

Comparative Study on The Composition and The Hygienic Quality of Some Locally-Made and Imported Cheeses *

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Abstract:

The daily consumption of high quality foods in Egypt created a situation which is marked with increased quantities of imported foods as well as dairy products to cover the needs of these products. These imported cheeses, which are originated from several sources, allowed us to carry this work out in order to compare these products with the locally-made one. The sampling and analyses of this work were concentrated on products already exist in the market and ready for consumption.

70 samples of cheeses were tested in this study. 40 were locally-made, while the count of the corresponding imported samples was 30.

An evaluation of the experimental products was carried out by determination of the chemical composition and the microbial counts in each experimental sample with respect to the following main topics: 1- Evaluation of the investigated products according to the fulfillment of the recent Egyptian Standards and 2-

Evaluation according to the hygienic quality of this dairy product.

These two topics were taken in consideration in order to: a) compare the locally-made with the imported product and/or b) compare the locally-made market products exist under different trading names with each other. Results were as follow:

1- Evaluation according to the fulfillment of the recent Egyptian standards:

Generally, the results of this work indicate a complete agreement of the chemical composition of the experimental samples of Edam, Blue veined, Gouda, Cheddar and processed cheeses either locally-made or imported with the Egyptian standards (ES:1183-3/2005), (ES:1183-2/2005), (ES:1183-1/2005), (ES:1007-2/2005) and (ES:999-2/2005), in the same order. No compositional significant differences were found between the two experimental groups of cheeses

2- Evaluation according to the hygienic quality:

The existence of the coliform bacteria was taken as a parameter for a low hygienic quality before

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or during the making process and/or during the handling of the final product. These bacteria were not detected either in the local or in the imported Edam, Blue veined, Gouda and Cheddar cheeses as well as the processed cheeses.

The counts of yeasts and moulds were detected in higher counts in all the samples of the locally-made and imported Edam, Gouda and Cheddar cheeses, while the experimental samples of processed cheeses contained lower counts of these organisms, which indicated in general satisfactory hygienic quality of the cheeses examined in this work.

Introduction

It is recognized that dairy products play an important role in balancing the diet. At the present time, the consumption of liquid whole milk and the threatened shortage of meat have led to increasing the importance of cheese. Cheese is a very ancient food; records as its use go back more than 4000 years and it was made and eaten in biblical ages. The supplementary value of the proteins in cheese has long been recognized. Cheese offers great diversity of nutritive value, appearance, flavour, texture, cooking properties and uses. Consequently, cheese as a product is capable of satisfying a range of sensory and nutritional demands and has global usage appeal.

There are more than 1000 varieties of cheese all over the world

described more than 400 varieties of cheese and list the names of further 400. The most common criterion for the classification of cheese is texture (very hard, hard, semi-hard and soft), which is related mainly to the moisture content of cheese.

In recent years, the increasing consumer awareness has emphasized the need for microbiologically safe food. The microbial quality and safety of commercially imported dairy products is a major area of concern for producers, consumer and public health officials world wide. Products contaminated with microorganisms are undesirable from standpoint of public health, storage quality and general aesthetics (El-Karamani, 2008).

The aim of this work was to compare some locally-made cheeses with the corresponding imported one. This was carried out to fulfill the above mentioned evaluations of these dairy products.

Materials & Methods

Cheese samples:

Semi hard cheeses:

Edam cheeses:

Five different samples of the imported cheeses (Coberco Kaas) and five different packages of the locally-made Edam cheeses (Labanita) were collected from the local markets in Assiut city and used in this work.

Blue-veined cheeses:

Ten samples of imported Blue-veined cheeses were brought from local markets. These were five packages from each

of two companies; namely "Lady Bird" and "Golden Dan". Also, five samples of locally made Blue-veined cheeses from the production of "Mobi blue" were examined.

Gouda cheeses:

Five samples of each of imported (Coberco Kaas) and locally-made (Reiada) Gouda cheeses were collected from the local markets.

