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IMPACT OF SPOILAGE MICROORGANISMS ON SOME DAIRY PRODUCTS

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ABSTRACT

Food spoilage is a complex process and excessive amounts of foods are lost due to microbial spoilage even with modern day preservation techniques. The aim of this study was to assess the microbiological quality of some dairy products in Beni-suef city, Egypt. A total of 210 samples of some dairy products (Kareish, Tallaga, Ras cheeses, small scale and large scale yoghurt, small scale and large scale cream samples) (30 of each) were collected from local retail stores, dairy shops and farmers' markets in Beni-Suef city. All samples were analysed for total bacterial count (TBC), total coliforms count, total yeast and mold count, total psychrotrophic count, lipolytic count and proteolytic count. The mean value of Kareish cheese and small scale cream for TBC were $1.07\times10^7 \pm 5.64 \times10^6$ and $3.35\times10^6 \pm 1.23\times10^6$*cfu*/g, respectively. The mean values of Kareish, Tallaga, Ras cheeses, small scale yoghurt and small scale cream for total coliforms count were $2.55\times10^5 \pm1.59\times10^5$, $9.58\times10^2 \pm 4.32\times10^2$, 88.10 ± 21.11, $1.94\times10^2 \pm 79.47$ and $1.58\times10^4 \pm 5.85\times10^3$*cfu*/g, respectively. The mean values for total yeast and mold count were $1.83\times10^5 \pm 9.25\times10^4$, $6.10\times10^2 \pm 3.35\times10^2$, 54.67 ± 22.04, $2.66\times10^5 \pm 8.07\times10^4$ and $2.57\times10^4 \pm 2.10\times10^4$*cfu*/g, respectively. The mean values for total psychrotrophic count were $2.89\times10^7 \pm 1.36\times10^7$, $1.16\times10^6 \pm 7.00\times10^5$, $2.46\times10^6 \pm 4.50\times10^5$, $7.81\times10^5 \pm 3.37\times10^5$ and $2.51\times10^6 \pm 6.95\times10^5$*cfu*/g, respectively. The mean values for lipolytic count were $1.23\times10^6 \pm 5.18\times10^5$, $9.32\times10^5 \pm 5.63\times10^5$, $2.91\times10^6 \pm 4.13\times10^5$, $2.32\times10^5 \pm 8.68\times10^4$ and $3.00\times10^6 \pm 7.34\times10^5$*cfu*/g, respectively. The mean value for proteolytic count were $1.16\times10^6 \pm 4.88\times10^5$, $9.94\times10^5 \pm 6.03\times10^5$, $5.85\times10^6 \pm 7.58\times10^5$, $3.32\times10^5 \pm 2.12\times10^5$ and $5.21\times10^6 \pm 1.27\times10^6$*cfu*/g, respectively. In conclusion, the presence of these organisms indicated that the examined dairy products were of inferior quality which reflects unhygienic measures, inadequate heat treatment during the manufacture, using bad quality ingredients or additives and improper sanitation during handling, storage and distribution.

Key words: Lipolytic bacteria, Spoilage, Coliforms, Ras cheese, Yoghurt

INTRODUCTION

Milk and dairy products such as cheese are rich in nutrients such as protein, calcium, vitamins, phosphorus, magnesium, zinc, etc. providing a major part of human food, due to high nutritive value of these products, they provide a good media for the growth and multiplication of many of microorganisms (Ledenbach and Marshall, 2009; Pal and Awel, 2014).

Cheese is essentially a microbial fermentation of milk by selected lactic acid bacteria whose major function is to produce lactic acid from lactose causing curd formation, the poor hygienic conditions during milking and cheese making and the inappropriate conditions of their storage negatively influenced the cheese quality (Özdemir *et al.,* 2010). Kareish cheese is the most popular local types of soft cheese in Egypt, characterized by low fat content, sources of protein, calcium, phosphorus and water soluble vitamins, (El-Bagoury and Mosaad, 2002).

