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Estimation of The Quality of some Fermented Dairy Products in Cairo and Giza Governorates

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ABSTRACT

A total of twenty samples of different types of Zabady and Raybe milk were collected from local markets in Cairo and Al-Giza governorates and stored in the refrigerator at 5±1°C. Microbiological, physicochemical, and rheological properties of collected samples were studied at the beginning, middle, and end of storage period. The results showed that the average values of acidity, pH, Viscosity, Syneresis, Water Holding Capacity (WHC%) and Radical Scavenging Activity (RSA%) of fresh samples ranged from 0.72±0.02 to 0.82±0.04%, 4.52±0.05 - 4.61±0.02, 3393±7.00 - 8535±9.00 cP, 2.70±0.04 - 3.88±0.07 (ml/5g), 20.70±0.18 - 45.92±0.19% and 14.69±0.13 - 21.62±0.12%, respectively. The collected fresh samples contained 11.25±0.15 - 14.86±0.19 % total solids. Microbiological analysis revealed that the collected fresh samples contained 7.95 to 8.52 (log cfu/g) lactic acid bacteria, 2.16 to 2.62 (log cfu/g) Coliform Bacteria and 2.25 to 2.33 (log cfu/g) Yeasts and Molds. The hardiness and gumminess of the high-fat traditional zabady samples were higher than the rest of the zabady samples, while the springiness, cohesiveness, and chewiness in the industrial zabady samples were higher than the traditional zabady. As the storage period progressed, chemical, physical, microbiological, and rheological changes occurred.

Keywords: Zabady, Raybe milk, Rheological, R.S.A%.

INTRODUCTION

Yoghurt is defined as a Coagulated milk product obtained by lactic acid fermentation through the action of *Lactobacillus delbreukii spp bulgaricus* and *Streptococcus thermophilus***.** It should retain the sufficient number of the used starter alive until it reaches the consumers. Although quantitative microbiological standards differ all over the world, it is accepted that yoghurt should contain 107cfu/g of *Lactobacillus delbreukii spp bulgaricus* and *Streptococcus thermophilus*. Fermented milk comes in a variety of textures (e.g. liquid, stirred and set) and fat contents (Tamime and Death, 1980). Raybe milk is one of the fermented milk consumed by different ages in Egypt and other countries, for its highly nutritive value and therapeutic properties. There are various possible probiotic and therapeutic roles of starter microorganisms in cultured milk as anticarcinogenic activity, reduction of serum cholesterol levels, alleviation of effects of renal malfunction, maintenance of normal intestinal microflora, alleviation of lactose maldigestion, and nutritional enhancement (Varnam and Sutherland, 1994). Raybe milk is a type of fermented milk manufactured by Egyptian farmers as fresh milk is placed in an earthenware pot "Matared" and left undisturbed in a warm place until the cream rises and the lower partially skimmed milk coagulates; after removing the cream layer, which mainly made into butter, the remaining curd "Raybe milk" is either consumed as fermented milk or is converted to a soft acid cheese known as Karish (El-Gendy, 1983). Recently, safe and standardized Raybe milk is produced on large scale in dairy products plants which use ABT culture in production (Abou-Dobara *et al.*, 2016). Fermented milk has more nutritional benefits than milk as it is nutritionally rich in protein, calcium, riboflavin, vitamin B6, and vitamin B12 (Ashraf and Shah, 2011). Also, can aid the digestion process, boost immunity, ease diarrhea and protect against cancer (McFarland, 2015). The central process in converting milk into yoghurt is the condensation of casein micelles into a three-dimensional network structure. It was also mentioned that casein makes up about 80% of the total protein content in cow's milk consists of four main components (α_{s1}, α_{s2}, β and κ) (Fox *et al.*(1998). Also Hematyar *et al.*(2012) mentioned two main disadvantages of yoghurt: Serum expulsion (synergism) and/or difference in viscosity. Incubation, storage, and processing conditions influence these defects. Changes in the physical, chemical and microbiological structure of yoghurt determine the storage and shelf life of the product (Sofu and Ekinci, 2007). Moreover, Salvador and Fiszman (2004) reported that studies of changes in these quality characteristics during storage would enable producers to predict the shelf life of the product more accurately. The textural characteristics and ability to retain water are important quality factors for consumer preference. Hardness, creaminess, viscosity, and syneresis are considered the most important descriptors for the textural perception of yoghurt (Tamime and Robinson, 2007). The survival of microorganisms, particularly probiotics during storage is an important criterion for the quality and health characteristics of the product (Granatto *et al.*,2010). The study aimed to evaluate the quality of Zabady and Raybe milk collected from local markets in Cairo and Al-Giza governorates, and know the effect of storage on this quality.

