of women in all stages of development, evaluate needs, identify problems, planning, management, implementation and evaluation is. Equity participation in a patriarchal society was not easily achieved, such matter requires the participation of women, especially rural women in projects is the way that they are concerned. Rural population of Iran always different roles in the production and distribution have been responsible. Agricultural sector, supplier of about one third of employment, food needs of more than Chharpnjm

country, half of exports, do not need the agricultural products industry and one-fifth of GDP countries.

In all communities, rural women as an important factor in achieving rural development goals were discussed and in fact, half of rural human resources development are needed, however, the rural population of Iran, the ruling class (the owners of capital) and rural people, between urban and rural, between literate and illiterate, between men and women, there is a deep cleft.

Women's productive activities has affective role to increase revenue, rural family welfare, and its consequents is: foods status improvement, health, preventing irregular migration, literacy enhancement and development of rural family social status. Despite clearness of affective women's role at production, economy of village and country, they don't enjoy proper social base and they were deprived of educational and welfare programs especially at rural and nomadic area. Thus women and their roles should be considered particularly in order that they would find that first they are important and efficient; second they have educational needs and many technical gaps; third they shouldn't forget efforts for enabling themselves. As girls and women's discussion and solving their historical lag and restoring their social right are important and necessary, it is sensitive and accurate equally, because dominant patriarchal cultures at rural societies, put women at lower status. So that at some societies, women's duties are just upbringing and reproduction and maybe they are considered as workforce, and they are deprived of decision making and opining at family and society environment.

Creation of local organizations and regional organizations with a presence with the participation of women and rural residents to resolve problems such an important and influential cases that regional planning should be considered. Drfraynd system development and change advanced agricultural economy, the value of a woman who previously worked as unpaid family labor force was converted to money and he is placed at the disposal. Except for the agricultural sector is the main areas of rural women work in the other two parts of the economy, namely industry and services as well as the presence of rural women is very important in discussions of social and political participation of women, the most important issue in planning, decision making, implementation of decisions and evaluation results are.

Conclusion:

In order to be able to remove obstacles and problems of women's activity at villages , we should reinforce stamina if women's work by one exact and

codified programming in order to be able to progress at one correct direction.

villager access to education at different level , possibility to enjoy suitable occupation opportunities and also industrial , technical and healthcare equipment has caused that cities go out from concentration and attraction of inside and outside capitals , and so possibility of fair distribution of resources and facilities between city and village be provided , and government instead of bear heavy cost of urban population , spend these costs for rural development and support rural women whom get more damage while face lack of facility and compared to men enjoy less migration rate and also have to adopt existing conditions and use available facilities . In today world, it is impossible to achieve development goals without applying abilities of half of people of society (i.e. women).

Women at most countries, have low access to economic resources at the field of economic activity. They should reinforce them at this field by supplying economic facilities. Another part that changed women's attendance at economic affairs is agriculture activities. Opportunities which they gain at this part can have important impact on economic function and related social relations

Same discussions were presented about identifying women's role on environment changes (especially in preserving natural sources) that related to women's life and job. Women's access to agriculture credits, because increasing and improving their efficiency at agriculture. Women's membership at cooperatives, also help them to receive facilities in order to supply needed inputs of agriculture, sale productions and make some production with aim of increasing efficiency. Most of researches found that women's education is related to their agriculture efficiency. Indeed, years which women used educational programs, related to their productions meaningfully. So, by identifying their needs, demands and interests and also by determining their issues, resources and preferences, we should prepare proper extensional and educational programs for them.

Also literacy programs and generally their basic education should be considered specifically with aim of better women's enjoyment of extensional and educational programs. And also access opportunities to different resources and needed inputs at agriculture activity should be provide for them. Development programs for rural women mostly have certain importance that should be considered at extension activity.

Empowering women is one of principal discussions of development process for many countries of today world. existing factors contain

women's education , their ownership sample , their occupation opportunities and function of labor market but if we go beyond this rather classic variables , these factors also contain occupational relations nature , how to behave family and generally society with economic women's activity and economic and social conditions which encourage or prevent change at these moods .

Last conclusion is that men and women, play role at agriculture programs and rural development but each has different needs and knowledge base on kind of their activities, since total people activities were done to supply their needs and so governments should consider regional programming in their policy making and programming. This issue dose not achieved unless by identify climate, population, cultural, economic and politic constituents of each region and also kind of relation of these constituents with constituents outside village and region.

These kinds of study and recognition have provided causes of better programming and adopted with needs of region, and prevent loss of investment. If education, health, occupation, cure and … facilities be provided in village and improving rural life level be considered, so migration would be regulated. At the other hand, protecting agriculture and livestock products and local industry, and attracting well condition markets for it, by governments, can be affective for villager's interest about rural life. Finally, positive attitude of development programmers, would help significantly to improve condition of one benefited rural family, and would act as a factor to diminish gap between urban family and rural family.

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Using of Distance learning in agricultural education

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Abstract: Distance education courses also vary greatly in scope, level, and length. Some have a few assignments and require only a few months to complete, while others have a hundred or more lesson assignments requiring three or four years of conscientious study. Since 1890, more than 130 million Americans have studied at DETC member institutions, including Franklin D. Roosevelt, Walter P. Chrysler, Walter Cronkite, Barry Goldwater, Charles Schulz, and many other distinguished alumni of DETC members. Unlike most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority.
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Introduction:

In the present circumstances to provide our information infrastructure development and integration inevitably link the elements and tools that they are as indicators of technology education and technology education will be remembered. In the new context of combining these two indicators comes to training facilities and a variety of tools that will provide guidance and development in information will be very effective. While the effect of these two indices of body functions and its other fields (favorable to foster new ideas provides. Technologies training web-based technology as one of the most effective learning tools in educational issues have been identified and a total of E-learning as it is referred. . But if the scientific and cultural infrastructure with this technology's Day is not coordinated development of information will be obtained. This weakness caused by lack of growth and development of training required for pandemic knowledge of existing technology is. In many systems of scientific tools and capabilities needed to provide hardware and commissioning are still technological problems resulting from lack of knowledge of poverty and poor education in these centers to be seen.

In other words, the country still in the feasibility assessment and appropriate to make public the necessary training for operation and application of scientific principles and technological tools is has been done and why certain movements and sometimes non-normative point will not be able node an unlock.

The conditions and according to the capacity of developing countries and training facilities required a knowledge-based society feels is felt. If all processes in technology education and technology optimization and standardization of the Hungarian education should go, and appropriate channels that the best option in this area could benefit from state universities is capabilities.

According to the information in the development of any society should take half of the world to progress until the necessary coordination and synchronization global developments so as to accept the design structure of a knowledge-based society have a special place for the University and respect the role of education and technology was In designing a model with global standards of dynamism and flexibility at first be necessary to select a sample that the facilities and communications needed for this purpose provide action and then determine optimal cognitive deficiencies than Hammett and weaknesses push.

No doubt the experiences of implementing these standards and to develop troubleshooting information using technological tools would be much more economical. That if we develop a range of information from a city university level and conduct more successful we'll be more acceptable was. Because the utilization and application tools and step up the information they've been successful. Therefore the most important first step needed to coordinate and synchronize technology education and educational technology standards and capability in the high user acceptability of the world is also enjoyed.

In distance education teachers often are separate and comprehensive. Preparation of educational materials, supporting learners under the supervision of a training center takes place almost never do as a group are not. For services to education and electronic learning aids such as printed materials, computers and the Internet rely on.

Another look at the educational system of a new e-business and artistic and is a comprehensive solution to the institutions that want to move in the direction that technology and change their teaching methods and environments are possible to achieve the new educational approach provides.

Key factors in the process of distance education:

the process of remote training, the following factors contribute:

- Students:

Regardless of educational content, role and main element in the learning process students are responsible.

- Coaches and Teachers:

Success depends on a lot of educational activities the ability, skills and knowledge are the coaches and professors.

- Facilitators of communication:

Facilitator bases, as the bridge between students and mentors are. Must base expectations of teachers and educational needs of students and service coordination and communication to create.

- Support staff:

One of the important pillars of any development of distance education programs, by development group finds. Operational support staff such as student registration, copy and distribute their resources, order textbooks, security and copyright, and are responsible for the report.

- Management:

The group decision makers, builders and judges are considered to be educational and should be considered among the factors above, establish the correct relationship formation.

Distance Education:

Distance education is education designed for learners who live at a distance from the teaching institution or education provider. It is the enrollment and study with an educational institution that provides organized, formal learning opportunities for students. Presented in a sequential and logical order, the instruction is offered wholly or primarily by distance study, through virtually any media. Historically, its predominant medium of instruction has been printed materials, although non-print media is becoming more and more popular. It may also incorporate or make use of videotapes, CD or DVD ROM's, audio recordings, facsimiles, telephone communications, and the Internet through e-mail and Web-based delivery systems. When each lesson or segment is completed, the student makes available to the school the assigned work for correction, grading, comment, and subject matter guidance by qualified instructors. Corrected assignments are returned to the student. This exchange fosters a personalized student-instructor relationship, which is the hallmark of distance education instruction. Historically, most distance education courses were vocational in nature, but today courses are offered for academic, professional, and avocational purposes for students of all ages. There are numerous specialized programs, such as those for blind persons and for parents of small children with hearing impairments. Distance education is available in practically any field, from accounting to zoology. Courses are offered in gemology, high school diploma, journalism, lock smiting, child day care management, yacht design, and many fascinating subjects.

The Distance Learning Main Aspects

Let us define and consider some features it provides:

1. No Physical attendance: The traditional model of education requires regular physical attendance in classes in a specific geographically located campus. This has always been both a source of interest and a source of difficulties for many students. It requires strict attendance during the day only and entails travel expenses and time spent commuting instead of studying.

The distance learning model eliminates physical campuses, eliminating the need to waste time and money on travel. It allows students to take courses during individually scheduled hours in any time of day or night. It means, furthermore, than now it is possible to attend any institution, regardless of how "where" it is located geographically – all online institutions are located online and admit students from any country, no matter how remote. It should be noted that some online education programs do require occasional physical attendance on specially designed sites, most often for the purpose of taking an exam.

2. High-Quality Education: A very important point to be aware of is that Distance Learning becomes increasingly recognized as high-quality education. That is, it is not simply a poor substitute to the traditional model, but very valid option for anyone to take.

3. Human interactions: Distance Learning is often criticized for its lack of real human interactions, but more and more courses are offered using real-

time live video lectures, in addition to email, chat, message boards, and forums for communication.

4. Multimedia: In addition, online courses allow uses of multimedia which are impossible in traditional classes.

5. Continues Education – Or adult Education: The segments of society currently most enthusiastic about online education are primarily adults who work full time and parents. Tuition are either a little lower or compatible for those for traditional education.

Conclusion:

Despite the diversity of information in various forms of media in local, national and international, access, exchange and use of various information easier than last time is. Information society, a member of your buddies know that open information system in terms of geographical location and the last 25 years, organizational development, are limited. Distance learning faster than other forms of training has been.

Growth factor in the economic interests of this type of educational approach, flexibility and remove the distance can be named. The methods of distance education, required for building physical education is not providing services. Teachers and trainers in this method - compared with traditional methods - and have more opportunities to more people than are being trained. In this type of teaching style of each person in each academic field, and each job can be arbitrary in time and space, trained without having to leave the house for work or business is education. This method requires that students are dispersed over long distances provides. Distance learning advantages of distance education in comparison with traditional education, the need for physical locations and training programs limited to no specific time period. In this type of teaching style, learning for life without possibility of spatial and temporal constraints for each individual there. In distance education, problems related to lack of qualified teachers and appropriate educational environment - as it posed in the traditional method of M is - is resolved. In this way the use of advanced features in digital libraries and search the various sites during the study, time and cost savings are.

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Rural women empowerment: definitions and Criteria

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Abstract: Rural women are among those major groups at society who previously were considered less by planners, due to specific reasons in the past. And this problem is more observable at developing countries. While, by looking at women's history of economic and social life, we can find that this great group, continuously have played basic role in forming economic condition of country. This great group consistent with men have had active role at areas of social-economic activities and always have had major part on economic production of society. Nowadays, supporting family supervisor women is adopted by universal society, as politic, economic a social concern and nearly all countries applied related approaches, and however these efforts have resulted in failure, in so many cases. paying part of cost of life by government or charities , establishing forums to analyze family supervisor women's problems , supplying necessary facilities to grow and improve child's life quality and paying facilities to provide sustainable employment , are among most important approaches to support family supervisor women . Paying credit facilities to access sustainable employment with easy terms at limited time, is one of the most important approaches to support family supervisor women. Because alongside supplying their continues needs, their esteem wouldn't be marred. Currently, this approach is used at many countries and have emerged positive results.
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Introduction:

Extent of women's participation at economic activities, extent of women's activity at economic activities, is confirmation on lack of adequate attention to women's affair and their added value, because rural women work alongside men, at all levels of producing agriculture crops and livestock products and generally all affairs, and also spend their little leisure time for handicrafts such as rugs and carpets and etc. so it is necessary to establish self acknowledgement fields, directing women's economic and social ability and programming to attract their participation at different activities(Saadi and Arab Mazar, 2005) . At rural area, women have more significant role on family economy and inside activities and cause economic prosperity of society. yet , women couldn't gain their real position as active citizens who have talent for participation at economic , politic , social and cultural arena at most countries , especially developing country , and still their activities in economic calculations aren't considered , and they be considered as intangible workforce . Disappointing estimation about number of active rural women and underestimate about extent of their participation at economic activities is confirmation on lack of adequate attention to women's affairs and their added value. they are major force to create revolution and potential sources to progress rural economy and increasing extent of growth rate of producing food productions , although traditionally, farming and ranching , has been male profession , but

women's role was never restricted to house and family , so they are active outside (farming, ranching , forestry and …) other than inside activity (Balali, 2005).

Increasing Suffrage, lack of relying on vast patriarchal families, increasing cultural acknowledgment, relation with newer institutions, having intellectual independence, making decision for marrying, occupation, emigration and etc are those rights that they gain. gaining aforementioned rights by women in context of cultural and social framework followed some changes that maybe lead to disfunctions and even create disorders and abnormalities at traditional , familial and kinship relations that dominated on villages (Fakhraee 2002).

What that performing credits programs, has made in recent years, was on broad outlook with purpose to access to same results as above findings.

Thus, in one inclusive outlook , it is possible to use micro-credits programs to solve those issues which involved with rural women's economic limitations, so that lead them toward social empowerment, in the context of economic growth(Rahmani andalibi, 2001) .

Development along with economic growth and income increase is an important goal for most countries. Recently the growth of awareness about destructive effects of poverty has made countries believe that the best way to achieve sustainable development is to eradicate poverty; therefore most

development programs have been oriented towards poverty eradication by micro-credit services.

Supporting poor to raise their life standards should be based on the belief that the poor are able to help themselves. Explicitly, this proves that among a variety of deprivation they do consider their survival.

In the new system of advanced agricultural economy, the value of women's work that previously was unpaid labor now must be paid in cash. Expect for agriculture which is rural women's main work field they have rarely participated in tow other fields of economy. The most important issue of women's social and political participation is to take part in planning, decision making, implementation of decisions, and evaluation of results. Generally they have had a little share in such processes. Although in recent years rural women have participated more in villages' management, social and cultural organizations, and cooperative institutions' management; but having a lower level of literacy, education, income and social status than urban women they still have the smaller share of administrative and official jobs. Some barriers to women's participation which can be categorized in 3 groups of personal, familial, and social include: law literacy level, large volume of work both inside and outside of home for many reasons including seasonal migration of men and the great diversity of rural women's activities(nursing, housekeeping, agriculture, handicrafts, livestock,…), malnutrition, law health indicator, Patriarchal structure of society, father or husbands disagreement with a woman's participation in social and economic activities for various reasons like cultural reasons or unwilling to lose the labor force at home, negative attitudes towards women's abilities, gender discrimination, family's poverty, superstitious beliefs, misleading customs like fatalism, law access of women to credit and facilities, inaccessibility of extension services, men-orientated social activities and participation plans, deficiency of professionals needed to educate rural women, problems of access to health services and social facilities, low income of rural women compared with men, lack of non-governmental organizations dealing with rural women's problems, few women managers in rural area. (Rahimi, 1380)

Empowering rural women:

Empowerment is capacity that woman can obtain in cultural and social environment, for economic independency and self reliance, by controlling over emotional decision making and far from violation. Empowering means, evolution and developing activities through non governmental organizations (NGOS) that lead empowerment to improve economic dimensions. (Amiri, 2000)

Enabling is process that, during it, people of society do activities to overcome barriers of advancement that finally cause their domination to determine their own density. The term "enabling"

means overcoming fundamental inequalities. So it is different from self-reliance.

Enabling, enables individual to overcome any problematic condition and consider barriers and problems as part of life and positive campaign. Finally, enabling provides energy to overcome most intellectual barriers and external problems at private life.

Thus, among all what have been said, it is possible to present suitable definition of enabling women, as follows:

"Process of explaining women about themselves (and also men about them) for instances that they must or want to do, and growth of their willingness and courage until they reach to needed competency "(management of rural and tribal women). it should be noted here , that major factor which should be considered about women's ability , is eliminating individual and social barriers , and finally preparing field of economic and social participation for women at all fields . purpose of women's participation , is because of their dominance on all affairs of village including decision making process , organizations , forums , enterprising posts and … that involve , participation at all social and economic dimensions (Moazami, M, Rahimi A. and Azam tayefe Heidari, 2005).

Criteria of empowering women:

Enabling as a theory of policy making for women, in it present five criteria:

Welfare, access, Concientisation, participation and control.

1- welfare criteria :

In this criteria, men and women as human resources of development should enjoy of desirable welfare conditions and equality .

Most of timing developmental programs, have worked on base of women's welfare. They have considered and provided some services for women who were passive recipient of these services. But these services were limited to physical needs and mostly were considered to revive their role of productivity, again. sometimes , it has been said that this approach has begun at colonial era and has considered women from poor country and intended services for them that dose not exceed from that poverty level . Agricultural and industrial projects were designed for men and social programs for women and children. Most of welfare programs were inadequate or its success was limited. Considerable point in this criteria is that men and women as human resources of development should enjoy equality and desirable welfare conditions. At this stage, women's material welfare and their enjoyment of welfare programs, compared to men (nutrition, death rate and

…) were considered. And women's role as producer to supply their own needs isn't very important.

