Microorganisms Found in Fast and Traditional Fast Food

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Abstract: Sixty food samples were collected from 60 random restaurants of fast and traditional fast foods in El Qassium, Saudi Arabia and were investigated for bacteria species using different temperature degrees (10°C, 20°C, 30°C, 40°C and 50°C) wrere incubated for 24-48 hours and analyzed for fungi and yeasts incubated at 25°C. The results revealed that from 45 sample of traditional foods, yielded a total twenty two species of eighteen genera of bacteria. A fourteen species of twelve genera of fungi and three species of three genera of yeasts. While fast food results revealed that from 15 fast food samples collected from 15 restaurants a total ten species of ten genera of bacteria. A total eight species of seven genera of fungi. The species of bacteria isolated in this study namely, *Acetobacter spp., Achromobacter spp., Bacillus coagulans, B. Subtilis, Clostridium perfringens, Erwinia carotovora,p Escherichia coli, Flavobacterium spp., Klebsiella pneumoniae, Lactobacillus plantarum, Leuconostoc mesenteroides, Listeria monocytogenes, Microbacterium lacticum, Micrococcus spp., Pseudomonas aeruginosa, Pseudomonas fluorescens, Pseudomonas putrefaciens, Salmonella spp., Staphylococcus aureus, Streptococcus lactis, Streptococcus thermophilus, Campylobacter jejuni, Citrobacter fruendii, Proteus vulgaris and Yersinia sp.* The occurrence of some these bacteria illustrate that fast foods in these restaurants may act as a reservoir of pathogenic bacteria for human. Fungi isolated namely *Aspergillus glaucus, A. niger, Alternaria sp., Cheotomium candidum, Cladosporium herbarum, Fusarium sp., Monilia sp., Mucor rouxii, Neuropora sp., Penicillium expansum, Penicillium sp., Rhizopus nigricans, Sporotrichum carinis and Thamnidium elegans.* Yeasts were represented namely *Torulopsis caroliniana, Saccharomyces rouxii* and *Zygosaccharomyces sp.* Total viable count of bacteria (CFU) was higher in foods containing vegetable salad and fresh vegetables more than heated foods (e.g., chicken Shawarma, Beef burger). Some bacteria resist heat and grow at 50°C. Contamination occurred through raw foods, use of polluted irrigation waters, human handling and use of contaminated containers. The binge-eating of fast food can lead to measurable signs of liver injury, inflammation and inexpensive fat- and calorie-packed foods make as the fattest. Food poisoning can be controlled by the adjustment of pH, water activity, temperature control. Prevention of toxins in fast foods must become a cooperative effort on the part of all involved in food production. Prevent multiply the microorganisms by washing and dry hands before preparing any foods and after handling raw foods (meat, poultry, vegetables or fruits), food preparation areas, equipment must be cleaned, kitchen areas, restaurants and foods protected from insects, pests and other animals. Patients should not handle foods in restaurants. [Journal of American Science 2010;6(10):515-531]. (ISSN: 1545-1003).

Key words: Fast food, traditional fast food, bacteria, fungi, yeasts, temperatures, contamination, poisoning food.

1. Introduction:

Food is a chemically complex matrix, and predicting whether, or how fast, microorganisms will grow in any given food is difficult. Most foods contain sufficient nutrients to support microbial growth. Several factors encourage, prevent, or limit the growth of microorganisms in foods, the most important factor are water availability, pH, and temperature *(Dockins and Mefeters, 1978; Troller and Stinson, 1978; Bryan et al., 1980; ICMSF (eds), 1980a, 1996; Roberts, 1982; Makukutu and Guthrie, 1986; Smith and Fratamico, 1995).*

The busy and hectic life schedule has opened the way for the fast food industry in most parts of the world. The traditional or conventional way of cooking is over and the fast food joints are visible everywhere. Fast food does not only include the traditional fast food items like pizza, burger or French fries but it also includes Chinese as well as Indian. The most typical fast food meals eaten in Germany are similar to those eaten in American namely burger, Pizza and freis from well-known chains such as MacDonald's burger king and Pizza Hut. Other popular meals are (a sliced sausage with ketchup and mayonnaise), Kebab (the meat is served in flatbread along with lettue, onion, cucumber, tomatoes) *(Ockerman and Stec, 1980; El-Sherif et al., 1991; Lock and Board, 1994).* Although fast food restaurants are often viewed as a representation of modern technology, the concept of "ready-cooked food to go" is as old as cities themselves; unique variations are historical in various cultures. Ancient Roman cities had bread-and-olive stands, flat bread and falafel are ubiquitous in Middle East. Food habits, pattern and behavior vary widely from culture to culture. Popular Saudi Arabian traditional foods include

meat, rice, wheat, vegetables and species that give these recipes a special flavor.

There are many popular foods in Saudi Arabia like Jarish, Qursan, Saliq, Masapep, Keshta, Mataziz, Freek, Hunayni and Harisah *(Print edition of Saudi Aramco World, 1975).*

In recent years just about all the quick service restaurants have added salads fresh vegetables (Leuttuce, Cabbage, Carrot, Cucumber, Onion, Ketchup, Mayonise). Some foods will be cooked prior to consumption others will be eaten raw. Products that might be classed with both fresh and processed vegetables are the chopped salad ingredients sold in the grocery store and to the institutional trade. Although essentially fresh produce, contamination during processing, and changes in microbial growth patterns during storage, may later to microflora of these foods quantitatively and qualitatively. The inner tissues of healthy plants and animals are free of microorganisms. However, the surfaces of raw vegetables and meats are contaminated with a variety of microorganisms and this depends on the condition of the raw product, the method of handling, the time and conditions of storage *(Albrecht et al., 1995; Al-Mohizea, 1996; Wood-Ward, 1996; Odumeru et al., 1997; Kaneko et al., 1999 and Pelczar et al., 2006).*

Microbial food safety is an increasing public health concern worldwide. It is estimated that each year in the United States there are approximately 76 million food borne illnesses *(Mead et al., 2000).* Cases are caused by *Campylobacter spp.*, nontyphoidal salmonella, pathogenic *Escherichia coli* all colonize the gastrointestinal tracts of a wide range of wild and domestic animals, especially animals raised for human consumption *(Meng and Doyle, 1998).* Food contamination with these pathogens can occur at multiple steps along the food chain, including production, processing, distribution, retail marketing and handling or preparation. It was reported that numerous epidemiological reports have implicated foods of animal origin as the major vehicles associated with illnesses caused by food-borne pathogens *(Todd, 1997; Petersen and James, 1998).*

Contaminated raw or undercooked poultry and red meats are particularly important in transmitting these food borne pathogens. Other sources of human infections include contaminated produce and contact with farm animals and pets. Person-to person transmission has also been described *(Sofos et al., 1999).* Dangerous microorganisms are found in soil, water, animals and people. These microorganisms are carried on hands, wiping cloths and utensils, especially chooping boards. The slightest contact can transfer then to food and cause food borne disease. examples of zoonotic pathogens that may be transmitted in this way include *Salmonella, Campylobacter, Escherichia coli* and eggs of the tape worm, *Taenia solium (Meng and Doyle, 1998; Adams and Moss, 2000).*

The gut is the most important source of bacteria, contributing *Clostridium perfringens, Coliforms, Salmonella* and *Staphylococcus* to the meat surface. Mesophiles, including pathogens, cannot grow on chilled carcasses, but psychrotrophs of the pseudomonas, Achromobacter grow readily, and eventually spoil the meat *(Meng and Doyle, 1998).* The conditions in a well wrapped piece of meat encourage the growth of the *Lactobacilli* at the expese of the *Pseudomonas, Achromobacter* group *(Petersen and James, 1998).*

The bacterial level in chilled meats after transportation and storage at the retail level has little or no relationship to that at the processor's level because bacterial growth has continued *(Todd, 1997).*