Yoghurt is one of the most popular fermented dairy products which have a wide acceptance worldwide that obtained by controlled fermentation of milk by lactic acid bacteria, which is carried out specifically by Lactobacillus bulgaricus and Streptococcus thermophiles (Tamime and Robisons, 2007). It is considered a nutrient dense food, whereas it's highly nutritious, easily digestible and a source of more than ten essential nutrients, certain minerals and vitamins (Weerathilake *et al.,* 2014). The changes in the physical, chemical and microbiological structures of yoghurt determine the storage and shelf life of the product (Sofu and Ekinci, 2007).

Cream is effectively a selective milk concentrate containing an elevated level of milk fat globules

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dispersed in a continuous phase of skim milk; it provides both a valued range of products and the raw material for butter production. Common taints found in cream include sour, rancid, cheesy, stale, bitter, putrid, and yeasty; a slight, ill-defined taint may be described as stale or unclean. Ropiness or sliminess may be caused by some coliforms or lactococci (Wilbey, 2005).

Spoilage microorganisms cause changes of primary characteristics and properties of milk and dairy products. The product defects depend on the specific species and number of microorganisms involved in pre- and post- technological processing. Most often, these changes are related to single undesirable sensory characteristic, smell, flavour or consistency (Samaržija *et al.,* 2007).

Total counts of bacteria are the most useful indication of microbiological status of dairy products. High levels indicate raw material contamination, improper sanitation or unsuitable time and temperature factors during storage and production (Mossel, 1983).

Coliforms, defined as aerobic or facultative anaerobic, Gram-negative, non-spore-forming rods capable of fermenting lactose with the production of acid and gas at 32–35°C (Davidson *et al.,* 2004). The presence of coliforms has long been thought to indicate faecal contamination, however, recent discoveries regarding this diverse group of bacteria indicates that only a fraction are faecal in origin, while the majority are environmental contaminants. Coliforms are common contaminants in cheeses and other dairy products (Wolfe *et al.,* 2014).

Yeasts are the most important contaminants in some types of dairy products. This is especially relevant in fermented products such as yoghurt and sour milk, where yeast species are the major cause of spoilage because the low pH provides a suitable environment for their growth (Rohm *et al.,* 1992). Molds have pathogenic, allergic and toxic effect also their presence in high levels in dairy products may cause a risk to human health especially immunocompromised (Minervini *et al.,* 2001).

The term psychrotrophs (also denominated psychrotolerant) refers to microorganisms able to grow at low temperatures and have optimal and maximal growth temperatures above 15 and 20 °C, respectively (Moyer and Morita, 2007). Moreover psychrotophic bacteria have the ability to produce heat stable extracellular and/ or intracellular hydrolytic enzymes (Chen *et al.,* 2003) and enter processed dairy products through post- pasteurization contaminants in the milk processing plant (Ralyea *et al.,* 1998).

Lipolytic microorganisms are known to induce certain objectionable changes in the butter fat of dairy products rendering them unmarketable or unfit for human consumption. Most of them play a role in maturation of cheese or in inducing a desirable flavour (Death and Fitz-Gerald, 1983).

Proteolytic microorganisms degrade protein and cause bitterness and putrefaction to some dairy products. The proteolytic enzymes produced by psychrotrophs in milk are more powerful in its action on milk protein than that naturally present in milk and that produced by leucocytes even if present by great amount (Grieve and Kitchen, 1985). Therefore, this study was conducted to evaluate the microbiological quality of some dairy products (Cheese, Yoghurt and cream) and discuss the economic and public health hazards of these microorganisms.

MATERIALS AND METHODS

1- Collection of samples:

A total of 210 samples of dairy products consisting of Kareish, Tallaga, Ras cheeses, fresh cream, large scale cream, small-scale yoghurt and large scale yoghurt (30 of each) were collected from local retail stores, dairy shops and farmers' markets in Beni-Suef city, Egypt.

2- Preparation of dairy samples: (APHA, 1992)

Ten g of cheese samples was homogenized with 90 ml of 2% sterilized sodium citrate solution in sterile blender for 2 min. Ten g of cream and yoghurt samples were mixed with 90 ml of sterile saline or distilled water. Additional 10-fold serial dilutionswere prepared with the same diluent and appropriate dilutions were used to enumerate the different groups of microorganisms.

