Egypt. J. Chem. **Vol. 66**, No. 2 pp. 449 – 457 (2023)

Egyptian Journal of Chemistry

http://ejchem.journals.ekb.eg/

Microbiological and Chemical Quality Assessment of Soft White Cheese Produced by Large Egyptian Dairy Plants

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Abstract

The compliance with the microbiological and chemical limits required by the cheese standards was tested in different samples of soft white cheese produced by dairy plants in Egypt. According to the cheese standard, almost the mean of microbial counts in all cheese samples were above standard limits. Cheese samples were contaminated by lactic acid bacteria, coliform group, and *Staphylococcus aureus*. Pathogenic bacteria were not detected in any sample. The samples were analyzed to investigate of some physiochemical composition and preservatives parameters. The obtained data revealed that most of the examined samples recorded very low protein, sodium chloride and high fat contents, besides the presence of a preservative substances. The means of protein content of tested cheese samples ranged from 7.83 to 9.50%. The average fat content of tested cheese samples ranged from 21.37% to 24.5%. NaCl ranged from 2.5 to 3.6. Preservatives content of the samples higher than standard limits, which were statistically significant. The microbiological and chemical parameters of soft white cheese samples in this study showed unacceptable results for most samples. Therefore, these specifications should be reviewed, and some items should be changed to achieve minimal nutritional and healthy value being requested in the dairy products.

Keywords: Chemical quality, Preservatives substance, Pathogens, Lactic acid Bacteria, Soft cheese.

1. Introduction

Cheese is recognized to be of abundant nutritional value for human consumption. Protein in cheese has a high biological value and cheese contains all essential amino and fatty acids. As well as it is a good source of minerals and vitamins **[1].** Modifications of the manufacturing process have led to the emergence of a wide variety of cheese, many of them closely related to the cultural and geographical conditions of their origin; currently, more than 500 cheese varieties are described, depending on their final characteristics **[2]**. The Food and Agriculture Organization (FAO) reports that cheese consumption worldwide has increased by 5% last 4 years, and global cheese market revenue is anticipated to escalate to $124 billion by 2022**.** This FAO report attributes the majority of global cheese consumption to the European Union and North America, with per capita consumption expected to increase through 2028 **[3].** Lactic acid bacteria (LAB) are fundamental for the development of specific flavor and odor in cheese, especially starter LAB during manufacturing and non-starter LAB during ripening. Traditional cheeses were initially manufactured with raw milk, and therefore many sensorial traits have been associated with the presence of autochthonous LAB. It is also considered that some rheological and sensory properties are lost when pasteurized milk is used as a starting material in cheese manufacturing **[4].** On the other hand, cheese nutrients can promote the growth of many microorganisms, including food-borne pathogens. Although LAB are predominant in cheese, other microorganisms are also present, including yeast, molds, spoilage bacteria, and foodborne pathogens (*Brucella* spp., *Staphylococcus aureus*, *Listeria monocytogenes*, *Salmonella* spp. among others), There are numerous reports of foodborne outbreaks related mainly to fresh cheese **[5].**

Soft white cheese production in Egypt accounts for 75% of total cheese production. The use of ultrafiltration (UF) in cheese making offers many advantages, as it increases cheese yield, low-cost production, the product has high nutritional and health value as well as solves the problems of whey

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Receive Date: 20 April 2022, Revise Date: 24 May 2022, Accept Date: 31 May 2022

DOI: 10.21608/EJCHEM.2022.134985.5938

disposal which produced by the traditional method **[6, 7].** This type of cheese produce either by enzymatic or acidic coagulation of fresh milk or reconstituted skim milk powder containing some food additives with vegetable oils. It is a low-salt soft white cheese, which is specifically popular in the countryside **[6].** Pasteurized soft white cheese has all conditions necessary for the multiplication of bacteria and fungi. The microbial load of pasteurized white soft cheese is determined by several factors, including the quality of milk, heat treatment, and transportation temperature and storage conditions. The factors that may hinder the multiplication of microorganisms in cheese are refrigeration, sterilization, the addition of salts, lowering the pH and decreasing water content. The commonest method of milk sterilization is pasteurization, which destroys all the pathogens in milk, except for spore-forming pathogens **[8].**