Pathogenic microorganisms on raw vegetables and fruits suggested that the use of poor quality water for irrigation could increase the incidence of enteric pathogens *(E. coli). Erwinia spp., Aeromonas, Serratia spp.* and some gram negative bacteria, *Pseudomonas spp., Citroacter freundii, Clostridium* and *Xanthomonas* and also *Staphylococcus aureus, Corynebacterium, Listeria spp., Lactobacillus spp., Streptococcus spp., Micrococcus spp.,* as gram positive bacteria. The consumption of fast foods, raw milk and raw milk products have been reported to be associated with serious health problems *(De Boer and Hahne, 1990; Adesiyun, 1993; Lin et al., 1996; Anonymous, 1997; Pacini et al., 1997; Bell and Kyriakides, 1998; Adams and Moss, 2000; Food and Drug Administration (FDA), 2000 and Pelczar et al., 2006).*

Microorganisms in fast and traditional fast foods are responsible for many human disease *(Evenson et al., 1988; Bean and Griffin, 1990; Qadri et al., 1991a; Chowdhury and El-Eissa, 1992; Woodward, 1996; Anonymous, 1997; Al-Turki et al., 1998; Uyttendaele et al., 1999; Angelillo et al., 2000; Chandler et al., 2000; Mead, 2000).*

Salmonella bacteria is a common cause of food borne illness, particularly in undercooked chicken and chicken eggs *(Arumugaswany, 1995; Lin et al., 1996; Anonymous, 1997; Kaneko et al., 1999).*

However, some studies suggested the incidence of *Listeria spp.* in retail foods, ready-cooked chicken, on the hands of food workers, food stuffs, human faeces, sewage and soil from urban sources *(Kerr, 1993; MacGowan et al., 1994; Ng and Seath, 1995).*

Furthermore, it was reported the prevalence of *Campylobacter spp., Staphylococcus spp., Escherichia coli, Salmonella spp., Yersinia Spp.* and *Listeria* on meat, sea foods, vegetable ingredients, chicken shawarmas, raw

and cooked foods, raw chicken, beef burger sandwiches, ready-to eat salad vegetables, commercial mayonnaise, frozen chicken, poultry products and on the hands of food workers *(Kerr et al., 1993; Kaneko et al., 1999 and Pelczar et al., 2006).*

Uzeh et al. (2009) reported that microorganisms isolated from salad containing raw vegetables include *Mucor sp., Aspergillus fumigatus, Trichoderma, Neurospora crassa and Aspergillus niger (Deak and Beuchat, 1996; Adams and Moss, 2000).*

It was investigated that fast food contains high levels of refined sugar, white flour, trans fat and polyunsaturated fat, salts and numerous food additives, at the same time it is lacking in proteins, vitamins and fiber. Consumption of fast food in the world has been associated with obesity leading to many diseases *(The Center for Disease Control for American, 2001; Canadian Institute for Health Information, 2007).*

Raw materials, including water, ice and milk, may be contaminated with dangerous microorganisms. Toxic chemicals may be formed in damaged and mouldy foods. Care in selection of raw material sand simple measures such as washing and peeling, may reduce the risk. Contaminated water, for example, has been associated with outbreaks of *Salmonella, Campylobacter and Escherichia coli,* whilst infections with *Salmonella, Campylobacter, Mycobacteria* (TB), Brucella and *Escherichia coli* can be acquired through the consumption of contaminated milk or dairy products that are not pasteurized *(Meng and Doyle, 1998).* When raw milk is left standing for a while, it turns "sour" this is the result of fermentation, where lactic acid bacteria ferment the lactose inside the milk into lactic acid. Prolonged fermentation may render the milk unpleasant to consume. This fermentation process is exploited by the introduction of bacterial cultures (e.g., *Lactobacilli spp., Streptococcus spp., Leuconostoc sp.* …etc) to produce a variety of fermented milk products. The reduced pH from lactic acid accumulation denatures protein and caused the milk to undergo a variety of different transformations in appearance an texture. Fast foods sold in a restaurant or store with low quality preparation and served to the customer in a packaged form for take out/take away. In most fast food operations, menu items are generally made from processed ingredients prepared at a central supply facility and then shipped to individual outlets where they are reheated, cooked (usually by microwave or deep frying) or assembled in a short amount of time, fast food are often very high in calories, saturated fat and sodium that can make us fatter, clog our arteries and send our blood pressure soaring. Some items from McDonald's menu in particular include chicken, hamburgers, Frensh fries, Egg McMuffins-Premium salad, chicken sandwiches, yogurt parfaits and fruit salads. Food substances that have been prepared by a fermentative process, or have been exposed to microbial contamination during aging or storage, are likely to contain amines. Alcoholic beverages such as beers can contain biogenic amines, as do some other fermented foods such as sauerkraut and soy bean products *(Sanchez, 2009).* Amines were also considered as endogenous to plant substance that is commonly used for food, where some vegetables and fruits were found to contain high concentrations of various amines. The biogenic amine content of various foods and feed have been widely studied and found in cheese, fish, meat products, eggs and mushrooms. Biogenic amines may also be considered as carinogens because of their ability to react with nitrites to form potentially carcinogenic nitrosamines. The toxicity of biogenic amines to chicks in terms of loss of weight and mortality was also reported *(Heaton and Jones, 2008 and Rahn et al., 1998).*

Meat, produce and soft cheeses (e.g., brie, cheese, cottage cheese) have more water content, allowing any bacteria, viruses or molds present to multiply quickly *(Bichai et al., 2008; Ono and Yamamoto, 1999).*

It was suggested that ensure that food should cook thoroughly to the correct temperature because proper cooking kills almost all dangerous microorganisms. Studies have shown that cooking food to a temperature of 70^{o}C can help ensure that it is safe for consumption. For example poultry, minced meat products (e.g., hamburger and sausages). Ideally, the center of the food should reach a temperature of 70^{o}C for at least two minutes *(Makukutu and Guthrie, 1986; Lock and Board, 1994).* Chilled, ready to eat foods must be kept to temperature below 5^{o}C. Hot foods must be kept at temperatures above 60^{o}C before serving. Cool rapidly and refrigerate left over foods if they are not to be used within 2 hours. Food should be cold before placing in the refrigerator since it may take a while to cool off in the refrigerator and hot food may warm up other foods *(Kaneka et al., 1999).* Some of the highest aerobic counts have been reported for tubers and other vegetables that are in contact with the soil e.g., lettuce, carrots, potatoes and cabbage and flafel with fresh vegetable salads record the highest count of microorganism *(Kaneko et al., 1999 and Mead et al., 2000).* The high acid and sugar content of fruits often permits yeasts and molds to predominate, while the high carbohydrate content of many vegetables favors the lactic acid bacteria. It was reported that the major source of the organisms on frozen vegetables is contaminated equipment. Operations that have been especially troublesome chopers, slicers, conveyor and inspection helts, and filling machines. Some of these units possess surface that are difficult to reach for proper cleaning. Belts may present problems because of the tenacity with which organisms adhere to certain surfaces, and because some

fabrics absorb moisture and thus permit a microbial build up within the belt interior *(Norberg, 1981).*

Many microorganisms do not survive at a low pH environment; for example, *Salmonella* and *Shigella* die off rapidly in citrus juices.