2- access criteria :

Lack of access or limited access for women to sources including (fields, job, capital and training) cause that their functions at production is less than men . Access to facilities, sources, designed program and projects for women and access to schools and … are in this part. Just whenever most of other legal, cultural and social issues being solved, men and women would equally access to sources and facilities. Concept of enabling at this stage is that women have equal right to access to sources at family and greater society.

3- Concientisation criteria

Women should know that their problems aren't due to their individual inefficiency and shortage but it has emerged by social system in which discriminations has become formal and acceptable issue. (Araghzadeh, 2002). This stage is more critical and important than other stages. Because women can participate at development activities not just be passive users. Women have real equality at development, just when be aware. Concientisation will help to increase women's ability to equality at participation at society. At this stage, women face with critical analysis with society and will find that what has been considered natural and unchangeable reality, is changeable. (Bakhshoodeh, 2005).

4- Participation criteria

One the most important items that this criteria has considered , is men and women's equal participation at decision making process of affairs of family at society. Men and women both should participate at process of assessment needs, designing, performing and evaluation of projects and development programs . In summary, this criterion means women's participation at all stages of surveying needs, detecting problems, planning, management, performing and valuation.

5- Control criteria

This criterion emphasize on this point that in addition to equal access of men and women to development sources , they must have adequate control on these sources that this issue is balance criterion , between men and women so that no one exceed other one. Women should have opportunities for decision making at workplace and home. If woman is producer, should be shared with part of her interest and wage. Women like men, should be able to choose her individual and social field and able to make decision and also development activities should be facilitator of these processes(Kar, 2000).

FAO (food and agricultural organization) addresses these three purposes as strategic goals while enabling women:

1- equality between men and women to access production sources

2- women's participation at policy and decision making

3- decreasing rural women's workload and increasing job opportunity and income for them

within theoretical framework of enabling women , having control on sources is presented as highest stage at women's participation process on development , but existing data at most developing countries , indicates that not only rural women haven't any control on financial resources of family but even they were deprived to access to sources and credits , specially through formal credits system(Farghdan, 2001) .

The question that arises here is that what relation is there between enabling women and micro-credits programs? Nowadays, micro-credits are considered as effective mechanism to eradicate poverty for women. Interests of micro-credits further increasing women's income, include:

- improving women's role in family

- Increasing women's confidence, not only through obtain financial success through business activity, but through increasing women's access to social services and communication with other women.

- Changing at social level (social class) at perspective of women's role.

Conclusion:

Woroniuk Schalkwyk (1998) at their conducted research believe that now, micro credits, micro finance sources and small business unites are most effective mechanism to decrease poverty.

Plitt and others, conducted research as they called it "do credits programs, can empower women "? Results showed that corporation at credits programs helps empowering women.

Goetz Sengupta (2003), presented negative image of credits effects on empowering women. They concluded that most women have minimum control on their loans. And when repayment period is short, this shortage of control has devastating effects on women welfare.

Hashemi and others (2004) found that joining to Gramin Bank, has meaningful positive affects on controlling women, and helps to family income.

In researches that conducted by Nanda (2004) became clear that women participation in credits programs had positive affects on their demand about health care.

Fiona Steele and etal (2008) in researches that conducted as called " influences of credits programs

on empowering women at Bangladesh , found that women who joined to credits programs , have participated in more educational programs and have married with more educated men and also they have saved more and they had more cash .

Ellen and her colleagues (2009) used approach called it "credits and education at Bolivia, Ghana, Honduras, Mali and Thailand". This approach looks for empowering women through financial services with education. In this approach, women get familiar with importance of credits through education and extension and also familiar with ways to access it through establishing different groups.

Shahnaj and chaudhury(2009) in research as "credits and its role on empowering women " concluded that there is meaningful relation between attending in credits programs and empowering women , at economical dimensions .

Ruhal amin and others (2010) found that those who joined credit funds had more ability rather than those who didn't.

Jameela (2010) presented that credit programs has shown lot of affects on empowering women so that has increased their social, politic and economic ability.

Thus it is obvious that credits programs and its educational and empowering programs can be affective on social, humane and economic development or rural society, if it be associated with proper and gradual practices and base on reciprocal communications principles and apply opinion of local society(Bahar, 2001).

Maybe the main challenges that threaten credits associations , is lack of necessary emphasizes on social dimensions and on reinforcing their basics , that practically cause that this social foundations lose its efficiency soon and practically changed to unsuccessful institution .

In order to overcoming dominant consideration, experts believe that we should consider following in protection process of these social institutions.

- establishing and reinforcing through supporting without ant direct government involvement
- evaluating and constant modifying of financial management mechanisms
- improving organization effectiveness
- establishing constant relation and interaction with similar and equal systems.
- establishing local , regional and national networks
- establishing support and cover systems in order to decrease risk

- establishing balance and interaction with financial systems greater decision making include: capital market (local, regional, national) and governmental.

also following suggestions have been offered:

- helping to marketing and establishing many exhibitions for member's productions, credit programs, guiding and training them in line with group and workshop activity, can assist them on economic empowerment.
- since women have pointed to education deficiency as major barrier for empowering them , thus educating rural women at the field of exploiting different credits and channels of receiving credits , and also various educations , is so that lead to enabling them , that contain considerable importance.
- providing extension educations for men in order to believe economic role of their women , and give them chance of corporation on all economic , credits fields
- Since that base of credit association, forms base on People Corporation, so it's good chance to use these communities to expand extension-education activities. so it is better to consider special programs on different extensional filed such as agriculture , ranching , family health , housekeeping economy and other fields accordance to condition of region and rural women's needs .

- it is suggested that vast and exact programming happens at following fields:

    a- extending insurance, facilities for amenities

    b- educating women about awareness of their own individual and social rights

    c- persuading rural women about importance of participating at cooperatives   and other educational institutes

    d- educating women about job management and income management

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New Look to the indigenous knowledge in rural

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Abstract: Indigenous knowledge is set of all knowledge and skills that people enjoy in one geographical area (in one environmental conditions) that most of their skills and knowledge be transmitted to next generation , and new generation would be adapted with them and add to it . The lack of indigenous knowledge about indigenous practices in many technologies in the developing countries will lead to failure. So attention to indigenous knowledge as a knowledge that is result of many thousand years experience is important in development of villages. Rural benefactors, the people who had communion in development of villages, can take efficient steps in rural development if they pay attention in the process of rural schematization for its development. Indigenous knowledge has different aspects, such as hygiene and treatment, medical plants, linguistics, livestock and agriculture, art and mystery and unprofessional things. Indigenous knowledge is local knowledge that is restricted to one specific culture and/or certain society. Indigenous knowledge is different with scientific knowledge that was established by universities and scientific communities. This knowledge is basis for decision making at field of agriculture, health, education, food and natural sources.
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Introduction:

During 1950 and 1960 decades, native (indigenous) knowledge was an inefficiency and absolute barrier for development. Nevertheless, now indigenous knowledge is recognized as a basic source. Indeed this knowledge was an answer to failure of great developmental theories by great countries and it was as a technical oriented solution for changing most peasants and farmers view in the world. (Agrawall, 2002).

Since, each knowledge is consequent of individual interaction with environment, so indigenous knowledge is consequent of indigenous people interaction with their environment. Chambers with emphasis on people's role at development process believes that "rural people's knowledge" term is more eloquent than other terms for indigenous knowledge. Our purpose of rural people are producer farmers , input buyers , agriculture production sellers and etc. "people" in above phrase emphasis that this knowledge is more verbal and less has been written . This word also referred to whole knowledge system which contains concepts, beliefs, and attitudes and also contains gain, store and transmitting knowledge process (Rajasekaran, and Babu, 1996).

Indigenous knowledge of each nation has enabled them to supply their needs from natural sources without reducing these sources. So, indigenous knowledge collection of world is valuable source of practices and time-tested tool that would be useful for sustainable development of all societies. At third world countries, unconsidered triumph of world development policies has led to various social, economic, cultural and environmental issues (Agrawal, 2002). Imbalance population growth, non-sustainable efficiency of natural sources and unequal distribution of resources, goods and services made involved societies in confusing issues and impasses. In these countries , inappropriate sampling of abroad countries and inordinate imports (e.g. heterogeneous and non-indigenous technology) devastated independent collection of micro local systems , and instead has established heterogeneous and dependent system to global economy system , that obviously couldn't supply people's needs. Since , this development process is formed without considering social , cultural and environmental consequents so isn't continuing and human have to find strategies which can make development sustainable and humane(Popzan, 2002) .

Comparison of native and modern knowledge

Native knowledge is different from modern knowledge in some cases that we will explain them as follow:
- Modern knowledge is reductionism (atomistic) but native knowledge is holist
- Native knowledge is reductionism (atomistic) and modern knowledge is holist
- By using native knowledge we can reach to a sustainable agriculture and modern knowledge doesn't have this feature.

- Government organizations have known native knowledge unreliable but modern knowledge is supported by scientific organization and institutions.
- Native knowledge is available for rural people but modern knowledge is not (Rajasekaran and et al, 1996).

Compilation of native and modern knowledge:

Many experts believe that for making a sustainable development, native and modern knowledge should be combined. Nowadays, so much efforts have done to make use of native knowledge but main part of these efforts were done for derivation and making it scientific (Burger, 1997).

Amiri Ardakani and Shah vali (2003) believe that the undesirable outcomes of development on people and rural environment is the result of using new science by scientist, so by blending and making relation between modern and native knowledge we can solve this problem.

Millar believe that by combining native and modern knowledge we can make trust between researchers and rural people, because by using this way researchers and rural people know themselves as a partner that are responsible for a common process and product. Millar believe that the trust is the reason for future development (Penny, 2001).

Experts believe that there is no way to reach sustainable development except to combine native and modern knowledge.

Native and modern knowledge will complicate when:

1- We solve structural barriers such as political, economical, cultural and social difficulties.
2- We correct the thoughts on educational systems by emphasizing on learning and thought process and also correct the thoughts on research systems by emphasizing on audience and beneficiaries needs.
3- We solve communication barriers that cause inactivity on relation process and steady and dynamic flow of knowledge between peasants, experts and scholars. (Emadi and Amiri Ardakani. 2004).

Nowadays, making scientific native knowledge in agriculture had devoted important part of native knowledge researches to itself. Creation forestry cultivation system which is taken from indigenous exploitation pattern in forested region is the result of making scientific native knowledge. Stimulus cultivation of fruit trees with other production was usual by farmers in developing countries from one hundred years before (Louise, 2000).

Environmental problems because of forest destruction, made scientist interested to use of forestry's methods and ways and forced them to make these ways scientific. Scientist had specified the physical and biological compatibility between different species and it is output according to laboratory studies and has identified compatible trees and productions. Then they supplied package sets by new title such as forestry cultivation, multi-cultivation and ecological agriculture systems and give them to farmers in commercial and formulated packages. Making native knowledge scientific is meaning to find its efficiency scientific reasons. In the process of making native knowledge scientific, most of the experts and researchers are not aware of cultural aspects of ways and native methods. If derivation of native knowledge and making it scientific was without attention to cultural aspects and governing values on indigenous society, it couldn't be acceptable among native people.

Experiences show that native people would not accept methods which are not compatible with their belief and needs even if it had had scientific bank roll (Emadi and Abbasi, 2001).

Features of indigenous knowledge

Some of these features are as follow:

Indigenous knowledge is holistic: indigenous knowledge is gained by sense and inspiration force and leads information unity. In spite of formal knowledge that is aural, visual and analytic.

Indigenous knowledge is verbal: writing and documenting indigenous knowledge would make it out of reach of villagers who can add to it, if it would not follow applied activities.

Indigenous knowledge is practical: it is possible to write about indigenous knowledge but it is impossible to educate and learn it through books and articles. Only way to learn it is close view and follow professor.

Indigenous knowledge isn't explanatory: it isn't possible to expect one master (e.g. mason, apothecary, farmer) to explain his method efficiency in a way that is apprehensible to us (literate people)

Indigenous knowledge is local: villager's knowledge has formed in itself environmental and climate framework. Effective indigenous knowledge at one geographical area isn't necessarily effective at other area (Nowroozi, A and Alagha, 2000).

Indigenous knowledge is general : while, formal knowledge emphasis is on saving time and removing ideas and also monopoly of knowledge at universities and research institutes , but indigenous knowledge is , receptive , incentive and needs to more people's participation at learning , developing and add to it. Furthermore, in verbal cultures, it is impossible to

separate science from world and even include it to computer and book. Every human are important in indigenous knowledge.

Indigenous knowledge is deteriorating quickly: by every death of old indigenous people, great knowledge resources would be lost also, so every action toward gathering indigenous knowledge is necessary.

Learning by doing: repeating action in order to sustain and enforce indigenous knowledge through "learning by doing" is one of features of indigenous knowledge in real operation environment (Emadi and Abbasi, 2001)

Villager's knowledge and especially indigenous knowledge systems have various dimensions that is include linguistic knowledge, zoology, ecology, climate, agriculture, ranching and professional skills. Range and value of this knowledge hasn't been considered. Four aspects of various dimensions of rural knowledge were selected and were analyzed, In order to change attitudes and reformer's behavior of rural development. These dimensions are: agriculture operations, rural knowledge about nature, rural people's aptitudes and abilities and their experiences (Razavi, 2002).

In Chambers' opinion , indigenous knowledge or rural knowledge has various dimensions that he classified them to four parts in order to explain more and better about diversity of indigenous knowledge that are as follow : A: farming activity ; B: knowledge in relation to nature ; C : indigenous people's aptitude and ability ; D: indigenous people's test . indigenous people's knowledge originated from exact viewing of environment; since indigenous villagers have direct contact with phenomenon and also see all different processes at nature so have especial aptitude and ability compared to outside people . Maybe least known aspect of indigenous villager's knowledge is essence of tests that they do which maybe these tests are available to choose "bests" and some other for "minimizing risks" (Dewes, 1998).

Characters of indigenous knowledge :

The characters of indigenous knowledge like the definition of this knowledge are presented by experts in different ways which we will explain about them as follow:

1- it is based on experience:
Indigenous knowledge is the result of people's experience during many centuries.

2- it was tested during centuries by working on it.

3- it is compatible with indigenous environment and culture:
Indigenous knowledge was created through native societies and it was formed according to their needs

and during time the things which were not compatible with indigenous environment were omitted, so what was remained was compatible with the environment and culture of that society (Amiri Ardekani and 2003).

4- it is dynamic and is changing:
Simultaneously with changing indigenous culture, the indigenous knowledge was changing too.

5- the knowledge of rural people was not technical:
This knowledge was consisted of rural people's wishes, values and preferences.

6- the rural people's knowledge is not statistic:
This knowledge was formed according to people's culture, social and economic history. The history which was written by these rural people shows that their manner and activities were efficient in changing of their conditions.

7- rural people's knowledge is not enough.
Maybe the rural people are knowledgeable but they like to know more and more. Because they want to be powerful in their discussions with political, economical and social forces who made these people poverty before give them technology (Zare and Yaghoubi, 2003).

8- rural people's knowledge has root on their political economy and is more important in political field.
 The advantages that rural people can get from indigenous knowledge are the knowledge that is created and released locally and is on their authority and also depends on main factors in regional politic economy (land distribution, marketing relations, and vertical links and …). So improvement of their livelihoods depends on interferences which were made to pervade on these main factors.

9- most of the rural people are public-oriented
Mostly, they have a little information about many things which is in contrast with academic educations. Specialist people in universities have deep knowledge in little fields (of course some of these native people are specialist too) (Razavi, 1999).

10- indigenous knowledge systems are holist:
Local people consider the other people's problems as their problems and try to solve these problems in a whole frame with using their knowledge.

11- indigenous knowledge systems combine the culture and religious believes.
Religious believes as a part of indigenous knowledge are not separated from technical knowledge and these believes effect on people' do and don't

12- indigenous knowledge systems prefer the less risk to most profit
Escaping of risk is important for native people, for example a native person usually keeps some goats for

possible cases such as disease of his children and he and he didn't expect any incomes of these cases.

Conclusion and discussion:

not only attendance of indigenous knowledge is necessary for applied researches but is important at compatibility researches and it enforced importance of attending to indigenous people and their knowledge. Therefore , applying affective strategy for transmitting technology has been among from affective fields at attending to indigenous people's knowledge and especially experts; because, development institutes realized positive their affects for doing this more than ever (Merrewij 1998) .

Indigenous knowledge has been manifested at sustainable process and improving extension programs at industrial countries of world, very well. Indigenous knowledge related to agriculture, medicine, food and architecture has been widely used At European countries, USA, Canada, Australia, by new names.

 At one research as a name of "analyzing position of indigenous knowledge at sustainable rural development" that was done by Buzarjomhore (2005) it was signified that although there are some differences between indigenous and formal knowledge, but they should not be compared, because they are complementary of each other and it is possible to gain successes by synthesizing them that is impossible lonely. Base on new paradigms of rural development in order to solve rural problems, we should first refer to indigenous solutions and if it was working, then we should reinforce it; if not we should test and use outside solutions. Findings of one research done by Emadi and Amiri (2004), as "Synthesizing indigenous knowledge and formal knowledge as necessity for accessing to sustainable rural development", has shown that dominated belief among educated groups toward natives and their knowledge is precondition of every interaction, synthesis and relation. Creating revolution in formal education systems in order to attending empirical knowledge area is considered as one of main necessity of this synthesis that is outcome of years of researches. Researchers attention to "exploiter's accumulated experimental and historical wisdom" is one of other necessities of this revolution by using cooperative, qualitative and filed methods. Also, applying mutual extension ways and creating revolution at communication system between governmental, education-extension centers and farmers and rural people so that they be interacting, was considered as precondition and necessities. At researches as "indigenous knowledge at development process" done by Karimi (2003) , findings show that indigenous knowledge is principal factor and main

source at the field of research of sustainable development , decreasing poverty , enabling local men and attracting their participation at activities and rural development programs , developing and producing appropriate technology , self-reliance of rural societies and country.

 So, effort and national commitment and multi-dimensional support is very critical for recording, valuing, extending and exchanging this rich source and also preparing mechanism and practical strategy for synthesizing this knowledge with new knowledge and agricultural development programs.