The added chemicals include chemicals that are intentionally added such as permitted food additives and non-intentionally added chemicals to a food such as cleaning and sanitizing chemicals. Food and agricultural organization describes preservative as any substance which is added to food and enables the physical properties and chemical composition of food to remain unaffected by microbial or other spoilage so that milk and dairy products retain their original whole sameness and nutritional value **[9]**.The most likely preservatives to be found in milk are formaldehyde, hydrogen peroxide, and neutralizers such as sodium bicarbonate, which preserve it for a longer time and prevent curdling. Benzoic acid, sorbic acid, and their salts are commonly used as chemical preservatives in food products including cheese to prevent alteration and degradation by microorganisms during storage. However, excessive addition of these preservatives may be harmful to consumers, because of the tendency to induce allergic contact dermatitis and spasm. Therefore, the development of convenient and inexpensive analysis methods of these preservatives is of great importance for food safety **[10]**.

This study aimed to evaluate the microbiological and chemical quality of soft cheese produced by large plants in Egypt.

2. Materials and methods

120 different soft white cheese samples were randomly collected from dairy shops and supermarkets from Egypt. The cheese varieties included feta, double cream, baramely, and istanbully cheeses (different large sectors for each one). The cheeses were sampled in triplicates, kept at 4 °C, transported to the laboratory, and analyzed within 24 h of receipt.

2.1. Microbiological examination

All microbiological techniques were performed according to Bacteriological Analytical Manual **[11]** as the following:

Cheese samples were analyzed for Aerobic bacterial count, Lactic acid bacteria, Total coliforms, Fecal coliforms, *Staphylococcus aureus*, and Yeast and Mold using plate count technique on Plate count agar, De man, Rogosa, Sharpe (MRS), Mac-Conkey, Baird parker egg yolk tellurite and Potato dextrose (PDA) agar media, respectively. Whereas, the *Salmonella* spp., *Shigella* spp., *Bacillus cereus*, *Campylobacter* spp. and *Listeria monocytogenes* were detected by enrichment technique **[11]** on brilliant green agar and bismuth sulfite, xylose lysine deoxycholate (XLD), *Salmonella Shigella* (S.S), *Bacillus cereus*, *Campylobacter* blood and Palcam agar media, respectively as the following:

Detection of *Salmonella* spp. and *Shigella* spp. was performed as fallow; The sample was mixed with sterile 1% peptone water in a ratio of 1:10 and incubated at 37°C for 24 hr. One ml of the pre-enriched broth was transferred to a sterile test tube containing 9 ml selenite broth as an enrichment medium. The tubes were incubated for 16-18 h at 37°C after which a loopful from each enriched broth was streaked on the surface of both XLD, S.S. agar, brilliant green and bismuth sulfite agar media **[12].**

Detection of *Bacillus cereus*: The sample was mixed with sterile 1% peptone water in a ratio 25:225 and incubated at 37°C for 24 h to enrichment. After which a loopful from each enriched broth was streaked on the surface of *Bacillus cereus* agar base medium.

Detection of *Campylobacter* spp.: Two grams of each sample were transferred to screw tube containing 10 ml of thioglycolate broth medium supplemented with Skirrow and incubated at 37°C for 24 hours under microaerophilic conditions. A loopful from each enriched broth was streaked on the surface of both *Campylobacter* blood agar base media (10% sheep blood) and selective *Campylobacter* agar base medium. The plates were incubated inverted at 43°C for 48 hours under microaerophilic conditions using

gas generation kits specific for *Campylobacter* spp. **[13].**

Detection of *Listeria monocytogenes*: 25 grams from each sample were added to 225 ml of *listeria* enrichment broth medium. Enrichment broth was incubated at 30°C for 7 days. After that, 0.1 ml of the inoculated enrichment broth culture was streaked on Palcam agar media incubated at 35°C for 24-48 hours and loopful from *listeria* enrichment broth culture was streaked on Oxford agar incubated at 37°C for 24- 48 hours **[14].**

2.2. Physiochemical analysis

Fat content, total solids and protein content of cheese were determined in collected samples **[15].** The pH values were determined using benchtop pH meters, HANNA Model HI –9321**[16]**.