Contamination of eggs and egg products: Contamination of the egg shell occurs after laying nesting material, dirt, and fecal matter. It was reported that the flora of egg shells is dominated by gram positive cocci while the gram negative rods are present in numbers. The contents of shell eggs may become contain with organisms from the shell surface by improper washing and storage methods. The most common genera of bacteria found in liquid eggs are gram negative types, including *Pseudomonas, Proteus and Escherichia.* In commercial egg breaking operations the egg shell is a source of contamination and may contribute large numbers of gram positive cocci to the liquid egg *(Administration Urged to Boost Food Safety, 2009).* Colonization of the shell contents is characterized by a mixed flora of gram negative bacteria. The most common contaminants are the *Coliforms, Achromobacter, Pseudomonas, Serratia, Proteus, Alcaligenes and Citrobacter (Finegold and Martin, 1982; Uyttendaele et al., 1999).*

The major which pathogen associated with eggs and egg products is *salmonella.*

Ready to eat meat and poultry meat:

Some meat products such as flame seared beef patties and cooked beef are processed at lower temperatures. These temperatures are sufficient to destroy pathogens, but the final bacterial counts include some of the more heat resistant vegetative bacteria such as the enterococci. For these products, the final bacterial numbers normally may be at levels of about 10^3 to 10^4. Unless cooked products are packaged hot and immediately frozen, recontamination invariably occurs from equipment, food handlers, raw products or dust *(Talarico et al., 1997; Angelillo et al., 2000).*

Human health and mycotoxicoses: It was reported that the ubiquitous fungal strains involved could utilize wide variety of foodstuffs for toxin production. Several mycotoxins have been verified as naturally occurring foods and feeds *(Barnett et al., 2000).*

Mycotoxins and toxigenic fungi: Most mycotoxicoses of man or animals have been recognized by observation of the toxicity of moldy foods and feeds. The toxigenic storage fungi are primarily *Aspergillus penicillium*, while some like Fusarium may be either field or storage organisms. The mycotoxins presently considered to present the most potential for human health hazard are the toxins of the storage fungi in the genera, *Aspergillus, Penicillium* and *Fusarium* are those elaborating mycotoxins which are more important in foods and feeds.

Some of the mycotoxin findings reported represent extensive survey, others are very limited. Fungi, such as the moulds commonly seen on bread, can also cause illness while viruses such as hepatitis A may also be food borne *(Wart, 1989; Barnett et al., 2000).* It was reported that when foods such as meat, spaghetti sauce or vegetables are canned, the oxygen can't get in therefore growth of aerobic organisms is controlled and the food is preserved. Some microorganisms will grow only in anaerobic conditions. Botulism is a rare type of food borne illness caused by microorganism that prefers anaerobic conditions. Home canned food that haven't been preserved properly are the most common source of this type of food borne illness *(Evenson et al., 1988; Kao and Shih, 1993; Pacini et al., 1997).*

The objectives of this study were to determine the presence of pathogenic bacteria, fungi and yeasts in fast foods and in traditional foods in some restaurants causing human diseases, and to investigate the association of microbial contamination with component, type, temperature, season of foods. This study carried out to give information about the methods of prevention of diseases due to food borne pathogens and how to control it.

2. Materials and Methods:

Sixty restaurants were used in the present study. Fast and traditional foods samples were obtained form fast food and traditional fast food restaurants in El Qassim, Saudi Arabia in summer. The Centers for Disease Control Food Borne Diseases Active Surveillance Network (Food net) data indicate that outbreaks and clusters of food-borne infections peak during the warmest months of the year *(Centers for Disease Control and Prevention, 2001; Fotadar et al., 2005).*

Samples of foods: *A) Traditional foods: The traditional fast foods which were used in the research: 1. Jarish:* composed of yorgot, animal fats, crush wheat, oil, salts and speices. Jarish may be simply boiled and served with a topping of chopped hot paper and onion or it may be browned in butter or oil and then cooked into a sort of pilaf with a chunks of meat, chopped onion and tomato for the richly flavored dish. *2. Mataziz:* composed of flour, meat, cucurbita, onion, oil, spices, tomato and salt. *3. Qursan:* included meat, oil, different vegetables onion, tomato, limon and salt. *4. Keshta:* included of palm, butter and flour. *5. Mathbib:* Contained eggs, oil, flour, salt and sugar. *6. Freek:* composed of eggs, flour, sugar, small amount of salt and cinnamum zeylani. *7. Hunayni:* included palm, bread, butter, spices and water. *8. Saliq:* contained chicken, rice, milk and spices. The rice first half cooked in meat or

chicken both and then with milk for one. *9. Harees:* composed of meat, sugar, butter, wheat, salt and cinnamum zeylani.

B) Fast foods: 1. Chicken shawrmas with salads. 2. Hamburger (beef burger) with salads. 3. Flafel with salads (leuttuce, tomato, onion, cucumber).

1. Collection of samples: A total of 60 samples were obtained from 60 restaurant at temperature 35°C-37°C in summer. The food samples were taken from restaurant in sterile plastic bags in Ice-Box, according to *Chessbrough (1984)*

2. Preparation of food samples: From each sample 25 g was aseptically weighed and macerated and 225 mls of sterile distilled water was added. Sterile dilution was carried out using sterile distilled water as diluents. From each dilution 1 ml was plated using the pour plate methods of *Swanson et al. (1992).*

3. Isolation of Bacteria: Samples were cultivated on different media. The inoculated media were cultured at different temperatures. Pure cultures of the microorganisms were identified using the standard procedures of *(Barrow and Feltham, 1993).* The test employed for the identification of isolates was the gram stain, biochemical test, pigments and colony morphology.

The streak plate method for the recovery of the various bacteria species. The Total Viable Count (TVC) of bacteria species was done on different media. The inculated plates of bacteria were incubated at different temperatures 10°C, 20°C, 30°C, 40°C and 50°C for 24-48 hours. The colony forming units (CFU) were counted with a Gallenkamp colony counter, the result reported as (CFU) per ml of sample. The same process was repeated in respect of fungi and yeasts, which were incubated at (25-30°C).

I- Isolation of bacteria: The culture media used were

1. *Nutrient agar medium:* was used for total bacterial count (enumeration of bacteria). The medium containing (per liter of distilled water) according to *Atals (1993)*, beef extract 2.0 g, peptone 5.0 g., yeast extract 1 gm, sodium chloride 5 g., agar 15.0 g., distilled water up to 1 liter. at pH 7.3±0.2 *(Swanson et al., 1992).*
2. *MacConkey agar medium:* MacConkey agar is a differential and low selectivity medium used to distinguish lactose fermenting (e.g, klebsiella and Esherichia coli) from non lactose fermenting bacteria (Pseudomonas aeruginosa, Salmonella species and Proteus mirabilis. It composed of gelatin 17 g., casein 1.5 g., peptic of animal tissue 1.5 g., lactose 10 g., bile salts 1.5 g., sodium chloride 5 g., neutral red 0.03 g., crystal violet 0.001 g., agar 13.5 g., and distillated water up to liter *(Oxoid 1992).*
3. *Salmonella-Shigella agar medium:* was used for isolation of Salmonella and Shigella and incubation at 35°C for 24-48 hours *(Feng et al., 2007).*
4. Violet red bile agar was used to distinguish coliform bacteria, and Eosin-Methylene blue Agar (EMB) was used for isolation of Escherichia coli *(Oxoid, 1992).*
5. *Mannitol salt agar:* Mannitol salt agar is a differential and selective plate medium used to isolate *Staphylococcus aureus* . the medium is available in dehydrated from Oxoid Ltd. Mannitol is fermented by *Staphylococcus aureus* (yellow in medium)*(Finegold and Martin, 1982).*
6. *Staphylococcus medium (No. 110):* Staphylococcus medium used for isolation of Staphylococcus spp. and Micrococcus spp. (gram +ve bacteria), it composed of (per liter) yeast extract 2.5 g., tryptone 10 g., gelatin 30g., lactose 2 g., D/mantol 10 g., Nacl 75 g., dipotassium phosphate 5 g., agar 15 g., pH 7±0.02 According to *(Matthews et al., 1997).*
7. *Rosef broth: Campylobacter* strains were grown in stationary cultures in 5 ml of Rosef broth without antibiotics for 48 hours in anaerobic atmosphere created by using BBL gas peak plus anaerobic system envelops without the palladium catalyst. Rosef broth contains (per liter) peptone 10 g., Labelmco (oxid) 8 g., yeast extract 1 g., Nacl 5 g., Rezasurin solution (0.025% wt/ vol.) 1.6g *(Ryan and Ray, 2004).*

Clostridium perfringers were grown in a stationary culture in an anaerobic atmosphere and subsequently diluted in sterile Rosef broth or sterile saline to concentrations of 10^6 to 10^8 CFU per ml *(Baumgart et al., 2007).*

8. *MRS Broth (de Man, Rogosa and Sharpe):* Lactobacilli bacteria were counted with M.R.S. agar medium which is composed of casein peptone 10 g., meat extract 10 g., yeast extract 5 g., glucose 20 g., tween 80 1.0g., K_2mpo_4 2 g., sodium acetate 5 g., diammonium citrate 2 g., $MnSO_4$ 0.2 g., and distilled water up to 1 liter *(Laner and Kandier, 1980).* After incubation, colonies that developed on the plate were counted. The plates with between 30 and 300 colony recorded as colony forming units [total viable count (CFU/ml)]. Pure cultures of the isolates were obtained by subsequent sub culturing on fresh agar plates.