Agricultural extension was identified as one powerful IT focused area, due to role variation at knowledge system and agriculture information at one hand and at the other hand due to its dependence on various exchanges among farmers, that can has great affect on rural society and developing agriculture. So that work and productions of farmers would increase by farmer's access and use of Internet and subsistence farmers at all over the world are at developing by gaining needed knowledge and information that during time would becoming as commercial producers. Transmitting from system-cycle source of agriculture to technology-cycle system of agriculture placed more responsibility on agricultural extension because agriculture extension system is as vital technology transfer crossing to farmers at one hand and as crossing for referring feedbacks, needs and agriculture issues, researchers and policy makers of market.

What that is obvious is that extending and researching agriculture can help to sustainability through close relation to farmers , attending to their experiences , gaining their information and logical understanding of agriculture activities , attending to their vital needs for doing "demand-base" researches and extension education efforts for developing agriculture , at process of improving agriculture development.

 On the research which was done by Bozarjomhari (2004) with this title "analyzing native knowledge position on rural sustainable development". It was specified that although there are many differences between native and modern knowledge but they are not in contrast with each other, because they are each other's supplement and we can't be success when we use them separately. According to new parameters in rural development, for solving rural problems, at the first we should use of native solutions and if it was not efficient, we can use and test external solutions.

 Research findings which was done by Emadi and Amiri (2004) with this title " compilation of native and modern knowledge is necessary for reaching agriculture sustainable development" signify that The believe of educated people to native people and their

knowledge " precondition for making them close" is called combination and compilation. Making evolution in modern system for attention to tentative knowledge is the main necessity for this compilation. Another necessity for this evolution is the researcher's attention to experimental accumulated wisdom and historical exploit by using qualitative and communion methods. Also applying compilation methods and making evolution among government, educational centers, farmers and peasant is the necessity and pre condition for combination of modern and native knowledge.

Research findings that was done by Karimi with this title " native knowledge in development process" signify that native knowledge was a essential element and important source for realization of sustainable development, poverty reduction, making local people capable and motivate them to participate in activities for agriculture and rural development, developing and product suitable technology, rural society's self-reliance and self sufficiency. For this reason all side's try, partnership and protection for record and registration, compatibility, distribution and promotion , exchange of this resources and also suitable and scientific guidelines for compilation of this knowledge with new knowledge and rural and agricultural development plans are needed. Although native and modern knowledge are different from each other in their nature and usage, but it doesn't mean that they are in contrast with each other. Experience shows that not only native and modern knowledge are not in contrast with each other, but also they are suitable supplement in agriculture and rural development for providing developmental needs.

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Effect of Mineral and Organic Nitrogen Fertilization and K-Humate Addition on Soil Properties (Orchard Field Experiment)

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Abstract: This study was carried out through two successive seasons (2008 and 2009) in a private orange orchard in Qalubia governorate, Egypt in a three years old Navel orange trees budded on sour orange rootstock on clay loam soil (Typic Torriorthents). Planting distance was 2.5×5.0 meters apart and flood irrigation was used by river Nile water. Two nitrogen rates were used 150 and 300 g N/tree/year in three form, 100% mineral nitrogen (M.N.) as ammonium nitrate, 100% organic nitrogen (O.N.) as compost and mixed 50% M.N.+ 50% O.N. each of these treatments with or without K-humate addition (6 kg/feddan). All fertilization treatments were divided into equal five doses added every two months from February to October during the two seasons. The obtained results showed that soil pH values increased significantly with treatments of O.N. and mixed N form. Soil saturation percent increased significantly with organic nitrogen treatments. The highest value of soil organic matter content was obtained with treatment of 300g N/tree/year in organic form and with addition of K-humate (4.7%). There is not clear role of humic acid at 6 kg/feddan on the soil organic matter content. Total soil N content recorded higher significant values with the nitrogen addition as organic form compared with mineral form. Regarding to the N rate treatments of 300 g N/tree/year gave higher significant total soil N content than of 150 g N/tree/year. The treatment of organic nitrogen form at 300 g N/tree/year with K-humate addition had highest significant soil available P and K compared with all other treatments in both seasons. In spite of the content of K-humate of K was 7%, there is no stable trend for the K-humate application for the two seasons. There were inconstant trends in soil available Ca, Mg, Fe, Mn and Zn.
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Key words: Ammonium nitrate – Compost – K-humate – Navel orange – Nonbearing trees – Soil characteristics – Soil mineral content.

1. Introduction:

The typically low natural levels of soil organic matter in arid regions such as Egyptian and Mediterranean often are lowered by inappropriate agricultural practices, which negatively affect crop yields and increase the risk of erosion and desertification in these areas (Caravaca *et al.,* 2002 and Senesi *et al.,* 2006). Nutrient availability is one of the major factors influencing the suitability of organic substrates for growing plants (Caballero *et al.,* 2007) which may depend not only on their elemental composition, but also on other factors affecting nutrient forms and dynamics such as adsorption capacity, pH, biological stability of the growing medium and presence of dissolved organic compounds. Melero *et al.* (2007) found that the total organic carbon, humic acids content, microbial biomass and enzymatic activities increased with organic fertilization, which indicate an improvement of soil fertility through organic fertilization. Also their results hold the importance of the incorporation of organic management and crop rotation to improve the quantity and quality of organic matter in dry-land and especially in Mediterranean soil, which are characterized by low organic matter content. In

addition, there was an increase of quantity and activity of microbial biomass, aspect of great importance in organic matter turnover and nutrients availability in studied clay soils, which is characterized by its low mineralization rate with respect to other type of soil such as, sandy soil. Mylonas and McCants (1980) showed that the important and beneficial effects of humic substances on plant growth. Shiralipour *et al.* (1992) recorded that The organic matter content of compost is high and its addition to soil often improves soil physical and chemical properties and enhances biological activities. Most agricultural benefits from compost application are derived from improved physical properties related to increased organic matter content rather than its value as a fertilizer. Compost provide a stabilized form of organic matter that improves the physical properties of soil by increasing nutrient and water holding capacity, total pore space, aggregate stability, erosion resistance, temperature insulation and decreasing apparent soil density. Application of compost improves the chemical properties by increasing cation exchange capacity and soil nutrient content.

The above facts advert that the important of organic fertilizer applications but regret the limited availability of organic matter resources traditionally employed in agriculture, such as manure, can not satisfy the current soil requirements. A new sources are being experimented among these sources, humic acid, which is rich in organic matter (Fernandez *et al.,* 2009). Roan *et al.* (2006) recommended heavy dose of organic matter to increase the available nutrients content of soils.

The main objectives of this work were (i) to determine the effect of mineral and organic sources of N fertilizer on the soil characteristics (ii) to evaluate the effect of humic acid application and its cumulative effect with compost applications on properties of soil.

2. Materials and Methods:

This study was carried out in two successive seasons (2008 and 2009) in a private orange orchard in Qalubia governorate Egypt. Three year old Navel orange trees budded on sour orange rootstock were used. The soil was characterized by: pH = 7.55, ECe =1.66 dS/m, organic matter = 2.18%, CaCO3 =1.7%, Sand = 31%, Silt = 36% and clay = 33%, The soil texture class was clay loam (Typic Torriorthents). Flood irrigation system was used. Planting distance was 2.5×5 meters apart. Nitrogen fertilizer was added at two rates (150 and 300 g N/tree/y) as treatment of mineral type (ammonium nitrate 33.5% N), organic type (compost) and mixed (50% M.N + 50% O.N) with or without K-humate (humic acid, Power Humus, Humintech Co., Germany) addition at rate of 6 kg/feddan. Compost was characterized by: Humidity =20%, Salts = 3.0%, pH = 8.7, Organic matter = 37.5%, Intinisity = 1.2 g/cm^3, N = 1.9%, K = 2.1%, P = 0.52%, Fe = 944 mg/kg, Zn = 58 mg/kg and Mn = 473 mg/kg. K-humate was characterized by: organic matter = 87.5%, N = 0.8%, P = 0.16%, K = 7%, Zn = 20 mg/kg, Fe = 500 mg/kg and Mn = 125 mg/kg.

Treatments were as follow:

1- 100 % M.N at 150 g N/tree/y;
2- 100 % M.N at 150 g N/tree/y + K-humate;
3- 100 % M.N at 300 g N/ tree/y;
4- 100 % M.N at 300 g N/tree/y + K-humate;
5- 100 % O.N at 150 g N/tree/y;
6- 100 % O.N at 150 g N/tree/y + K-humate;
7- 100 % O.N at 300 g N/tree/y;
8- 100 % O.N at 300 g N/tree/y + K-humate;
9- 50 % M.N + 50 % O.N (at 150g N/tree/y);
10- 50 % M.N + 50 % O.N (at 150g N/tree/y) + K-humate;
11- 50 % M.N + 50 % O.N (at 300g N/tree/y);
12- 50% M.N + 50% O.N (at 300g N/tree/y) + K-humate.

All fertilization treatments were divided into equal five doses and added every two months from February to October during the two seasons. The treatments were arranged in a randomized complete block design in a factorial experiment (three factors the first is the form of nitrogen, the second is application rate and the third is with or without addition of humic acid) with five replicates for each treatment and each replicate was represented by one tree.

Soil sample were taken from rizosphere (20 cm from soil surface) at the end of both seasons, air dried and kept in plastic bags for analysis. All soil properties were determined according to Page *et al*. (1982). Soil pH was determined in 1 soil : 2.5 water suspension. Electric conductivity (EC) was determined in soil saturation extract. Organic carbon was determined by Walkley and Black method. Soil total nitrogen was determined by MicroKjeldahl method. Soil available P was extracted by Olson's method. Available K, Ca and Mg in the soil were extracted by 1 N ammonium acetate and available Fe, Mn and Zn were extracted by DTPA extractant. Nitrogen was determined by MicroKjeldahl method. Phosphorus was determined colorimetrically by spectrophotometer (Lambda 1A, Perkin Elmer, Inc., MA, USA), using the ascorbic acid method. Potassium was determined by the method of the flame photometer (JENWAY, PFP-7, ELE Instrument Co. Ltd., UK). Calcium and magnesium were determined by titration against versenate solution. Iron, zinc and manganese were estimated by using Atomic Absorption spectrophotometer (Varian Spetra AA20, Victoria, Australia). The above elements were determined according to Page *et al.* (1982).

Data obtained throughout this study were statistically analyzed using the analysis of variance method as reported by Snedecor and Cochran (1980) and the differences between means were differentiated by using Tukey's multiple range test.

3. Results and Discussion

As shown in Table (1) all factors and its interactions significantly affected soil pH in the first season. Organic N at 300g N/tree/year without K-humate then organic N at 150g N/tree/year with K-humate then organic N at 150g N/tree/year without K-humate treatments had the highest pH values (Table, 1). For the second season data in Table (2) revealed that the nitrogen form and the double interaction between nitrogen form and rate as well as between nitrogen rate and K-humate addition recorded significant effects on soil pH value. Whereas, the higher pH values were recorded with treatments of organic and mixed forms than that of

mineral form. Double interaction between nitrogen form and rate showed that the higher value of soil pH was recorded with organic at 300g N/tree/year and lowest one for mineral form at 300g N/tree/year. For The interaction between nitrogen rate and humic acid addition, it is cleared that the highest pH values were recorded with 300g N/tree/year without humic acid addition.

It could be noticed that, the ranges between the values of soil pH for all treatments in the two seasons were 7.25 to 8.11. No constant trend effect for humic acid addition on pH value was recorded. The increment of pH value with organic matter treatment could be due to ammonia release during degradation of organic matter and which had alkaline effect. The increase in soil pH with compost application was recorded by Roan *et al.* (2006) and Warman *et al.* (2009).

Data of the electric conductivity of soil saturation extract (EC) for the first season was affected significantly with all treatment factors and its interaction as shown in Table (1). The highest values were recorded for mineral N at 150g N/tree/year with K-humate then mineral N at 150g N/tree/year without K-humate, mineral N at 300g N/tree/year with K-humate and mixed N at 150g N/tree/year without K-humate treatments. Data shown in Table (2) showed that soil EC values for the second season were affected significantly by nitrogen rate, humic acid addition and their double interaction. The increment of soil EC was cleared in the interaction between nitrogen rate and K humate, the highest value was recorded with 300g N/tree/year with humic acid addition. The increment of EC values could by deduced to addition of organic or mineral fertilizers. This increment didn't affect on the tree growth because the highest value not increased up to 3.1 dS/m (Table, 2), in spite of it must be taken in consideration the leaching requirements to prevent salt accumulation in rizosphere. The same results were found by Madejon *et al.* (2001). They studied the effect on chemical properties of a Xerochrept (Cambisol) soil after 2 year of compost application. A slight increase of soil salinity was observed in the compost and in the fertilizer treatments. Nevertheless, this increase did not case sodium hazard to the soil.

Soil saturation percent affected significantly by nitrogen form only where organic nitrogen form had highest value (Tables 1 and 2 for the first and second seasons, respectively). This increment could be due to addition of organic matter that had high water holding capacity. Shiralipour *et al.* (1992) recorded that the organic matter content of compost is high and its addition to soil often improves soil physical and chemical properties and enhances biological activities. Most agricultural benefits from compost application to soil are derived from improved physical properties related to increase organic matter content rather than its value as a fertilizer. Compost provide a stabilized form of organic matter that improves the physical properties of soil by increasing nutrient and water holding capacity, total pore space, aggregate stability, erosion resistance, temperature insulation and decreasing apparent soil density.

Data in Table (1) showed that the form of N and the application of K-humate and the interaction between them affected significantly on the soil organic matter content for the first season. Where, the treatments of organic N with K humate had the highest soil organic matter content as shown by Tukey's multiple range test. For the second season (Table, 2) soil organic matter content had affected significantly by nitrogen rate and form and K-humate addition and their interactions. The highest value was obtained with treatment of 300g N/tree/year in organic form and with addition of K-humate (4.7%). The other treatments either with or without K-humate addition had no significant differences on the 150g N/tree/year in organic form with K-humate addition treatment (Table, 2). This denoted that there is not a clear role of humic acid at 6 kg/feddan on the soil organic matter content. Madejon *et al.* (2001) found that soil organic matter increased in soil treated with compost when compared with control and mineral fertilizer treatments.

All main factors and the interaction between N form and the K-humate treatments affected significantly on the soil $CaCO_3$ content for the first season as shown in Table (1). Treatments of mineral N form with K-humate, organic N form without K-humate, mixed N form without and with K-humate had a higher $CaCO_3$ content than the treatments of mineral N form without K-humate and organic N form with K-humate (Table, 1). For the second season soil calcium carbonate content was affected by nitrogen form and rate as well as the interaction between nitrogen form and humic acid addition. Organic nitrogen form without humic acid addition treatments recorded the highest value of calcium carbonate. Whereas, the increment in calcium carbonate was not more than 0.26% (Table, 2). This increment may be due to the source of compost and its content of calcium carbonate.

Total nitrogen content in the soil for the first season ranged from 0.11 and 0.17% (Table, 3). It affected significantly with the N form, rates and their interaction. The highest N contents were for 300g N/tree/year as mineral, organic forms and 150g N/tree/year as organic form treatments. Analysis of variance in Table (4) showed that the total soil nitrogen content for the second season affected

significantly by form and rate of nitrogen application. Multiple range analyses test revealed that, the nitrogen type addition as organic form recorded higher significant soil nitrogen content compared with mineral type. Regarding to the N rate treatments of 300g N/tree/year gave higher significant total soil N content than of 150g N/tree/year. The highest total soil nitrogen content with organic nitrogen type may be attributed to slow release and leaching of organic nitrogen than that of mineral type which easy to leach with drainage water. All treatments gave lower soil nitrogen content than optimum level as recorded by Landon (1991). The above results were in agreement with Madejon *et al.* (2001). They reported that organic fertilization increased the N content of the soil when compared with control and inorganic fertilizer treatments.

Available phosphorus content was affected significantly by all studied factors and their interaction as reveal analysis of variance for the first and second seasons (Tables 3 and 4). The treatment of organic nitrogen form at 300g N/tree/year with K-humate addition had the highest significant soil phosphorus content compared with all other treatments for the two seasons. Also it could be noticed that the treatments with organic and mixed nitrogen form for the second season (Table, 4) gave the same values from statistical stand point. They gave critical available soil phosphorus content except the treatment of 300g N/tree/year which recorded optimum level of available soil phosphorus content as recorded by Landon (1991). The increment of soil phosphorus content may be due to addition of compost. Canali *et al.* (2004) reported that compost and poultry manure increased soil potentially available nutritive elements to crops.

All factors, N form, rates and K-humate addition and their interactions affected significantly on the soil available K for the two seasons as showed in Tables (3 and 4). The highest significant soil potassium available content was recorded by treatment of 300g N/tree/year in organic form with K-humate addition for the two seasons. The availability level of soil K was optimum for all treatments as noticed by Landon (1991). In spite of the content of K-humate from K was 7%, there is no stable trend for the K-humate application for the two seasons. It may be due to the inadequate K-humate rate, where the application rate was 6 kg/feddan as commercial recommended amount.

The effects of the all treatment factors and their interaction on the soil available Ca, Mg, Fe, Mn and Zn for the two seasons were illustrated in Tables (3 and 4). There were inconstant trends in soil available Ca, Mg, Fe, Mn and Zn. It could be noticed that all treatments had optimum level on soil available Ca and Mg content. Soil available levels ranged from 593 to 724 mg/100g and 105 to 124 mg/100g for the first season and 846 to 961 mg/100g and 102 to 161 mg/100g for the second season for Ca and Mg, respectively. But the available contents of Fe, Mn and Zn were insufficient levels for all treatments. The ratio between Ca and Mg was higher than 5:1 which decrease soil phosphorus availability and the higher ratio of K to Mg than 2:1 cause decrement of Mg uptake (Landon, 1991).

Conclusion

The results showed that the higher pH values were obtained with treatments of O.N. and mixed forms than that of M.N. there is no constant trend for K- humate addition on pH values. Soil saturation percent increased significantly with organic nitrogen treatments. The highest value of soil organic matter was obtained with treatment of 300g N/tree/year in organic form and with addition of K-humate (4.7%). The other treatments either with or without K-humate addition had no significant difference include that the 150g N/tree/year as organic form with K-humate addition treatment. This denoted that there is no a clear role of humic acid at 6 kg/feddan on the soil organic matter content. Total soil N content recorded higher significant values with the nitrogen addition as organic form compared with mineral type. Regarding to the N rate treatments of 300g N/tree/year gave higher significant total soil N content than of 150g N/tree/year. The treatment of organic nitrogen form at 300g N/tree/year with K-humate addition had the highest significant soil available P and K compared with all other treatments for the two seasons. In spite of the content of K-humate from K was 7%, there is no stable trend for the K-humate application for the two seasons. There were inconstant trends in soil available Ca, Mg, Fe, Mn and Zn.