Hard cheese:

Cheddar cheeses:

Five samples of imported Cheddar cheese (from New Zeland) were used and five locally-made samples were obtained from the dairy science department plant, Agriculture Collage, Assiut University.

Processed cheeses:

Locally-made and imported processed cheese samples were collected from the local markets. Samples were belonging to five different companies; namely "La vache qui rit", "Président" and "Milkana", as full fat processed cheeses, "Teama", as full fat processed cheese in which milk fat was replaced with vegetable fats, while the "Kiri" cheese as an imported high fat processed cheese.

Chemical analysis:

The moisture contents of the examined cheeses were determined according to the methods of A.O.A.C. (2000). The percentage of cheese fat content had been estimated by using Gerber method (Ling, 1963). The total nitrogen content (T.N.%) was determined by using the Kjeldahl method as reported in

A.O.A.C. (2000). Calculations of total protein (T.P.%) were carried out as follow:

$$\% \text{ Total protein} = \% \text{ Total nitrogen} \times 6.38$$

The titratable acidity in the experimental samples was determined according to A.O.A.C. (2000). Salt contents of cheese were determined by using the "Mohr method" of A.P.H.A. (2004).

Microbial Analysis:

Preparations of samples and dilutions for the microbiological examinations were carried out according to IDF standards (1996).

Total bacterial count was determined with the standard plate count technique (A.P.H.A., 2004) by using of Nutrient Agar medium (Difco, 1998).

The presence of coliform bacteria was detected by the multiple tube technique. The sample dilutions were inoculated into MacConky Broth medium (Difco, 1998).

Yeasts and moulds count in samples were counted on Bacto Czapek Solution Agar medium with adding an antibiotic (Difco, 1998).

Statistical analyses:

The obtained data were subjected to statistical analyses using "F-test" and "T-test". Means were compared using L.S.D. test. Data were performed in computer using the Spss package (SPSS 1998).

Results and Discussion

Evaluation according to the fulfillment of the recent Egyptian standards:

As mentioned before the Egyptian standards are based on the composition of the evaluated dairy products. Therefore, we will concentrate on the chemical composition of these products to compare it with that of these standards.

• **Semi hard cheeses:**

1. Edam cheeses:

The moisture contents of the locally-made and the imported Edam cheeses are present in Table 1 and were 45.93% for the local cheese, while this content in the imported cheese were 42.67%. This difference can be relatively attributed to the relatively long period between the production and the marketing of the imported products.

Similar values of moisture found in this work were reported by El-Neshawy *et al.* (1995) and El-Batawy *et al.* (2004).

The moisture contents in all samples are in agreement with those required by the Egyptian standards (ES:1183-3/2005). The statistical analysis of the percentage values of moisture showed significant differences ($P < 0.05$) between the locally-made and the imported cheese.

Regarding the values of F/DM%, these were in agreement with the requirements of the Egyptian standards (ES:1183-3/2005) for both the locally-made and the imported Edam cheeses and showed no significant differ-

ences in the fat% contents or in that of F/DM ratio (Table 1).

Table 1 indicated the total nitrogen% (T.N.), the total nitrogen/dry matter% ratio (T.N/D.M.), the total protein% (T.P.) and the total protein/dry matter% ratio (T.P./D.M.) in the locally-made and in the imported Edam cheeses. These averages were 4.17, 7.71, 26.59 and 49.13% for the locally-made Edam cheese and were 3.96, 6.91, 25.29 and 44.11% for the imported Edam cheese, respectively.

These results are in agreement with that reported by Ismail *et al.* (2004) and El-Batawy *et al.* (2004) and nearly similar to that found by Towler (1987) and El-Neshawy *et al.* (1995). The statistical differences for the T.P./D.M. were found highly significant (Table 1).