Identification of microbial isolates:

Isolates of bacteria were identified by the API 20E system following the method adapted by *Collins et al. (1995).* This was done based on cultural,

morphological and biochemical characteristics of the isolates, the method of bacterial classification, was the gram stain method, as described by *Barrow and Feltham (1993); Inglis et al. (1994) and Bergey's (1989).*

II- Isolation and identification of fungi

The purpose of screening was to isolate potent pure cultures from different samples of fast and traditional foods. Test-samples were plate on the surface using the dilution plate method *Swanson et al., 1992)* using (1) Sabourauds Dextrose agar (SDA) (2) Potato Dextrose agar (PDA). Identification to the genus level was carried out throughout macroscopic and microscopic examination, followed by more accurate identification to the species level according to *John (1979), Domsch et al. (1993); Robert et al. (2000); Watanabe (2002).*

III- Isolation of yeasts: Yeats were isolated from samples of traditional and fast foods by using the dilution plate method of *Swanson et al. (1992),* media were used (1) Peptone Yeast molt agar (PYM), (2) Dextrose-Yeast broth (DYB), (3) Nutrient agar (NA). Yeasts isolates were identified according to *(Arex, 1981; Barnett et al., 2000).*

Statistical analysis:

Statistical analysis was carried out using statistical program SAS (1988). Duncan's multiple range tests was used to separate means.

3. Results:

(1) Microorganisms isolated from traditional foods samples: The results of isolation of some species of microorganisms from 60 food samples collected from different 60 restaurants at El Qassim revealed that, a total of twenty two species in eighteen genera of bacteria were isolated. A fourteen species in twelve genera of fungi. A three species of three genera of yeasts were isolated are recorded in table (1, 2 and 3).

(2) Bacteria isolated from fast foods samples: The results of isolation of bacteria from 15 fast food samples collected from 15 restaurants at El Qassim revealed that a total ten species of ten genera were isolated (table 4).

(3) Effect of different temperatures on isolated bacteria: The occurrence of isolated bacteria at different temperatures (isolated from traditional foods and fast foods) at 10^{o}C, 20^{o}C, 30^{o}C, 40^{o}C and 50^{o}C (table 5 and 6).

(4) Fungi isolated from fast foods samples: The results of isolation of fungi from 15 fast food samples collected from 15 restaurants revealed that eight species of seven genera were isolated (table 7).

The total bacterial count from traditional foods: In the present study the restaurants were chosen because of people in these localities are more exposed to pathogenic fungi, bacteria, yeasts which may transmitted to them from foods, soil or hands of workers and also from person to another. The total bacterial count was higher in food samples from Mathabib, Jarish and Qursan than those from samples from Hunayni, Mataziz and Keshta. The total bacterial count was lower in food samples from Freek and Saliq and the lowest number shows from Harees (table 8).

Table (1) shows the bacteria isolated from traditional foods include *Acetobacter spp., Achromobacter, spp., Bacillus coagulans, Bacillus subtilis, Clostridium perfringens, Escherichia coli, Erwinia carotovora, Flavobacterium spp., Klebsiella pneumoniae, Lactobacillus plantarum, Lactobacillus spp., Listeria monocytogenes, Micrococcus spp., Microbacterium lacticum, Proteus vulgaris, Pseudomonas aeruginosa, Pseudomonas putrefactens, Staphylococcus aureus, Streptococcus lactis, Streptococcus thermophilus and Leuconostoc mesenteroides.*

The total bacterial count from fast foods:

Bacteria of this group of fast foods samples may cause disease to man. Bacteria isolated include *Campylobacter jejuni, Citrobacter fruendii, Bacillus subtilis, Escherichia coli, Listeria monocytogenes, Proteus vulgaris, Pseudomonas aeruginosa, Staphylococcus aureus, Salmonella sp., and Yersinia spp.* (Table 4).

On the other hand we can divide the isolated bacteria from fast and traditional samples into:

1. Gram negative bacteria: isolated from traditional foods and fast foods are: *Campylobacter Jejuni, Escherichia coli, Klebsiella pneumoniae, Salmonella sp., Yersinia sp., Proteus vulgaris, Acetobacter sp., Flavobacterium spp., Pseudomonas aeruginosa, Citrobacter freundii, Erwinia carotovora, Pseudomonas fluorescens, pseudomonas putrefaciens, Achromobacter spp.*
2. *Gram positive cocci:* Isolated from traditional foods and fast foods are: *Leconostoc mesenteroides, Micrococcus spp., Staphylococcus aureus, Streptococcus Lactis and Streptococcus thermophilus.*
3. *Gram positive rode, non sporing: Listeria monocytogenes* and *Lactobacilli plantarum* were isolated from traditional foods and fast foods.
4. *Gram positive rods irregular, nonsporing: Microbacterium sp.* isolated from traditional foods only.
5. *Gram-positive rods and cocci (endospores):* Isolated from traditional foods and fast foods are: *Bacillus coagulans, Bacillus subtilis, Clostridium*

perfringens. Regarding traditional foods and fast foods sharing in some bacteria as *Escherichia coli, Bacillus subtilis, Listeria monocyenes, Pseudomonas aeruginosa, Salmonella sp. and Staphylococcus aureus.* Concerning fast foods, *Campylobacter jejuni, Proteus vulgaris, Citrobacter fruendii and Yersinia sp.* the isolated species which not isolated from traditional foods.

It was noticed that the samples of traditional foods included many bacteria not isolated from the samples collected from fast foods such as *Clostridium perfringens, Acetobacter spp., Bacillus coagulans, Erwinia carotovora, Flavobacterium Klebsiella pneumoniae, Lactobacillus plantarum, Leconostoc mesenteroides, Microbacterium spp. Micrococcus spp., Pseudomonas Fluorescens, Pseudomonas putrefaciens, Streptococcus, Lactis, Streptococcus thermophilus and Achromobacter spp.*

Matching the results recorded in table (1) with the results recorded in table (4), it was noticed that many species of pathogenic bacteria were isolated from traditional foods and fast foods causing many diseases for human (Fig. 1).

The total count of bacteria was the highest in Flafel with vegetable salads samples following by Beef burger sample and the bacterial count was lower in chicken sharwma samples (table 9).

As shown in table (10) pathogenic bacteria, important diseases and prevention of each disease were recorded to indicate the possible causative factor.

Isolation of fungi: *A- From traditional foods*

Isolation and identification of fungi were performed those include *Alternaria sp., Aspergillus niger, Aspergillus glaucus, Cheotomium candidium, Cladosporium herbarum, Fusarium sp., Monilia sp., Mucor rouxii, Neurospora sp., Penicillium expansum, Penicillium sp., Rhizopus nigricans, Sporotrichum carnis and Thamnidium* (table 2).

B- From fast foods: The fungi isolated from fast foods samples include *Aspergillus fumigatus, Aspergillus niger, Mucor sp., Rhizopus nigricans, Trichoderma sp., Alternaria sp., Penicillium sp., and Cladosporium herbarum* (table 7).

(5) Isolation of yeasts from traditional foods: In the present study yeasts were isolated from traditional food samples include *Saccharomyces rouxii, Torulopsis caroliniana and Zygosaccharomyces sp.,* as shown in table (3).