From these results we recommended that mixed source of N fertilizer (50% mineral N + 50% organic N) at 150g N/tree/year is the best N fertilizer, and the application of commercial K-humate or humic acid is not recognized for the young Navel orange trees in clay loam (Typic Torriorthents) soil.

Table 1. Analysis of variance and multiple range test of some characteristics of soil treated with different forms and rates of N and K-humate in the first season.

Source of variance		pH 1: 2.5	EC Soil paste dS/m	Saturation Percent	Organic Matter %	CaCO₃
Analysis of variance						
N forms		***	***	***	***	***
Rates		***	***	NS	NS	**
K-humate		***	***	NS	***	**
N forms X Rates		***	***	NS	NS	NS
N forms X K-humate		***	***	NS	***	***
Rates X K-humate		***	***	NS	NS	NS
N forms X Rates X K-humate		***	***	NS	NS	NS
Tukey's Multiple range test						
Main effect						
N Forms	Mineral	7.46C	1.63A	53.0B	2.00B	1.90B
	Organic	7.90A	1.18C	56.7A	3.03A	1.89B
	Mixed	7.73B	1.33B	53.8B	2.20B	2.11A
Rates	150g N/tree/y	7.64B	1.47A	54.5A	2.36A	2.01A
	300g N/tree/y	7.75A	1.29B	54.6A	2.46A	1.92B
K-humate	Without	7.67B	1.30B	54.6A	2.07B	2.01A
	With	7.73A	1.46A	54.4A	2.75A	1.92B
N forms X Rates						
Mineral X 150		7.30F	1.85A	53.1A	2.00A	1.96A
Mineral X 300		7.63E	1.41B	52.8A	2.01A	1.83A
Organic X 150		7.93A	1.21CD	56.5A	2.96A	1.91A
Organic X 300		7.87B	1.15D	57.0A	3.10A	1.86A
Mixed X 150		7.70D	1.35B	54.0A	2.11A	2.15A
Mixed X 300		7.77C	1.31BC	53.6A	2.28A	2.08A
N forms X K-humate						
Mineral X Without		7.44E	1.40B	52.8A	1.85B	1.85BC
Mineral X With		7.48D	1.86A	53.1A	2.16B	1.95AB
Organic X Without		7.95A	1.10D	57.0A	2.30B	2.06A
Organic X With		7.85B	1.26C	56.5A	3.76A	1.71C
Mixed X Without		7.62C	1.41B	54.0A	2.08B	2.11A
Mixed X With		7.85B	1.25C	53.6A	2.31B	2.11A
Rates X K-humate						
150 X without		7.55C	1.46A	54.6A	2.01A	2.04A
150 X with		7.73B	1.48A	54.4A	2.71A	1.97A
300 X Without		7.79A	1.15B	54.5A	2.14A	1.97A
300 X With		7.72B	1.43A	54.4A	2.78A	1.87A
N forms X Rates X K-humate						
Mineral X 150 X without		7.25I	1.60B	53.0A	1.83A	1.86A
Mineral X 150 X with		7.35H	2.10A	53.3A	2.16A	2.06A
Mineral X 300 X Without		7.64F	1.20CD	52.6A	1.86A	1.83A
Mineral X 300 X With		7.62F	1.63B	53.0A	2.16A	1.83A
Organic X 150 X without		7.91C	1.20CD	57.0A	2.30A	2.10A
Organic X 150 X with		7.95B	1.23CD	56.0A	3.63A	1.73A
Organic X 300 X Without		7.99A	1.00E	57.1A	2.30A	2.03A
Organic X 300 X With		7.76E	1.30C	57.3A	3.90A	1.70A
Mixed X 150 X without		7.49G	1.56B	54.2A	1.90A	2.16A
Mixed X 150 X with		7.91C	1.13DE	54.0A	2.33A	2.13A
Mixed X 300 X Without		7.74E	1.26CD	54.1A	2.26A	2.06A
Mixed X 300 X With		7.79D	1.36C	53.3A	2.30A	2.10A

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.*
The same streaks within factors are not different but a value A > B > C …etc at 5% level.

Table 2. Analysis of variance and multiple range test of some characteristics of soil treated with different forms and rates of N and K-humate in the second season.

Source of variance		pH 1: 2.5	EC Soil paste dS/m	Saturation percent	Organic matter %	CaCO$_3$
Analysis of variance						
N forms		***	NS	***	***	NS
Rates		NS	*	NS	**	*
K-humate		NS	***	NS	**	***
N forms X Rates		***	NS	NS	**	NS
N forms X K-humate		*	NS	NS	*	***
Rates X K-humate		***	***	NS	*	NS
N forms X Rates X K-humate		NS	NS	NS	***	NS
Tukey's Multiple range test						
Main effect						
N Forms	Mineral	7.85B	1.6A	52.83B	2.08C	1.91A
	Organic	7.97A	1.8A	57.83A	3.26A	1.93A
	Mixed	7.96A	1.5A	54.00B	2.55B	1.84A
Rates	150g N/tree/y	7.94A	1.4B	55.27A	2.44B	1.92A
	300g N/tree/y	7.91A	1.8A	54.50A	2.82A	1.86B
K-humate	Without	7.94A	1.3B	55.38A	2.45B	1.94A
	With	7.91A	1.9A	54.38A	2.81A	1.84B
N forms X Rates						
Mineral X 150		7.92B	1.5A	53.66A	2.10B	1.90A
Mineral X 300		7.77C	1.6A	52.00A	2.07B	1.91A
Organic X 150		7.90B	1.5A	58.16A	2.78B	1.98A
Organic X 300		8.05A	2.1A	57.50A	3.74A	1.88A
Mixed X 150		7.99AB	1.3A	54.00A	2.44B	1.88A
Mixed X 300		7.92B	1.7A	54.00A	2.66B	1.80A
N forms X K-humate						
Mineral X Without		7.90AB	1.1A	53.16A	2.07C	1.91B
Mineral X With		7.79B	2.0A	52.50A	2.10C	1.90B
Organic X Without		7.99A	1.4A	59.00A	2.82B	2.06A
Organic X With		7.95A	2.2A	56.66A	3.71A	1.80B
Mixed X Without		7.93A	1.5A	54.00A	2.47BC	1.85B
Mixed X With		7.98A	1.5A	54.00A	2.62BC	1.83B
Rates X K-humate						
150 X without		7.89BC	1.5B	55.77A	2.43B	1.97A
150 X with		7.98AB	1.4B	54.77A	2.45B	1.86A
300 X Without		8.00A	1.1B	55.00A	2.48B	1.91A
300 X With		7.83C	2.4A	54.00A	3.17A	1.82A
N forms X Rates X K-humate						
Mineral X 150 X without		7.90A	1.3A	54.33A	2.07B	1.90A
Mineral X 150 X with		7.95A	1.8A	53.00A	2.14B	1.90A
Mineral X 300 X Without		7.92A	1.0A	52.00A	2.07B	1.93A
Mineral X 300 X With		7.63A	2.2A	52.00A	2.07B	1.90A
Organic X 150 X without		7.88A	1.7A	59.00A	2.92B	2.13A
Organic X 150 X with		7.92A	1.3A	57.33A	2.65B	1.83A
Organic X 300 X Without		8.11A	1.1A	59.00A	2.72B	2.00A
Organic X 300 X With		7.99A	3.1A	56.00A	4.77A	1.76A
Mixed X 150 X without		7.90A	1.6A	54.00A	2.30B	1.90A
Mixed X 150 X with		8.09A	1.1A	54.00A	2.57B	1.86A
Mixed X 300 X Without		7.97A	1.4A	54.00A	2.65B	1.80A
Mixed X 300 X With		7.88A	2.0A	54.00A	2.67B	1.80A

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.*
The same streaks within factors are not different but a value A > B > C …etc at 5% level.

Table 3. Analysis of variance and multiple range test of total N and some available macro and micronutrient contents in soil treated with different forms and rates of N and K-humate in the first season.

Source of variance		Macronutrients					Micronutrients		
		%	mg/kg		mg/100g		mg/kg		
		N	P	K	Ca	Mg	Fe	Mn	Zn
Analysis of variance									
N forms		***	***	***	***	***	***	*	***
Rates		***	***	***	***	***	*	NS	NS
K-humate		NS	***	***	***	***	NS	***	***
N forms X Rates		***	***	***	***	***	***	***	***
N forms X K-humate		NS	***	***	***	***	***	***	**
Rates X K-humate		NS	***	***	***	***	***	***	**
N forms X Rates X K-humate		NS	***	***	***	***	***	***	***
Tukey's Multiple range test									
Main effect									
N Forms	Mineral	0.14B	7.1B	258C	674A	117B	2.9A	1.7A	0.5B
	Organic	0.16A	16.7A	435A	626B	124A	2.5B	1.6AB	0.9A
	Mixed	0.13C	7.9B	296B	620C	125A	3.0A	1.5B	0.6B
Rates	150 g/tree/y	0.14B	8.3B	338A	631B	121B	2.7B	1.6A	0.7A
	300 g/tree/y	0.15A	12.8A	321B	649A	123A	2.8A	1.6A	0.7A
K-humate	Without	0.14A	9.3B	276B	636B	125A	2.8A	1.5B	0.6B
	With	0.14A	11.8A	383A	645A	119B	2.8A	1.7A	0.8A
N forms X Rates									
Mineral X 150		0.12B	5.6D	271D	662C	119C	2.6C	1.4D	0.6C
Mineral X 300		0.17A	8.5C	244E	687A	114D	3.2A	1.8A	0.5C
Organic X 150		0.16A	12.5B	426B	625C	121BC	2.5C	1.7AB	0.8B
Organic X 300		0.17A	21.0A	445A	627C	128A	2.5C	1.5CD	1.0A
Mixed X 150		0.13B	6.8D	317C	607D	122B	3.2A	1.6BC	0.7BC
Mixed X 300		0.12B	9.0C	275D	633B	128A	2.8B	1.4D	0.6C
N forms X K-humate									
Mineral X Without		0.15A	7.5D	249E	688A	118C	3.1AB	1.4C	0.5C
Mineral X With		0.14A	6.7D	266D	661B	115D	2.7C	1.8A	0.5C
Organic X Without		0.16A	11.0B	282C	616D	128A	2.5D	1.5BC	0.8B
Organic X With		0.17A	22.5A	589A	636C	121B	2.5D	1.6B	1.1A
Mixed X Without		0.12A	9.5C	297B	603E	129A	2.9BC	1.5BC	0.5C
Mixed X With		0.13A	6.2D	295B	638C	121B	3.1A	1.5BC	0.7B
Rates X K-humate									
150 X without		0.14A	8.7C	269D	625D	131A	3.1A	1.6B	0.5C
150 X with		0.14A	7.9C	407A	638C	111D	2.4B	1.6B	0.8A
300 X Without		0.15A	9.9B	283C	647B	119C	2.5B	1.4C	0.7B
300 X With		0.15A	15.7A	360B	652A	127B	3.1A	1.7A	0.7B
N forms X Rates X K-humate									
Mineral X 150 X without		0.13A	6.1CH	252DE	652C	132B	2.8B	1.4CD	0.5DE
Mineral X 150 X with		0.11A	5.1H	291C	672B	107F	2.4C	1.5CD	0.6CDE
Mineral X 300 X Without		0.17A	8.8DEF	247E	724A	105FG	3.4A	1.5CD	0.5DE
Mineral X 300 X With		0.17A	8.2EFG	242E	650C	124C	3.1A	2.2A	0.5DE
Organic X 150 X without		0.16A	12.0BC	263D	609G	142A	3.2A	1.6BC	0.7BCD
Organic X 150 X with		0.17A	13.0B	590A	641D	101G	1.8D	1.8B	0.9B
Organic X 300 X Without		0.17A	10.0CDE	301C	623F	114E	1.8D	1.5CD	0.8BC
Organic X 300 X With		0.17A	32.0A	589A	632E	142A	3.2A	1.3D	1.2A
Mixed X 150 X without		0.13A	8.1EFG	293C	613G	119D	3.3A	1.5CD	0.4E
Mixed X 150 X with		0.13A	5.5H	341B	602H	125C	3.1A	1.5CD	0.9B
Mixed X 300 X Without		0.12A	11.0BCD	301C	593I	140A	2.5C	1.3D	0.6CDE
Mixed X 300 X With		0.13A	7.0FGH	249E	674B	117DE	3.1A	1.5CD	0.6CDE

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.*
The same streaks within factors are not different but a value A > B > C …etc at 5% level.

Table 4. Analysis of variance and multiple range test of total N and some available macro and micronutrient contents in soil treated with different forms and rates of N and K-humate in the second season.

Source of variance		Macronutrients					Micronutrients		
		%	mg/kg		mg/100g		mg/kg		
		N	P	K	Ca	Mg	Fe	Mn	Zn
Analysis of variance									
N forms		-***	***	***	***	***	**	**	***
Rates		**	***	***	NS	NS	NS	NS	***
K-humate		NS	***	*	NS	NS	NS	NS	***
N forms X Rates		NS	**	**	**	***	**	***	***
N forms X K-humate		NS	***	***	***	NS	NS	**	***
Rates X K-humate		NS	*	*	**	**	NS	NS	***
N forms X Rates X K-humate		NS	***	***	***	*	NS	NS	***
Tukey's Multiple range test									
Main effect									
N Forms	Mineral	0.16B	3.8B	331B	880B	143A	3.4AB	1.1B	0.6C
	Organic	0.20A	17.9A	746A	894B	123B	4.2A	1.2A	1.1A
	Mixed	0.19AB	10.2B	609B	937A	131B	2.9B	1.1B	0.8B
Rates	150 g/tree/y	0.17B	8.1B	427B	905A	130A	3.6A	1.2A	0.9A
	300 g/tree/y	0.20A	13.1A	697A	902A	135A	3.4A	1.1A	0.8B
K-humate	Without	0.18B	8.6B	499B	902A	136A	3.5A	1.1A	0.7B
	With	0.19B	12.6A	624A	906A	129A	3.5A	1.2A	0.9A
N forms X Rates									
Mineral X 150		0.16A	3.5D	309C	896BC	154A	4.0AB	1.3A	0.6DE
Mineral X 300		0.16A	4.1D	353C	864C	133B	2.8B	0.9B	0.5E
Organic X 150		0.18A	13.2B	490C	901BC	114C	3.7AB	1.2A	1.4A
Organic X 300		0.23A	22.5A	1002A	888BC	132BC	4.6A	1.2A	0.8BC
Mixed X 150		0.17A	7.6CD	483C	920AB	123BC	3.1B	0.9B	0.7CD
Mixed X 300		0.20A	12.8BC	735B	955A	140AB	2.7B	1.1AB	0.9B
N forms X K-humate									
Mineral X Without		0.17A	3.7C	335C	860D	151A	3.5A	1.2AB	0.6D
Mineral X With		0.16A	3.8C	327C	900BC	136AB	3.2A	1.1B	0.5D
Organic X Without		0.19A	12.1B	480BC	920AB	125B	3.8A	1.1B	0.9B
Organic X With		0.22A	23.6A	1011A	869CD	121B	4.5A	1.3A	1.4A
Mixed X Without		0.19A	10.0B	683B	926AB	132B	3.1A	1.1B	0.7C
Mixed X With		0.19A	10.4B	535BC	949A	131B	2.7A	1.1B	0.9B
Rates X K-humate									
150 X without		0.17A	7.4B	422B	916A	139A	3.7A	1.2A	0.8B
150 X with		0.17A	8.8B	432B	895AB	122B	3.5A	1.2A	1.1A
300 X Without		0.18A	9.8B	577B	888B	133AB	3.2A	1.1A	0.7B
300 X With		0.21A	16.4A	817A	917A	137A	3.5A	1.2A	0.8B
N forms X Rates X K-humate									
Mineral X 150 X without		0.17A	3.3D	289C	874CD	161A	4.3A	1.3A	0.7CDE
Mineral X 150 X with		0.15A	3.8D	329C	918ABC	148AB	3.8A	1.2A	0.5EF
Mineral X 300 X Without		0.16A	4.2CD	382C	846D	142ABC	2.8A	1.0A	0.4F
Mineral X 300 X With		0.16A	3.9D	325C	883BCD	124BCD	2.7A	0.9A	0.5EF
Organic X 150 X without		0.18A	12.8BC	516BC	961A	127BCD	3.5A	1.1A	0.9BC
Organic X 150 X with		0.18A	13.7B	464C	841D	102D	3.8A	1.3A	1.9A
Organic X 300 X Without		0.19A	11.5BCD	445C	880BCD	123BCD	4.1A	1.1A	0.9BC
Organic X 300 X With		0.26A	33.6A	1559A	897BCD	141ABC	5.1A	1.4A	0.8BCD
Mixed X 150 X without		0.17A	6.3BCD	463C	914ABC	129BCD	3.4A	1.0A	0.6DEF
Mixed X 150 X with		0.18A	8.9BCD	504BC	926ABC	117CD	2.7A	0.9A	0.8BCD
Mixed X 300 X Without		0.20A	13.8B	903B	938AB	135ABC	2.7A	1.1A	0.8BCD
Mixed X 300 X With		0.20A	11.9BCD	567BC	972A	145ABC	2.7A	1.2A	1.0B

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.*
The same streaks within factors are not different but a value A > B > C …etc at 5% level.