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MATERIALS AND METHODS

Materials

Samples:

A total of 20 samples of different types of Zabady and Raybe milk (industrial and traditional) five samples of every type, were collected from local markets in Cairo and Al-Giza governorates. Samples were brought to the laboratory at 5±1 °C by using an icebox and prepared immediately after arrival for the microbiological, chemical, and rheological analysis.

IZ=Industrial Zabady, TZ=Traditional Zabady, IR=Industrial Rayeb Milk, TR=Traditional Rayeb Milk

Chemical materials:

The materials used in the extraction and the materials used in chemical analyzes were obtained from the company Sigma Chemical Co. Distilled water was used for the preparation of all solutions, Pyrex glassware was used throughout.

Media:

MRS medium, Violet Red Bile Agar (VRBA), Potato - dextrose agar (PDA).

Methods:

Analysis of Zabady and Raybe milk:

Zabady and Raybe milk were analyzed in triplicate for the analysis of microbiological, chemical, physical, and rheological of fresh samples and within 7, 15 days to the industrial samples, 3, 5 days to the traditional samples storage at the 5±1 °C.

Microbiological analysis:

Lactic Acid Bacteria were counted according to the methods described in the FIL/IDF Standard (117A/ 1988), While coliform bacteria, Molds, and yeast counts were determined according to (APHA, 1992).

2.2.3. Chemical composition and Physical analysis:

Total solid content, and Titratable acidity (%) were determined in all samples as the method described in AOAC (2012). The pH value was measured using a Swiss Gallenkamp stick pH meter with a glass electrode. Syneresis was determined according to (Tamime, *et al.*, 1996). For measurement of water-holding capacity, 25 g of sample was centrifuged at 4500 rpm for 30 min at 10 ± 1 °C. After centrifugation, the supernatant was removed and the Pellet was collected and weighed. The WHC was calculated as follows:

$$\mathbf{WHC = (wt/wi)\times 100}$$

Where: wt is the weight (g) of the pellet and wi is the initial weight (g) of the sample (Wu *et al.*, 2000).

Rheological analysis

Textural profile analysis (TPA) of the Zabady samples was performed using multi test 1-d texture analyzer, (mecmesin limited, Slinfold, West Sussex, UK) as described by (El-Kholy *et al*., 2019). Viscosity was determined using Swiss made viscometer Drug type TV aunevitesse.

The scavenging activity of DPPH radical measurement

Was assessed according to the method of Larrauri *et al.* (1998).

Statistical analysis:

The data was analyzed by ANOVA according to the appropriate experimental designs and expressed as means ± standard deviation, which were then statistically compared by the Duncan test at the confidence level of 0.05 using SPSS program, version 20.0 (IBMSPSSSTATISTICS20). All experiments were repeated in triplicates according to the SAS (1996).

Means ± Standard deviation with different capital letters within each column are significant a 5% level. Means ± Standard deviation with different small letters within each row are significant a 5 % level.

RESULTS AND DISCUSSION

Microbiological properties changes of collected samples from the Egyptian market (zabady and rayeb milk) during storage:

Lactic acid bacterial count:

Survival of lactic acid bacteria (log cfu/g) of zabady and rayeb milk along with storage at 5±1 °C for 15 days is shown in Table **(**1**)**. The results indicated that, at the beginning of the storage period, the counts of lactic acid bacteria in zabady and rayeb milk range from 7.95 to 8.52 log cfu/g.