Table (1): Bacteria isolated from traditional foods

No.	Sample	Bacteria isolated from samples
1	Jarish	Escherichia coli, Lactobacillus plantarum, Pseudomonas putrefactens, Streptococcus thermophilus.
2	Mataziz	Acetobacter sp., Erwinia carotovora, Micrococcus sp., Pseudomonas aeruginosa, Staphylococcus aureus, Clostridium perfringens
3	Qursan	Acetobacter sp., Escherichia coli, pseudomonas aeruginosa, Erwinia carotovora, Lactobacillus sp.,
4	Keshta	Klebsiella pneumoniae, Micrococcus sp., Staphylococcus aureus
5	Mathabib	Bacillus subtilis, Flavobacterium sp., Klebsiella pneumoniae, Micrococcus sp., Pseudomonas aeruginosa, Microbacterium lacticum, Leuconostoc, mesenteroides.
6	Freek	Bacillus subtilis, Listeria monocytogenes, Proteus vulgaris, Micrococcus sp., Pseudmonas putrefactens, Staphylococcus aureus.
7	Hunayni	Bacillus coagulans, Micrococcus sp., Pseudomonas fluorescens, Staphylococcus aureus
8	Saliq	Escherichia coli, Listeria monocytogenes, Lactobacillus plantarum, Micrococcus sp., Achromobacter sp., Staphylococcus aureus, Streptococcus lactis.
9	Harees	Flavobacterium sp., Micrococcus sp., Staphylococcus aureus.

Table (2): Fungal species isolated from traditional foods

No.	Sample	Fungal species
1	Jarish	Aspergillus niger, Alternaria sp., Fusarium sp., Neurospora sp.
2	Mataziz	Penicillium expansum, Cheotomium candidum
3	Qursan	Aspergillus glaucus, Penicillium expansum, Neurospora sp., Cheotonium candidum, Mucor rouxii, Alternaria sp.
4	Keshta	Penicillium expansum, Rhizopus nigricans
5	Mathabib	Aspergillus niger, Cladosporium herbarum, Penicillium sp.
6	Freek	Aspergillus glaucus, Cladosporium herbarum, Monilia sp., Rhizopus nigricans
7	Hunayni	Alternaria sp., Thamnidium elegans
8	Saliq	Sporotrichum carnis, Penicillium sp.
9	Harees	Alternaria sp., Penicillium sp.,

Table (3): Yeast species isolated from traditional foods

No.	Sample	Yeast species
1	Jarish	*Torulopsis caroliniana*
2	Mataziz	-
3	Qursan	*Torulopsis caroliniana*
4	Keshta	*Saccharomyces rouxii, Torulopsis caroliniana, Zygosaccharomyces sp.*
5	Mathabib	*Torulopsis caroliniana*
6	Freek	*Torulopsis caroliniana*
7	Hunayni	*Saccharomyces rouxii, Torulopsis caroliniana*
8	Saliq	*Torulopsis caroliniana, Saccharomyces rouxxi*
9	Harees	*Torulopsis caroliniana*

Table (4):Bacteria isolated from different fast foods

Type of sample	Bacteria isolated from samples
Chicken Shawarmas	Campylobacter jejuni, Escheirchia coli, Listeira monocytogenes, Salmonella sp.
Hamburger (beef burger)	Listeria monocytogenes, Salmonella sp., Staphylococcus aureus, Yersinia sp.
Flafel with salads (Lettuces, Tomato, Cucumber	Campylobacter jejuni, Escherichia coli, Listeria monocytognees, Salmonella sp., Pseudomonas aeruginosa, Citrobacter fruendii, Proteus vulgaris, Bacillus subtilis

Table (5): Occurrence of bacteria at different temperatures isolated from traditional foods from different restaurants

No.	Bacterial species	Temperature				
		10oC	20oC	30oC	40oC	50oC
1	Acetobacter sp.	-	+	+	-	-
2	Acrhomobacter sp.	+	+	-	-	-
3	Bacillus coagulans	+	+	+	+	+
4	Bacillus subtilis	+	+	+	+	+
5	Clostridium perfringens	-	-	-	-	+
6	Erwinia carotovora	-	+	+	+	-
7	Escherichia coli	+	+	+	+	+
8	Flavobacterium sp.	+	+	+	-	-
9	Klebsiella (Aerobacter) pneumoniae	-	+	+	+	-
10	Lactobacillus plantarum	+	+	+	-	-
11	Leuconostoc mesenteroides	-	+	+	-	-
12	Listeria monocytogenes	+	+	+	+	-
13	Microbacterium sp.	-	+	+	+	+
14	Micrococcus lacticum	+	+	+	+	-
15	Proteus vulgaris	-	-	-	-	+
16	Pseudomonas aeruginosa	-	+	+	+	-
17	Pseudomonas fluorescens	+	+	-	-	-
18	Pseudomoas putrefactens	+	+	+	+	-
19	Salmonella sp.	-	-	+	+	-
20	Staphylococcus aureus	+	+	+	+	+
21	Streptococcus lactis	+	+	+	-	+
22	Streptococcus thermophilus	-	+	+	+	+

Table (6): Occurrence of bacteria at different temperatures isolated from fast foods from different restaurants

No.	Bacterial species	Temperature				
		10oC	20oC	30oC	40oC	50oC
1	Campylobacter jejuni	-	+	+	+	-
2	Escherichia coli	-	+	+	+	-
3	Listeria monocytogenes	+	+	+	+	-
4	Salmonella sp.	-	-	+	+	-
5	Staphylococcus aureus	-	+	+	+	-
6	Pseudomonas aeruginosa	+	+	+	+	-
7	Citrobacter fruendii	-	+	+	+	-
8	Proteus vulgaris	+	+	+	+	-
9	Bacillus subtilis	+	+	+	+	+
10	Yersinia sp.	+	+	+	+	-

Table (7): Occurrence of fungi isolated from different fast foods at 25°C

No.	Bacterial species	Temperature		
		Chicken shawarma	Beef burger	Flafel with vegetable salads
1	Aspergillus fumigatus	-	+	+
2	Aspergillus niger	-	-	+
3	Mucor sp.	+	-	-
4	Rhizopus nigricans	-	-	+
5	Trichoderma sp.	-	-	+
6	Alternaria sp.	+	-	+
7	Penicillium sp.	-	+	-
8	Cladosporium sp.	-	+	-

Table (8): Total viable count of bacteria from traditional samples

No.	Sample	Total viable count (Log 10 cfu/gm)
1	Jarish	5.20
2	Mataziz	5.07
3	Qursan	5.20
4	Keshta	1.02
5	Mathabib	5.38
6	Freek	0.94
7	Hunayni	5.15
8	Saliq	0.94
9	Harees	0.59

cfu: colony forming unit

Table (9): Total viable count of bacteria from fast foods

Type of sample	Total count of bacteria (Log 10 cfu/gm)
Chicken shawarmas	5.28
Beef burger	5.53
Flafel with vegetable salads (lettuces, tomato, cucumber)	5.76

cfu: colony forming unit

Table (10): Pathogenic bacteria, important diseases and prevention of each disease (bacteria isolated from fast and traditional foods)

Organisms	Where they be found	Important diseases	Prevention
Campylobacter jejuni	Contaminated drinking water and unpasteurized milk, contaminated food, with incorected prepared meat and poultry	Human gastroenteritis in the world, food poisoning, abdominal pain diarrhea, fever, and malaise	Treated with antibiotics in severe cases such as ciprofloxacin, erythromycin, azithromycin or norfloxacin
Escherichia coli	Food or water or with the individuals handling the infant's child, unwashed vegetables or undercooked meat, raw ground beef, raw seed sprouts, raw milk, unpasteurized juice, and foods contaminated, by infected food workers via fecal-oral route. Found in recreational waters and its presence is used to indicate the presence of recent fecal contamination	Most E. coli strains are harmless, but some can cause serious food poisoning in humans, and are occasionally responsible for product recalls, the harmless strains are part of the normal flora of the gut. Produce potentially lethal toxins, food poisoning, diarrhea in humans, rabbis, dogs, cats and horses, urinary tract infections	Cooking food property, preventing cross-contamination instituting barriers such as gloves for food workers, pasteurization of juice or dairy products and proper hand washing requirements treated with antibiotics.
Listeria monocytogenes	Foods as raw milk, pasteurizede fluid milk, cheeses, ice cream, raw vegetables, fermented raw meat sausages, raw and cooked poultry, raw meats (of all types), and raw and smoked fish and refrigerated foods. Isolated also from soil and silage.	It is the causative agent of listeriosis. It is one of the most virulent food borne pathogens with fatality rates exceeding even Salmonella and Clostridium botulinum Gastrointestinal symptoms such as nausea, vomiting, and diarrhea	For gastrointestinal using antacids or cimetidine. May using also Vancomycin or Ampicillin Alcohol as an effective topical sanitizer or quaternary ammonium added to alcohol.