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The Response of Nonbearing Navel Orange Trees for Mineral and Organic Nitrogen Fertilization Treatments and K-Humate Addition

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Abstract: T This study was carried out through two successive seasons (2008 and 2009) in a private orange orchard in Qalubia governorate Egypt in a three years old Navel orange trees budded on sour orange rootstock on clay loam soil (Typic Torriorthents). Planting distance was 2.5×5 meters apart and flood irrigation was used by river Nile water. Two nitrogen rates were used 150 and 300 g N/tree/y in three forms 100% mineral nitrogen (M.N.) as ammonium nitrate, 100% organic nitrogen (O.N.) as compost and mixed (50% M.N. + 50% O.N.) each of these treatments with or without K humate addition (6 kg/feddan). All fertilization treatments were divided into equal five doses added every two months from February to October during the two seasons. The obtained results showed that the highest stem thickness increment percentage was recorded by mixed nitrogen form (50% M.N. + 50% O.N.). Mixed nitrogen form with K-humate recorded the highest significant value of plant height increment percentage in the first season, but in the second season, using nitrogen form at 150g N/tree/y without K-humate recorded the highest significant value. Leaf N content had higher significant values with M.N. treatments. Leaf P content showed insignificant differences among treatments. Mixed N source at 300g N/tree/y without K-humate recorded a higher significant value of leaf K content, in the second season compared with other treatments. Leaf Ca content showed a higher significant value by organic and mixed N form treatments in the first season. Leaf Mg, Fe, Mn and Zn contents increased significantly with M.N. treatments in the first season. While in the second season leaf Fe content had a higher significant value with O.N. treatments. Leaf Mn content illustrated the lowest significant mean level by using N form at 150g N/tree/y treatment. While, leaf Zn content recorded a higher significant value with mixed nitrogen source at 150g N/tree/y with K-humate addition compared with all other treatments. From this results we recommended that the mixed sources of N fertilizer (50% M.N. + 50% O.N.) at 150g N/tree/y is the best N fertilizer, and the application of K-humate or humic acid at commercial rate is not recognized for the young Navel orange trees in clay loam (Typic Torriorthents) soil.
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Key words: Ammonium nitrate – Compost – Fertilization – K-humate – Leaf mineral content – Navel orange – Vegetative growth.

1. Introduction:

Thompson *et al*. (2002) used N rates of 0, 0.15, 0.30, and 0.45 lb N/tree/y, and fertigation frequencies of weekly, monthly, and three times per year in five years old 'Newhall' navel oranges on 'Carrizo' rootstock. They found that leaf N in all fertilized plots was above tissue critical levels. There were no significant yield differences among N rates from 0.15 to 0.45 lb N/tree and fertigation frequencies from weekly to three times per year. Menino *et al*. (2003) revealed that in a field experiment conducted in the South of Portugal with young (0-3 years old) non-bearing 'Lane Late' orange trees. The 180g N tree^{-1} over three years led to the greatest canopy width (176 cm). Strong relationships between canopy width and N, which were greater at the larger rates of fertilizer application, and strong and inverse relationships between K and Mg, also with the greatest N rates. Madejon *et al.* (2001)

reported that the application of compost significantly increased crop yield.

Fuegoson (1994) found that standard granular fertilizer and processed chicken manure applied at recommended N rates (0.48 lbs N/tree/y) to 1-year old "Hamlin" orange *C. sinensis* (L) Osb. trees on Swingle citruelo rootstock stimulated similar growth increases in stem caliper and plant height. Turan *et al.* (2009) in a comparison of several plant nutrient elements in conventionally (CON) and organically (ORG) grown citrus orchards they recorded that analysis of the samples from 2007 indicated statistically significant differences between the two groups for concentrations of N, K, Mg, B and Mn. Several trace elements (Pb, Cu, Fe, Mn, Ni and Zn) from five randomly chosen soil samples from both CON and ORG growing groups were determined, and the results indicated that the mean concentrations for the two groups were similar for

most of the elements (Pb, Cu, Fe and Ni). Their results shed light on the optimization of plant nutrient programs in organic citrus production. Canali *et al.* (2004) found that compost increased soil potentially available nutritive elements to crops.

Shiralipour *et al.* (1992) recorded that the organic matter content of compost is high and its addition to soil often improves soil physical and chemical properties and enhances biological activities. Most agricultural benefits from compost application to soil are derived from improved physical properties related to increase organic matter content rather than its value as a fertilizer. Compost provide a stabilized form of organic matter that improves the physical properties of soil by increasing nutrient and water holding capacity, total pore space, aggregate stability, erosion resistance, temperature insulation and decreasing apparent soil density. Application of compost improves the chemical properties by increasing cation exchange capacity and soil nutrient content. Alva and Obreza (1997) studied the demonstrated significant improvements in growth and Fe availability to non-bearing trees and Fe availability and fruit yield of bearing trees in high pH soils with application of Fe humate as compared to the amendments treated.

This investigation aimed to study the effect of nitrogen form (mineral and organic and their combination) at two rates (150 and 300g N/tree/y) with or without K-humate (humic acid) addition on growth and leaf mineral content of the three year old Navel orange trees budded on sour orange rootstock grown on clay loam soil (Typic Torriorthents). In order to define the suitable form and rate of nitrogen fertilizer and the important of humic acid addition at the first few years of tree planting in the orchard which induce great tree growth and optimum leaf mineral content.

2. Materials and Methods:

This study was carried out in two successive seasons (2008 and 2009) in a private orange orchard in Qalubia governorate, Egypt. Three year old Navel orange trees budded on sour orange rootstock were used. The soil was characterized by: pH = 7.55, ECe = 1.66 dS/m, organic matter = 2.18%, $CaCO_3$ = 1.7%, Sand = 31%, Silt = 36% and clay = 33%, the soil texture class was clay loam (Typic Torriorthents). Flood irrigation system was used. Planting distance was 2.5×5 meters apart. Nitrogen fertilizer was added at two rates (150 and 300g N/tree/y) as treatment of mineral type (ammonium nitrate, 33.5% N), organic type (compost) and mixed (50% M.N. + 50% O.N.) with or without addition of K-humate (humic acid, Power Humus, Humintech Co., Germany) addition at rate of 6 kg/feddan. Compost was characterized by:

humidity = 20%, Salts = 3.0%, pH = 8.7, organic matter = 37.5%, intinisity = 1.2 g/cm^3, N = 1.9%, K = 2.1%, P = 0.52%, Fe = 944 mg/kg, Zn = 58 mg/kg and Mn = 473 mg/kg. K-humate was characterized by: organic matter = 87.5%, N = 0.8%, P = 0.16%, K = 7%, Zn = 20 mg/kg, Fe = 500 mg/kg and Mn = 125 mg/kg.

Treatments were as follow:
1- 100 % M.N at 150g N/tree/y;
2- 100 % M.N at 150g N/tree/y + K-humate;
3- 100 % M.N at 300g N/tree/y;
4- 100 % M.N at 300g N/tree/y + K-humate;
5- 100 % O.N at 150g N/tree/y;
6- 100 % O.N at 150g N/tree/y + K-humate;
7- 100 % O.N at 300g N/tree/y;
8- 100 % O.N at 300g N/tree/y + K-humate;
9- 50 % M.N + 50 % O.N (at 150g N/tree/y);
10- 50 % M.N + 50 % O.N (at 150g N/tree/y) + K-humate;
11- 50 % M.N + 50 % O.N (at 300g N/tree/y);
12- 50 % M.N + 50 % O.N (at 300g N/tree/y) + K-humate.

All fertilization treatments were divided into equal five doses and added every two months from February to October during both seasons. The treatments were arranged in a randomized complete block design in a factorial experiment (three factors the first is the form of nitrogen, the second is application rate and the third is with or without addition of humic acid) with five replicates for each treatment and each replicate was represented by one tree.

The following data were recorded:
1- Stem thickness increment percentage of (10 cm above union zone) was recorded every two month from May to November.
2- Leaf dry matter percentage was calculated at the end of each season in spring flushes leaves.
3- Leaf mineral content was determined as follow:

Twenty leaves 5-7 months old from spring flushes leaves were collected randomly from each replicate. The leaf samples were washed several times with tap water then rinsed with distilled water, dried at 70°C in an electric oven till a constant weight, grounded in electric mill and digested according to Chapman and Prat (1961). Nitrogen was determined by MicroKjeldahl method. While, phosphorus was determined colorimetrically by spectrophotometer (Lambda 1A, Perkin Elmer, Inc., MA, USA), using the ascorbic acid method. Potassium was determined by the method of the flame photometer (JENWAY, PFP-7, ELE Instrument Co. Ltd., UK). Whereas, calcium and magnesium were determined by titration against versenate solution. Also, iron, zinc and manganese were estimated by using Atomic Absorption

spectrophotometer (Varian Spetra AA20, Victoria, Australia). All elements were determined according to Page *et al.* (1982).

Data obtained throughout this study were statistically analyzed using the analysis of variance method as reported by Snedecor and Cochran (1980) and the differences between means were differentiated by using Tukey's multiple range test.

3. Results and Discussion

Data presented in Table (1) showed that the stem thickness increment percentage of young Navel orange trees as affected by different forms and rates of N and K-humate addition in both seasons. Only second interaction between N form X rate always had a significant effect by analysis of variance for all 8 measurements, whereas, the K-humate application had no constant effect. The highest significant stem thickness increment percentage by Tukey's multiple range test for first season in May and July were obtained with mixed N form X 150g N/tree/y treatments (Table, 1). These increment percentages were 13.1% and 18.1%, respectively. For the second season the highest significant increment percentage in May, July and September were obtained with mixed N form X 300g N/tree/y treatments (Table, 1).

Data shown in Table (2) indicated that the leaf dry matter percentage of young Navel orange trees in the first season, without K-humate treatments gave a higher significant value than with K-humate treatments, but in the second season all data lake significance among them.

Plant height increment percentage of young Navel orange trees was significantly affected by the different forms and rates of N and K-humate addition as shown in Table (2). In the first season both the second interaction between N forms X rates and N forms X K-humate had significant effects. The highest mean of plant height increment percentage were obtained with mixed N form X 150 and 300g N/tree/y treatments. This increase was 72.0 and 69.5%, respectively. For the interaction between N form X K-humate, the highest mean increase percent was 75.5% for the treatments with mixed N form with K-humate. While in the second season all treatment factors and its interactions were recorded significant effects. For the third interaction the highest mean of plant height increment percentage were 87 and 78% for mixed N X 150g N/tree/y with K-humate and organic N X 150g N/tree/y with K-humate, respectively, (Table, 2). On the other hand, the treatment with mineral N at 150 or 300g N/tree/y with or without K-humate recorded little significant effect on plant height increment percentage. These results are in contrary with those found by Menino *et al*. (2003) concluded that using 180g N tree^{-1} over

three years led to the greatest canopy width and volume. In the same regards, Fuegoson (1994) had the same trend of these results and found that granular fertilizer and processed chicken manure nitrogen form stimulated similar growth increases in stem caliper and plant height of Hamlin" orange trees.

Data in Tables (3 and 4) generally showed that N, Ca, Mg, Fe, Mn and Zn contents in young Navel orange trees in the first and second seasons were significantly affected by N forms while N rates and K-humate application and its interactions were recorded no significant affects.

Nitrogen content of young Navel orange trees significantly increased with mineral N form application in the first and second seasons.

Navel orange trees P and K contents were not affected with N form, rates and K-humate application and its interactions in both seasons. Only the third interaction between N form X rates X K-humate for the second season had a significant effect on the K content. The treatment of mixed N form X 300g N/tree/y X without K-humate application had the highest K content (Table, 4). In spite of K-humate contain 7% K, plant K content was not affected may be due to the inadequate K-humate rate (commercial recommended amount). These results are in harmony with those found by Turan *et al.* (2009) in a comparison of several plant nutrient elements in conventionally (CON) and organically (ORG) grown citrus orchards. They recorded significant differences between the two groups for concentrations of N, K, Mg, B and Mn.

Calcium content of young Navel orange tree increased significantly for organic and mixed N treatments in the first season (Table, 3). This increment of Ca content may be due to the Ca content of compost.

Plant contents of Mg, Fe, Mn, and Zn in the first season were significantly affected by the main effect of N form (Table, 3). These elements increased significantly with mineral N treatments compared with organic or mixed N treatments may be due to decrease the soil availability of these elements by the chelation effect of compost organic matter. Manganese and zinc in the plant increased significantly with the main effect of K-humate application. In the second season (Table, 4), iron content of Navel orange trees was significantly affected with the main effect of N form and the interaction between N form X K-humate treatments. The level of mean Fe content of Navel orange ranged from 82 to 161 mg/kg for the interaction between N forms X K-humate treatments. The highest significant content was organic N with K-humate and organic N without K-humate treatment. Alva and

Obreza (1997) studied the demonstrated significant improvements in growth and Fe availability to non-bearing trees and Fe availability and fruit yield of bearing trees in high pH soils with application of Fe-humate as compared to the amendments treated. Manganese content of trees affected significantly with the N form and rates of N and the interaction between them. The level of mean Mn content of plant ranged from 17 to 26 mg/kg for the interaction between N forms X rates treatments. The lowest significant mean level was mixed N form X 150g N/tree/y treatments. Zinc content in plant was affected significantly with the interaction of N form X rates X K-humate. The highest mean level of Zn content was mixed N form X 150g N/tree/y X with K-humate treatment as shown in Table (4).

Finally it could be concluded that the highest stem thickness increment percentage was recorded by mixed nitrogen form (50% M.N. + 50% O.N.). Leaf dry matter percentage gave a higher significant value without K-humate addition than that of with K-humate, but in the second season all data recorded lake significance among them. Concerning plant height increment percentage, mixed nitrogen form with K-humate recorded the highest significant value. While, in the second season mixed nitrogen form at 150g N/tree/y without K-humate recorded the highest significant value. Leaf nitrogen content had higher significant values with mineral nitrogen form treatments. Leaf phosphorus content showed insignificant differences among treatments. Leaf potassium content, in the second season mixed nitrogen source at 300g N/tree/y without K-humate recorded a higher significant value compared with other treatments. Leaf calcium content showed a higher significant value by organic and mixed N form treatments in the first season. Leaf Mg, Fe, Mn and Zn contents increased significantly with mineral N treatments compared with the organic or mixed N treatments in the first season. While in the second season leaf Fe content had a higher significant value with organic nitrogen form treatments. Leaf manganese content illustrated the lowest significant mean level by mixed N form X 150g N/tree/y treatments compared with the other N form X rates interaction treatments. Leaf zinc content recorded a higher significant value with mixed nitrogen source at 150g N/tree/y with K-humate addition compared with all other treatments.

From these results we recommended that the mixed source of N fertilizer (50% M.N. + 50% O.N.) at 150g N/tree/y is the best N fertilizer, and the application of commercial K-humate or humic acid is not recognized for the young Navel orange trees in clay loam (Typic Torriorthents) soil.

Table 1. Stem thickness increment percentage of young Navel orange trees as affected by different forms and rates of N and K-humate addition in seasons of 2008 and 2009.

Analysis of variance		Stem thickness increment percentage							
		First Season				Second Season			
		May	Jul.	Sep.	Nov,	May	Jul.	Sep.	Nov,
Analysis of variance									
N forms		***	**	***	**	NS	***	*	**
Rates		**	NS	NS	NS	NS	***	NS	NS
K-humate		**	NS	***	***	NS	NS	*	NS
N forms X Rates		***	***	***	***	*	***	***	***
N forms X K-humate		NS	*	***	*	NS	***	***	NS
Rates X K-humate		*	NS	***	**	NS	**	***	***
N forms X Rates X K-humate		**	NS	***	NS	NS	NS	NS	NS
Tukey's Multiple range test									
Main effect									
N Forms	Mineral	9.1B	14.3B	8.3B	10.5A	8.5A	11.1B	6.0B	9.75A
	Organic	7.3C	15.1B	11.7A	7.9B	87.8A	9.2C	7.3AB	8.00B
	Mixed	12.4A	16.5A	6.2C	7.7B	9.1A	15.1A	7.7A	8.00B
Rates	150g N/tree/y	10.2A	15.2A	8.4A	9.2A	8.7A	10.7B	6.9A	8.94B
	300g N/tree/y	9.1B	15.4A	9.1A	8.1A	8.9A	13.0A	7.1A	8.22B

K-humate	Without	10.3A	15.6A	9.9A	10.0A	8.7A	12.1A	7.7A	9.0A
	With	9.0B	15.0A	7.6B	7.4B	8.8A	11.6A	6.3B	8.16A
N forms X Rates									
Mineral X 150		8.3D	11.8D	6.7C	8.6BC	8.6B	11BC	8.5AB	9.5AB
Mineral X 300		10.1C	17AB	10.0B	12.4A	8.3B	11BC	3.5D	10.0A
Organic X 150		9.4CD	16BC	12.6A	9.4B	9.2AB	8.8D	6.8BC	10.3A
Organic X 300		5.4E	14.4C	10.8B	6.5CD	8.3B	9.7CD	7.8ABC	5.6C
Mixed X 150		13.1A	18.1A	6.0C	9.9B	8.2B	12.3B	5.3CD	7.0BC
Mixed X 300		11.8B	14.9C	6.4C	5.5D	10.0A	18.0A	10.0A	9.0AB
N forms X K-humate									
Mineral X Without		9.5A	15BC	9.9BC	10.5A	8.3A	11.5C	5.5BC	11.0A
Mineral X With		8.9A	13.5C	6.7D	10.5A	8.6A	10.7C	6.5BC	8.5A
Organic X Without		8.1A	16AB	10.6B	9.6A	8.8A	11.2C	10.0A	8.0A
Organic X With		6.6A	14BC	12.7A	6.2B	8.7A	7.3D	4.6C	8.0A
Mixed X Without		13.4A	16AB	9.0C	10.0A	9.1A	13.7B	7.5AB	8.0A
Mixed X With		11.5A	17.1A	3.3E	5.4B	9.0A	16.7A	7.8AB	8.0A
Rates X K-humate									
150 X without		10.6A	15.5A	10.5A	11.7A	8.9A	10.2C	6.0BC	8.3AB
150 X with		9.9A	14.9A	6.3C	6.8B	8.4A	11BC	7.8AB	9.5A
300 X Without		10.1A	15.8A	9.2B	8.3B	8.6A	14.0A	9.3A	9.6A
300 X With		8.1B	15.0A	8.9B	7.9B	9.1A	12.0B	4.8C	6.7B
N forms X Rates X K-humate									
Mineral X 150 X without		8.5BC	12.5A	9.2DE	9.2A	8.7A	10.3A	7.0A	9.0A
Mineral X 150 X with		8.0C	11.0A	4.2F	8.0A	8.5A	11.3A	10.0A	10.0A
Mineral X 300 X Without		10.5B	17.7A	10CD	11.7A	7.9A	12.6A	4.0A	13.0A
Mineral X 300 X With		9.8BC	16.0A	9.4DE	13.0A	8.7A	10.0A	3.0A	7.0A
Organic X 150 X without		10.5B	17.2A	13AB	13.0A	10.0A	10.0A	8.0A	10.0A
Organic X 150 X with		8.3C	14.2A	12BC	5.7A	8.3A	7.7A	5.7A	10.7A
Organic X 300 X Without		5.7D	14.5A	7.9E	6.3A	7.6A	12.3A	12.0A	6.0A
Organic X 300 X With		5.0D	14.2A	13.8A	6.7A	9.1A	7.0A	3.7A	5.3A
Mixed X 150 X without		12.8A	16.7A	8.8DE	13.A	8.0A	10.3A	3.0A	6.0A
Mixed X 150 X with		13.5A	19.5A	3.1F	6.7A	8.4A	14.3A	7.7A	8.0A
Mixed X 300 X Without		14.0A	15.0A	9.3DF	7.0A	10.2A	17.0A	12.0A	10.0A
Mixed X 300 X With		9.5BC	14.7A	3.5F	4.0A	9.6A	19.0A	8.0A	8.0A

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.
The same streaks within factors are not different but a value A > B > C …etc at 5% level.