The lactic acid bacteria slightly decreased until the seventh day of the storage period of industrial zabady and Rayeb milk, while slightly decreased until the third day of storage period of traditional zabady and rayeb. Along the cold storage period thereafter, lactic acid bacterial counts decreased even more till the end of the storage period. The decrease of lactic acid bacterial counts may be due to the sensitivity of these bacteria to acid developed during the storage period. The results are in harmony with those obtained by Hanou *et al.* (2016) who found a gradual decline for all samples zabady. Also, this result agrees with previous studies by Rahmatalla *et al.* (2017) who indicated that the decrease in lactic acid bacterial counts may be due to the sensitivity of these bacteria to acid developed along the storage period**.** Also, according to Olson and Aryana (2008) the decrease of the lactic acid bacteria can be explained by three mechanisms: the depletion of some nutrients needed by bacteria; Some undesirable relationships may have occurred between lactic acid bacteria; and may have produced higher concentrations of antimicrobials such as bacteriocins, H_2O_2, or organic acids that may have eventually inhibited more lactic acid bacteria.

Coliform Bacterial count:

Coliform Bacterial is an indicator of the hygienic quality. Coliforms are used to measure the quality of the practices used to minimize microbial contamination of dairy products and as an approved safety indicator in the HACCP system (Banwart, 1998)**.** Data in the Table (**1**) illustrated that the Coliform group was absent in all examined industrial zabady and rayeb milk samples, while the counts of coliform bacteria of some traditional zabady and rayeb milk samples range from 2.16 to 2.62 log cfu/g, which increased during the storage period cold, these samples were out of Egyptian standards specification (8042/2016), which stated that Coliforms in zabady samples should not be more than 10 cfu/g. also, coliform group was absent in some traditional zabady and rayeb milk samples**.** The presence of Coliforms in a high incidence in zabady samples declare the neglected sanitary measures that reflect the use of poor-quality raw milk, insufficient preheating process, as well as the presence of other enteric pathogens. Moreover, Coliforms as an indicator of post processing contamination in zabady manufacture have been established and recommended by public health authorities worldwide (El Bakri and El Zubeir, 2009). Higher results were obtained by Majoie *et al.* (2020) and El leboudy *et al.* (2015).

Table 1. Microbiological properties of collected samples (zabady and rayeb milk) at storage period (days).

Sample	Lactic acid bacteria count (Log CFU)/g			Coliform Bacteria count (Log CFU)/g			Yeast and Mold (Log CFU)/g		
	Storage period (days)			Storage period (days)			Storage period (days)		
	fresh	**7**	**15**	**fresh**	**7**	**15**	**fresh**	**7**	**15**
IZ 1	7.95	7.94	7.82	Nil	Nil	Nil	Nil	Nil	Nil
IZ 2	8.03	8.01	7.91	Nil	Nil	Nil	Nil	Nil	Nil
IZ 3	8.22	8.21	8.04	Nil	Nil	Nil	Nil	Nil	Nil
IZ 4	8.06	8.04	7.90	Nil	Nil	Nil	Nil	Nil	Nil
IZ 5	8.08	8.05	7.93	Nil	Nil	Nil	Nil	Nil	Nil
IR 1	8.42	8.40	8.23	Nil	Nil	Nil	Nil	Nil	Nil
IR 2	8.34	8.33	8.21	Nil	Nil	Nil	Nil	Nil	Nil
IR 3	8.38	8.35	8.22	Nil	Nil	Nil	Nil	Nil	Nil
IR 4	8.33	8.31	8.24	Nil	Nil	Nil	Nil	Nil	Nil
IR 5	8.34	8.32	8.21	Nil	Nil	Nil	Nil	Nil	Nil
Sample	fresh	3	5	fresh	3	5	fresh	3	5
TZ 1	8.49	8.47	8.25	2.16	2.94	3.09	2.26	2.60	3.02
TZ 2	8.49	8.49	8.24	Nil	Nil	Nil	Nil	Nil	Nil
TZ 3	8.47	8.46	8.21	2.32	2.96	3.16	2.28	2.62	3.00
TZ 4	8.52	8.51	8.28	2.48	3.00	3.18	2.25	2.71	3.15
TZ 5	8.48	8.48	8.24	Nil	Nil	Nil	Nil	Nil	Nil
TR 1	8.41	8.41	8.16	2.62	3.01	3.23	2.30	2.71	3.21
TR 2	8.42	8.40	8.16	2.48	2.96	3.16	2.33	2.79	3.23
TR 3	8.39	8.36	8.15	Nil	Nil	Nil	Nil	Nil	Nil
TR 4	8.43	8.40	8.14	Nil	Nil	Nil	Nil	Nil	Nil
TR 5	8.40	8.39	8.15	2.52	2.99	3.18	2.31	2.77	3.20