Data in Table (1) indicated that the average of salt % were 3.63 and 4.41% %, while that of salt/serum ratio were 7.95 and 10.34 % for the local and the imported Edam cheeses, respectively. The statistical differences for the salt% and salt/serum% were found significant and highly significant as shown in Table (1), respectively. These values are in agreement with that of El-Neshawy *et al.* (1995) and El-Batawy *et al.* (2004)

2. Blue veined cheeses:

Data in Table (2) showed that the moisture contents of the locally-made and the imported Blue veined cheeses were 36.55, 46.57 and 46.49% for the locally-

made cheese "Mobi blue" and the imported cheeses "Golden Dan" and "Lady Bird" samples, respectively.

The contents of moisture in the locally-made cheeses were in agreement with that of Mahmoud *et al.*, (1982) and Abd El-Salam *et al.* (1988), while the same value in the imported cheeses were in agreement with that of deBoer and Kuik (1987) and Darwish (2004), while lower values were found by Gomaa *et al.*, 1993. The differences in moisture content between the locally-made and the imported cheeses were highly significant (Table 2)

These results are in agreement with that stated in the Egyptian standards (ES:1183-2/2005).

The averages of fat % and F./D.M.% in the tested Blue veined cheeses were 38.20 and 60.32% for the locally-made cheese "Mobi blue", 31.88 and 59.74% for the imported cheese "Golden Dan" and were 30.50 and 57.04% for "Lady Bird" samples, respectively (Table 2).

The values of fat in the imported cheeses was nearly similar to that reported by Abd El-Salam *et al.* (1988), Kebary *et al.* (1992), Lawlor *et al.* (2003) and Darwish (2004), while the same value in case of the locally-made cheese were higher.

The analysis of the Blue veined cheeses showed a value of F./D.M.% ratio, which was in agreement with the limit values stated in the Egyptian standards (ES:1183-2/2005).

Highly significant differences ($P < 0.01$) in fat content were found between the two groups of the locally-made and the imported Blue veined cheeses.

Table (2) revealed that the averages of total nitrogen (T.N.%) for the "Mobi blue", "Golden Dan" and the "Lady Bird" Blue veined cheese samples were 3.21, 2.94% and 2.93%. The low values of T.N. in the imported cheese may be due to the high moisture content. The averages of total nitrogen/dry matter ratio. (T.N./D.M.%) were 5.06, 5.50 and 5.47%, the averages of total protein (T.P.%) were 20.47, 18.75 and 18.68% and the averages of total protein/dry matter ratio (T.P./D.M.%) were 32.30, 35.16 and 34.94%, in the same order. The recorded values of T.N. , T.N./D.M. and T.P. are not significant.

The value of total nitrogen and total protein in the experimental Blue veined cheeses were lower than that reported by Abd El-Salam *et al.* (1988), Kebary *et al.* (1992) and Lawlor *et al.* (2003), this result can be due to the lower moisture content in the samples studied in the mentioned works, which reflects in higher total solids. On the other hand, the same value was in agreement with that reported by Gomaa *et al.*, 1993.

The titratable acidity of the locally-made Blue veined cheese are 2.93% which was higher than that reported by Gomaa *et al.* (1993).

The averages of salt and salt/serum % ratio are given in Table (2). These were 3.66 and 10.07% for the locally-made blue veined cheese from "Mobi blue" company, 3.46 and 7.43% for "Golden Dan" and were 4.33 and 9.32% for the product from "Lady Bird", respectively.

Similar results for the value of salt was found by Mahmoud *et al.*, (1982) and Darwish (2004), while lower values were previously reported by deBoer and Kuik (1987) and Lawlor *et al.* (2003).

3. Gouda cheeses:

The average of moisture content in the locally-made and imported Gouda cheese was 38.10 and 39.93%, respectively (Table 3). These values were in agreement with that of the Egyptian standards (ES:1183-1/2005).

Similar results were reported by Smit *et al.* (2001) and O'Brein and O'Connor (2004).

The fat content and ratio of fat/dry matter were 30.60 and 49.43 for the locally-made Gouda cheese, while they were 31.10 and 51.66% in the imported samples, respectively (Table 3). Similar findings for fat content were showed by Smit *et al.* (2001).