3- Microbiological examination:

3.1. Total Aerobic plate count: (APHA, 1992)

One ml of each dilution was transferred into duplicated labelled petri dishes. 12 to 15 ml of liquefied sterile plate count agar (PCA) at 44°C- 46°C were poured into each plate, then incubation at 35°C for 48 hours.

3.2. Total coliforms count using Most Probable Number (MPN) technique: (FAO, 1992)

One ml from previously prepared dilutions was added to three replicate tubes of lauryl sulphate tryptose broth (LST) supplied with inverted durham′s tubes. The inoculated LST tubes were incubated at 35±0.5°C for 48 ± 2 hours and examined after 24 ± 2 hours.

3.3. Yeast and Mold count: - (APHA, 1985)

One ml from each of the prepared dilutions was mixed by pouring technique in duplicate plates with 10-15 ml of Sabouraud Dextrose agar containing 50 mg chloramphenicol per liter tempered at 45 ºC. After solidification the inoculated plates were incubated at 25 ºC for 5 days.

3.4. Enumeration of psychrotrophic bacteria using a standard plate count method: - (APHA, 1985)
One ml from previously prepared dilution was placed in duplicated plates using PCA. The inoculated plates were incubated at 7°C for 10 days.

3.5. Lipolytic count: (APHA, 1992)
One ml from each of the prepared dilutions was mixed by pouring technique in duplicate plates with 10-15 ml of standard plate count agar supplied with tributyrin followed by incubation at 32°C for 2 days.

3.6. Proteolytic count: (APHA, 1992)
One ml from each of the prepared dilutions was mixed by pouring technique in duplicate plates with 10-15 ml of standard plate count agar fortifiedwith 10% sterile skim milk and incubated at 32°C for 2 days.

4- Statistical analysis:
SPSS pocket program for windows (version 16, 2007) was used for the statistical analysis. Values of different parameters were expressed as the mean ± standard error (SE).

RESULTS

Table 1: Statistical analytical results of microbial load in the examined Kareish cheese samples / g(n=30).

	No. of positive samples		Min	Max	Mean ± SE
	No.	%			
Total bacterial count	30	100	4.00×10^4	1.68×10^8	$1.07\times10^7 \pm 5.64\times10^6$
Total coliforms count	30	100	2.30×10^2	4.30×10^6	$2.55\times10^5 \pm 1.59\times10^5$
Yeast and mold count	30	100	3.00×10^3	2.80×10^6	$1.83\times10^5 \pm 9.25\times10^4$
Psychrotrophic count	30	100	1.37×10^4	2.98×10^8	$2.89\times10^7 \pm 1.36\times10^7$
Lipolytic count	30	100	4.20×10^3	1.52×10^7	$1.23\times10^6 \pm 5.18\times10^5$
Proteolytic count	30	100	4.00×10^3	1.44×10^7	$1.16\times10^6 \pm 4.88\times10^5$

Table 2: Statistical analytical results of microbial load in the examined Tallaga cheese samples / g(n=30).

	No. of positive samples		Min	Max	Mean ± SE
	No.	%			
Total coliforms count	13	43.33	<3	9.30×10^3	$9.58\times10^2 \pm 4.32\times10^2$
Yeast and mold count	29	96.67	<10	9.00×10^3	$6.10\times10^2 \pm 3.34\times10^2$
Psychrotrophic count	30	100	3.00×10^3	1.96×10^7	$1.16\times10^6 \pm 7.00\times10^5$
Lipolytic count	30	100	4.40×10^3	1.71×10^7	$9.32\times10^5 \pm 5.63\times10^5$
Proteolytic count	30	100	5.20×10^3	1.83×10^7	$9.94\times10^5 \pm 6.03\times10^5$

Table 3: Statistical analytical results of microbial load in the examined Ras cheese samples / g (n=30).

	No. of positive samples		Min	Max	Mean ± SE
	No.	%			
Total coliforms count	24	80	<3	4.30×10^2	88.1 ± 21.11
Yeast and mold count	19	63.33	<10	6.10×10^2	54.67 ± 22.04
Psychrotrophic count	30	100	8.00×10^4	9.60×10^6	$2.46\times10^6 \pm 4.50\times10^5$
Lipolytic count	30	100	2.02×10^5	9.60×10^6	$2.91\times10^6 \pm 4.13\times10^5$
Proteolytic count	30	100	1.03×10^6	1.36×10^7	$5.85\times10^6 \pm 7.58\times10^5$

Table 4: Statistical analytical results of microbial load in the examined small scale yoghurt samples / g (n=30).