The filtrate of cheese samples was assessed for its sensitivity to various enzymes (protease E, pepsin, trypsin) and heat treatments at 90°C **[17, 18]** to estimate the concentration of nisin using well diffusion technique in presence of indicator microorganisms (*Staphylococcus aureus, Micrococcus luteus, Bacillus cereus, Bacillus subtillus* and *Candida* spp.). The nisin also was detected by turbidimetric assay **[19]**. Natamycin content in samples assayed using spectrophotometric method **[20]**. Detection of ß-Lactam antibiotic residues in samples was performed according to the official European method for detecting antibiotic residues in dairy by indicator microorganisms (Commission Decision 91/180/EEC of 14 February 1991) and using the quantitative enzyme immunoassay (ELISA) technique **[21]**.

Detection of formalin **[22]**, hydrogen peroxide **[23]** and sulphur dioxide by using spectrophotometric method **[24]** in collected samples. Determination of both potassium bonzoate and potasium sorbate according method of **[24]** and nitrate using sulfanilic acid method **[25]**.

2.3. Statistical analysis

SPSS for statistical software (version 13; SPSS Institute Inc., Chicago, IL) was used for all statistical analysis in this investigation. All data are shown as mean ± standard deviation means **[26]**.

3. Results and discussion

3.1. Microbiological quality of soft white cheese produced from large dairy plants.

The microbiological analysis of soft white cheese samples produced by large plants in Egypt are given in **Table (1).**

The results in **Table (1)** revelated that the total aerobic bacterial count in cheese samples was ranged between 2.36 and 4.95 log cfu/g with an average of 3.71 log cfu/g of double cream, while paramely cheese samples were ranged between 2.11 and 4.51 log cfu/g with an average 3.39 log cfu/g. Istanbuly cheese was ranged between 2.07 and 3.60 log cfu/g with an average of 2.82 log cfu/g and feta cheese were ranged between 1.09 and 2.69 log cfu/g with an average of 2.20 log cfu/g. These results were lower than results as reported by Abdel Moneim *et al*, 2016 **[27]** who found aerobic bacterial count in soft white cheese was 6.69 log cfu/g.

The decrease of aerobic bacterial count (ABC) level in this study may be due to different factors such as pasteurized milk, good hygienic processing conditions and added some preservative agents. Whereas high microbial load values for cheese samples reflected the general unhygienic conditions used during production and storage **[28].**

Determination of lactic acid bacteria (LAB) group was done to characterize the predominant microbiota at each step of the manufacturing of white cheese, as well as to establish differences among dairies analyzed and responsible for many of the physicochemical and rheological cheese properties, and also influences the sensorial profile **[4].** LAB was determined in all cheese samples. Obtained results showed an absence of lactic acid bacteria in some samples. The absence of LAB indicate that didn't use as starter cultures in these cheeses. Few samples have LAB ranged from < 1.0 to 2.70 log cfu/g of tested cheese samples.

Yeasts and molds are dominate microflora in cheese because they can tolerate low water activity and pH, high salt concentrations, and low storage temperatures and are resistant to some chemicals such as sanitizers and cleaning. Certain yeasts may cause spoilage by having the ability to use lactose, proteins, lipids and can produce gas, off-flavors, softening of texture, and discoloration changes in dairy products, especially with low pH such as yogurt, soft white cheese. Yeast spoilage activities might lead to alteration of the organoleptic properties, decreased shelf life, and impaired quality of white cheeses **[29]**. Yeasts and molds were determine in all tested samples. Total yeast and molds count were ranged between 1.77 and 4.25 log cfu/g recorded by double cream samples with an average 3.17 and 2.75 log cfu/g of paramely and

istanbuly cheese 5.4 log cfu/g in feta cheese sample.

Table (1): Microbiological load (log cfu/g) in soft white cheese produced from large dairy plants in Egypt

Cheese types	Microbial groups (log cfu/g) ± SD														
	ABC			LAB			Coliform group			*Staphylococcus aureus*			Yeast & Molds		
	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
Double Cream	2.36 ± 0.34	3.71 ± 0.98	4.95 ± 0.24	< 1.0	1.90 ±0.53	2.70 ± 0.34	< 1.0	1.86 ± 1.51	3.36 ± 0.50	< 1.0	0.80 ± 1.26	2.8 ±0.84	1.77 ± 0.55	2.98 ±0.92	4.25 ± 0.15
Paramely	2.11 ± 0.54	3.39 ± 0.80	4.51 ± 0.11	< 1.0	1.43 ± 0.27	1.69 ± 0.24	< 1.0	1.90 ± 1.6	3.63 ± 0.72	< 1.0	0.70 ± 1.08	2.2 ± 1.0	2.04 ± 0.19	3.17 ±0.98	4.32 ± 0.65
Istanbuly	2.07 ± 0.62	2.82 ± 0.74	3.60 ±0.54	< 1.0	< 1.0	< 1.0	< 1.0	1.63 ±1.84	3.85 ±0.33	< 1.0	0.90 ±1.05	2.3 ±1.64	1.69 ± 0.22	2.75 ±0.81	3.96 ± 0.17
Feta	1.09 ± 0.88	2.20 ± 0.62	2.69 ± 0.73	< 1.0	1.33 ± 0.48	1.61 ±0.7 1	< 1.0	1.20 ± 0.62	1.30 ± 0.23	< 1.0	0.50 ± 0.79	1.20 ±1.2 6	1.84 ± 0.34	3.32 ±1.4	5.40 ±0.89

