

**MICROBIOLOGICAL QUALITY OF KISHK, LABAN RAYEB AND KAREISH
CHEESE AS RURAL PRODUCTS IN SOHAG GOVERNORATE, EGYPT
BY**

A.A. Abd-Alla^{*}, K.H. Salman^{} and E.A. Mahmoud^{***}**

^{*} Department of Dairy Sciences, Faculty of Agriculture, Sohag University, Sohag, Egypt.

^{**} Department of Dairy Science, Faculty of Agriculture, Al-Azhar University at Assuit, Assuit, Egypt.

^{***} Department of Food Science and Nutrition, Faculty of Agriculture, Sohag University, Sohag, Egypt.

(Accepted, 23/12/2019)

SUMMARY

The chemical and microbiological quality of 156 samples of kishk, Laban Rayeb, homemade kareish cheese and market Kareish cheese were collected randomly from different localities in Sohag Governorate, Egypt were assessed. Moisture contents of kishk, Laban Rayeb, homemade kareish cheese and market Kareish cheese ranged from 4.24 to 5.67, 80.04 to 91.73, 67.20 to 76.01 and 67.13 to 80.26% respectively. The corresponding pH values of these results ranged from 4.34 to 4.75, 4.55 to 5.03, 4.59 to 5.73 and 5.06 to 5.74 respectively, while their acidity values ranged from 1.32 to 2.08, 0.65 to 1.29, 0.83 to 1.65 and 0.87 to 1.41% respectively. Moreover, the total bacterial counts in the different samples ranged from 5.85 to 7.85 log cfu/g and the highest values were found in market kareish cheese samples. *Escherichia coli*, *Staphylococcus aureus*, *Salmonella* and *Shigella* and Moulds & Yeasts were detected in all samples and their counts ranged from 3.21 to 5.52, 3.22 to 5.62, 3.22 to 5.42 and 2.15 to 3.26 (log cfu/g) respectively. Significant differences ($p < 0.05$) were found in microbiological between samples from different places. Market kareish cheese samples had higher counts of all micro-organisms compared to other products analysed.

Key words: Microbiological quality; Kishk; Laban Rayeb and kareish cheese.

INTRODUCTION

Kishk, Laban Rayeb and kareish cheese are traditionally manufactured in the rural areas of Upper Egypt from raw milk by spontaneous fermentation with the natural milk microflora. This leads to product of variable quality due to the diversity of environmental conditions that affect the dominant microflora in raw milk. Moreover, the resulting products may contain some pathogenic bacteria due to the unhygienic way of processing.

Kishk is a traditional dairy food produced in Upper Egypt from Laban Zeer (concentrated Laban Rayeb or fermented Butter milk) mixed with boiled, dried and crushed whole wheat grains (El-Gindy, 1983). Kishk is defined as dried mixture of fermented milk and cereal, which is widely consumed in the region between the Eastern Mediterranean and the Indian sub-continent (Tamime and O'Connor,

1995). Kishk is a good source of protein, fiber, minerals and amino acids (Tamime *et al.*, 1999a and Tamime *et al.*, 1999b).

Laban Rayeb is a traditional fermented milk product produced for centuries, in some Arab countries, produced by natural fermentation of cow's and buffalo's milks. Kareish cheese is traditionally produced by acid coagulation of skim milk and contains about 70% moisture and no more than 10% fat (El Gendy, 1983).

The use of raw milk and the poor hygienic conditions during processing usually results in products contaminated with food borne pathogens (Khalifa1 and Nossair, 2016). Micro-organisms such as *S. aureus*, *E. coli* and *Salmonella spp.* were considered as the most common food-borne pathogens in dairy products (Cokal *et al.*, 2012). Existence of

harmful microorganisms results in unsafe products for human consumption as it constitute a public health hazard (Todaro *et al.*, 2013).

Thus the objective of this study was to evaluate the chemical and microbiological

quality of kishk, Laban Rayeb and kareish cheese which traditionally manufactured in rural areas of Sohag Governorate, Egypt.