Yeasts and Molds count:

Yeasts and Molds of zabady and rayeb milk samples, are shown in Table (1), which illustrated that yeasts and molds were absent in all examined industrial zabady and rayeb milk samples, while the counts of Yeasts and Molds of some traditional zabady and rayeb milk samples range 2.25 to 2.33 log cfu/g, that increased along the cold storage period, these samples were out of Egyptian standards specification (8042/2016), which stated that Yeasts, and Molds in zabady samples should not be more than 10 cfu/g. also, yeasts and molds was absent in some traditional zabady and rayeb milk samples. Abd El Gawad *et al.* (2010) showed that counts of coliform groups, molds, and yeasts were high in all traditional rayeb milk samples from different governorates in Egypt, these results can be explained by the fact that the methods of production of the various traditional foods are usually primitive and the major risk enhancing factors are the use of contaminated raw materials, lack of pasteurization, and inadequate fermentation and storage conditions (Savadogo *et al.*, 2004).

Chemical composition and Physical properties changes of collected samples from the Egyptian market (zabady and rayeb milk) during storage:

The total solids (%):

Total solids content of zabady and rayeb milk samples are presented in Table (2). The total solid content of zabady and rayeb milk samples ranges from 11.25 ± **0.1**5 to 14.86 ± 0.19 **%**.

During cold storage, the total solids content of zabady and rayeb milk samples increased significantly ($P \leq 0.05$) due mainly to the syneresis that occured. Similar trends were observed by (El-Sayed *et al.*, 2013 and Abou-Dobara *et al.*, 2016).

Titratable acidity (%):

The results in a Table (3) indicated that titratable acidity % (as lactic acid) increased significantly ($P \leq 0.05$) in all studied zabady and rayeb milk samples during the storage period at refrigerator temperature. This increase in acidity could be due to the conversion of residual lactose in zabady and rayeb milk samples by lactic acid bacteria. The titratable acidity % of fresh zabady and rayeb milk samples range from 0.72 ± 0.02 to 0.82 ± .0.04 %. Similar trends were observed by (El-Abasy *et al.*, 2012, Tammam *et al.*, 2019).

Table 2. (T. S %) of collected samples (zabady and rayeb milk) at storage period (days).