Table 2. **Dry matter and plant height increment percentages of young Navel orange trees as affected by different forms and rates of N and K-humate addition in seasons of 2008 and 2009.**

Source of variance		Dry matter%		Plant height increment%	
		First season	Second season	First season	Second season
Analysis of variance					
N forms		*	NS	***	***
Rates		NS	NS	***	***
K-humate		*	NS	**	***
N forms X Rates		NS	NS	***	***
N forms X K-humate		NS	NS	**	***
Rates X K-humate		NS	NS	NS	**
N forms X Rates X K-humate		NS	NS	NS	**
Tukey's multiple range test					
Main effect					
N Forms	Mineral	46.9A	44.6A	36.0B	29.6C
	Organic	47.9A	45.0A	39.0B	50.6B
	Mixed	44.5B	44.3A	70.7A	67.5A
Rates	150g N/tree/y	46.6A	44.5A	53.3A	58.0A
	300g N/tree/y	46.2A	44.8A	43.8B	40.5B
K-humate	Without	47.6A	44.2A	46.0B	46.8B
	With	45.2B	45.1A	51.2A	51.6A
N forms X Rates					
Mineral X 150		46.6A	43.8A	47.8B	24.6E
Mineral X 300		47.1A	45.5A	24.1D	34.6D
Organic X 150		48.1A	45.6A	40.1C	70.3B
Organic X 300		47.6A	44.5A	37.8C	30.8DE
Mixed X 150		45.0A	44.1A	72.0A	79.0A
Mixed X 300		44.0A	44.5A	69.5A	56.0C
N forms X K-humate					
Mineral X Without		48.0A	44.1A	31.5D	22.8D
Mineral X With		45.8A	45.1A	40.5C	36.5C
Organic X Without		49.0A	44.8A	40.5C	41.5C
Organic X With		46.8A	45.3A	37.5C	59.6B
Mixed X Without		46.0A	43.8A	66.0B	76.2A
Mixed X With		43.0A	44.8A	75.5A	58.8B

Rates X K-humate				
150 X without	47.8A	44.3A	53.0A	57.4A
150 X with	45.3A	44.7A	53.6A	58.5A
300 X Without	47.4A	44.2A	390A	36.2C
300 X With	45.1A	45.4A	48.6A	44.7B
N forms X Rates X K-humate				
Mineral X 150 X without	49.0A	43.0A	44.6A	22.6E
Mineral X 150 X with	44.3A	44.6A	51.0A	26.6E
Mineral X 300 X Without	47.0A	45.3A	18.3A	23.0E
Mineral X 300 X With	47.3A	45.6A	30.0A	46.3D
Organic X 150 X without	49.0A	45.6A	42.3A	62.6C
Organic X 150 X with	47.3A	45.6A	38.0A	78.0AB
Organic X 300 X Without	49.0A	44.0A	38.6A	20.3E
Organic X 300 X With	46.3A	45.0A	37.0A	41.3D
Mixed X 150 X without	45.6A	44.3A	72.0A	87.0A
Mixed X 150 X with	44.3A	44.0A	72.0A	71.0BC
Mixed X 300 X Without	46.3A	43.3A	60.0A	65.3C
Mixed X 300 X With	41.6A	45.6A	79.0A	46.6D

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.
The same streaks within factors are not different but a value A > B > C …etc at 5% level.

Table 3. Leaf macro and micronutrient contents of young Navel orange trees as affected by different forms and rates of N and K-humate addition during the first season of 2008.

Analysis of variance		Macronutrients (%)					Micronutrients (mg/kg)		
		N	P	K	Ca	Mg	Fe	Mn	Zn
Analysis of variance									
N forms		**	NS	NS	*	*	**	*	***
Rates		NS	NS	NS	*	NS	NS	NS	NS
K-humate		NS	NS	NS	NS	NS	NS	*	*
N forms X Rates		NS	NS	NS	NS	NS	NS	NS	NS
N forms X K-humate		NS	NS	NS	NS	NS	NS	NS	NS
Rates X K-humate		NS	NS	NS	NS	NS	NS	NS	NS
N forms X Rates X K-humate		NS	NS	NS	NS	NS	NS	NS	NS
TukeyNS's Multiple range test									
Main effect									
N Forms	Mineral	2.75A	0.30A	0.83A	2.8B	0.40A	197A	35A	93A
	Organic	2.76A	0.31A	0.85A	3.5A	0.41A	120B	31AB	49B
	Mixed	2.29B	0.28A	0.80A	3.4A	0.23B	74B	26B	27B
Rates	150g N/tree/y	2.64A	0.30A	0.83A	3.1B	0.30A	123A	30A	49A
	300g N/tree/y	2.55A	0.29A	0.82A	3.5A	0.39A	138A	32A	64A
K-humate	Without	2.60A	0.30A	0.82A	3.3A	0.39A	140A	34A	72A
	With	2.59A	0.29A	0.83A	3.2A	0.30A	121A	29B	41B
N forms X Rates									

Mineral X 150	2.72A	0.29A	0.81A	2.6A	0.33A	167A	33A	71A
Mineral X 300	2.78A	0.30A	0.85A	3.1A	0.47A	228A	37A	116A
Organic X 150	2.89A	0.35A	0.89A	3.2A	0.37A	122A	30A	50A
Organic X 300	2.63A	0.27A	0.82A	3.7A	0.45A	118A	33A	47A
Mixed X 150	2.32A	0.27A	0.80A	3.3A	0.21A	81A	26A	25A
Mixed X 300	2.25A	0.29A	0.80A	3.5A	0.24A	68A	25A	29A
N forms X K-humate								
Mineral X Without	2.78A	0.30A	0.79A	2.9A	0.48A	221A	39A	127A
Mineral X With	2.72A	0.29A	0.87A	2.8A	0.31A	174A	31A	60A
Organic X Without	2.83A	0.32A	0.88A	3.5A	0.48A	121A	32A	54A
Organic X With	2.69A	0.30A	0.83A	3.5A	0.33A	120A	31A	44A
Mixed X Without	2.19A	0.27A	0.80A	3.5A	0.19A	78A	29A	34A
Mixed X With	2.38A	0.29A	0.79A	3.3A	0.26A	70A	22A	20A
Rates X K-humate								
150 X without	2.68A	0.29A	0.83A	3.1A	0.33A	154A	34A	58A
150 X with	2.61A	0.31A	0.83A	3.0A	0.27A	93A	26A	40A
300 X Without	2.53A	0.30A	0.82A	3.5A	0.44A	126A	32A	86A
300 X With	2.58A	0.27A	0.83A	3.4A	0.33A	150A	30A	43A
N forms X Rates X K-humate								
Mineral X 150 X without	2.86A	0.28A	0.81A	2.7A	0.35A	217A	38A	80A
Mineral X 150 X with	2.58A	0.31A	0.81A	2.5A	0.32A	117A	29A	61A
Mineral X 300 X Without	2.70A	0.32A	0.77A	3.1A	0.62A	224A	40A	174A
Mineral X 300 X With	2.86A	0.28A	0.94A	3.1A	0.31A	232A	33A	59A
Organic X 150 X without	2.91A	0.36A	0.88A	3.2A	0.52A	146A	35A	67A
Organic X 150 X with	2.87A	0.35A	0.89A	3.3A	0.22A	98A	25A	34A
Organic X 300 X Without	2.76A	0.29A	0.88A	3.8A	0.45A	96A	29A	41A
Organic X 300 X With	2.50A	0.24A	0.77A	3.7A	0.45A	141A	36A	54A
Mixed X 150 X without	2.25A	0.25A	0.79A	3.5A	0.14A	98A	30A	27A
Mixed X 150 X with	2.39A	0.28A	0.80A	3.2A	0.28A	94A	23A	24A
Mixed X 300 X Without	2.13A	0.29A	0.81A	3.5A	0.25A	58A	29A	42A
Mixed X 300 X With	2.37A	0.30A	0.78A	3.5A	0.24A	77A	22A	16A

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.*

The same streaks within factors are not different but a value A > B > C …etc at 5% level.

Table 4. Leaf macro and micronutrient contents of young Navel orange trees as affected by different forms and rates of N and K-humate addition during the second season of 2009.

Analysis of variance	Macronutrients (%)					Micronutrients (mg/kg)		
	N	P	K	Ca	Mg	Fe	Mn	Zn
Analysis of variance								
N forms	**	NS	NS	NS	NS	***	*	NS
Rates	NS	NS	NS	NS	NS	NS	**	NS
K-humate	NS	NS	NS	NS	NS	NS	NS	*
N forms X Rates	NS	NS	NS	NS	NS	NS	*	NS

N forms X K-humate		NS	NS	NS	NS	NS	*	NS	NS
Rates X K-humate		NS	NS	NS	NS	NS	NS	NS	NS
N forms X Rates X K-humate		NS	NS	*	NS	NS	NS	NS	*
Tukey's Multiple range test									
Main effect									
N Forms	Mineral	2.47A	0.21A	0.92A	4.1A	0.56A	96B	24AB	17A
	Organic	2.27B	0.21A	0.91A	4.2A	0.62A	141A	26A	16A
	Mixed	2.36AB	0.19A	0.95A	4.2A	0.70A	90B	22B	17A
Rates	150g N/tree/y	2.39A	0.21A	0.93A	4.3A	0.62A	111A	22B	17A
	300g N/tree/y	2.34A	0.19A	0.92A	4.1A	0.63A	106A	26A	16A
K-humate	Without	2.41A	0.21A	0.92A	4.3A	0.59A	110A	25A	15B
	With	2.33A	0.19A	0.93A	4.1A	0.66A	109A	23A	18A
N forms X Rates									
Mineral X 150		2.50A	0.23A	0.95A	4.2A	0.58A	112A	24AB	17A
Mineral X 300		2.44A	0.19A	0.89A	4.1A	0.53A	81A	25A	18A
Organic X 150		2.36A	0.21A	0.91A	4.1A	0.62A	139A	26A	17A
Organic X 300		2.19A	0.20A	0.92A	4.4A	0.62A	143A	27A	14A
Mixed X 150		2.32A	0.19A	0.93A	4.6A	0.66A	84A	17B	18A
Mixed X 300		2.40A	0.20A	0.96A	3.9A	0.73A	95A	26A	15A
N forms X K-humate									
Mineral X Without		2.45A	0.23A	0.87A	4.2A	0.58A	111AB	26A	16A
Mineral X With		2.48A	0.19A	0.97A	4.0A	0.54A	82B	23A	19A
Organic X Without		2.31A	0.20A	0.89A	4.4A	0.55A	121AB	27A	15A
Organic X With		2.24A	0.20A	0.92A	4.1A	0.70A	161A	25A	16A
Mixed X Without		2.46A	0.19A	1.01A	4.2A	0.65A	96B	23A	15A
Mixed X With		2.26A	0.19A	0.88A	4.2A	0.74A	83B	22A	19A
Rates X K-humate									
150 X without		2.40A	0.21A	0.90A	4.4A	0.60A	126A	24A	15A
150 X with		2.38A	0.20A	0.96A	4.1A	0.65A	97A	21A	19A
300 X Without		2.41A	0.20A	0.95A	4.2A	0.58A	92A	26A	15A
300 X With		2.27A	0.19A	0.89A	4.1A	0.67A	121A	25A	16A
N forms X Rates X K-humate									
Mineral X 150 X without		2.39A	0.26A	0.9AB	4.3A	0.60A	127A	24A	16AB
Mineral X 150 X with		2.60A	0.20A	1.0AB	4.1A	0.57A	96A	23A	19AB
Mineral X 300 X Without		2.51A	0.20A	0.8B	4.1A	0.55A	94A	26A	16AB
Mineral X 300 X With		2.36A	0.18A	0.9AB	4.0A	0.51A	68A	22A	19AB
Organic X 150 X without		2.44A	0.20A	0.9AB	4.1A	0.56A	137A	26A	14AB
Organic X 150 X with		2.29A	0.22A	0.9AB	4.1A	0.69A	141A	25A	20AB

Organic X 300 X Without	2.19A	0.19A	0.9AB	4.7A	0.54A	105A	29A	17AB
Organic X 300 X With	2.19A	0.20A	0.9B	4.1A	0.71A	182A	26A	12B
Mixed X 150 X without	2.38A	0.18A	0.9AB	4.9A	0.64A	115A	20A	16AB
Mixed X 150 X with	2.26A	0.20A	0.9AB	4.3A	0.68A	53A	15A	20A
Mixed X 300 X Without	2.53A	0.21A	1.1A	3.6A	0.67A	78A	24A	14AB
Mixed X 300 X With	2.26A	0.19A	0.8B	4.2A	0.80A	113A	28A	17AB

*, ** and *** significant effect at $P < 0.05$, 0.01 and 0.001, respectively, NS = not significant.*
The same streaks within factors are not different but a value A > B > C …etc at 5% level.

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5/6/5011

Effective factors on rural women's employment

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Abstract: Rural women are among those major groups at society who previously were considered less by planners, due to specific reasons in the past. And this problem is more observable at developing countries. While, by looking at women's history of economic and social life, we can find that this great group, continuously have played basic role in forming economic condition of country. This great group consistent with men have had active role at areas of social-economic activities and always have had major part on economic production of society. Nowadays, supporting family supervisor women is adopted by universal society, as politic, economic a social concern and nearly all countries applied related approaches, and however these efforts have resulted in failure, in so many cases . Supplying credits and analyzing credits approaches cause opportunity to activate poor men's working power , establishing field for sustainable production and income , prevent usurers and pre shoppers of agriculture productions to plunder poor rural men and finally empowering poor people especially women who can work but were deprived to have capital and work tools , and extension accordance to their activities such as needs assessment, identifying target group , organizing poor people , giving needed specialized and public training and … have important role on effectiveness and make effective activities of these credits.
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Keywords: Employment, rural women, economic participation**.**

1- Introduction:

Poverty spreading in village is a global issue. According to the Fao finding about % 75 of world's poor people that are more than 1 milliard people are living in rural zone and more than % 70 of this poverty people are women. As the most of the people who are poor are living in village and are women is the reason for insufficiency of rural development programs.

One of the other basic barriers in development of rural women is their independent inaccessibility to get credits for investment in their job. Although their illiteracy is the big barrier to use of bank credits, but this view that women are dependent people that their husband should decide about their financial decisions is the other reason that rural women couldn't access to official credits. Maybe these barriers are the reason why rural women are happy about applying micro-credit thought in village. (Najafi, 2007).

Having investment (capital) independency enforce people to think about economic from different angles. He should study the ways for using capital, he must consult with authority and experienced people and he will investigate about relevant markets. Such things will help him to be authoritative & independent. But how rural women can get such independency? Are the women created inherently for housekeeping, parenting and working or is there any opportunity for rural women to show their skills in economic & social development?

It seems that experiences which are obtained from performing financial programs in some villages in the developing countries could answer clearly to such questions.

A glimpse to previous planning about rural development in the world shows that from 1950 many developing countries understood that the main reason for making their economic growth (development) slowly in their countries is the weakness of investment in the agriculture part. Although many countries by patterning from developed societies have proceeded to improve & develop their industrial agriculture part and by this action not only had irreparable damages to many traditional farmers but also the main problem (the lack of capital sources) is also remained in the rural regions. (Rahimi, 2001).

2- Experimental factors affecting women's employment

Based on theoretical and empirical studies, women in the labor market in terms of environmental, economic, social, cultural and political per country, depends on various factors that the most important factors can be briefly outlined as follows:

2-1 - economic development:

Women's participation in agricultural activities for is generally for families and receives no salary and has more self consumption aspects. But during the process of economic development outcomes below

can be achieved which affects on women's participation in the labor market: (Tansel, 2002, 8; Mammen and et al., 2000, 142)

A – In agriculture, production for self consumption reduces and instead of it production for the market increase and new technologies and methods developed for the market development that ultimately led to increased agricultural incomes. With increasing income, women's participation in the labor market reduced and women's access to job opportunities are limited. Because those who go outside of the agricultural sector compete to find jobs and generally in this competition on women are outnumbering men and women are deprived of access to such jobs.

B - In the non-agricultural sector, participation of women in employment in the oven come early development is weak for two major reasons:

B -1 - due to low literacy levels, inadequate skills and expertise out in low and lower productivity of women, most employers prefer to hire men.

B-2 - duplicate the role of women in the field of work and family, particularly in one hand women in industry and services will force to stay away for long periods of home environment and on the other hand home responsibilities such as keeping kids, cooking and other home affairs significantly, they should inevitably have more presence in home . This dichotomy, deny these groups in the labor market. But the obstacles and problems regarding lack of participation of women in the labor market while increasing revenue and developing countries are lesser and thus participation rate of women in the labor market has increased. Therefore we can say that in the early stages of development, women participation rate in the labor market decreased to a minimum reached and then by increasing the degree of development, the share of women in the labor market has increased (Amiri, 2000).

2-2 - Size of government:
 The size of government can affect the employment of women Kavalkanty and colleagues study the effects of government spending on women's participation in the labor market. Their research results show that the causal relationship between government spending and labor market participation of women in there. In other words, by increasing the government spending, women's participation in the labor market increases and vice versa. (Cavalcanti and et al, 2004)

2-3 - Distribution of household income and expenditure:
If the income distribution is worse in the country, women are forced to pay for household economic activities and therefore their employment rate increases. On the other hand, the financial position of households is effective on female employment in the

labor market.Zareen and colleagues in their paper study the participation of women in Pakistan and show that the financial position of households, women's age, education and marital status on women's participation rate has positive effect. . (Zareen & et al., 2002; Del Boca & et al., 2000)

2-4 – Unemployment rate:
Any national unemployment rate increased due to reduced job opportunities for women, incentives per job is lower among women and therefore the share of women in employment decreases (Hashemi, 2000).