ABC* = aerobic bacterial count LAB* = lactic acid bacteria Min* = minimum Max* = maximum
all data are shown as mean ± standard deviation (SD) means.

These results were above the limits required by the Egyptian standards **[30]** which should not exceed 10 cfu/g for fungi and 400 cfu/g for yeast. Yeasts and molds which may result from different sources contaminate the product during production and through the post-process contamination during handling and packaging of the product, the quality and shelf-life of cheese are affected negatively **[29]**.

Fecal *E.coli* and pathogenic bacteria were not detected in any sample, but total coliform group and *Staphylococcus aureus* were found in some samples. The means count of the coliform group were 1.86, 190, 1.63 and 1.2 log cfu/g of double cream, paramely, istanbuly, and feta, respectively. The count of coagulase-positive *Staphylococci* is lower than the established standards (2.0 log cfu). Its mean ranged from 0.50 to 0.90 log cfu/g in tested samples.

Medveďová *et al*, 2019 **[31]** stated that *Staphylococcus aureus* is often present on human skin and in nosal passages and is potentially a post-processing contaminant. Conditions required for *Staphylococcus aureus* growth are temperature 5–46ºC, pH 5.0–9.0, and water activity >0.86 and it can grow at 0–20% NaCl. *S. aureus* may be the main cause of several food intoxication outbreaks for their production of heat-stable enterotoxins, which can cause food poisoning with levels as low as 0.5ngg-1. White soft cheese products can be prepared with raw milk or with pasteurized milk in Egypt. It is important to consider that pasteurization is not enough to maintain microbial quality in the final product, and good manufacturing practices need to be enforced throughout cheese production and storage **[31,32].** So_2 absence the most of pathogenic bacteria in all cheese samples results from an add some preservatives, pasteurization, salting and acidity level which is an efficient control measure, regardless the environmental and health burdens. Normally, this pathogen able to be present in cheese at the first stage of maturation, and then it becomes inactivated as ripening proceeds **[33]**, but pasteurized white soft cheese is produced from pasteurized milk, without a ripening process and sold as fresh. Therefore, the presence of some microorganisms in cheese samples suggests that environmental conditions were not controlled during manufacturing or inadequately pasteurized milk was used in cheese production.

3.2. Physiochemical composition in soft white cheese

The results recorded in **Table (2)** shows the mean fat content in cheese samples was 24.5, 22.7, 22.62, and 21.37 % in double cram, paramely, istanbuly, and feta, respectively. High levels of fat content in the present study are related to the use of extra vegetable oils instead of milk fat to reduce the cost of cheese making. The vegetable oils are the cheapest fat in the market and such fat gives better properties of the cheese texture.

The means of protein content of tested cheese samples ranged from 7.83 to 9.50 %. These results are below of standards limit which should be 10% at least. This reduction of protein content in pasteurized soft white cheese because of using different ratios of dry milk in addition to increasing the total solids of cheese milk during the manufacture of such cheese. The highest mean of total solids (TS) content was observed in istanbuly cheese (45.0%), whereas the

lowest mean was recorded by feta cheese (35.0 %), these results are below of standards limit (> 40 % TS). The means of salt content (NaCl) were 3.0, 3.5, 3.6, and 2.5% in double cram, paramely, istanbuly, and feta, respectively. Salt contents in pasteurized soft white cheese are lower than measured in raw milk soft white cheese (traditional). These salt levels are lower than salt required to control the potential microbial hazards. This results are in agreement with that reported by Abdelhalim *et al* (2007) **[34].**

Table (2): Physiochemical composition in soft white cheeses produced from large dairy plants in Egypt.