Sample	Total Solids (T. S %)		
	Storage period (days)		
	fresh	**7**	**15**
IZ 1	13.61^{Ca} ±0.17	14.00^{Bb} ±0.14	14.42^{Aa} ±0.12
IZ 2	12.22^{Cd} ±0.13	12.89^{Be} ±0.10	13.14^{Ad} ±0.05
IZ 3	13.08^{Bb} ±0.16	13.58^{Ac} ±0.11	13.85^{Ab} ±0.14
IZ 4	13.71^{Ba} ±0.14	14.25^{Aa} ±0.14	14.52^{Aa} ±0.13
IZ 5	12.74^{Cc} ±0.09	13.13^{Bd} ±0.07	13.55^{Ac} ±0.04
IR 1	11.25^{Bc} ± 0.15	11.50^{ABb} ± 0.17	11.73^{Ab} ± 0.14
IR 2	11.63^{Bb} ± 0.12	11.97^{Aa} ± 0.15	12.11^{Aa} ± 0.13
IR 3	11.98^{Ba} ± 0.08	12.23^{Aa} ± 0.06	12.27^{Aa} ± 0.11
IR 4	11.77^{Bab} ± **0.1**8	12.04^{ABa} ± 0.17	12.31^{Aa} ± 0.15
IR 5	11.76^{Bab} ± 0.09	12.01^{Aa} ± 0.08	12.11^{Aa} ± 0.06
Sample	fresh	3	5
TZ 1	14.33^{Bb} ± 0.17	14.83^{Ab} ± 0.18	14.99^{Ab} ± 0.15
TZ 2	13.91^{Bc} ± 0.13	14.47^{Ac} ± 0.14	14.67^{Ac} ± 0.11
TZ 3	13.39^{Cd} ± 0.12	13.80^{Bd} ± 0.09	14.06^{Ad} ± 0.10
TZ 4	14.86^{Ba} ± 0.19	15.20^{ABa} ± 0.17	15.48^{Aa} ± 0.16
TZ 5	14.72^{Ba} ± 0.21	15.06^{ABab} ± 0.17	15.34^{Aa} ± 0.18
TR 1	12.49^{Cd} ± 0.11	12.76^{Bd} ± 0.11	12.98^{Ad} ± 0.09
TR 2	12.75^{Cc} ± 0.14	13.13^{Bc} ± 0.13	13.43^{Ac} ± .010
TR 3	11.68^{Be} ± 0.09	11.87^{Ae} ± 0.05	12.00^{Ae} ± 0.07
TR 4	14.75^{Ca} ± 0.10	15.14^{Ba} ± 0.08	15.40^{Aa} ± 0.03
TR 5	13.84^{Cb} ± 0.08	14.29^{Bb} ± 0.07	14.61^{Ab} ± 0.05

Table 3. Titratable acidity %, pH of collected samples (zabady and rayeb milk) at storage period (days).