2-5 - government policies:
Government policies in the field of monetary, fiscal, foreign exchange and the direct and indirect traders affect in the share of women employment. Effect of each policy may be positive or negative. Also, Del Boca and colleagues in their paper show that various tax policies and administration of public policies affect on women's participation in the labor market. (Del Boca and et al., 2002)

2-6 - Number of children and fertility rate:
Fertility rates and increased number of children will be increased women responsibilities and thus negatively related to women's share of employment. Mincer (Mincer, 1995) studies the relationship between women's paid work hours and participation. His results show that household income effects on demand for women's work and, consequently, women's employment inversely is depending on wealth criteria. Moreover, he concluded that the number of children is effective on women's decisions for work offered.

2-7 - family environmental conditions and social and cultural factors:
 According to The time allocation theory, participation or non participation of women in the outdoors, depends on the common surname utility function and family decisions also affect on the share of women employed outside the home. Moreover, social and cultural factors and traditions in each country affect on participation rate of women in the labor market.

Shah (1995) studied the Effect of social and economic variables on participation rate of women in the labor market in Pakistan. His results show that the women's participation is inverse with number of children and the type of family relationship.

2-8 - knowledge:
 If the knowledge of women increase, their accessibility to the industrial and service sector jobs will increase and a there is a positive relationship between knowledge and participation rates of women in the labor market. (Sultana & et al., 1999).

2-9 - marital status:
women marriage and the general responsibility of the family cause to   decrease their labor market

participation rate and in contrast, the divorced or single people, have higher the labor market participation rate because they have enough time to work outdoors and need financing to fund its life. (Aly and et al., 2000)

Conclusion:

Macroeconomic view of employment of different aspects such as creating income, production and entrepreneurship, science and technology development, etc. is important, and gives the dignity, status and social position and a sense of confidence from the social viewpoint of man. Working and use of inherent forces, skills and knowledge and personal management to begin to work and to accomplish the activity, are not specific to particular groups**.** Around the world and in Iran, female employment, especially in rural area (which is a manifestation of participation) is not raised the issue of unemployment. Matter is the work with no reward. Because all the unpaid work is done that by women at home such as cleaning, laundry, nursery and social affairs, agriculture and livestock work and.... has come to account as non-economic work. While the visible part of economic can't continue to exist without goods and services of this invisible section of the economy.

Goetz Sengupta (2003), presented negative image of credits effects on empowering women. They concluded that most women have minimum control on their loans. And when repayment period is short, this shortage of control has devastating effects on women welfare.

Hashemi and others (2004) found that joining to Gramin Bank, has meaningful positive affects on controlling women, and helps to family income.

In researches that conducted by Nanda (2004) became clear that women participation in credits programs had positive affects on their demand about health care.

Fiona Steele and etal (2008) in researches that conducted as called " influences of credits programs on empowering women at Bangladesh , found that women who joined to credits programs , have participated in more educational programs and have married with more educated men and also they have saved more and they had more cash .

Ellen and her colleagues (2009) used approach called it "credits and education at Bolivia, Ghana, Honduras, Mali and Thailand". This approach looks for empowering women through financial services with education. In this approach, women get familiar with importance of credits through education and extension and also familiar with ways to access it through establishing different groups.

Shahnaj and chaudhury(2009) in research as "credits and its role on empowering women " concluded that there is meaningful relation between attending in credits programs and empowering women , at economical dimensions .

Ruhal amin and others (2010) found that those who joined credit funds had more ability rather than those who didn't.

Jameela (2010) presented that credit programs has shown lot of affects on empowering women so that has increased their social, politic and economic ability.

Thus it is obvious that credits programs and its educational and empowering programs can be affective on social, humane and economic development or rural society, if it be associated with proper and gradual practices and base on reciprocal communications principles and apply opinion of local society.

Maybe the main challenges that threaten credits associations , is lack of necessary emphasizes on social dimensions and on reinforcing their basics , that practically cause that this social foundations lose its efficiency soon and practically changed to unsuccessful institution .

In order to overcoming dominant consideration, experts believe that we should consider following in protection process of these social institutions.

- establishing and reinforcing through supporting without ant direct government involvement
- evaluating and constant modifying of financial management mechanisms
- improving organization effectiveness
- establishing constant relation and interaction with similar and equal systems.
- establishing local , regional and national networks
- establishing support and cover systems in order to decrease risk
- establishing balance and interaction with financial systems greater decision making include: capital market (local, regional, national) and governmental.
  also following suggestions have been offered:
- helping to marketing and establishing many exhibitions for member's productions, credit programs, guiding and training them in line with group and workshop activity, can assist them on economic empowerment.
- since women have pointed to education deficiency as major barrier for empowering them , thus educating rural women at the field of exploiting different credits and channels of receiving credits , and also various educations

, is so that lead to enabling them , that contain considerable importance.

- providing extension educations for men in order to believe economic role of their women , and give them chance of corporation on all economic , credits fields

- Since that base of credit association, forms base on People Corporation, so it's good chance to use these communities to expand extension-education activities. so it is better to consider special programs on different extensional filed such as agriculture , ranching , family health , housekeeping economy and other fields accordance to condition of region and rural women's needs .

- it is suggested that vast and   exact programming happens at following fields:

  a- extending insurance, facilities for amenities

  b- educating women about awareness of their own individual and social rights

  c- persuading rural women about importance of participating at cooperatives   and other educational institutes

  d- educating women about job management and income management

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Proper use of learning styles in adult education

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Abstract: There are many tests available to help you and your students discover your best learning style. Generally speaking, however, if you are someone who is more likely to think in pictures, prefer to meet with someone in person, and are more likely to want visual diagrams when completing a project you have tendencies towards visual learning. Similarly, if you are more likely to think in terms of sounds, prefer to speak on the phone with someone, and want verbal instructions then you tend towards auditory learning. Finally, if you are more likely to think in terms of moving images like mini-movies in your mind, prefer to participate in an activity when you meet to speak with someone, and tend to jump right into a project without reading directions you tend towards tactile/kinesthetic learning. In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.
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Introduction:

Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy initiatives" often are defined in terms of the needs of a particular target group. These may be parents of young children, youth who have dropped out of high school without earning a high school diploma, welfare recipients, persons with limited English-speaking ability, incarcerated adults, or adults in the workforce.

2. Other literacy initiatives are defined in terms of a particular educational service, strategy, or means to address a target population's literacy problems. "Adult basic education" and "family literacy" are examples. These initiatives are often defined in terms of a particular configuration of services for the target population (e.g., assessment and information and counseling services).

3. The term "lifelong learning" is often associated with "literacy." Lifelong learning is a means to the goal of maintaining necessary levels of literacy throughout one's lifetime. The goal of lifelong learning has implications for both individual adult's learning behavior as well as education policy and the design of the education system.

Goal six of the National Education Goals illustrates a broadly stated goal that incorporates expectations about both adult literacy and the kinds of policies and services that should be in place to improve literacy. Goal six, "Adult Literacy and Lifelong Learning," states that, "By the year 2000, every adult will be literate and possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship."

Adult who is able to recognize their needs. He is who knows what will. Refers to individual adults in their lives cross and understand their responsibilities and has accepted the role is social. Adult learners are often those that distinguish each other and have many different targets at the same time and will follow a common challenge to fulfill the goals of building self motivation vectors as educational materials to learn and use the forge.

Several definitions of adult education has been done Community

- Adult Education is a⌋in the following examples are given of them. conscious effort by public institutions or voluntary organizations to promote community awareness comes action.

- adult education teaching is typically specific age group above the legal age⌋ limits as formal and informal, voluntary and at different levels of time, place

- Adult Education is a process in which people who and education is presented. somehow been cut course they consciously to change or advance their skills in information and do organized activities.
- Adult education includes all formal and informal training and volunteer after school, which by experienced educators and aware of the system.

Educational materials on adult education with daily life, needs, goals, aspirations and past experiences of adults and their relationship helps to results learned in life and career are used.

Understanding and Using Learning Styles
Students, in fact all individuals, are most effective when they are taught in their personal learning style. In fact, there are three major types of learners: visual, auditory, and tactile/kinesthetic. While most individuals without disabilities can learn using any one of these styles, most people have one for which they show a stronger affinity.

A Look at the Three Learning Styles
1- Visual Learners - Visual learners are those who generally think in terms of pictures. They often prefer to see things written down in a handout, text or on the overhead. They find maps, graphs, charts, and other visual learning tools to be extremely effective. They remember things best by seeing something written.

2- Auditory Learners - Auditory learners are those who generally learn best by listening. They typically like to learn through lectures, discussions, and reading aloud. They remember best through hearing or saying items aloud.

3- Kinesthetic Learners- Kinesthetic, also called tactile, learners are those who learn best through touching, feeling, and experiencing that which they are trying to learn. They remember best by writing or physically manipulating the information.

How to Effectively Use Learning Styles in Class:
In the best of all possible worlds, you would incorporate all three learning styles into each of your lessons. However, this is just not possible in the real world of teaching. In truth, it is often not hard to include both auditory and visual learning styles in your lessons. For example, you can have instructions written on the board and say them out loud. However, it is not always as easy to include the tactile/kinesthetic learning style into your lessons. The sad truth is that many students have this as their strongest learning style. It is best to not force the issue but instead find natural places to include kinesthetic learning. If your class warrants it, you could include simulations, role-playing, debates, or the use of manipulatives.

Concerns When Incorporating Learning Styles
Though rarer today then in the past, some teachers discount the importance of learning styles. They continue to teach in their one major method without trying to vary instructional methods. This is a mistake that will lead to less learning in the classroom.
On the other hand, many students and to a lesser degree some teachers make the mistake of thinking that they cannot learn using methods that are not focused on their learning style. This is also a huge mistake that in the end will result in less learning. If teachers do not help their students find ways to be successful learning information presented in any style, they are not helping them succeed in the future. The fact is that students will be faced with many different styles of teaching during the educational career. Only by finding ways to adapt and learn using other styles, will students end up succeeding.
Examples of ways that students can adapt:
- Kinesthetic learners would include writing down information that they are to learn.
- Visual learners could create word webs, venn diagrams, or other visual presentations of information.
- Auditory learners could read a passage out loud from their textbook or from handouts

1- Kinesthetic Learners:
A Look at Kinesthetic Learners:
Kinesthetic learners typically learn best by doing. They are naturally good at physical activities like sports and dance. They enjoy learning through hands-on methods. They typically like how-to guides and action-adventure stories. They might pace while on the phone or take breaks from studying to get up and move around. Some kinesthetic learners seem fidgety, having a hard time sitting still in class.

Key Learning Methods for Kinesthetic Learners:
Kinesthetic learners learn best through doing including manipulating items, simulations and role plays, and other methods that physically involve them in the learning process. They enjoy and learn well from experimenting and first hand experience. Further, they learn best when activities are varied during a class period.

Ways to Adapt Lessons for Kinesthetic Learners:
Vary instruction not only from day-to-day but also within a single class period. Provide students with as many opportunities as your curriculum warrants to complete hands-on work. Allow students to role-play to gain further understanding of key concepts. Provide students with the opportunity to work in small discussion groups as they study materials. If possible, plan a field trip that can help reinforce key concepts. Allow students to stretch partially through the class if they seem to become restless.

2- Auditory Learners

A Look at Auditory Learners:
Auditory learners learn best by listening and talking aloud. They typically notice and remember sounds. They are good at remembering things that they hear. They are also good with words and language. They often read to themselves as they study. They are also often distracted by noise and sounds.

Key Learning Methods for Auditory Learners:
Auditory learners learn best through hearing the information. They often need to read the written word aloud to help them remember key points. Verbal repetition is an effective means of study for auditory learners.

Ways to Adapt Lessons for Auditory Learners:
Provide students with oral along with written instructions for assignments. Include whole group discussion in your class. Provide students with videos to complement the written text. Allow time for students to read out loud or talk through problems they might be having. Provide breaks from silent reading periods. Also, realize that those who are strong in auditory learning typically take longer to read a passage.

3- Visual Learners

A Look at Visual Learners:
A typical visual learner uses visualization techniques to remember things. They often have a good sense of direction because they visualize maps and directions in their mind. Many prefer to read information in a textbook or on the whiteboard rather than listen to the teacher lecture. They also enjoy doodling and drawing. Visual learners typically use sight words in their everyday terminology. For example, they might say "Let's take a look at this." or "Let's look at this from a different perspective." They remember details including colors and spatial arrangements.

Key Learning Methods for Visual Learners:
Visual learners learn best by seeing what they are being taught. Visual learners typically prefer images, maps, graphs, and other visual representations over other forms of instruction. They will find that if they include images, mind maps, lists, and other visual techniques in their notes then they will have a better chance of remembering key information.

Ways to Adapt Lessons for Visual Learners:
Including diagrams, mind maps, word webs, visuals, and other forms of graphic organizers will help visual learners get the most from your instruction. Teach students to use highlighters when going through their notes and to create flashcards when studying for tests and learning information. Try not to give only oral instructions before requiring students to complete an assignment. Further, stay away from lecture without accompanying notes and/or visuals.

Conclusion:

Additional material for the next stage of learning often means to be expected when developing your learning skills Learners to increase awareness and enjoyment of reading and studying to operate.

To improve the quality of life, learning materials should reinforce the skills they acquired previous. This material should have access to information and provide new technology. should also have to make learning more fun. Additional materials should provide opportunities for literacy skills to read and to strengthen their cognitive awareness.

Track materials (continued) which increased literacy skills and knowledge gained is also effective in enriching learning environment for learners are important. Participatory materials to ensure the participation of learners in the learning process and codification are included out of class activities, dialogue, role playing, etc.

In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.

Learning activities such as activities outside the classroom, dialogue, role playing and ... Another type of content is presented. Duties are placed on the learner, a resource for developing knowledge, skills and insights he considered.

Curriculum content only from the training provided to learners or not, but put together their learning through activities that can inform or does, skills and attitude to achieve. In this case, apart from learning that the assays taught learners directly to sustainable and effective learning occurs in his.

Another way of providing content that is educational activities outside the learning environment possible for learning more and better enables adult learners. For example, hits, field trip experiences for learners or transfer is provided, develop knowledge, insight and skills they will.

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning.

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5/5/2011

Application of Learning Styles in education

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Abstract: One of the aspects of flexible space is that individuals can, regardless of their residence to the study and advancing their knowledge and skills pay. For example, adults in remote villages should like people who live in the city use of educational programs. After flexibility in other places is that the issue of specificity of location is not considered primarily educational. Educational opportunities for certain age should not use it for all regardless of their age, is possible. In fact, educational programs must use people of different ages to prepare. No adult should not only be deprived of education because of the necessary conditions for admission in the class does. Of course this is not such a person without academic records to participate in university classes is accepted, Adoption order is that the adults in educational programs at different levels, according to the possibility of using the opportunity that is provided must be based on the experience and knowledge and their knowledge is. Generally speaking, however, if you are someone who is more likely to think in pictures, prefer to meet with someone in person, and are more likely to want visual diagrams when completing a project you have tendencies towards visual learning. Similarly, if you are more likely to think in terms of sounds, prefer to speak on the phone with someone, and want verbal instructions then you tend towards auditory learning.
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Introduction:

The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills

necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients. Examples include workplace literacy (combining both basic academic skills and workplace skills), and family literacy (combining basic academic skills and other skills essential for successful parenting).

2. "Education attainment" usually refers to the numbers of years of schooling completed or the level of credential (e.g., high school diploma or associate degree) an individual has obtained. Despite concerns about the meaning of credentials, there is a strong correlation between educational attainment and literacy.

3. "Literacy initiatives" often are defined in terms of the needs of a particular target group. These may be parents of young children, youth who have dropped out of high school without earning a high school diploma, welfare recipients, persons with limited English-speaking ability, incarcerated adults, or adults in the workforce.

4. Other literacy initiatives are defined in terms of a particular educational service, strategy, or means to address a target population's literacy problems. "Adult basic education" and "family literacy" are examples. These initiatives are often defined in terms of a particular configuration of services for the target population (e.g., assessment and information and counseling services).

5. The term "lifelong learning" is often associated with "literacy." Lifelong learning is a means to the goal of maintaining necessary levels of literacy throughout one's lifetime. The goal of lifelong learning has implications for both individual adult's learning behavior as well as education policy and the design of the education system.

Goal six of the National Education Goals illustrates a broadly stated goal that incorporates expectations about both adult literacy and the kinds of policies and services that should be in place to improve literacy. Goal six, "Adult Literacy and Lifelong Learning," states that, "By the year 2000, every adult will be literate and possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship." The objectives related to this goal touch on several of the common elements of definitions listed above, for example:

- Different dimensions of literacy (e.g., academic and workplace skills),
- The level of education attainment (e.g., increasing the number of persons who complete postsecondary degrees),
- The needs of target groups (e.g., parents, minorities, or part-time learners),
- The need to increase the availability of particular educational services, strategies or means (e.g., accessibility of libraries to part-time learners or opportunities for parental involvement), and
- The importance of lifelong learning, both in the learning behavior of individuals and in the educational system's responsiveness to the needs of adult learners.

Literacy goals include:
- Providing primary education in childhood that adults were deprived
- raising awareness for adults;
- knowledge bases and adults about their cultural heritage;
- increase confidence in adults.

Professional education goals include:
- Equipped with the necessary skills to adults living;
- providing the necessary manpower for the country's goals;
- achieving social equality and equity and eliminate the existing differences between different classes.

Adult characteristics:
to understand the characteristics of adult learners, their mental and physical condition should be considered in the following referred to some of them.

Operating speed:
slow reaction in adults is natural that necessarily means reducing the logic and practice skills, not due to weakness and increased awareness of natural forces and their skills.

Consciousness:
no stimulus and incentives encouraging, despite inhibiting stimuli, slow transfer rate, mental, and weak inhibitors of natural forces (mostly visual and auditory) are factors that slow reaction affect individual mental and cognitive activities, but never able to understand, understanding and learning ability (which varies with the speed of learning) is not relevant.

Health:
what is most age, longer duration is necessary to be heard by listening issue. Why is that when elderly people and old could not hear well, their confidence and vulnerable to the possibility that negative beliefs about their find, they are great. Visual abilities can be like other people, usually decreases with age.