	No. of positive samples		Min	Max	Mean ± SE
	No.	%			
Total coliforms count	16	53.33	<3	2.10×10^3	$1.94\times10^2 \pm 79.47$
Yeast and mold count	27	90	<10	1.78×10^6	$2.66\times10^5 \pm 8.07\times10^4$
Psychrotrophic count	28	93.33	<10	9.90×10^6	$7.81\times10^5 \pm 3.37\times10^5$
Lipolytic count	28	93.33	<10	1.97×10^6	$2.32\times10^5 \pm 8.68\times10^4$
Proteolytic count	28	93.33	<10	6.20×10^6	$3.32\times10^5 \pm 2.12\times10^5$

Table 5: Statistical analytical results of microbial load in the examined small scale cream samples / g(n=30).

	No. of positive samples		Min	Max	Mean ± SE
	No.	%			
Total bacterial count	30	100	3.10×10^4	2.66×10^7	$3.35\times10^6 \pm 1.23\times10^6$
Total coliforms count	30	100	9.30×10	1.50×10^5	$1.58\times10^4 \pm 5.85\times10^3$
Yeast and mold count	30	100	10.00	6.30×10^5	$2.57\times10^4 \pm 2.10\times x10^4$
Psychrotrophic count	30	100	4.40×10^4	1.66×10^7	$2.51\times10^6 \pm 6.95\times10^5$
Lipolytic count	30	100	3.60×10^4	1.22×10^7	$3.00\times10^6 \pm 7.34\times10^5$
Proteolytic count	30	100	7.10×10^4	2.73×10^7	$5.21\times10^6 \pm 1.27\times10^6$

Table 6: Acceptable and unacceptable samples of the examined dairy products for total coliforms count according to the Egyptian standards (2005).

Product	Permissible limit of total coliforms	Acceptable samples		Unacceptable samples	
		No.	%	No.	%
Kareish cheese	Not more than 10 *cfu*/g	0	0	30	100
Tallaga cheese		18	60	12	40
Ras cheese		6	20	24	80
Small scale yoghurt		14	46.67	16	53.33
Large scale yoghurt		30	100	0	0
Small scale cream		0	0	30	100
Large scale cream		30	100	0	0

Table 7: Acceptable and unacceptable samples of the examined dairy products for total yeast and mold count according to the Egyptian standards (2005).

Product	Permissible limit of total yeast and mold	Acceptable samples		Unacceptable samples	
		No.	%	No.	%
Kareish cheese	Not more than 410 *cfu*/g	0	0	30	100
Tallaga cheese		26	86.67	4	13.33
Ras cheese	Not more than 110 *cfu*/g	25	83.33	5	16.67
Small scale yoghurt	Not more than 10 *cfu*/g	3	10	27	90
Large scale yoghurt		30	100	0	0
Small scale cream	Not more than 20 *cfu*/g	1	3.33	29	96.67
Large scale cream		30	100	0	0

DISCUSSION

Many foods spoil due to microbial degradation with their metabolites being the cause of the off-flavours or the textural changes resulting in sensory rejection.

The results given in Table (1) showed that the mean values of microbial load of the examined Kareish cheese samples were $1.07\times 10^7 \pm 5.6^4 \times 10^6$, $2.55\times10^5 \pm 1.59\times10^5$, $1.83\times10^5 \pm 9.25\times10^4$, $2.88\times10^7 \pm 1.36\times10^7$, $1.23\times10^6 \pm 5.18\times10^5$, $1.16\times10^6 \pm 4.88\times10^5$ *cfu* / g for TBC, total coliforms count, total yeast and mold count, total psychrotrophic count, lipolytic count and proteolytic count, respectively.