Sample	Titratable acidity %			PH		
	Storage period (days)			Storage period (days)		
	fresh	7	15	fresh	7	15
IZ 1	$0.79^{Ca} \pm 0.04$	$0.97^{Ba} \pm 0.02$	$1.26^{Aab} \pm 0.03$	$4.59^{Aa} \pm 0.03$	$4.35^{Bb} \pm 0.02$	$4.17^{Ca} \pm 0.05$
IZ 2	$0.72^{Cb} \pm 0.03$	$0.93^{Bb} \pm 0.01$	$1.24^{Ab} \pm 0.02$	$4.61^{Aa} \pm 0.02$	$4.41^{Ba} \pm 0.04$	$4.21^{Ca} \pm 0.03$
IZ 3	$0.80^{Ca} \pm 0.04$	$0.99^{Ba} \pm 0.01$	$1.28^{Aab} \pm 0.03$	$4.58^{Aa} \pm 0.03$	$4.37^{Bab} \pm 0.02$	$4.19^{Ca} \pm 0.05$
IZ 4	$0.76^{Cab} \pm 0.03$	$0.97^{Ba} \pm 0.02$	$1.29^{Aa} \pm 0.01$	$4.58^{Aa} \pm 0.02$	$4.35^{Bb} \pm 0.04$	$4.17^{Ca} \pm 0.03$
IZ 5	$0.79^{Ca} \pm 0.02$	$0.98^{Ba} \pm 0.01$	$1.29^{Aa} \pm 0.01$	$4.59^{Aa} \pm 0.02$	$4.38^{Bab} \pm 0.01$	$4.16^{Ca} \pm 0.04$
IR 1	$0.75^{Ca} \pm 0.04$	$0.98^{Ba} \pm 0.01$	$1.27^{Aa} \pm 0.03$	$4.53^{Ab} \pm 0.03$	$4.38^{Ba} \pm 0.02$	$4.19^{Ca} \pm 0.05$
IR 2	$0.74^{Ca} \pm 0.03$	$0.93^{Bb} \pm 0.03$	$1.24^{Aa} \pm 0.02$	$4.64^{Aa} \pm 0.02$	$4.37^{Ba} \pm 0.06$	$4.21^{Ca} \pm 0.03$
IR 3	$0.75^{Ca} \pm 0.01$	$0.94^{Bb} \pm 0.01$	$1.23^{Aa} \pm 0.02$	$4.56^{Ab} \pm 0.01$	$4.42^{Ba} \pm 0.02$	$4.21^{Ca} \pm 0.03$
IR 4	$0.73^{Ca} \pm 0.04$	$0.94^{Bb} \pm 0.02$	$1.25^{Aa} \pm 0.04$	$4.55^{Ab} \pm 0.03$	$4.42^{Ba} \pm 0.04$	$4.20^{Ca} \pm 0.07$
IR 5	$0.72^{Ca} \pm 0.02$	$0.98^{Ba} \pm 0.01$	$1.27^{Aa} \pm 0.01$	$4.56^{Ab} \pm 0.02$	$4.39^{Ba} \pm 0.05$	$4.18^{Ca} \pm 0.02$
Sample	fresh	3	5	fresh	3	5
TZ 1	$0.79^{Ca} \pm 0.04$	$0.98^{Ba} \pm 0.02$	$1.27^{Aa} \pm 0.04$	$4.58^{Aa} \pm 0.03$	$4.41^{Bb} \pm 0.04$	$4.31^{Ca} \pm 0.07$
TZ 2	$0.79^{Ca} \pm 0.03$	$0.98^{Ba} \pm 0.01$	$1.20^{Ab} \pm 0.02$	$4.59^{Aa} \pm 0.02$	$4.51^{Ba} \pm 0.05$	$4.29^{Ca} \pm 0.03$
TZ 3	$0.81^{Ca} \pm 0.01$	$0.96^{Ba} \pm 0.02$	$1.19^{Ab} \pm 0.03$	$4.57^{Aa} \pm 0.01$	$4.44^{Bab} \pm 0.04$	$4.31^{Ca} \pm 0.05$
TZ 4	$0.82^{Ca} \pm 0.04$	$0.97^{Ba} \pm 0.01$	$1.19^{Ab} \pm 0.03$	$4.57^{Aa} \pm 0.03$	$4.48^{Bab} \pm 0.02$	$4.25^{Ca} \pm 0.05$
TZ 5	$0.81^{Ca} \pm 0.05$	$0.98^{Ba} \pm 0.02$	$1.18^{Ab} \pm 0.04$	$4.58^{Aa} \pm 0.04$	$4.43^{Bb} \pm 0.04$	$4.27^{Ca} \pm 0.07$
TR 1	$0.77^{Ca} \pm 0.02$	$0.94^{Bb} \pm 0.01$	$1.16^{Ac} \pm 0.02$	$4.53^{Aa} \pm 0.02$	$4.50^{Aa} \pm 0.05$	$4.29^{Ba} \pm 0.03$
TR 2	$0.77^{Ca} \pm 0.03$	$0.98^{Ba} \pm 0.02$	$1.20^{Ab} \pm 0.01$	$4.53^{Aa} \pm 0.04$	$4.49^{Aab} \pm 0.04$	$4.29^{Ba} \pm 0.02$
TR 3	$0.76^{Ca} \pm 0.02$	$0.96^{Bab} \pm 0.03$	$1.19^{Ab} \pm 0.01$	$4.55^{Aa} \pm 0.02$	$4.44^{Babc} \pm 0.06$	$4.30^{Ca} \pm 0.05$
TR 4	$0.75^{Ca} \pm 0.04$	$0.95^{Bab} \pm 0.01$	$1.24^{Aa} \pm 0.02$	$4.54^{Aa} \pm 0.03$	$4.39^{Bc} \pm 0.02$	$4.24^{Ca} \pm 0.03$
TR 5	$0.78^{Ca} \pm 0.03$	$0.98^{Ba} \pm 0.01$	$1.19^{Ab} \pm 0.01$	$4.52^{Aa} \pm 0.05$	$4.41^{Bbc} \pm 0.04$	$4.28^{Ca} \pm 0.02$