These values are in agreement with the Egyptian standards (ES:1183-1/2005).

Results in Table (3) reveal that the average of total nitrogen (T.N.%), the ratio of total nitrogen/dry matter (T.N./D.M.%), total protein (T.P.%) and total protein/dry matter (T.P./D.M.%) for the locally-made Gouda

cheese were 3.50, 5.65, 22.31 and 36.04%, while the corresponding values for the imported Gouda cheese were 3.44, 5.73, 21.96 and 36.51%, respectively.

The obtained value of total protein was found in agreement with that reported by Spangler *et al.* (1990).

Table (3) indicated that the average of salt content and salt/serum % ratio for the locally-made Gouda cheese were 3.40 and 8.92%, while in the imported Gouda cheese they were 3.57 and 8.95%, respectively.

Highly significant differences ($P < 0.01$) were detected in the value of salt%. This was not significant in the salt/serum ratio.

Hard Cheeses:

1. Cheddar cheese:

The average of moisture content in the locally-made and the imported Cheddar cheese were 35.10 and 35.04% (Table 4). These values were in agreement with that of Abd Rabou *et al.* (2004a) and Shazly *et al.* (2008).

The obtained values of moisture % were in agreement with the limits of the Egyptian standards (ES:1007-2/2005) for Cheddar cheese.

Significant differences ($P < 0.05$) in the values of fat/dry matter was found between the locally-made and the imported Cheddar cheese.

Also, the obtained values of fat /dry matter% in the locally-made and the imported Cheddar cheeses were in agreement with that stated in the Egyptian Standards (ES:1007-2/2005) (Table 4).

Table (4) indicated that the average of total nitrogen% (T.N.%), total nitrogen/dry matter% (T.N./D.M.%), total protein (T.P.)% and total protein/ dry matter % (T.P./D.M.%) in the locally-made Cheddar cheese are 4.35, 6.71, 27.77 and 42.78, respectively, and 3.80, 5.88, 24.27 and 37.49% in the imported Cheddar cheese, in the same order. The value of T.N.% in the imported Cheddar cheese was nearly similar to that found by Abd Rabou *et al.* (2004a).

The obtained value for total protein% are close to the requirements of the Egyptian standards (ES:1007-2/2005) for Cheddar cheese, which stated that this value of total protein is about 25%.

Highly significant differences ($P < 0.01$) were detected in the values of total nitrogen and total protein, while significant differences ($P < 0.05$) were found in the values of total nitrogen/dry matter and total protein/ dry matter between the experimental locally-made and the imported Cheddar cheese

The average of salt% and salt/serum % are shown in Table (4). Data revealed that these averages for the locally-made Cheddar cheese were 3.86 and 11.00%, which were higher than that of the imported Cheddar cheese. They were 2.35 and 6.77%, respectively.

Highly significant differences ($P < 0.01$) were found for salt content% and salt/serum% between the locally-made Cheddar

cheeses and the imported one.

Processed cheese:

The averages of moisture content of the locally-made and the imported processed cheeses were 55.80, 55.90, 55.16 and 55.60% for "La vache qui rit", "Président", "Milkana" and "Teama" processed cheeses and 52.61% for Kiri (imported high fat cheese), respectively (Table 5). The obtained results were similar to that previously reported by Mahfouz *et al.* (1986), while were lower than that reported by Shazly *et al.* (2008).

the moisture values for all experimental locally-made processed cheeses as well as for the imported one were almost in agreement with that stated in the Egyptian standards (ES:999-2/2005).

These results were in agreement with those found by Khader *et al.* (1997). They showed that the average of the moisture content ranged from 48.33% to 56.14%.

Statistical analysis of moisture contents of the imported and the locally-made processed cheeses showed a highly significant differences ($P < 0.01$) between the two types of processed cheeses.