Table (10): Pathogenic bacteria, important diseases and prevention of each disease (bacteria isolated from fast and traditional foods) *(Cont…)*

Pseudmonas aeruginosa	It is found in soil, water, skin flora, in normal atmospheres and also in little oxygen. This bacterium is also found on and in medical equipment including catheters, causing cross infections in hospital and clinics	It infects the pulmonary tract, urinary tract, burns wounds, and also causes other blood infections, gastrointestinal infection and external ear infection	Many antibiotics, for example, ear infections or nail infections, topical gentamicin or colistin may be used.
Salmonella sp.	It can be transmitted by humans to animals and vice versa. Transmitted to humans by eating foods contaminated with animal feces. Contaminated food such as beef, poultry, milk, or eggs, any food including vegetables, food also become contaminated by the hands of an infected food handler who did not wash hands with soap after using the bathroom. The human pathogen of salmonella abdominals transmission by contact and infected food, water or fly. Contamined foodstuffs.	Diarrhea, fever, or abdominal cramps, food poisoning.	Food be heated for at least ten minutes at 75^{o}C (167^{o}F) so that the center of the food reaches this temperature. It is not destroyed by freezing.

Table (10): Pathogenic bacteria, important diseases and prevention of each disease (bacteria isolated from fast and traditional foods) *(Cont…)*

Staphylococcus aureus	Part of the skin floral found in the nose and on skin. It presents in prepared foods left too long at room temperature (e.g., cooked hamburger, salads dairy products).	It can cause skin infections, pneumoniae, meningitis osteomyelitis, endocarditis, toxic shock syndrome, bacteremia and septicemia, food poisoning.	Treatment using penicillin, gentamicin.
Yersinia sp.	Food products (especially vegetables, milk-derived products and meat)	Gastroenteritis	By oxidizing agents such as hydrogen peroxide and potassium permanganate solutions
Shigella sp.	Salads, milk and dairy products, and unclean water	Bacillary dysentery, bacteramia	Wash and dry hands before preparing any food and after handling raw foods, especially raw meat or poultry. Ensure that food is cooked thoroughly to the correct temperature.

4. Discussion:

The effect of microorganisms on human health has been reported, the present study was performed to give information of the distribution and presence of pathogenic microorganisms in traditional fast foods and fast foods from different restaurants, that important to human and to discus their role in the food poising and also the causation of many human diseases. Studies on isolation of pathogenic bacteria, fungi and yeasts from fast foods and traditional foods in this investigation indicated that some gram negative bacteria and gram positive bacteria recorded in table (1 & 4). The food bacteria of greatest important to human pathology are the most common causes of human infection and extensively widespread in the environment using fast foods. Our results are in agreement with the above studies and are supported by many researches (Kay et al., 1994). His findings are consistent with our results that revealed some pathogenic bacteria, fungi and yeasts were found in fast foods, traditional fast foods. Most investigators indicated that bacteria, fungi and yeasts may exert their pathogenic action either thorugh infection of body, or as a source of toxic substances demonstrated in contaminated foods. The most common infections causing food poisoning and other diseases are those associated with contaminations due to fast foods and traditional fast foods (Kay et al., 1994; Al-Turki et al., 1998).

More recent studies have focused attention on the food poisoning diseases due to several pathogenic microorganisms. Many disease of human associated with contamination of fast and traditional fast foods. Many workers reported that raw food, especially meat, poultry and sea food, and their juices, can contain dangerous microorganisms, such as Salmonella, Campylobacter, Listeria and Escherichia coli, which may be transferred onto other foods during food preparation and storage (Lin et al., 1996; Uyttendaele et al., 1999; Chapman et al., 2001). Our work is in agreement with the above studies. In raw milk, the presence of lactic acid producing bacteria, under suitable conditions ferments the lactose present to lactic acid. The increasing acidity in turn prevents the growth of other organisms, or slows their growth significantly. During pasteurization however, these lactic acid bacteria are mostly destroyed (McGee, Harold, 2004; Christison and Ivany, 2006; Chen et al., 2007). These results are agreement with the results of our study.

Feng et al. (2007) reported that some microorganisms are harmful and cause disease while others are benevolent neutral, or even helpful. Some help us to produce certain foods (e.g., Streptococcus lactis to make butter milk break down toxins in our environment, while others can sick as (e.g., contaminants in food like Escherichia coli or Salmonella), or can kill us for example, Proteus cause amoebic dysentery, fungi cause athelete's food and ringworm, bacteria cause pneumonia, legionmaire's disease, streptococcus, throat, tetanus and other diseases.

Some animal diseases bacteria can cause human disease with close animal-man contact. Some of these are Brucella enteropathgoenic E. coli, Corynebacteria, Mycobacterium, Leptospira, Coxiella burneti and Clostridium tetani. Heaton and Jones (2008) suggested that coliforms, E. coli, enterococci, S. aureus, C. perfringens and Salmonella are often present on fresh tissues since slaughter process does not include a bacterial step. The frequency and levels of these bacteria will vary, depending upon farm, climatic, and processing conditions.

Recent studies indicated that Staphylococcus aureus, Clostridium perfringens, and Salmonella frequently are present in low numbers on raw meat surface Clostridium botulinum occurs infrequently. These species are most hazardous when they grow without competition as in cooked foods (Talarico et al., 1997; Baumgart et al., 2007). Our results are also in agreement with the previous studies. The hazard potential from foods precooked in commercial establishment is high but the incidence of outbreaks has been low. The Center for Disease Control reports that although more than half of all food borne disease outbreak can be traced to meat and poultry products, there was a serious departure from good practices at the serving level (homes, restaurants, institutions) in nearly all instances.

Baumgart et al. (2007) showed that the heating step in the production of cooked cured meats destroyes the typical raw meat flora except for the spores. Salt and nitrite in the cure inhibit the growth of survivors and contaminats somewhat selectively. These agreed with our results (table 9).

Rayan and Ray (editors) (2004) found that upon prolonged refrigeration, lactic acid bacteria, micrococci, enterobacteria, bacillus, and yeast may grow and form slime. If the product is in a tight, gas impermeable package, the package may swell. Products of bacterial action sometimes combine with meat pigments to form a green color. Human contact may sometimes introduce a few Escherichia coli or Staphylococcus aureus. These results are in agreement with our results. The food grade bacteria associated with food fermentation are capable of producing different types of metabolites they have antimicrobial properties (organic acids e.g., lactic, cetic pyopionic, aldehydes, ketones, and alcohols (ethanol, diacetyl and acetaldehyde), hydrogen peroxide, reuterine and bacteroides. It was reported that in the presence of the mesophilic lactic acid bacteria (e.g., lactococcus lactis,

some lactobacillus species, and Pediococcus sp.), the growth of psychrotrophic spoilage and pathogenic bacteria is reported to be controlled.

Studies were conducted by adding lactic acid bacteria to fresh meat, seafoods, liquid egg., and some processed meat products, such as bacon, against Clostridium botulinum, Salmonella serovars, and Staphylococcus arueus. Our results are supported by the presence of many researches agreed with our data (Feng et al., 2007; Heaton and Jones, 2008).

In refrigerated raw milk, meat, egg., and seafood, cells of lactobacillus, Lactococcus and Leuconostoc species were added to control the growth of psychorotrophic spoilage bacteria such as Pseudomonas spp. The inhibitory property could be due to the release of antimicrobial compounds from the cells by the nonmetabolizing lactic acid bacteria.