Cheese types	Physiochemical composition ± SD														
	Fat %			Protein %			Total solid%			Na Cl %			pH		
	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
Double Cream	18.0 ±2.06	24.5 ±1.2	29.0 ±1.06	3.23 1.30	8.56 ±0.54	10.0 ±1.2	35.0 ±0.45	43.0 ± 3.2	45.0 ±0.88	2.0 ±0.98	3.0 ± 0.23	3.5 ± 0.56	3.0 ± 0.78	3.8 ± 0.61	4.0 ± 0.78
Paramely	15.0 ±1.70	22.7 ±1.04	28.0 ±2.8	3.62 ±1.45	7.83 ±0.67	9.00 ±2.8	38.0 ±0.82	40.0 ± 2.7	48.0 ±0.78	2.5 ± 0.87	3.5 ± 0.41	3.8 ± 0.76	3.2 ± 0.39	3.5 ± 0.21	4.0± 1.2
Istanbuly	16.0 ±1.33	22.62 ±1.3	27.0 ±1.98	3.75 ± 2.0	8.25 ±0.99	13.0 ±3.2	35.0 ±0.65	45.0 ± 4.6	50.0 ±3.8	3.0 ± 0.54	3.6 ± 0.52	4.0 ± 0.90	3.0 ± 0.48	3.4 ± 0.45	4.0± 0.78
Feta	13.0 ±3.91	21.37 ±1.14	25.0 ±3.22	3.5 ±1.80	6.50 ±0.87	8.52 ±2.7	31.0 ± 3.8	35.0 ± 3.8	45.0 ± 3.8	1.5 ± 0.66	2.5 ± 0.27	3.5 ± 1.8	3.2 ± 0.88	4.0 ± 0.23	4.6± 0 .45

all data are shown as mean ± standard deviation (SD)

means. Min* = Minimum Max* = Maximum

Obtained results indicated a decreased pH in all tested cheese samples, the average values of pH were 3.8, 3.5, 3.4, and 4.0 for double cream, paramely, istanbuly and feta, respectively which possible be attributed to the addition of some acid lance such as glucan delta lactone (GDL) as acidic substance during making these cheeses according to the manufacturer methodology.

3.3. Preservatives substance in pasteurized soft white cheese

It is evident that chemical preservatives are the most prevalent type of inhibitory substance. Some unscrupulous producers tend to add preservatives to milk and dairy products in order to mask the neglected sanitary measures and to improve its keeping quality. Chemical preservation works either as direct microbial poisons or as acid neutralizer to prevent the microbial growth **[35]**.

The detection of formalin, hydrogen peroxide, sulfur dioxide and ß-Lactam antibiotic residues and the determination of potassium sorbate, potassium benzoate, nitrate, nisin and natamycin in cheese tested were presented in **Table (3).** The obtained results show that 4.0 (13.3) out of 30 examined double cream samples contained formalin substances; 3.0 samples (10%) contained hydrogen peroxide and 5.0 samples (16.6%) contained Sulphur dioxide in istanbuly cheese samples, 2.0 Feta samples (6.67%) contained ß-Lactam antibiotic residues (tetracyclines only), it was not detected in the rest of the examined cheese samples. It is known that long continuous intake of formalin or hydrogen peroxide and ß - Lactam antibiotic residues might be harmful, as it causes damage to the gastrointestinal tract, primarily the stomach and lower esophagus. In addition, it may have a carcinogenic effect on human and severe acidosis which result from the rapid conversion of formaldehyde to formic acid [35]. Formaldehyde and sulfur dioxide are added to food because of their antiseptic and preservation properties, improving the appearance of the product, and keeping it moist and odorless **[36]**.

Table (3): Assessment of preservative agents in soft white cheese samples produced by large dairy plants in Egypt.