Regarding the TBC, nearly similar results were recorded by Khair-Allah (2000), while higher results were postulated by El- Bessary (2006) and lower results were recorded by Ahmed (2012). For total coliforms count, nearly similar results were indicated by Shahin (2015), and higher results were recorded by El-Barbary (1999), but lower results were estimated by Abd El-Fattah (2013). For total yeast and mold count, our results were in agreement with Nawar (2001), higher results were postulated by Sharkawy (2018) but lower results were detected by El-Bagoury *et al.* (2014). For total psychrotrophic count, the obtained results were in agreement with Meshref and Hassan (2009), and some extent lower results were reported by Khair Allah (2000). For total lipolytic and proteolytic counts, lower results were showed by El-Bagoury *et al.* (2015).

Higher total bacterial count in Kareish cheese and cream samples gives an indication on general quality of the product through contaminated raw materials or unsatisfactory processing from sanitary point of view.

Presence of coliforms in dairy products in high counts such as in case of Kareish cheese may indicate unsanitary practices in cheese making process and may sometimes give rise to early blowing or gassing of the product. It is characterized by large gas holes, a spongy texture of cheese and generally occurs 1 – 2 days after manufacture (Bintsis, 2006). Contamination of cheese with coliforms gives indication of bad hygienic conditions during production, handling and distribution and the possible presence of enteric pathogens (ICMSF, 1996).

In Table (2), the results showed that the mean value ofmicrobial load in the examined Tallaga cheese samples were $9.58\times10^2 \pm 4.32\times10^2$, $6.10\times10^2 \pm 3.34\times10^2$, $1.16\times10^6 \pm 7.00\times10^5$, $9.32\times10^5 \pm 5.63\times10^5$ and $9.94\times10^5 \pm 6.03\times10^5$ *cfu*/g. For total coliforms count, total yeast and mold count, total psychrotrophic count, lipolytic count and proteolytic count respectively.

For total coliforms count, nearly similar results were detected by Ahmed (2012); the mean value of coliform count was higher than that reviewed by Hassan (2008b). For total yeast and mold count, nearly similar results were reported by Abdel- Elall *et al.* (2006), higher results were detected by Ahmed (2012). For total psychrotrophic count, results of Meshref and Hassan (2009) were in agreement with the obtained results. For the total lipolytic and proteolytic counts, higher results were noted by Sallam *et al.* (1991) and Awad *et al.* (2005), respectively.

The results given in Table (3) showed that the mean values of microbial load of the examined Ras cheese samples were 88.10 ± 21.11, 54.67 ± 22.04, $2.46\times10^6 \pm 4.50\times10^5$, $2.91\times10^6\pm 4.13\times10^5$ and $5.85\times10^6 \pm 7.58\times10^5$*cfu*/g for total coliforms count, total yeast and mold count, total psychrotrophic count, lipolytic count and proteolytic count, respectively.

Comparing to the other results for total coliforms count, similar results were detected by Hassan (2008a), on the other hand, the mean value of coliform count was higher than those reported by both Salem (2017) and Bakr (2018). For total yeast and mold count, similar results were detected by Sharkawy (2018), higher results were indicated by El-Bagoury *et al.* (2014), Shahin (2015). For total lipolytic and proteolytic counts, lower results were recorded by El-Bagoury *et al.* (2015).

Lower counts of coliforms and total yeast and mold in Ras cheese than the other products may be due to the heat treatment of milk during manufacturing and also refrigeration that decrease the counts of these organisms.

The inspection of the results in Table (4) revealed that the mean values of the microbial load of the examined small scale yoghurt samples were$1.94\times10^2 \pm 79.47$, $2.66\times10^5 \pm 8.07\times10^4$, $7.81\times10^5 \pm 3.37\times10^5$, $2.32\times10^5 \pm 8.68\times10^4$ and $3.32\times10^5 \pm 2.12\times10^5$*cfu*/g for total coliforms count, total yeast and mold count, total psychrotrophic count, lipolytic count and proteolytic count, respectively.

For total coliforms count, the results were in line with that showed by Abou El-Makarem (2013), while Morsy (2016) found higher mean value than the noted results but lower results were declared by El-Bakri *et al.* (2009). For total yeast and mold count, similar results were recorded by Osman (2015), higher results were reported by Zeinhom (2007) and lower results were detected by Abou El- Makarem (2013). For total psychrotrophic count, lower results were detected by El- Malt *et al.* (2013).