MATERIALS AND METHODS

Sampling:

Kishk, Laban Rayeb, homemade kareish cheese (collected directly from country houses) and market kareish cheese (156 samples) were collected randomly from rural area of thirteen centers and cities in Sohag Governorate. The collected samples were directly transferred in a sterile bags or bottles to the laboratory and subjected directly to chemical and microbiological analysis.

Media:

Nutrient agar and Salmonella-Shigella agar were obtained from Laboratorios Conda, Spain. Manitol salt agar and Mac Conkey agar were obtained from Hi Media Laboratories, India. Potato dextrose agar was obtained from Lab-M-United Kingdom.

Chemical Analysis:

The moisture content and titratable acidity of samples were determined according to IDF

(1987) and AOAC (2000) methods respectively. The pH values were measured using a pH meter (model 68 ESD 19713), USA.

Microbiological Analyses:

The total bacterial count was determined according to Marshal (1992). *Staphylococcus aureus* was enumerated according to the method of FDA (2002). *Salmonella* and *Shigella* counts were determined according to ICMSF, 1996; James and Natalie (2002). *E. coli* count was enumerated according AOAC (1990). Moulds & Yeasts were enumerated according FDA (2002).

Statistical Analysis:

Data were analyzed by using SAS program (SAS ver. 9.2, SAS Institute 2008). Comparing of means for each trait done by using the revised LSD (Petersen, 1985).

RESULTS AND DISCUSSION

Moisture content of Kishk and Laban rayeb.

The data in Table 1 show that the moisture content of Kishk ranged from 4.24 to 5.67%. The low moisture content of Kishk can be attributed to the sun drying used in the preparation of Kishk, moreover, the low moisture content is responsible for extending the shelf life of Kishk. These values are slightly higher than those reported by Tamime *et al.* (1999c). The moisture content of Laban Rayeb differed significantly ($p < 0.05$) between samples obtained from different places. The moisture content of Laban Rayeb samples ranged from 80.04 to 91.73%. These values are in agreement with those reported by Abd-El-hamid *et al.* (2015).

Acidity and pH values of Kishk and Laban rayeb.

Data in Table 1 show significant differences ($p < 0.05$) in the pH and acidity values of Kishk samples obtained from different localities. The pH values ranged from 4.34 to 4.75 and acidity ranged from 1.32 to 2.08%. The pH values of kishk in the present study were higher than those reported by Tamime *et al.* (1999c) while the acidity values were higher than those reported by Gadallah and Hassan, (2019). Also the pH and acidity values of Laban Rayeb obtained from different localities were significantly ($p < 0.05$) different. The pH values in Laban Rayeb samples ranged from 4.55 to 5.03 while the values of acidity ranged from 0.65 to 1.29%. The pH values of Laban Rayeb were in agreement with those reported by Abou-Dobara *et al.* (2016).

Table (1): Moisture content, pH and acidity of Laban Rayeb and Kishk samples collected from different localities in Sohag governorate:

Area	Kishk			Laban Rayeb		
	Moisture %	pH	Acidity %	Moisture %	pH	Acidity %
Akhmim	5.67 ^a	4.75 ^a	1.51 ^g	91.73 ^a	5.03 ^a	0.65 ⁱ
Dar AlSalam	5.59 ^a	4.69 ^b	1.32 ^h	89.77 ^{ab}	4.93 ^b	0.81 ^h
AlBalyana	5.31 ^{ab}	4.59 ^c	1.33 ^h	88.66 ^{bc}	4.88 ^c	0.89 ^g
El Manshab	5.11 ^{bc}	4.58 ^c	1.34 ^h	88.52 ^{bc}	4.87 ^d	0.91 ^{fg}
AlMinshah	5.03 ^{bc}	4.55 ^d	1.60 ^f	88.13 ^{bcd}	4.81 ^e	0.93 ^f
El-Usayrat	5.03 ^{bc}	4.54 ^{de}	1.63 ^f	87.31 ^{bcd}	4.80 ^e	0.99 ^e
Girga	4.85 ^{cd}	4.52 ^e	1.68 ^{de}	86.75 ^{cde}	4.78 ^f	1.07 ^d
Juhaynah	4.80 ^{cd}	4.49 ^f	1.68 ^e	86.23 ^{cdef}	4.77 ^f	1.09 ^d
Saqltaha	4.60 ^{de}	4.44 ^g	1.72 ^d	85.86 ^{def}	4.76 ^f	1.17 ^c
Shandawel	4.41 ^e	4.43 ^{gh}	1.72 ^d	84.40 ^{ef}	4.59 ^g	1.18 ^c
Sohag	4.38 ^e	4.41 ^h	1.84 ^c	84.15 ^{bf}	4.58 ^h	1.23 ^b
Tahta	4.34 ^e	4.35 ⁱ	2.01 ^b	80.43 ^g	4.57 ^h	1.27 ^a
Tima	4.24 ^e	4.34 ⁱ	2.08 ^a	80.04 ^g	4.55 ⁱ	1.29 ^a
Mean	4.87	4.51	1.65	86.31	4.77	1.04
L.S.D.	0.386	0.019	0.044	2.490	0.014	0.033