Cheese types	Detection of preservative agents								Determination of preservative agents (ppm) ± SD													
	N*	Formalin		Hydrogen peroxide		Sulphur dioxide		ß-Lactam antibiotic		Potassium sorbate			Potassium benzoate			Nitrate			Nisin			Natamycin		
		NO. of positive samples								Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
		n	%	N	%	n	%	n	%															
Double	30	4.0	13	Nd	0	nd	0	nd	0	800.0 ±	1000 ±	1100 ±	200 ±	500 ±	700 ±	15.0 ±	38.0 ±	40.0 ±	9.50 ±	16.0 ±	18.5 ±	35.3 ±	45.0 ±	65.7 ±

cream			.3							0.20	0.22	0.50	0.24	0.41	0.80	1.7	0.38	0.34	0.44	0.44	0.78	0.44	0.62	0.94
Paramely	30	nd	0	Nd	0	nd	0	nd	0	700.0 ± 0.31	850 ± 0.67	1000 ± 0.72	350 ± 0.98	450 ± 0.17	500 ± 0.82	20.0 ± 0.99	40.0 ± 0.59	47.0 ± 0.59	12.0 ± 1.3	15.0 ± 0.77	16.3 ± 1.2	30.4 ± 1.20	43.0 ± 0.93	65.6 ± 1.44
Istanbuly	30	nd	0	3.0	10.0	5.0	16.6	nd	0	250.0 ± 0.99	1100 ± 0.34	1500 ± 0.67	400 ± 0.19	550 ± 0.18	700 ± 0.98	12.5 ± 0.57	45.0 ± 0.82	52.0 ± 0.50	10.5 ± 0.91	13.8 ± 1.19	15.4 ± 0.98	28.0 ± 0.44	35.0 ± 0.78	45.3 ± 1.04
Feta	30	nd	0	Nd	0	nd	0	2.0	6.67	600.0 ± 0.20	900 ± 0.56	1100 ± 0.47	430 ± 0.87	520 ± 0.3	600 ± 0.56	33.0 ± 1.7	38.0 ± 0.69	45.0 ± 0.89	12.0 ± 1.3	14.0 ± 1.66	16.0 ± 0.91	35.0 ± 0.89	55.0 ± 0.12	70.2 ± 0.44
Standard limit (CODEX)	Not add									1000 ppm			500 ppm			35 ppm			12.5 ppm			40 ppm		

N* = number of the samples analyzed n* = number of the samples detected. nd* = not detected
all data are shown as mean ± standard deviation (SD) means. Min* = minimum Max* = maximum

It reduces the bacteria count and increases the shelf life of milk, it is a highly reactive chemical that readily combines with DNA, RNA, proteins, and amino acids **[37]**. However, they exert toxic effects on humans, including irritation of the eyes and respiratory tract, headaches, nausea, drowsiness allergic skin reactions, and carcinogen **[38]**. β-lactam group of antibiotics are widely used in therapy for bacterial infections in cattle, particularly for the treatment of mastitis, the most common disease in adult dairy cows **[39]**. According to the European (EU) and Codex Alimentarius Commission standards (CAC), the maximum residue levels (MRLs) in milk for tetracyclines, including Oxytetracycline, is 100 µg/kg or 100 ppb **[40].**

Potassium sorbate was detected in the examined soft cheese samples with mean values of 1000, 850, 1100, and 900 ppm.; while potassium benzoate content was detected with mean values of 500, 450, 550, and 520 ppm. of double cream, paramely, istanbuly, and feta, respectively. The average value of nitrate concentration in cheese samples ranged between 38.0 and 40.0 ppm.

The minimum and maximum concentration of nitrate were in istanbuly cheese samples being 12.5 and 52.0 ppm respectively against standard limit 35 ppm. The mean of nisin concentration ranged from 13.8 to 16.0 ppm recording the minimum (9.5 ppm) and maximum value (18.5 ppm) in tested double cream cheese samples, knowing that the standard limit is 12.5 ppm according to CODEX, 2019 **[41]**. The minimum and maximum concentration of natamycin were recorded in some samples of double cram and feta cheese respectively with the average ranged between 35.0 and 55.0 ppm. These results were not conformable to the standard limit. Excessive addition of these preservatives may be harmful to consumers, because of the tendency to induce allergic contact dermatitis and convulsion **[42].**

Potassium sorbate, $C_6H_7KO_2$, has a linear structure with two unsaturated bonds consumed in cheese, yogurt, beverage, processed meat, cake and pastry **[43].** Potassium sorbate at 500 ppm acts as an efficient fungicide **[35]** while, **[44]** mentioned that addition of sorbate with concentration of 0.1% can inhibit the growth of *Staphylococcus aureus* in processed cheese**.** Sodium benzoate, $C_7H_5NaO_2$ is added to a wide range of food products like soft drinks, natural fruit juice and dairy products with acidic environment. Nitrate is used in Europe to prevent late blowing of certain cheeses due to *Clostridium butyricum* **[45]**. Nisin-producing *Lactococcus lactis* is a antimicrobial polypeptides is applied in fermented foods (mostly dairy products), and it is generally recognized as safe, that act against Gram-positive bacteria (acting in the peptidoglycan walls), Gram-positive bacteria and yeast but with low activity against Gram-negative bacteria and molds **[46].** Natamycin, known as pimaricin, is a polyene macrolide antifungal drug is commonly used to delay yeasts and mold growth in cheese **[47]**.