(PH) value:

The results in a Table (3) indicated that pH decreased significantly (P≤0.05) in all studied zabady and rayeb milk samples during the storage period at refrigerator temperature. This decrease in PH could be due to the microflora adapted to hydrolyze gradually lactose into lactic acid during storage at refrigerator temperature in zabady and rayeb milk samples by lactic acid bacteria. The PH of fresh zabady and rayeb milk samples range from 4.52 ± **0.**05 to 4.6**1** ± **0.**02. Similar trends were observed by Assem *et al.* (2013). These differences might be attributed to several reasons such as the chemical composition of milk used in production, a starter activity, manufacturing conditions, or handling. Anyway, industrial rayeb milk samples had higher pH values than that of traditional rayeb milk reported by El-Abasy *et al.* (2012), which was 4.53. This is due to the different processing conditions**.** In the manufacturing of rayeb milk in dairy products plants, fermentation time and temperature are controlled, and a selective starter is utilized unlike spontaneous fermentation for two days at ambient temperature with natural microorganisms which, occurred in traditional rayeb milk.

Syneresis of collected samples from the Egyptian market:

Spontaneous syneresis is a major visible defect, appearing as an accumulation of whey on the surface of zabady gels, and can adversely affect the consumer acceptability of the product (Purwandari *et al.,* 2007**).** Data in a Table (4) revealed that the syneresis of fresh zabady and rayeb milk samples range from 2.70 ± 0.04 to 3.96 ± 0.02 (ml/5g), it has an increase of during the storage period to all sample. The increase of the syneresis in all sample's during storage is likely due to the lowering of pH during storage resulting in the contraction of the casein network and consequently greater whey expulsion owing to the reduction in net negative charge of the casein micelles leading to a decrease in electrostatic repulsion between the charged molecules (Lee and Lucey, 2010). Syneresis usually takes place due to the loss of zabady gel ability to entrap water phase owing to the weakening of gel structure (Lucey, 2002).

Table 4. Syneresis (ml / 5 g), Water Holding Capacity (WHC %) of collected samples (zabady and rayeb milk) at storage period (days).

