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.

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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 ferementers 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 preparied 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 M_1:

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 M_1 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 $8x10^{8}$ cfu/g with an average of $3x10^{4}$ 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.

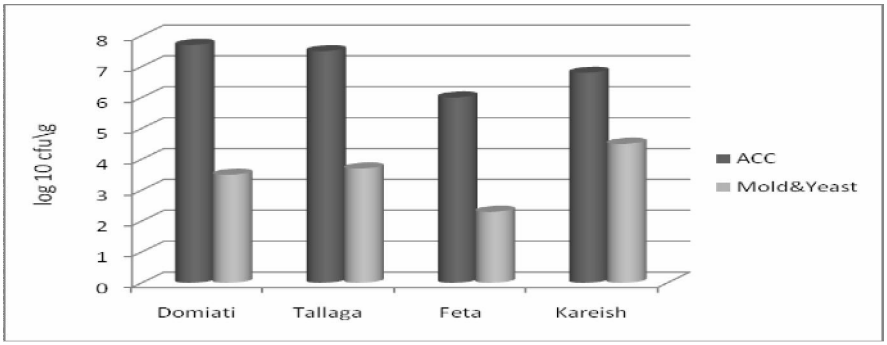
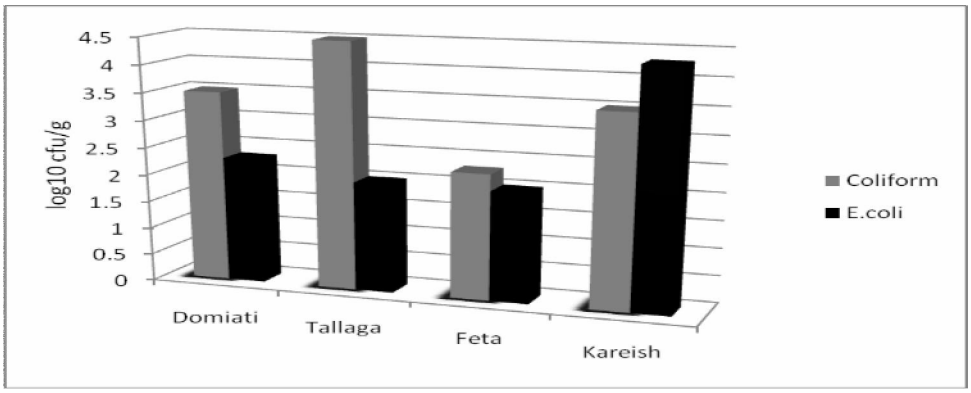


Fig (1): Microbial indicators determining the quality of the retailed Egyptian white soft cheese varieties.



Fig(2) ; Coliform group , *E.coli* , as indicators and foodborne etiologies in the retailed white soft cheese Egyptian varieties .

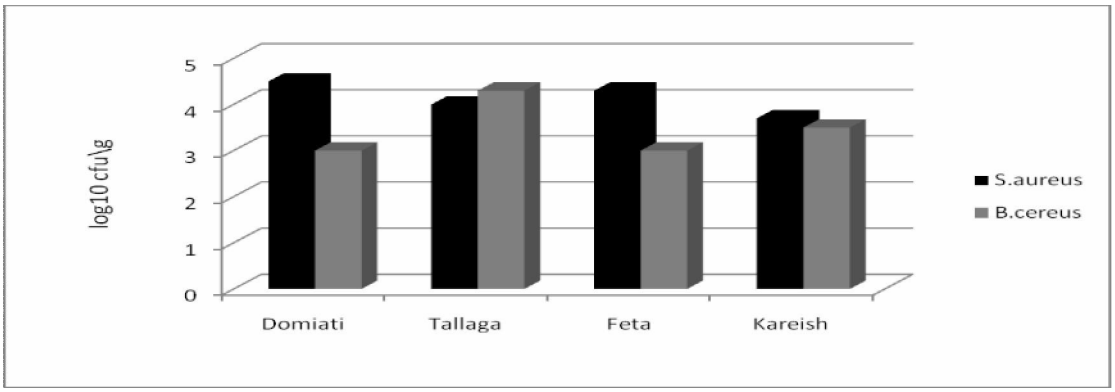


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Fig (3): *Staphylococcus aureus and Bacillus cereus* in the retailed Egyptian varieties of white soft cheese.

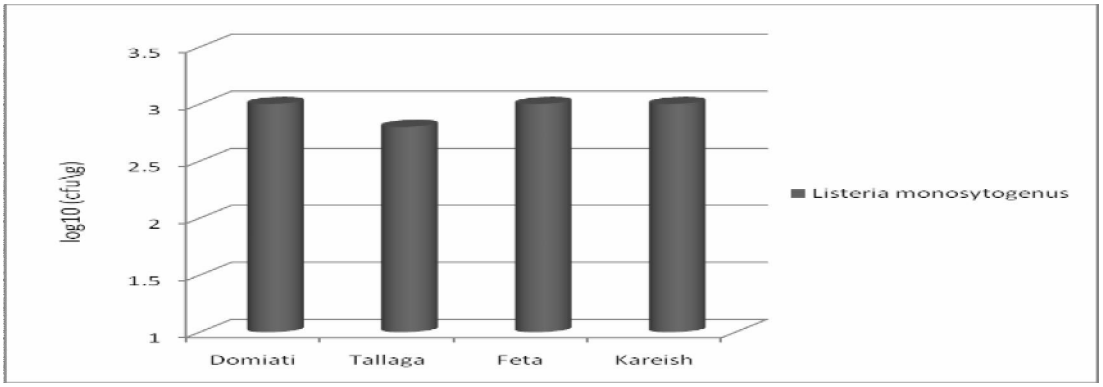

Fig (4): *Listeria monocytogens* in the retailed Egyptian varieties of white soft cheese.

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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