4. Conclusion

According to standards limit, the results of the present study showed the following:-

- All cheese samples were contaminated with yeasts and molds and bacteria respectively. Almost cheese samples were satisfactory for total coliform bacteria, *S. aureus* and lactic acid bacteria. Physiochemical composition in samples are not conformity with standard limits. The

microbiological quality of soft white cheese in this study indicates insufficient sanitation during the manufacture, handling, and storage of this type of cheese. It is considered an improvement the implementation of ‘‘Good Manufacturing Practices’’ in the production of soft white cheese is fundamental for preventing contamination.

- The results obtained from this work allow us to conclude that, formalin, hydrogen peroxide, sulphur dioxide and ß-Lactam residues antibiotic (tetracyclines) were detected in some samples of tested cheese, while potassium sorbate, potassium benzoate, nitrate, nisin and natamycin were detected in all examined cheese samples with variable concentration, that explains the decrease of microorganisms presented in this type of samples.
- Therefore, to ensure safety in dairy industries the following suggestions should be observed:

1) Strict hygienic measures should be adopted in dairy farms to ensure the production of high-quality milk.
2) Good sanitary conditions should be applied during production and processing of milk. Educational programs should be imposed on producers, processors, and handlers to improve the quality of the product and to ensure maximum safety to the consumers.
3) Application of effective technological measures (pasteurization, sterilization, acidification, and natural additives in technological processes to prolong the product shelf life and decrease or eliminations of pathogens in chesses and milk products.
4) Application of adequate control measures through periodical examination of market cheeses and milk products by specialists to ensure maximum safety to the consumers.
5) Good manufacturing practices should be maintained throughout, and HACCP should be applied to ensure the safety of the finished products.

5. Acknowledgment

Better governmental supervision on supermarkets and sectors selling soft white cheese with regular sampling of their products.

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الملخص العربي

تقيم الجوده الميكروبيولوجيه والكميائيه للجبن الابيض الطرى المنتج بمصانع منتجات الالبان الكبيره فى مصر

تقيم الجوده الميكروبيولوجيه والكميائيه وفقآ للمعاير المحدده للجبن الابيض الطرى الذى تنتجه مصانع منتجات الألبان فى مصر. اوضحت النتائج المتحصل عليها أن متوسط أعداد المجاميع الميكروبيه في جميع عينات الجبن أعلى من الموصفات القياسية المسموح بيها. عينات الجبن كانت ملوثة ببكتريا حمض اللاكتيك ومجموعة القولون والمكورات العنقودية الذهبية. أظهرت النتائج عدم وجود اى انواع من البكتريا المرضيه فى العينات التى تم تحليلها. تم تحليل العينات لمعرفة بعض التقديرات الفيزيوكيميائية والمواد الحافظة. أظهرت البيانات التي تم الحصول عليها أن معظم العينات التي تم فحصها ذات محتوى منخفض جداً من البروتين وكلوريد الصوديوم ومحتوي عالية من الدهون ، إلى جانب وجود العديد من المواد الحافظة. تراوحت متوسطات محتوى البروتين في عينات الجبن المختبرة من 7.83 إلى 9.50٪. تراوح معدل محتوى الدهن لعينات الجبن المختبرة من 21.37٪ إلى 24.5٪ بينما تراوحت نسبة كلوريد الصوديوم من 2.5 إلى 3.6. كان محتوى المواد الحافظة في العينات أعلى من الحدود المسموح بيها ، وهذا ذو دلالة إحصائية. أظهرت التحليلات الميكروبيولوجية والكيميائية لعينات الجبن الأبيض الطري في هذه الدراسة نتائج غير مقبولة لمعظم العينات. لذلك ، يجب اتباع المواصفات القياسيه المسموح بيها وتغيير بعض العناصر بيها لتحقيق الحد الأدنى من القيمة الغذائية والصحية المطلوبة في منتجات الألبان.