Moisture content of homemade and market Kareish cheeses samples.

Data presented in Table 2 show that the moisture content of Kareish cheeses differed significantly ($p < 0.05$) between samples obtained from different localities.

The data showed significant differences ($p < 0.05$) in moisture content of homemade and market Kareish cheese between samples collected from different places. The moisture content of homemade and market Kareish cheese samples ranged from 67.20 to 76.01% and 67.13 to 80.26% respectively. The moisture contents of samples obtained from different localities were higher than that specified in the Egyptian standards for Kareish cheese No. 4-1008/2005 (moisture not exceed 75%) EOS (2005).

Acidity and pH values of Kareish cheese:

Table 2 shows that, the pH values of homemade and market Kareish cheese were significantly ($p < 0.05$) affected by the place of

collected samples. The pH values of homemade and market Kareish cheese samples ranged from 4.59 to 5.73 and 5.06 to 5.74 respectively. Thus the pH values of some homemade kareish cheese samples were lower than those for market kareish cheese.

Also significant differences ($p < 0.05$) were found between samples from different localities. The acidity values of homemade and market kareish cheese ranged from 0.83 to 1.65% and 0.87 to 1.41% respectively. These results are in agreement with those reported by Awad *et al.* (2015).

Microbiological quality of Kishk, Laban Rayeb homemade Kareish cheese and market Kareish cheese

Data presented in Table 3 show no significant differences ($p < 0.05$) in the total bacterial count of kishk samples collected from different localities probably due to its low moisture contents that limit the bacterial growth in the samples.

Table (2): Moisture content, pH and acidity of homemade and market Kareish cheese samples collected from different localities in Sohag Governorate:

Area	Homemade Kareish cheese			Market Kareish cheese		
	Moisture %	pH	Acidity %	Moisture %	pH	Acidity %
Akhmim	75.61 ^{ab}	4.71 ^h	1.45 ^{ab}	80.26 ^a	5.74 ^a	0.87 ^h
Dar AISalam	75.36 ^{bc}	4.70 ⁱ	1.64 ^a	80.22 ^a	5.62 ^b	0.87 ^h
AlBalyana	76.01 ^a	4.70 ⁱ	1.55 ^a	78.78 ^b	5.60 ^b	0.97 ^g
El Maraghah	75.00 ^c	4.69 ⁱ	1.49 ^a	78.16 ^c	5.47 ^c	0.98 ^g
AlMinshah	75.00 ^c	5.73 ^a	0.83 ^d	78.13 ^c	5.45 ^c	1.05 ^{fg}
El-Usayrat	74.01 ^d	5.58 ^b	0.99 ^d	75.35 ^d	5.44 ^c	1.07 ^{fg}
Girga	72.65 ^e	5.27 ^c	1.05 ^{cd}	74.40 ^e	5.22 ^d	1.13 ^{ef}
Juhaynah	72.01 ^f	5.07 ^d	1.14 ^{bcd}	72.53 ^f	5.22 ^d	1.17 ^{de}
Saqltah	71.93 ^f	5.02 ^e	1.35 ^{abc}	72.49 ^f	5.20 ^d	1.19 ^{de}
Shandawel	71.67 ^f	4.82 ^f	1.41 ^{ab}	72.02 ^f	5.19 ^{de}	1.25 ^{cd}
Sohag	71.56 ^f	4.76 ^g	1.43 ^{ab}	71.06 ^g	5.15 ^e	1.30 ^c
Tahta	70.36 ^g	4.72 ^h	1.43 ^{ab}	68.89 ^h	5.08 ^f	1.37 ^b
Tima	67.20 ^h	4.59 ^j	1.65 ^a	67.13 ⁱ	5.06 ^f	1.41 ^a
Mean	72.95	4.95	1.34	74.57	5.34	1.13
L.S.D.	0.606	0.022	0.353	0.600	0.052	0.096