It was reported that some strains of Lactobacillus reuteric, found in the gastrointestinal tract of humans and animals, produce a small molecule, reuterine that is antimicrobial against gram-positive and gram negative bacteria (Daeschel and Penner, 1992). It produces antibacterial action by inactivation some important enzymes such as ribonucleotide reductase. Many strains of species from genera lactococcus, Streptococcus Leuconostoc, Pediococcus, Bifidobacterium, and propionibacte used in food fermentation have been reported to produce different bacteriocins (Daeschel and Penner, 1992).

Moreover, many organisms was found in our data is in agreement with many researches, several yeast isolates normally present on the surface of fruits and vegetables were reported to prevent spoilage of the products by molds. Some of the inhibitory compounds are small proteins, while some others are enzymes. It was reported that cells of one such yeast isolate were found to adhere tightly with the mold mycelia and produce B-gluconase that degrades the cell wall of the molds and kills them. As many of these yeasts are normally present in fruits and vegetables that are eaten raw, they are not consider pathogenic and thus human may be sick when eat it or when used in salads in fast foods or traditional foods (Barnett et al., 2000).

Uzeh et al. (2009) showed that decay caused by molds and certain bacteria accounts for much of spoilage of fresh fruits and vegetables. Many of these organisms are true plant pathogens in that they can invade healthy plant tissue. While bacterial rot is caused mainly by genus Erwinia, numerous mold such as Alternaria, Botrytis, Phytophtora are responsible for a variety of market diseases from these results above we can observed that our data is in agreement with them.

Bichai et al. (2008) showed that, the presence of Escherichia coli can be related to use of polluted irrigation waters during growth. Contamination through human handling, the use of contaminated containers, or washing after harvest with polluted water. It was suggested that it could increase the incidence of enteric pathogens (Angelillo et al., 2000; Kramer et al., 2000). Products fresh or processed vegetables are the chapped salad ingredients (Lettuce, cabbage, carrots, tometo, cucumber….etc) sold in the grocery store and to the institutional trade (Kaneko et al., 1999).

Ali (1999) reported that biogenic amines are natural antinutrition factors and are important form a hygienic point of view as they have been implicated as the causative agents in a number of food poisoning episodes, and they are able to initiate various pharmacological reaction. Histamine, putrescine, cadaverine, tyramine, tryptam, B-phenylethylamine, spermine, and spermidine are considered to be the most important biogenic amines occurring in foods.

It was suggested that the binge-eating of fast food can lead to measurable signs of liver injury and inflammation. The plentiful availability of relatively in expensive fat-and calorie-packed foods, has helped to make us the fattest (Robert et al., 2008).

Fats which are commonly found in fast food have been shown in many tests to have a negative health effect on the body (Hathcox et al., 1995; Todd, 1997; Ono and Yamamoto, 1999).

It was suggested that fast food consumption has been shown to increase calorie intake, promote weight gain, and elevate risk for diabetes (David Ludwing, 2004). A food may start with a pH which precludes bacterial growth but as a result of the metabolism of other microorganisms (yeasts or molds), pH shifts may occur and permit bacterial growth.

Interplay of factors affecting microbial growth in foods: The interplay between the factors (water activity, pH, temperature) ultimately determines whether a microorganism will grow in a given food. Often, the results of such interplay are unpredictable, as poorly understood synergism or antagonism may occur (Wart, 1989; Smith and Fratamico, 1995).

Richard et al. (2007) reported that some pathogenic bacteria cause sick for human when eat fast foods these bacteria such as: Listeria monocytogenes has been associated with such foods as raw milk, pasteurize fluid milk, cheeses,, ice cream, raw vegtables, fermented raw-meat sausages, raw and cooked poultry, raw meats (of all types), and raw and smoked fish. Its ability to grow at temperature as low as 0oC permits multiplication in refrigerated foods. In refrigeration temperature such as 4oC the amount of ferric iron promotes the growth of L. monocytogenes (Shanal et al., 1986; Dykes and Dworacze, 2002; Gray et al., 2004; Ramaswamy et al., 2007; Dharmarha and Vaishali, 2009; Farber and Peterkin, 2009).

Richard et al. (2007) showed that gastrointestinal disease has been reported by eating raw or inadequately cooked meat containing bacillus spores. B. cereus causes food poisoning by means of enterotoxins, reported that the prevention, because of the resistance of endospores to chemical disinfectants, autoclaving is the only reliable means of decontamination. B. subtilis, B. coagulans were isolated from traditional food samples (table 1) and (table 4) from fast food samples of our study.

Campylobacter jejuni is widely distributed in nature, it infects the intestine, where it can cause ulcerative, inflammatory lesions in the jejunum, ileum, or colon. It is the leading cause of food born disease. Prevention and treatment: diarrhea should be treated using fluids, if disease is severe ciprofloxacin is the drug of choice. Prevention by good hygiene avoiding contaminated water, pasteurizing milk and milk products, and thoroughly cooking potentially contaminated food (e.g., poultry). C. jejuni was isolated from fast food samples only (table 4) (Ryan and Ray, 2004).

Richard et al. (2007) showed that Clostridium perfringen: is part of the normal flora of the vagina and gastrointestinal tract. Its spores are found in soil. Acute food poisoning is caused by the generation of spores in improperly cooked food, resulting in the production of enterotoxin in the small intestine. Treatment of food poisoning requires only supportive care prevention of food poisoning is a matter of appropriate food handling practices. It was isolated from traditional food samples (table 1).

Feng et al. (2007) suggested that Escherichia coli is part of the normal flora in the colon of human and other animals, but can be pathogenic both within and outside the gastrointestinal tract. Enterotoxigenic E. coli (ETEC), this organism is a common cause of "traveler's diarrhea" in developing countries, it infects only humans, with transmission occurring through food and water contaminated with human waste, or by person to person contact. Treatment and prevention by trimethoprim, sulfamethoxazole or ciprofloxacin are the drugs of choice and diarrhea can be prevented by taking precaution in food and water consumption, hand washing and disinfection. E. coli was isolated from traditional food samples (table 1) and from fast food samples (table 4) (Nataro and Kaper, 1998; Fotadar et al., 2005; Vogt and Dippold, 2005; Baumgart et al., 2007).

AVI Biopharma (2008) suggested that Pseudomonas aeruginosa often includes identifying the production of both pyocyanin and fluorescein, as well as its ability to grow at 42oC. P. aeruginosa is capable of growth in diesel and jet fuel, where it is known as a hydrocarbon-utilizing microorganism (or HUM bug), causing microbial corrosion. It creates dark gellish mats sometimes called "algae" because of their appearance. Several studies indicated that P. aeruginosa is the common cause of infections of burn injuries and of the external ear (otitis externa), and is the most frequent colonizer of medical devices (e.g., catheters). However, research indicates that salicylic acid can inhibit pyocyanin production (Prithiviraj et al., 2005).

P. aeruginosa widely distributed in nature (soil, water, plants, animals). P. aeruginosa can grow in distilled water, laboratory hot water baths, hot tubes, wet IV tubing, and other water containing vessels. This explains why the organism is responsible for so many nosocomial infections. This result is in agreement with our results (Heaton and Jones, 2008).

P. aeruginosa was isolated from traditional food samples and was isolated from fast food samples (table 1 and 4).

Pseudomonas putrefactens was isolated from samples (table 1 and 4). Prevention and treatment by aminoglycoside antibiotic and an antipseudomonas lactam.

To protect against Salmonella infection, it is recommended that food be heated for at least ten minutes at 75oC (167oF) so that the center of the food reaches this temperature.

Salmonella is not destroyed by freezing. It can survive several weeks in a dry enviornmetn and several months in water thus, they are frequently found in polluted water, contaminated from the excrement of carrier animals being particularly important (Giannella, 1996; Administration Urged to Boost Food Safety, 2009; FDA/CFSAN-Food Safety, 2009). S. typhi is transmitted generally through food or water contaminated by human feces. Public food handlers or health care delivers who are carriers can present a serious public health problem. Salmonella sp. was isolated from fast food samples (Table 4). Our results goes with the previous studies as FDA-Center for Food Safety (2009).