The average of fat content for the tested processed cheeses were 26.10, 26.80, 26.80, 25.50, and 33.00% for "La vache qui rit", "Président", "Milkana", "Teama" and for the imported high fat "Kiri" cheese, respectively. The ratios of fat/dry mat-

ter (F/DM%) were 59.05, 60.76, 59.77, 57.43, and 69.64% for the same cheeses, in the same order (Table 5). The differences between fat and fat/dry matter values of these five processed cheeses are highly significant ($P < 0.01$). This value of F/DM was in agreement with those reported by Mahfouz *et al.* (1986) and Khader *et al.* (1997), while it was higher than that stated by Shazly *et al.* (2008)

On the other hand, the ratio of F/DM % was found to be comparable with that of the Egyptian standards (ES:999-2/2005) in all the experimental types of processed cheese.

Table (5) presents the values of the total nitrogen (T.N.%), total nitrogen/dry matter ratios (T.N./D.M.%), total protein (T.P.%) and total protein/dry matter ratios (T.P./D.M.%) of the five different processed cheeses. Data showed that the average

contents of T.N.% were 1.57, 1.41, 1.51, 1.32 and 1.52%, with an average contents of T.N./D.M.% ratios were 3.46, 3.20, 3.37, 2.98 and 3.21%, while the average contents of T.P.% were 10.02, 9.01, 9.63, 8.45 and 9.71% , with T.P./D.M. ratios of 22.67, 20.43, 21.48, 19.03 and 20.49% for the locally-made "La vache qui rit", "Président", "Milkana", "Teama" and for the imported high fat "Kiri" cheese, respectively. These results refer to higher contents of total nitrogen and total protein in the processed cheese "La vache qui rit" followed by "Kiri", "Milkana", "Président" and "Teama". The values of total protein were lower than that reported by Abd Rabou *et al.* (2004b).

No differences in composition between the four locally-made cheeses obtained from the market were found.

Table (1): The chemical composition of locally-made and imported Edam cheeses and statistical analysis:

Type of cheese	Edam "locally-made"	Edam "imported"	T-test
Chemical composition			
Moisture %	45.93	42.67	*
Total solid (T.S.%)	54.07	57.33	*
Fat %	21.70	23.00	N.S.
Fat/dry matter (F/D.M. %)	40.20	40.13	N.S.
Total nitrogen (T.N. %)	4.17	3.96	N.S.
Total nitrogen/dry matter (T.N/D.M.%)	7.71	6.91	**
Total protein (T.P. %)	26.59	25.29	N.S.
Total protein/dry matter (T.P/D.M. %)	49.13	44.11	**
Acidity %	1.34	1.41	N.S.
Salt %	3.63	4.41	*
Salt/Serum %	7.95	10.34	**

Average of 5 samples from each type of cheese

N.S.: Non significant *: Significant **: Highly Significant

Table (2): The chemical composition of locally-made and imported Blue veined cheeses and statistical analysis:

Name of company	Locally-made	Imported		T-test
	Blue veined "Mobi blue"	Blue veined "Gold en Dan"	Blue veined "Lady Bird"	
Chemical composition				
Moisture %	36.55	46.57	46.49	**
Total solids (T.S.%)	63.45	53.43	53.51	**
Fat %	38.20	31.88	30.50	**
Fat/dry matter (F/D.M. %)	60.32	59.74	57.04	N.S.
Total nitrogen (T.N. %)	3.21	2.94	2.93	N.S.
Total nitrogen/dry matter (T.N./D.M. %)	5.06	5.50	5.47	N.S.
Total protein (T.P. %)	20.47	18.75	18.68	N.S.
Total protein/dry matter(T.P./D.M. %)	32.30	35.16	34.94	N.S.
Acidity %	2.93	2.34	2.55	N.S.
Salt %	3.66	3.46	4.33	N.S.
Salt/Serum %	10.07	7.43	9.32	*

Average of 5 samples from each company

N.S.: Non significant *: Significant **: Highly Significant

Table (3): The chemical composition of locally-made and imported Gouda cheeses and statistical analysis:

Type of cheese \ Chemical composition	Gouda "locally-made"	Gouda "imported"	T-test
Moisture %	38.10	39.93	N.S.
Total solid (T.S.%)	61.90	60.07	N.S.
Fat %	30.60	31.10	N.S.
Fat/dry matter (F/D.M.%)	49.43	51.66	N.S.
Total nitrogen (T.N.%)	3.50	3.44	N.S.
Total nitrogen/dry matter (T.N/D.M.%)	5.65	5.73	N.S.
Total protein (T.P.%)	22.31	21.96	N.S.
Total protein/dry matter (T.P/D.M.%)	36.04	36.51	N.S.
Acidity %	1.62	1.41	*
Salt %	3.40	3.57	**
Salt/Serum %	8.92	8.95	N.S.

Average of 5 samples for each type of cheese

N.S.: Non significant *: Significant **: Highly Significant

Table (4): The chemical composition of locally-made and imported Cheddar cheese and statistical analysis:

Type of cheese \ Chemical composition	Cheddar "locally-made"	Cheddar "imported"	T-test
Moisture %	35.10	35.04	N.S.
Total solid (T.S.%)	64.90	64.96	N.S.
Fat %	32.40	36.10	N.S.
Fat/dry matter (F/D.M. %)	49.92	55.55	*
Total nitrogen (T.N. %)	4.35	3.80	**
Total nitrogen/dry matter (T.N/D.M. %)	6.71	5.88	*
Total protein (T.P. %)	27.77	24.27	**
Total protein/dry matter (T.P/D.M. %)	42.78	37.49	*
Acidity %	1.76	1.41	N.S.
Salt %	3.86	2.35	**
Salt/Serum %	11.00	6.77	**

Average of 5 samples from each type of cheese

N.S.: Non significant *: Significant **: Highly Significant

Table (5): The chemical composition of locally-made and imported processed cheeses and statistical analysis:

Name of company Chemical composition	La vache qui rit	Président	Milkana	Teama	Kiri "Imported"	F-test	L.S.D 0.05
Moisture %	55.80	55.90	55.16	55.60	52.61	**	0.97
Total solid (T.S.%)	44.20	44.11	44.84	44.40	47.39	**	0.97
Fat %	26.1	26.8	26.8	25.5	33.0	**	2.36
Fat/dry matter (F/D.M. %)	59.05	60.76	59.77	57.43	69.64	**	5.32
Total nitrogen (T.N. %)	1.57	1.41	1.51	1.32	1.52	*	0.16
Total nitrogen/dry matter (T.N/D.M. %)	3.46	3.20	3.37	2.98	3.21	N.S.	
Total protein (T.P. %)	10.02	9.01	9.63	8.45	9.71	N.S.	
Total protein/dry matter (T.P/D.M. %)	22.67	20.43	21.48	19.03	20.49	N.S.	
Acidity %	1.04	1.13	1.10	1.25	0.58	**	0.14
Salt %	0.98	0.85	1.33	1.06	0.86	**	0.15
Salt/Serum %	1.76	1.52	2.41	1.91	1.63	**	0.27

Average of 5 samples from each company

N.S.: Non significant *: Significant **: Highly Significant

2- Evaluation according to the hygienic quality:

In this work the hygienic quality was evaluated with regard to the existence of coliform bacteria in the experimental cheeses as well as the counts of total bacteria and that of yeasts and moulds.

Semi hard cheeses:

1. Edam cheeses:

The total bacterial counts of the locally-made and the imported Edam cheeses were 24.24×10^6 cfu/gm and 0.056×10^6 cfu/gm, respectively, while the counts of yeasts and moulds were

401.35×10^2 and 198×10^2 cfu/gm, in the same order (Table 6).

The total bacterial count in Edam cheese made from cows milk after 3 months of manufacturing was $36 \pm 3.50 \times 10^6$ cfu/gm cheese (Ismail *et al.*, 2004). These results are in agreement with that found in this work.