Yeasts and molds counts are used as an index of the proper sanitation quality. Defects such as rancidity,

softness and colour defects arise mainly from contamination by yeasts and molds. Moreover, in view of the potential ability of some molds to produce mycotoxins during their growth, thus their presence possess potential hazards to food safety and human health (Kivance, 1990).

The results given in Table (5) showed that the microbial load in the examined all small scale cream samples were with mean values of $3.35\times10^6 \pm 1.23\times10^6$, $1.58\times10^4 \pm 5.85\times10^3$, $2.57\times10^4 \pm 2.10\times10^4$, $2.51\times10^6 \pm 6.95\times10^5$, $3.00\times10^6 \pm 7.34\times10^5$ and $5.21\times10^6 \pm 1.27\times10^6$ *cfu*/g for TBC, total coliforms count, total yeast and mold count, total psychrotrophic count, lipolytic count and proteolytic count, respectively.

Comparing to the other results for TBC, similar results were detected by Meshref (2013) while El-Gendi *et al.* (2013) showed an average count lower than our results. For total coliforms count, similar results were detected by El-Gendi *et al.* (2013), higher results were reported by El-Barbary (1999) and Meshref (2013). For total yeast and mold count, lower results were detected by El- Gendi *et al.* (2013). For total psychrotrophic and proteolytic counts, nearly similar results were detected by El-Samragy *et al.* (1992).

Psychrotrophs have been a major problem to the dairy industry for many years and will continue to be a problem in the future. Some of these psychrotrophs have the ability to form hydrolytic thermostable enzymes causing spoilage to some milk and dairy products constituents as fat and protein stored in the refrigerator (Dogan and Boor, 2003). These enzymes retain from 30 to 100 % of their activity after conventional heat treatment of milk (pasteurization: 72 °C for 15 sec.; sterilization 138 °C for 2 sec.; 149 for10 sec.). Up to 30 % losses of modern dairy industry are due to spoilage and reduced product quality caused by psychrotrophic microorganisms (Randolph, 2006).

The counts of lipolytic and proteolytic bacteria are increasing in relation to the rate of initial raw milk contamination and time of cold storage of milk, the content of free fatty acids (FFA) is also rising and raw milk pH is decreasing (Celestino *et al.*, 1996).

Proteolytic microorganisms produced important physico-chemical changes of the protein content through reducing -and in some cases, even slightly higher - until the end of shelf-life, caused by the decomposition of proteins due to proteolysis processes and the proteins environmental releases of microorganisms development (Rotar *et al.*, 2009).

In examination of yoghurt and cream produced in large dairy plants, it showed that these products are free from coliforms, yeast and mold, psychrotrophic as well as lipolytic and proteolytic microorganisms and this is due to heating of milk at high temperature and following of strict hygienic measures during processing, handling, packaging and storage of such products.

The inspection of the results in Table (6) revealed that 0(0%), 18(60%), 6(20%), 14(46.67%), 30(100%), 0(0%) and 30(100%) of the examined Kareish, Tallaga, Ras cheeses, small and large scale yoghurt, small and large scale cream samples respectively have acceptable quality for the total coliforms count *cfu*/g according to the Egyptian standards (2005).

The results in Table (7) showed that 0(0%), 26(86.67%), 25(83.33%), 3(10%), 30(100%), 1(3.33%) and 30(100%) of the examined Kareish, Tallaga, Ras cheeses, small and large scale yoghurt, small and large scale cream samples respectively have acceptable quality for the total yeast and mold count *cfu*/g according to the Egyptian standards (2005).

CONCLUSION

Results of the study clearly indicated that the bacteriological quality of the examined dairy products was inferior. Most of the examined samples especially those obtained from small scale are highly contaminated with large number of total bacterial count, coliforms, psychrotrophs, yeast and molds, lipolytic and proteolytic microorganisms. The presence of these organisms and in high number render the processed dairy products unfit for human consumption and of inferior quality through the development of undesirable changes which reflecting unhygienic measures, inadequate heat treatment during the manufacture, using bad quality ingredients or additives and improper sanitation during storage, handling and distribution. Yeasts and molds may cause undesirable changes in the contaminated food and may expose the consumer to public health hazards.