Background of knowledge - skills and beliefs of adults:
adults, social experiences, many have already learned different values and beliefs in their pronouns have stabilized, so changes in the new act very cautiously. The idea of such a manner that skill and applying them older and longer life is, Similar resistance to accept new ideas will be more and more severe. Thus, the adult criteria for the built and paid for their ideas and beliefs that are forming. Because of these criteria and the beliefs that they are afraid of failure, Therefore, to prevent it, sometimes against the resistance of new phenomena are only the material taught and its face that make reinforced concrete and tangible interference situation is.

The Three Different Learning Styles:
Style 1: Visual
Fleming states that visual learners have a preference for seeing material in order to learn it.
- **Strengths of the visual learner:** Instinctively follows directions, can easily visualize objects, has a great sense of balance and alignment, is an excellent organizer
- **Best ways to learn:** Studying notes on overhead slides, reading diagrams and handouts, following a PowerPoint presentation, reading from a textbook, studying alone
- How do you know if you're a visual learner?

Style 2: Auditory
With this different learning style, students have to hear information to absorb it.
- **Strengths of the auditory learner:** Understanding subtle changes in tone in a person's voice, writing responses to lectures, oral exams,

story-telling, solving difficult problems, working in groups

- **Best ways to learn:** Participating vocally in class, making tapes of class notes and listening to them, reading assignments out loud, studying with a partner or group
- How do you know if you're an auditory learner?

Different Learning Style 3: Kinesthetic
Kinesthetic learners tend to want to move while learning.

- **Strengths of the kinesthetic learner:** Great hand-eye coordination, quick reception, excellent experimenters, good at sports, art, drama, high levels of energy
- **Best ways to learn:** experiments, acting out a play, standing, moving, or doodling during lectures, studying while performing an athletic activity like bouncing a ball or shooting hoops

How do you know if you're a kinesthetic learner?

Conclusion:
Beyond the issues relating directly to DAEL(Department of Adult Education and Literacy), the task force heard a number of concerns about the Commonwealth's overall approach to adult literacy.

- Lack of coherent statewide leadership and coordination among multiple complementary initiatives aimed at the same problem.
- Lack of continuity in state leadership. Cited in particular was the difficulty sustaining a high level commitment to the issue long enough to make a difference because of changes in priorities of the state's political leaders. A high level of turnover in the leadership of the Department of Adult Education and Literacy has also contributed to the instability.
- Tendency to think of adult education as a separate categorical program rather than a strategy that cuts across the mission and responsibility of multiple Commonwealth programs and initiatives (e.g., early childhood education, welfare reform, economic development, and corrections).
  - Multiple uncoordinated categorical federal initiatives that tend to drive (and fragment) policy for an overall state effort that is largely funded by Kentucky.
  - A tendency to commingle and confuse different functions. The most important distinction is between functions focused on the

needs of clients (adult learners, employers, communities, regions, and the Commonwealth as a whole) and functions associated with the operations and performance of providers. It is important that each of these functions receive attention, yet the tendency is for one (e.g., overseeing a network of providers) to drive out attention to overall system strategy.

- Inadequate coordination of services to meet the needs of individual adults, communities, employers, and regions is hindered by:

- Vertical financing and regulatory relationships between separate federal and state programs and local providers and administrative units. These vertical relationships can hinder the horizontal coordination of services for individual adult learners, communities, and employers.
- Turf wars among providers, local politics, and long-standing conflicts among neighboring counties.

- Inadequate links with and leverage of other public and private initiatives and investments to reach the target population. Major sources of help include employers, postsecondary education, and workforce development.
- Lack of a state financing policy and strategy for provider performance incentives and collaboration, and tax and other employer incentives for leverage of non-state resources.
- Lack of programmatic and administrative flexibility to meet the rapidly changing needs of adult learners, employers, regional economies, and communities.

Some research findings that can be a learning process for the Guidelines for training operations are applied, is given below:

1- - Preparation for adults to learn how much he depends on previous learning. Knowledge that has accumulated because of an ability to absorb new information more person is. Past educational experience features a diverse group of adult learners, the starting point of any activity on the diversity training is emphasized.

2- intrinsic motivation, learning a deeper and make them sustainable. When the need is met directly by the learning itself, what is learned, but is complementary learning. Creating a training activity in adult learning needs, learning ensures stable

3- Positive reinforcement (reward) learning to reinforce the negative (punishment) is more effective. Many adults because of negative experiences at the

beginning of schooling, are weak and afraid. Feeling of success in adult learning for continuous learning and adult participation is essential.

4- To maximize learning, information must be provided an organized manner. Entries can be simple or complex can be arranged around related concepts are organized. Starting point for organizing content knowledge for adults and adults is linked to past experiences

5- Learning, especially regarding skills development, will be added frequently.

6 - Duties and meaningful content than meaningless subjects are learned more easily and are later forgotten. This issue, especially for older adult learners is true. Challenges of adult learning facilitators by the way that content was significantly associated with the experiences and needs of learners is.

7- Passive than active participation in learning activities, learning increases. Adult educators are allowed to participate actively in India, a stable and meaningful learning to help

8- Environmental factors affect the learning. Tangible things such as noise, crowded places, temperature, light and ... Learning process can be prevented. Other factors such as stress, ridicule, pressure, fatigue and low health can also reduce learning.

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Indigenous Knowledge toward agricultural development

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Abstract: Imbalance population growth, non-sustainable efficiency of natural sources and unequal distribution of resources, goods and services made involved societies in confusing issues and impasses. In these countries , inappropriate sampling of abroad countries and inordinate imports (e.g. heterogeneous and non-indigenous technology) devastated independent collection of micro local systems , and instead has established heterogeneous and dependent system to global economy system , that obviously couldn't supply people's needs. Since , this development process is formed without considering social , cultural and environmental consequents so isn't continuing and human have to find strategies which can make development sustainable and humane Indigenous knowledge owners of world in current age (which known as information age) have valuable experiences from industry age and from inappropriate exploitation of their natural sources. These countries have learned that exporting produced goods is better than selling petroleum.
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Keywords: indigenous knowledge

Introduction:

Indigenous knowledge owners of world in current age (which known as information age) have valuable experiences from industry age and from inappropriate exploitation of their natural sources. These countries have learned that exporting produced goods is better than selling petroleum. enforcing indigenous productive system at villages and also encouraging youths and teens to learn indigenous knowledge at on hand , and preparing suitable research condition for applied-sciences scholars in order to identify better and increasing applied aptitude of indigenous knowledge at the other hand , is equal to protection and sustainable use of natural resources(Zare, H and Yaghoubi, 2003).

From Robert Chambers' view, power and wealth are at industry and at cities, and poverty and deprivation are part of villager's life. Power and wealth of cities of world has absorbed experts, sources and needed research facilities for producing and disseminating knowledge. Knowledge of these modern centers is considered scientific, advanced, and valid and enjoys premium technology. He labeled this group as "first" and in contrast "last" for deprived villagers. Because, preferences and values of these two groups are different. Their knowledge and attitudes are also different. he believes that since "first" development remedies and their attitudes have led to fault , irregular and deprivation , so deprived villager's attitudes and knowledge should be considered serious in order to reach to improve

conditions for this part of human society as they need and demand(Azkia, M and Imani, 2008) .

Some of these features are as follow:

Indigenous knowledge is holistic: indigenous knowledge is gained by sense and inspiration force and leads information unity. In spite of formal knowledge that is aural, visual and analytic.

Indigenous knowledge is verbal: writing and documenting indigenous knowledge would make it out of reach of villagers who can add to it, if it would not follow applied activities.

Indigenous knowledge is practical: it is possible to write about indigenous knowledge but it is impossible to educate and learn it through books and articles. Only way to learn it is close view and follow professor.

Indigenous knowledge isn't explanatory: it isn't possible to expect one master (e.g. mason, apothecary, farmer) to explain his method efficiency in a way that is apprehensible to us (literate people)

Indigenous knowledge is local: villager's knowledge has formed in itself environmental and climate framework. Effective indigenous knowledge at one geographical area isn't necessarily effective at other area (Nowroozi, A and Alagha, 2000).

Indigenous knowledge is general: while, formal knowledge emphasis is on saving time and removing ideas and also monopoly of knowledge at universities and research institutes , but indigenous knowledge is, receptive , incentive and needs to more people's participation at learning , developing and add to it. Furthermore, in verbal cultures, it is impossible to

separate science from world and even include it to computer and book. Every human are important in indigenous knowledge.

Indigenous knowledge is deteriorating quickly: by every death of old indigenous people, great knowledge resources would be lost also, so every action toward gathering indigenous knowledge is necessary.

Learning by doing: repeating action in order to sustain and enforce indigenous knowledge through "learning by doing" is one of features of indigenous knowledge in real operation environment (Emadi and Abbasi, 2001)

Villager's knowledge and especially indigenous knowledge systems have various dimensions that is include linguistic knowledge, zoology, ecology, climate, agriculture, ranching and professional skills. Range and value of this knowledge hasn't been considered. Four aspects of various dimensions of rural knowledge were selected and were analyzed, In order to change attitudes and reformer's behavior of rural development. These dimensions are: agriculture operations, rural knowledge about nature, rural people's aptitudes and abilities and their experiences (Razavi, 2002).

In Chambers' opinion , indigenous knowledge or rural knowledge has various dimensions that he classified them to four parts in order to explain more and better about diversity of indigenous knowledge that are as follow : A: farming activity ; B: knowledge in relation to nature ; C : indigenous people's aptitude and ability ; D: indigenous people's test . indigenous people's knowledge originated from exact viewing of environment; since indigenous villagers have direct contact with phenomenon and also see all different processes at nature so have especial aptitude and ability compared to outside people . Maybe least known aspect of indigenous villager's knowledge is essence of tests that they do which maybe these tests are available to choose "bests" and some other for "minimizing risks" (Dewes, 1998).

Advantage of indigenous agriculture

It is more than one hundred century that is passed from anthropologist studies in farming societies and production systems and during the last thirty years, comprehensive reports were obtained of subsistence practices. These reports consist of important information about social relations of production, operational practices and environmental protection that includes indigenous methods for using of earth and rural people's encounter with their environment (Smita, 2003).

These studies have given new dimension to agriculture research. Now, in many countries the managers of agriculture resources are the people who are trained in western countries. So if the manager become familiar with the culture and environment roots of indigenous system of resource management, they won't do mistake. Indigenous agriculture is based on cooperation of farmer with nature. Recently researchers of ecological agriculture have more attention to these systems. The result of these studies is important from two sides:

1- At the first, in the process of agriculture renovation in the third world that is indeed unavoidable, the indigenous agriculture knowledge and local methods in management of agriculture resources is to be destroyed and simultaneity environmental regions are on the verge of destruction. Modern agriculture prefers huge profit from resources and didn't pay attention to environmental, cultural, social and economic varieties of traditional agriculture. So incongruities of agriculture development plans are not compatible with rural needs and talents and also rural conditions. By recognizing indigenous agriculture features such as traditional classification for identifying plant and animal species and using of indigenous practices like simultaneous cultivation of compatible crops, we can get useful information about suitable ways for agriculture. Surely these guidelines will be more compatible with rural needs and agriculture and environmental features of each region and won't be reckless to social, economic and environmental complex issues (Appleton and Jeans, 1995).

2- Second, with studying indigenous agriculture we can get points that will help us to design the same systems in industrial countries. Sustainable agriculture which is taken from indigenous systems will remedy the shortcoming of modern agriculture. In a single-product of modern farm, life circles of nature has changed by using chemical poison that give no chance for using principles of ecological agriculture. But completeness (evolution) of culture and environment is the result of local agricultural systems (Ahmed, 2000). In indigenous agriculture, variety and alternation of cultivation make minimize the possibility of farming products destruction. Although these systems have resources limitation, but they use of learning advantage and intellectual ways for use of animals, soil and compatible farm species.

For this reason, researchers of ecological agriculture know these systems as unexampled kinds to specify constant static scales for agriculture activities. In industrial countries they use of these scales for designing and managing ecological production systems (Emadi and Amiri Ardekani, 2004).

With all the advantage we account for native knowledge we should contemplate that for reaching a balanced understanding of this knowledge, we shouldn't indicate it very important or not very unmeaning as Chambers say. Also we shouldn't consider rural people an intellectual people. Because they can make mistake like any other people or group. And also this knowledge is not reliable forever. In some places this knowledge is combined with some superstition believes and we should not forget its spiritual and mental aspect (Warren, 1999).

Dictated pattern's failure through western development countries to third world countries show that native knowledge is necessary to reach development.

Untrop believe that usage of local knowledge is efficient and useful in development and native knowledge's researchers believe that they achieved to an important source for innovation in agriculture methods and a good farming production to improve the rural people's life. On his idea, some of researchers call native knowledge as a good supplement and replacement for modern knowledge and they have tried to spread the usage of this knowledge all around the world. These plans as a "communion research with farmers" or "first is the first" are introduced. In this research method, private organs and local groups have the main role and unlink the current research plans, the tests are done with the farmers attendance in their farms and not in research centers and far from environment condition. The ways that farmers and rural people use for management of their living environment are the most scientific ways, although we couldn't understand it at the first sight (Chambers, 2000).

Eshraghi (2000) explained that by introducing sustainable development model or development environmental model and according to world food organization (FAO), sustainable development will create when applied technologies in rural development are in proportion with rural people's knowledge and also are acceptable by them. Also he says that one the main ways to reach sustainable development in society is that to have enough and necessary attention to the rural's native or local knowledge (Merrewij, 1998). It is also explained that attention to this knowledge needs a complete recognition of rural people and their knowledge that through assembling of this knowledge we can find a correct way to reach a sustainable development and we should know that the movement toward sustainable development is not possible without correct using of native knowledge. Many development experts believe that the Sustainability of this concept is at the studying of this knowledge and in becoming popular in development. Indeed, native knowledge with its holist features had known the relation between nature's components better and had smoothed the way to Sustainability of development (Gigler, 2003).

We can summarize the usage of native knowledge in development as fallow:

1- Protection and maintenance of natural sources. Native methods in management of natural sources are suitable pattern for managing natural sources in sustainable development.

2- The success of sustainable development plans is depended to rural people's communion at designing, schematization, performance and assessment. Use of native knowledge is necessary for rural people's communion.

3- Native and modern knowledge should be combined because according to our needs and vulnerability of remained natural sources, none of them are able to remove our needs a lonely.

4- For recognizing development needs, trouble shooting problems should be polestar from rural people's view and recognizing problems and making efficient relation with rural people are possible through native knowledge.

5- In industrial countries, native methods are forgotten completely because of using modern knowledge in production process. As native methods are the most suitable way for achieving sustainable development goals so, many efforts were done to make this knowledge alive.

As a result not only we shouldn't forget the native knowledge but also we should use of this knowledge in developmental plans. Using native knowledge in developmental projects will help to have sustainable development in villages. So developing and not developing that were using of western development patterns for many year, should use of their native and local knowledge which is the result of many years experience and by helping these plans they can reach to a sustainable development(Brouwer, 1998).

Conclusion and discussion:

Necessity of considering indigenous knowledge at developing extension programs is emanated from where that is considered as principal components and sustainable human development items is emanated from same sources. At sustainable human development, people are considered as "goal" of social and economic policies that their range of their selections would be extended in order to actively participate at decision making. Therefore, people's participation is one of tools of sustainable agriculture development. But active rural people's participation at extension programs as a form of sustainable would not be possible unless by believing role of rural people's knowledge, vision and skills (Brouwer 1998).

So, not only attendance of indigenous knowledge is necessary for applied researches but is important at compatibility researches and it enforced importance of attending to indigenous people and their knowledge. Therefore , applying affective strategy for transmitting technology has been among from affective fields at attending to indigenous people's knowledge and especially experts; because, development institutes realized positive their affects for doing this more than ever (Merrewij 1998) .

Indigenous knowledge has been manifested at sustainable process and improving extension programs at industrial countries of world, very well. Indigenous knowledge related to agriculture, medicine, food and architecture has been widely used At European countries, USA, Canada, Australia, by new names.

So, effort and national commitment and multi-dimensional support is very critical for recording, valuing, extending and exchanging this rich source and also preparing mechanism and practical strategy for synthesizing this knowledge with new knowledge and agricultural development programs.

Agricultural extension was identified as one powerful IT focused area, due to role variation at knowledge system and agriculture information at one hand and at the other hand due to its dependence on various exchanges among farmers, that can has great affect on rural society and developing agriculture. So that work and productions of farmers would increase by farmer's access and use of Internet and subsistence farmers at all over the world are at developing by gaining needed knowledge and information that during time would becoming as commercial producers. Transmitting from system-cycle source of agriculture to technology-cycle system of agriculture placed more responsibility on agricultural extension because agriculture extension system is as vital technology transfer crossing to farmers at one hand and as crossing for referring feedbacks, needs and agriculture issues, researchers and policy makers of market.

What that is obvious is that extending and researching agriculture can help to sustainability through close relation to farmers , attending to their experiences , gaining their information and logical understanding of agriculture activities , attending to their vital needs for doing "demand-base" researches and extension education efforts for developing agriculture , at process of improving agriculture development.

In the past half century, modern knowledge has provided new and modern technologies in agriculture that has caused a main evolution in production process. Also this technology has caused problems in environment, production and social aspects and has forced thinkers and deciders to think about them carefully. One of the ways to solve these problems is that to use of our ancestor's tentative knowledge. Using of our ancestor's knowledge and experience is called native knowledge and this provide an opportunity to use of local knowledge in the process of specifying needs and designing suitable technologies and applying it. The native and modern knowledge not only are not in contrast with each other but also are each other's supplement to reach a sustainable development and we can use of them in our needed technologies. Believe of educated people to native people and their knowledge "precondition for making them close" is called combination and compilation. Making evolution in modern system for attention to tentative knowledge is the main necessity for this compilation. Another necessity for this evolution is the researcher's attention to experimental accumulated wisdom and historical exploit by using qualitative and communion methods. Also applying compilation methods and making evolution among government, educational centers, farmers and peasant is the necessity and pre condition for combination of modern and native knowledge.

On the research which was done by Bozarjomhari (2004) with this title "analyzing native knowledge position on rural sustainable development". It was specified that although there are many differences between native and modern knowledge but they are not in contrast with each other, because they are each other's supplement and we can't be success when we use them separately. According to new parameters in rural development, for solving rural problems, at the first we should use of native solutions and if it was not efficient, we can use and test external solutions.

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