2. Blue veined cheeses:

It was found that the average values of the bacterial counts (T.B.C.) in Blue veined cheeses were 0.257×10^6 cfu/gm, 16.11×10^6 cfu/gm and 5.37×10^6 cfu/gm for "Mobi blue", "Golden

Dan" and "Lady Bird" samples, respectively (Table 7).

The average counts of T.B.C. in the locally-made Blue veined cheese were nearly to that reported by Darwish (2004) and El-Karamani (2008).

The relatively high counts of yeasts and moulds were expected in this type of cheese, which is depending on an active growth of the *Penicillium roqueforti* in the final ripened product.

3. Gouda cheeses:

Total bacterial counts (T.B.C.) of 372.8×10^4 and 30.70×10^4 cfu/gm were found in the locally-made and imported Gouda cheeses, respectively, while the average counts of the yeasts and moulds were 13.00×10^2 and 2.90×10^2 cfu/gm, in the same order (Table 8). These values indicates higher total bacterial counts (T.B.C.) of about 12 folds as well as higher counts of yeasts and moulds (about 4.5 folds) in the locally-made Gouda cheese when compared with the imported product. Similar results for yeasts and moulds counts in the imported Gouda cheese were reported by El-Karamani (2008).

Hard Cheeses:

1. Cheddar cheese:

The total bacterial counts of the locally-made and the imported cheeses were 70.4×10^6 and 27.16×10^6 cfu/gm, while the counts of yeasts and moulds were 186.6×10^2 and 6.62×10^2 cfu/gm in the same types, respec-

tively (Table 9). Results for the imported cheese were nearly similar to that reported by Halawa and Abd El-Hady (1998).

Processed cheese:

The average of T.B.C. ranged from 6.00×10^2 cfu/gm in the "Kiri" processed cheese to 210.53×10^2 cfu/gm in the "La vache qui rit" processed cheese (Table 10).

The average counts of yeasts and moulds were 64.00 cfu/gm, 20.00 cfu/gm and 4.00 cfu/gm in "La vache qui rit", "Président" and "Kiri" cheeses, respectively, while neither yeasts nor moulds could be detected in the cheese of the other two companies, namely from "Milkana" or "Teama". These results indicate that the product of "La vache qui rit" have higher total bacterial counts as well as yeasts and moulds.

Similar results for the bacterial counts were found by Abd Alla et al., (1996), while that of yeasts and moulds were lower than that reported by Ahmed (2007).

According to the results of the microbial counts (Table 10) the best hygienic qualities were found in the product of Teama followed by Milkana, Kiri, Président and La vache qui rit

Generally, all the previously experimental products were examined for the presence of coliform bacteria. No coliform bacteria were detected during this study.

Table (6): Detection and microbial counts of locally-made and imported Edam cheeses:

Type of cheese	Edam "locally-made"	Edam "imported"
Counts and detection		
T.B.C. $\times 10^6$ (cfu/gm)	24.24	0.056
Y. & M. $\times 10^2$ (cfu/gm)	401.35	198
Detection of coliform bacteria	-	-

Average of 5 samples from each type of cheese

Table (7): Detection and microbial counts of locally-made and imported Blue veined cheeses:

Name of company	Locally-made	Imported	
	Blue veined "Mobi blue"	Blue veined "Golden Dan"	Blue veined "Lady Bird"
Counts and detection			
T.B.C. $\times 10^6$ (cfu/gm)	0.257	16.11	5.37
Y. & M. $\times 10^5$ (cfu/gm)	8.50	47.00	74.70
Detection of coliform bacteria	-	-	-

Average of 5 samples from each company

Table (8): Detection and microbial counts of locally-made and imported Gouda cheeses:

Type of cheese	Gouda "locally-made"	Gouda "imported"
Counts and detection		
T.B.C. $\times 10^4$ (cfu/gm)	372.8	30.70
Y. & M. $\times 10^2$ (cfu/gm)	13.00	2.90
Detection of coliform bacteria	-	-