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تأثير الميكروبات المفسدة علي بعض المنتجات اللبنية

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يعتبر فساد الغذاء عملية معقدة بسبب الميكروبات المفسده حتي مع اساليب الحفظ الحديثة. يهدف هذا البحث الي تقييم الجودة الصحية لبعض منتجات الالبان الي تباع في محافظة بني سويف. تم تجميع ٢١٠ عينه من الجبن القريش والجبن الثلاجة والجبن الرومي وكذلك الزبادي والقشدة المنتجة من المصانع الكبيرة وصغار المنتجين (بواقع ٣٠ عينه لكل منتج) وتم تجميع هذة العينات من الاسواق والمحلات التجارية المختلفة وذلك لفحصها وتقدير العدد الكلي للبكتيريا والمجموعة القولونية والميكروبات المحبة للبرودة والعدد الكلي للخمائر والفطريات والميكروبات المحللة للدهون والبروتين. وقد اظهرت نتائج الفحص أن متوسط العدد الكلي للبكتيريا في عينات الجبن القريش والقشدة المنتجه من صغار المنتجين هي ١٫٠٧×١٠^٧ ± ٥٫٦٤ ×١٠^٦ و٣٫٣٥×١٠^٦ ± ١,٢٣ × ١٠^٦علي التوالي وقيمة المتوسط للمجموعة القولونية لعينات الجبن القريش والجبن الثلاجة والجبن الرومي والزبادي والقشدة المصنعه من صغار المنتجين هي ٢٫٥٥ ×١٠^٥± ١٫٥٩×١٠^٥و ٩٫٥٨×١٠^٢± ٤٫٣٢×١٠^٢و ٨٨٫١٠±٢١٫١١ و ١٫٩٤×١٠^٢±٧٩٫٤٧ و ١٫٥٨×١٠^٤± ٥٫٨٥×١٠^٣ علي التوالي وقيمه المتوسط للعدد الكلي للخمائر والفطريات هي ١٫٨٣×١٠^٥±٩٫٢٥×١٠^٤و ٦٫١٠×١٠^٢±٣٫٣٤×١٠^٢ و ٥٤٫٦٧±٢٢٫٠٤ و ٢٫٦٦×١٠^٥± ٨٫٠٧×١٠^٤و ٢٫٥٧×١٠^٤±٢٫١٠×١٠^٤ علي التوالي وقيمة المتوسط الميكروبات المحبة البرودة هي ٢٫٨٩×١٠^٧±١٫٣٦×١٠^٧و ١٫١٦×١٠^٦± ٧٫٠٠×١٠^٥ و ٢٫٤٦× ١٠^٦± ٤٫٥٠×١٠^٥و ٧٫٨١×١٠^٥±٣٫٣٧×١٠^٥و ٢٫٥١ ×١٠^٦±٦٫٩٥×١٠^٥ علي التوالي وقيمة المتوسط للميكروبات المحللة للدهون هي ١٫٢٣× ١٠^٦±٥٫١٨×١٠^٥ و ٩٫٣٢×١٠^٥±٥٫٦٣×١٠^٥ و ٢٫٩١× ١٠^٦±٤٫١٣×١٠^٥و٢٫٣٢×١٠^٥ ± ٨٫٦٨×١٠^٤ و ٣٫٠٠× ١٠^٦ ±٧٫٣٤×١٠^٥ علي التوالي وقيمة المتوسط للميكروبات المحللة للبروتين هي ١٫١٦× ١٠^٦± ٤٫٨٨×١٠^٥ و ٩٫٩٤×١٠^٥± ٦٫٠٣×١٠^٥ و ٥٫٨٥× ١٠^٦± ٧٫٥٨×١٠^٥ و ٣٫٣٢×١٠^٥± ٢٫١٢×١٠^٥ و ٥٫٢١× ١٠^٦± ١٫٢٧× ١٠^٦ علي التوالي. ولذلك، فان وجود مثل هذه الميكروبات تجعل منتجات الالبان غير صالحة للاستهلاك الادمي وذات جوده رديئة. هذا وقد تم مناقشة الاهمية الصحية والاقتصادية لمثل هذة الميكروبات في بعض منتجات الالبان.