Table (3): Total bacterial count (Log cfu/g) of kishk, Laban Rayeb, homemade kareish cheese and market Kareish cheese collected from different localities in Sohag Governorate:

Area	Kishk	Rayeb	homemade Kareish	market Kareish	Mean
Akhmim	6.22 ^d	6.22 ^l	6.49 ^a	7.10 ⁱ	6.62 ^{abc}
Dar AISalam	6.15 ^f	7.36 ^b	6.32 ^c	7.72 ^b	6.67 ^{abc}
AlBalyana	6.35 ^b	6.85 ^h	5.98 ^h	7.60 ^d	6.46 ^c
El Maraghah	6.15 ^f	7.12 ^f	6.15 ^g	7.64 ^c	6.74 ^{abc}
AlMinshah	5.95 ^g	7.22 ^c	6.22 ^e	7.48 ^f	6.77 ^{abc}
El-Usayrat	6.15 ^f	7.22 ^d	6.15 ^g	7.10 ⁱ	6.61 ^{abc}
Girga	6.22 ^d	6.85 ^h	6.35 ^b	7.25 ^h	6.89 ^{ab}
Juhaynah	6.22 ^d	7.85 ^a	6.25 ^d	7.60 ^d	6.53 ^{bc}
Saqltah	6.21 ^e	7.15 ^e	6.21 ^f	7.78 ^a	6.50 ^{bc}
Shandawel	6.49 ^a	6.35 ^j	5.90 ⁱ	7.40 ^g	6.66 ^{abc}
Sohag	6.22 ^d	6.55 ⁱ	6.22 ^e	7.52 ^e	6.98 ^a
Tahta	6.25 ^c	6.25 ^k	5.85 ^j	7.48 ^f	6.84 ^{abc}
Tima	6.15 ^f	6.90 ^g	6.15 ^g	7.25 ^h	6.70 ^{abc}
Mean	6.21	6.92	6.17	7.46	---
L.S.D.	0.0031	0.0028	0.0024	0.0051	---

On the other hand significant differences ($p < 0.05$) were found in the total bacterial count in other products obtained from the different localities. The high total bacterial count in market kareish cheese samples can be attributed to post contamination after manufacture. These results are in agreement with those reported by Gadallah and Hassan, (2019).

E. coli is considered as microbial indicator of faecal contamination and the possibility of the presence of enteric pathogens. Table 4 shows that *E. coli* was detected in all samples from the different products and its counts ranged between 3.21 and 5.52 log cfu/g. The mean *E. coli* count of kishk was slightly less than that of other products probably due to its low moisture content. On the other hand, the mean *E. coli* count of market kareish cheese was slightly higher than that of homemade kareish cheese.

The present results indicated that, all samples did not meet the standard specification for Kareish cheese which requires that Kareish cheese should be free of *E. coli* ESO (2005).

The presence of *Staph. aureus* in dairy products usually results from contamination of

milk from diseased udder or unclean hands of persons handling milk or milk products.

Table 5 shows the presence of *Staph. aureus* in all samples from the different products and its counts ranged from 3.22 to 5.62 log cfu/g. The highest and significant ($p < 0.05$) mean of *Staph. aureus* count was found in samples obtained from Tima area, and that *Staph. aureus* counts of samples from most localities were higher than that from home-made Kareish cheese. These results are in agreement with those reported by Gadallah and Hassan, (2019).