Average of 5 samples for each type of cheese

Table (9): Detection and microbial counts of locally-made and imported Cheddar cheeses:

Type of cheese	Cheddar "locally made"	Cheddar "imported"
Counts and detection		
T.B.C. $\times 10^6$ (cfu/gm)	70.4	27.16
Y. & M. $\times 10^2$ (cfu/gm)	186.6	6.62
Detection of coliform bacteria	-	-

Average of 5 samples from each type of cheese

Table (10): Detection and microbial counts of locally-made and Imported processed cheeses:

Name of company	La vache qui rit	Président	Milkana	Teama	Kiri "Imported"
T.B.C. x10 ² (cfu/gm)	210.53	86.90	15.90	10.40	6.00
Y. & M. (cfu/gm)	64.00	20.00	0.00	0.00	4.00
Detection of coliform bacteria	-	-	-	-	-

Average of 5 samples from each company

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دراسة مقارنة بين بعض الجبن المنتجة محلياً والمستوردة من ناحية التركيب والجودة الصحية

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أدت حالة الاحتياج اليومي للطعام ذو الجودة العالية بصفة عامة فى مصر إلى خلق وضعاً تميز باستيراد كميات متزايدة من الجبن لتغطية حاجة الاستهلاك وذلك من مصادر مختلفة وهو ما شجعنا على إجراء هذه الدراسة لتقييم هذه المنتجات ومقارنتها بمثيلتها المنتجة محلياً، اقتصرت العينات المأخوذة لهذا البحث على عينات السوق المعدة للاستهلاك.

جرى تحليل سبعين عينة من الجبن منها أربعين محلية الصناعة وثلاثين عينة مستوردة. وقد تم تقييم عينات الجبن من حيث تقدير تركيبها الكيماوى، ومحتواها البكتيرى مع أخذ ما يلى فى الاعتبار: 1- تقييم الجبن من حيث استيفاء مواصفاتها للمواصفات القياسية المصرية الحديثة، و2- تقييم الجبن من حيث درجات الجودة الصحية بها.

وقد روعي في تلك المحاور التى بنى عليها التقييم الوصول الى مقارنة بين الجبن محلية الصناعة والجبن المستوردة و/او الوصول الى مقارنة الأنواع المحلية الموجودة فى السوق تحت أسماء تجارية مختلفة ببعضها البعض. وكانت النتائج كالتالى:

1. استيفاء عينات البحث للمواصفات القياسية المصرية الحديثة حيث تأكد بصفة عامة تطابقاً تاماً فى التركيب الكيماوى لعينات البحث من جبن الإيدام ، الجبن الأزرق المعرق بالفطر، الجبن الجودا، الجبن التشيدر، الجبن المطبوخ سواء منها محلية الصناعة أو المستوردة حين جرت مقارنتها بالمواصفات القياسية المصرية (م ق م : 1183-2005/3) ، (م ق م : 1183-2005/2) ، (م ق م : 1183-2005/1) ، (م ق م : 1007-2005/2) ، (م ق م : 999-2005/2) ، على التوالى. وقد أظهرت التحليلات عدم وجود فروق معنوية بين تركيب الجبن المستوردة و المصنعة محلياً.

2. بالنظر لتقييم انواع الجبن حسب درجة الجودة الصحية فقد تم اخذ وجود أعداد من مجموعة بكتريا القولون كمؤشر لمعدل جودة صحية منخفضة قبل او خلال عملية التصنيع او خلال تداول المنتج. ولم يمكن التأكد من وجود هذا النوع من الميكروبات فى اى من المنتجات المحلية او المستوردة، بينما امكن التحقق من وجود أعداد كبيرة من الخمائر والفطريات فى الأنواع المحلية والأنواع المستوردة من جبن الإيدام والجودا والجبن التشيدر وقد أظهرت عينات الجبن المطبوخة أعداداً أقل من هذه الكائنات مما يظهر فى مجموعه درجة مرضية لمدى الجودة الصحية فى الجبن المختبرة.