Staphylococcal gastroenteritis is caused by ingestion of food contaminated with toxin produced by Staphylococcus aureus superantigen.

Some strains of S. aureus are capable of producing staphyloxanthin a carotenoid pigment that act as a virulence factor. It has an antioxidant action that helps the microbe to evade killing with reactive oxygen used by the host immune system. It is though that staphyloxanthin is responsible for S. aureus characteristic golden colour (Claudiz et al., 2006).

It was reported that emphasis on basic hand washing techniques are therefore effective in preventing the transmission of S. aureus. The use of disposable approves and gloves by staff reduces skin-to-skin contact that therefore further reduces the risk of transmission (Neely and Maley, 2000).

Recent reports have demonstrated that many researches showed that introduction of Staphylococcus aureus into the blood stream can lead to various complications including, but not limited to, endocarditis, meningitis, and if it is widespread, sepsis-toxins infecting the entire (Liu et al., 2008; Cosgrove et al., 2009). From the above studies, our results are also in agreement with many researches (table 1 and 4). Exotoxins including enterotoxins cause food poisoning can preventing by infection control procedures such as barrier precautions, washing of hands and disinfection of fomites are important in the control of nosocomial staphylococcus epidermidis, aureus.

Streptococcus lactis, streptococcus thermophilus were isolated from traditional food samples (table 1).

Streptococcus pneumoniae (diplococcus pneumoniae), an important cause of meningitis and bacteremia/sepsis. S. pneumoniae is carried in the nasopharynx of many healthy individuals. Infection can be either endogenous (in a carrier or exogenous (by droplets from the nose of a carrier). Treatment and prevention by penicillin G has been the drug of choice, using an anti-pneumococcal capsular polysaccharide vaccine.

Yersinia species is endemic distributed worldwide. Infection is transmitted by fleas, the organism can also be transmitted by ingestion of contaminated animal tissues, or via the respiratory route Y. pestis was isolated from fast food samples (table 1).

Some members of yersinia are pathogenic in humans, in particular, Y. pestis is the causative agent of the bubonic plaque. Rodents are the natural reservoirs of yersinia, less frequently other mammals serve as the host. Infection may occur either through blood (in the case of Y. pestis) or in an alimentary fashion, occasionally via consumption of food products (especially vegetables, milk-derived products and meat) contaminated with infected urine or feces (Ryan and Ray, 2004; Bichai et al., 2008 and Malekzadeh et al., 2009). These results were agreed with our results obtained. Yersinia may be associated with Crohn's disease, an inflammatory autoimmune condition of the gut. Treatment and prevention, Streptomycinis the drug of choice, gentamicin and tetracycline are acceptable alternatives.

For individuals in enzootic areas, efforts to minimize exposure to rodents and fleas is important. The above studies and discussion are in agreement with our research.

Barnett et al. (2000) reported that many mycotoxins found in various foods:

Aspergillus toxins: (a) Aflatoxins: Aspergillus and Pencillium sp. have been reported to produce aflatoxins, and the aflatoxins have been isolated from legumes, grains, fruits, meats, spices, cheeses, milk, rice, corn, cotton seeds, others compounds with carcinogenic, hemorrhagic, heptaotoxic, neurotoxic and uterotrophic properties have been isolated form food stuff and identified as metabolites of fungi common to a variety of agricultural commondities. The potential for economic loss and human health effects make mold contamination of agricultural products doubly significant (Shank et al., 1972). (b) Ochratoxins: these substances are a group of closely related compounds produced by Aspergillus ochraceus, A., sulphureus, and A. melleus. A. ochraceus group is common in soils and decaying vegetation, grains, wheat, corn, cotton seeds, legumes, peppers, onions and pears (Raper and Fennell, 1965; Adams and Moss, 2000). (c) Sterigmatocystin: another common food contaminant is Aspergillus versicolor, A. nidulans, a compound bearing some structural resemblance to the aflatoxins in that, it produces liver and kidney damage and is like the aflatoxing a hepatocarcinogen (Stack and Rodericks, 1973). (d) Other Aspergillus toxins: there are a number of other metabolites of this genus which have been shown to toxic to animals, which are potential food contaminants.

Penicillium toxins: (a) Patulin: among the more important of the large number of mycotoxins produced by the penicillia is the potent antibiotic, patulin. Species have been described as patulin producers: P. claviforme, p. divergens, P. expansum, P. griseofulvum, P. patulum, P. novozealandia and P. Lapidosum (Harwig et al., 1973). Penicillic acid, rubrotoxin, and tremorgens and cyclopiazonic acid, that compounds elaborate a toxin and have potential carcinogenic agents (Horwig et al., 1973). (b) Rice toxins: Storage fungi proliferate in improperly stored rice. Most are of the genera Aspergillus and Pencillium, and about 10% of the isolates tested are toxigenic. The toxic effects of these substances interactiosn among them, and their natural occurrence have been reported (Saito et al., 1971). A polyenic compound called citreoviridin and an acidic compound known as citreomycetin. Some of these toxins affect the liver and kidney, some are neurotoxic.

Fusarium toxins: (a) Zearalenone, trichothecenes (diacetoxyscirpenol) and other toxigenic fungi, their potential for human health effects is probably realized by growth of Fusarium sp. on grains after harvest in a high moisture condition. This mycotoxin has been associated with outbreaks of vulvovaginal swine. It was reported that it is probably one of the more common mycotoxin contamination of food and feed (Pelczar et al., 2006). (b) Trichothecenes: There are mold metabolites which have structural features similar to those of the compound known as diacetoxyscirpenol. The acute toxicity of some of mycotoxin trichothecenes cause hemorrhage on the lip and mouth, throat, and entire gastrointestinal tract.

International commission on microbiological specifications for foods (ICMSF, 1999) reported that there are hundred of fungal species which have been shown to be toxigenic from animal feeds, peanuts, and seeds, flour, spaghetti, black and red peppers the following genera showed toxic isolates: Alternaria; Cheotomium, Cladosporium, Curvularia, Gliocladium, Rhizoctonia, Scopulariopsis, Trichoderma, Trichothecium. Pithomyces chartarum produce mold metabolites known as sporidesmins and Rhizoctonia leguminicola produce Slaframine causing diarrhea for animals.

ICMSF (1996) suggested that control of fungal toxin production can be occurred by the adjustment of pH, water activity, and temperature control.

Temperature does not protect from all toxigenic molds, however, for many will grow at refrigeration temperatures (ICMSF) found several toxigenic species capable of growth and toxin production at temperatures down to 10oC. There is evidence that some strains may be more toxigenic at low temperatures than at optimum growth temperatures. Adjustment of water activity is the best means of controlling growth of microorganisms in foods. e.g., Campylobacter cells when ingested with food or water, it enter the host intestine via the stomach and colonize the distal ileum and colon (Ketley, 1995). The most effective means of eliminating human exposure to mycotoxins in foods is by the prevention of toxin formation. This requires agricultural and industry practices designed to reduce the opportunity for fungal growth from harvest to ultimate commodity use. Prevention of mycotoxins must become a cooperative effort on the part of all involved in food production.

However, the need for good hygienic practices, proper handling, storage and retail of salads in clean environment and at refrigeration temperature can not be over emphasized to ensure good quality and safe salads.

WHO's (2007) was reported that, it is important to handle food in such a way that the microorganisms present do not have a chance to multiply and to prevent food from becoming contaminated with other microorganisms by:

1. Wash and dry hands before preparing any food and after handling raw foods (meat, poultry, vegetables or fruits).
2. Ensure that food preparation areas and equipment are clean.
3. Protect kitchen areas or restaurants and food from insects, pests and other animals.
4. People with gastrointestinal illness, such as vomiting or diarrhoea, should not handle food intended for consumption by others.

We can concluded that if people have meals regularly and in suitable quantities, there will not be any health problems, relating habits concerning to nutrition according to what the healthy nutritional experts specify, if all the society follow right nutritional habits, healthy foods, they have health.

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