Salmonella and *Shigella* were detected in all samples from tested products and its counts ranged from 3.22 to 5.42 log cfu/g. The results for kareish cheese were in agreement with those reported by Badawi, (1996).

Kishk samples had the highest mean *Salmonella* and *Shigella* counts followed by that of market Kareish cheese, while Rayeb, homemade Kareish cheese and Kishk had lower counts from these microorganisms. The highest significant ($p < 0.05$) mean of *Salmonella* and *Shigella* was found in El-Maraghah area and the lowest was found in Juhaynah.

Table (4): *Escherichia coli* count (Log cfu/g) of kishk, Laban Rayeb, homemade kareish cheese and market Kareish cheese collected from different localities in Sohag Governorate:

Area	Kishk	Rayeb	homemade Kareish	market Kareish	Mean
Akhmim	4.15 ^c	4.22 ^d	3.99 ⁱ	4.57 ^g	4.23 ^{abc}
Dar AISalam	3.86 ^h	4.58 ^b	4.22 ^f	4.12 ^k	4.19 ^{abc}
AlBalyana	3.90 ^f	4.15 ^e	4.87 ^a	4.25 ^h	4.29 ^{abc}
El Maraghah	4.22 ^b	3.85 ⁱ	4.63 ^b	5.52 ^a	4.55 ^a
AlMinshah	3.65 ⁱ	3.98 ^f	4.62 ^c	4.25 ^h	4.13 ^{abc}
El-Usayrat	4.15 ^c	3.75 ^j	3.35 ^j	4.13 ^j	3.85 ^c
Girga	3.88 ^g	4.22 ^d	4.13 ^g	4.63 ^e	4.21 ^{abc}
Juhaynah	4.13 ^d	4.25 ^c	4.12 ^h	5.21 ^c	4.43 ^a
Saqltah	3.88 ^g	3.89 ^g	3.22 ^k	4.62 ^f	3.90 ^{bc}
Shandawel	4.25 ^a	4.25 ^c	4.13 ^g	4.13 ^j	4.19 ^{abc}
Sohag	3.99 ^e	4.70 ^a	4.25 ^e	5.18 ^d	4.53 ^a
Tahta	3.21 ^k	4.15 ^e	4.25 ^e	5.22 ^b	4.21 ^{bac}
Tima	3.35 ^j	3.88 ^h	4.57 ^d	4.22 ⁱ	4.00 ^{abc}
Mean	3.89	4.14	4.18	4.62	---
L.S.D	0.0104	0.0081	0.0092	0.0015	---

Table (5): *Staphylococcus aureus* count (Log cfu/g) of kishk, Laban Rayeb, homemade kareish cheese and market Kareish cheese collected from different localities in Sohag Governorate:

Area	Kishk	Rayeb	homemade Kareish	market Kareish	Mean
Akhmim	4.32 ^d	4.13 ^g	4.22 ^g	5.13 ^h	4.45 ^{bc}
Dar AISalam	4.22 ^f	4.55 ^a	4.88 ^e	4.82 ^k	4.62 ^{abc}
AlBalyana	4.12 ^h	3.65 ⁱ	4.55 ^f	5.12 ⁱ	4.36 ^{bc}
El Maraghah	4.22 ^f	4.21 ^e	4.13 ⁱ	5.30 ^f	4.46 ^{bc}
AlMinshah	4.90 ^b	3.99 ^h	4.22 ^g	5.46 ^d	4.64 ^{abc}
El-Usayrat	4.55 ^c	3.65 ⁱ	4.21 ^h	4.81 ^l	4.31 ^{bc}
Girga	3.22 ⁱ	3.55 ^j	4.98 ^d	4.91 ^j	4.17 ^c
Juhaynah	4.22 ^f	4.22 ^d	4.22 ^g	5.62 ^a	4.57 ^{abc}
Saqltah	4.25 ^e	3.65 ⁱ	5.13 ^c	5.58 ^b	4.66 ^{bac}
Shandawel	4.22 ^f	4.15 ^f	5.15 ^b	5.32 ^e	4.71 ^{abc}
Sohag	4.21 ^g	4.41 ^b	4.22 ^g	5.18 ^g	4.51 ^{bc}
Tahta	4.98 ^a	4.33 ^c	5.22 ^a	5.51 ^c	5.01 ^a
Tima	4.55 ^c	4.22 ^d	4.55 ^f	5.12 ⁱ	4.61 ^{abc}
Mean	4.31	4.05	4.59	5.22	---
L.S.D.	0.0052	0.0057	0.004	0.0056	---

Table (6): *Salmonella* and *Shigella* count (Log cfu/g) of kishk, Laban Rayeb, homemade kareish cheese and market Kareish cheese collected from different localities in Sohag Governorate:

Area	Kishk	Rayeb	homemade Kareish	market Kareish	Mean
Akhmim	4.99 ^f	3.82 ^c	3.55 ^f	4.55 ^f	4.23 ^{abc}
Dar AISalam	5.21 ^d	4.21 ^b	3.35 ^g	4.22 ⁱ	4.25 ^{abc}
AlBalyana	5.24 ^c	3.55 ^d	3.55 ^f	5.42 ^a	4.44 ^{bac}
El Maraghah	4.41 ^h	4.22 ^a	4.22 ^a	5.18 ^e	4.51 ^a
AlMinshah	4.22 ^j	3.35 ^f	4.21 ^b	5.21 ^d	4.25 ^{abc}
El-Usayrat	5.33 ^b	3.22 ^h	3.55 ^f	5.22 ^c	4.33 ^{abc}
Girga	5.21 ^d	3.25 ^g	3.25 ^h	5.25 ^b	4.24 ^{abc}
Juhaynah	4.22 ^j	3.55 ^d	3.25 ^h	4.22 ⁱ	3.81 ^c
Saqltah	4.21 ^k	3.55 ^d	3.25 ^h	5.22 ^c	4.06 ^{abc}
Shandawel	4.88 ^g	3.55 ^d	3.82 ^d	4.13 ^j	4.09 ^{abc}
Sohag	5.34 ^a	3.25 ^g	3.79 ^e	4.41 ^g	4.20 ^{abc}
Tahta	5.18 ^e	3.25 ^g	3.99 ^c	4.34 ^h	4.19 ^{abc}
Tima	4.34 ⁱ	3.54 ^e	3.22 ⁱ	4.22 ⁱ	3.83 ^{abc}
Mean	4.83	3.56	3.62	4.74	---
L.S.D	0.0072	0.0054	0.0027	0.0047	---

Data presented in Table 7 show that, yeasts and moulds were detected in all samples of tested products and their counts ranged from 2.15 to 3.26 log cfu/g. The results also show close counts of yeasts and moulds in kishk,

Laban Rayeb and homemade kareish cheese which were generally less than their counts in market kareish cheese. The highest ($p < 0.05$) mean of yeast & mould was found in AlBalyana area.

Table (7): Yeasts and molds count (Log cfu/g) of kishk, Laban Rayeb, homemade kareish cheese and market Kareish cheese collected from different localities in Sohag Governorate:

Area	Kishk	Rayeb	homemade Kareish	market Kareish	Mean
Akhmim	2.37 ^h	2.22 ⁱ	2.99 ^a	3.23 ^b	2.71 ^{ab}
Dar AISalam	2.55 ^e	2.22 ⁱ	2.15 ^g	2.94 ^h	2.46 ^b
AlBalyana	2.85 ^b	3.21 ^b	2.55 ^c	3.12 ^f	2.94 ^a
El Maraghah	2.99 ^a	2.99 ^c	2.15 ^g	2.90 ⁱ	2.76 ^{ab}
AlMinshah	2.99 ^a	2.22 ⁱ	2.55 ^c	2.99 ^g	2.68 ^{ab}
El-Usayrat	2.49 ^f	2.22 ⁱ	2.79 ^b	2.75 ^k	2.56 ^{ab}
Girga	2.35 ⁱ	3.22 ^a	2.22 ^f	2.87 ^j	2.67 ^{ab}
Juhaynah	2.79 ^c	2.25 ^g	2.15 ^g	2.72 ^l	2.47 ^b
Saqultah	2.65 ^d	2.37 ^f	2.55 ^c	3.15 ^d	2.68 ^{ab}
Shandawel	2.46 ^g	2.23 ^h	2.99 ^a	3.22 ^c	2.72 ^{ab}
Sohag	2.55 ^e	2.72 ^e	2.33 ^d	3.26 ^a	2.71 ^{ab}
Tahta	2.15 ^j	2.89 ^d	2.25 ^e	2.70 ^m	2.50 ^{ab}
Tima	2.55 ^e	2.15 ^j	2.15 ^g	3.13 ^e	2.50 ^{ab}
Mean	2.60	2.53	2.45	3.00	---
L.S.D.	0.0011	0.0008	0.0006	0.0023	---

CONCLUSIONS

The current study indicates the poor microbiological quality of the tested products in Sohag Governorate. The presence of pathogens poses a risk for public health. Attention should be given to improve the hygiene of dairy products. So, the manufactures of rural dairy products should receive training through

demonstration projects, covering courses and guidance for the application of proper sanitary measures during milking of dairy animals, manufacturing and marketing dairy products. Strict sanitary measures should be applied to manufacture and handling of dairy products in the Egyptian countryside.

REFERENCES

- AOAC. (1990). Official Methods of Analysis. 15th Ed., Association of Official Analytical Chemists, Benjamin Franklin Station, Washington, USA.
- AOAC. (2000). Official Methods of Analysis Association of Official Analytical Chemists. 17th Ed Wisconsin: George Banta Co. Inc.
- Abdel-hamid, E.A., Mohran, M.A. and Mahmoud, N.H. (2015). Chemical composition of rural dairy by-products. Assiut J. Agric. Sci. 46: 40.
- Abou-Dobara, M.I., Ismail, M.M. and Refaat, N.M. (2016). A survey study on chemical, microbiological and sensory properties of industrial rayeb milk produced in Egypt. J. Food & Dairy Sci., Mansoura University. 7: 119.
- Awad, R.A., Salama, W.M. and Ragb, W.A. (2015). Enhancing yield and acceptability of Kareish cheese made of Reformulated milk. Ann. Agric. Sci. 60: 87.
- Badawi, O.F.H., (1996). Dairy products as source of some bacterial zoonoses. Ph D Thesis, Faculty of Vet. Med. Cairo University.
- Cokal, Y., Dagdelen, A., Cenet, O. and Gunsen, U. (2012). Presence of *L. monocytogenes* and some bacterial pathogens in two Turkish traditional foods, Mihalic cheese and Hosmerim dessert. Food Control. 26: 337.

- El-Gindy, S.M. (1983). Fermented foods of Egypt and Middle East. J. food protect. 46: 358.
- EOS (2005). Egyptian Organization for Standardization and Quality. Soft cheese part 4, Karish cheese, ES:1008-4/2005.
- FDA (2002). Bacteriological Analytical Manual. 9th Ed., AOAC International, Arlington, VA, USA.
- Gadallah, M.G.E. and Hassan, M.F.Y. (2019). Quality properties of Kishk (a dried fermented cereal-milk mixture) prepared from different raw materials. J. Saudi Soc. Agric. Sci. 18: 95.
- ICMSF, (1996). Microorganism in foods. Microbiological specification of food pathogens, 1st Ed. International Committee of Microbiological Specification of Food. Black academic and professional, London, Pp: 112-300.
- IDF (1987). Milk, cream, fermented milks, and evaporated milk-total solids. FIL-IDF 21B, International Dairy Federation Brussels, Belgium.
- James, G.C., and Natalie, S. (2002). Microbiology; A laboratory Manual. Part II. 6th Ed. Benjman Cummings, N. Y.
- Khalifa, E. and Nossair, M. (2016). Comparative mycological assay on prevalence of yeasts, molds and aflatoxinM1 (AFM1) in some fermented milk products in Alexandria, Egypt. Life Sci. J. 13: 20.
- Marshall, R.T. (1992). Standard Methods for the Examination of Dairy Products. 16th ed. Am. Publ. Health Assoc., Washington, DC.
- Petersen, R.G. (1985). Design and Analysis of Experiments. Marcel Dekker, Inc., New York, USA.
- Tamime, A. Y. and O'Connor, T. P. (1995). Kishk (a dried fermented milk). Int. Dairy J. 5: 109.
- Tamime, A.Y., Barclay, M.N.I., Law, A.J.R., Leaver, J., Anifantakis, E.M. and O'Connor, T.P. (1999a). Kishk - a dried fermented milk/cereal mixture. 2. Assessment of a variety of protein analytical techniques for determining adulteration and proteolysis. Lait. 79: 331.
- Tamime, A.Y., Barclay, M. N. I. McNulty, D. and Connor, T.P.O. (1999b). Kishk - a dried fermented milk/cereal mixture. 3. Nutritional composition. Lait. 79: 435.
- Tamime, A.Y., Barclay, M.N.I. McNulty, D. and O'Connor, T.P.O. (1999c). Kishk - a dried fermented milk/cereal mixture. 1. Composition of gross components, carbohydrates, organic acids and fatty acids. Lait. 79: 317.
- Todaro, A., Adly, F.A. and Omar, O.A.H. (2013). History, processing and quality enhancement of traditional Egyptian kariesh cheese. J. Food Sci. Technol. 1: 1.

الجودة الميكروبيولوجية للكشك واللبن الرايب والجبن القريش كمنتجات ريفية في محافظة سوهاج - مصر

في هذه الدراسة، تم جمع ١٥٦ عينة من الكشك واللبن الرايب والجبن القريش المنزلي وجبن قريش الأسواق بشكل عشوائي من بعض قرى ثلاثة عشر مركزاً ومدينة مختلفة في محافظة سوهاج بمصر لتقدير الجودة الكيميائية والميكروبيولوجية لتلك المنتجات. وأظهرت النتائج أن قيم رطوبة الكشك واللبن الرايب والجبن القريش المنزلي وجبن قريش الأسواق تراوحت بين ٤٠،٢٤ إلى ٥٠،٦٧ و ٨٠،٠٤ إلى ٩١،٧٣ و ٦٧،٢٠ إلى ٧٦،٠١ و ٦٧،١٣ إلى ٨٠،٢٦٪ على التوالي. كما تراوحت قيم الأس الهيدروجيني في تلك العينات بين ٤،٣٤ و ٤،٧٥ و ٤،٥٥ إلى ٥،٠٣ و ٤،٥٩ إلى ٥،٧٣ و ٥،٠٦ إلى ٥،٧٤ على التوالي. أيضاً تراوحت قيم الحموضة من ١،٣٢ إلى ٢،٠٨ و ٠،٦٥ إلى ١،٢٩ و ٠،٨٣ إلى ١،٦٤ و ٠،٨٧ إلى ١،٤١٪ على التوالي. علاوة على ذلك، تراوحت أعداد البكتيريا الكلية في العينات من ٥،٨٥ إلى ٧،٧٨ (cfu/g) وأظهرت النتائج أن أعلى الأعداد في العد الكلي البكتيري تواجد في عينات جبن قريش الأسواق. تم اكتشاف *Staphylococcus aureus* و *E. coli* و *Salmonella* & *Shigella* و *Moulds* & *Yeasts* في جميع العينات الـ ١٥٦ وتراوحت أعدادهم بين ٣،٢١ إلى ٥،٥٢ و ٣،٢٢ إلى ٥،٦٢ و ٣،٢٢ إلى ٥،٤٢ و ٢،١٥ إلى ٣،٢٦ (cfu/g) على التوالي. كانت هناك اختلافات معنوية في نتائج التحليل الميكروبيولوجي ($P < 0.05$) بين أماكن تجميع العينات. وبشكل عام، أظهرت النتائج أن عينات الجبن القريش المجمعة من الأسواق كانت تحتوى على عدد أعلى من جميع الكائنات الحية الدقيقة التي تم فحصها مقارنةً بالمنتجات الأخرى (كشك، لبن رايب، جبن قريش منزلية).