Sample	Syneresis (ml / 5 g)			WHC %		
	Storage period (days)			Storage period (days)		
	fresh	7	15	fresh	7	15
IZ 1	$2.70^{Cb} \pm 0.04$	$2.84^{Bc} \pm 0.05$	$2.97^{Ab} \pm 0.08$	$45.92^{Aa} \pm 0.19$	$44.12^{Ba} \pm 0.21$	$42.26^{Ca} \pm 0.23$
IZ 2	$2.99^{Ba} \pm 0.07$	$3.25^{Aa} \pm 0.09$	$3.35^{Aa} \pm 0.12$	$40.17^{Ac} \pm 0.24$	$38.00^{Bd} \pm 0.26$	$35.10^{Cd} \pm 0.29$
IZ 3	$2.71^{Bb} \pm 0.04$	$2.89^{Ac} \pm 0.05$	$2.99^{Ab} \pm 0.08$	$45.80^{Aa} \pm 0.23$	$43.77^{Ba} \pm 0.21$	$42.15^{Ca} \pm 0.25$
IZ 4	$2.70^{Bb} \pm 0.06$	$2.89^{Ac} \pm 0.07$	$2.99^{Ab} \pm 0.09$	$45.71^{Aa} \pm 0.25$	$42.92^{Bb} \pm 0.27$	$40.24^{Cb} \pm 0.30$
IZ 5	$2.90^{Ca} \pm 0.04$	$3.05^{Bb} \pm 0.05$	$3.20^{Aa} \pm 0.08$	$42.08^{Ab} \pm 0.21$	$39.10^{Bc} \pm 0.23$	$36.00^{Cc} \pm 0.25$
IR 1	$3.29^{Ab} \pm 0.08$	$3.40^{Ab} \pm 0.10$	$3.49^{Ab} \pm 0.13$	$34.22^{Aab} \pm 0.20$	$31.04^{Ba} \pm 0.22$	$27.11^{Cc} \pm 0.24$
IR 2	$3.30^{Bb} \pm 0.05$	$3.44^{ABb} \pm 0.06$	$3.50^{Ab} \pm 0.10$	$34.01^{Ab} \pm 0.23$	$30.19^{Bb} \pm 0.25$	$28.21^{Ca} \pm 0.28$
IR 3	$3.88^{Aa} \pm 0.07$	$3.98^{Aa} \pm 0.09$	$4.01^{Aa} \pm 0.12$	$22.36^{Ad} \pm 0.21$	$20.09^{Bc} \pm 0.23$	$17.81^{Cd} \pm 0.25$
IR 4	$3.27^{Bb} \pm 0.06$	$3.38^{ABb} \pm 0.08$	$3.50^{Ab} \pm 0.10$	$34.55^{Aa} \pm 0.18$	$30.34^{Bb} \pm 0.20$	$27.60^{Cb} \pm 0.22$
IR 5	$3.85^{Ba} \pm 0.03$	$3.96^{Aa} \pm 0.04$	$4.00^{Aa} \pm 0.06$	$22.91^{Ac} \pm 0.16$	$20.16^{Bc} \pm 0.19$	$18.12^{Cd} \pm 0.25$
Sample	fresh	3	5	fresh	3	5
TZ 1	$3.28^{Ba} \pm 0.04$	$3.45^{Aab} \pm 0.05$	$3.50^{Aa} \pm 0.08$	$34.45^{Aa} \pm 0.23$	$30.08^{Bc} \pm 0.21$	$27.99^{Cc} \pm 0.29$
TZ 2	$3.30^{Ba} \pm 0.03$	$3.49^{Aa} \pm 0.04$	$3.56^{Aa} \pm 0.06$	$34.00^{Ab} \pm 0.19$	$30.16^{Bc} \pm 0.21$	$28.79^{Ca} \pm 0.23$
TZ 3	$3.30^{Ba} \pm 0.05$	$3.45^{Aab} \pm 0.06$	$3.54^{Aa} \pm 0.10$	$34.00^{Ab} \pm 0.22$	$31.07^{Bb} \pm 0.24$	$28.16^{Cbc} \pm 0.26$
TZ 4	$3.26^{Ba} \pm 0.06$	$3.37^{ABb} \pm 0.08$	$3.46^{Aa} \pm 0.11$	$34.87^{Aa} \pm 0.24$	$31.66^{Ba} \pm 0.26$	$28.84^{Ca} \pm 0.29$
TZ 5	$3.27^{Ba} \pm 0.02$	$3.38^{Ab} \pm 0.04$	$3.47^{Aa} \pm 0.07$	$34.70^{Aa} \pm 0.25$	$31.43^{Bab} \pm 0.27$	$28.63^{Cab} \pm 0.30$
TR 1	$3.84^{Bb} \pm 0.04$	$3.95^{ABab} \pm 0.05$	$4.03^{Aab} \pm 0.08$	$23.13^{Ac} \pm 0.15$	$21.00^{Bd} \pm 0.16$	$19.35^{Cd} \pm 0.18$
TR 2	$3.73^{Bc} \pm 0.05$	$3.88^{Abc} \pm 0.06$	$3.99^{Aab} \pm 0.08$	$25.37^{Ab} \pm 0.19$	$22.00^{Bc} \pm 0.23$	$20.21^{Cc} \pm 0.25$
TR 3	$3.96^{Ba} \pm 0.02$	$4.04^{Aa} \pm 0.03$	$4.10^{Aa} \pm 0.05$	$20.70^{Ad} \pm 0.18$	$19.12^{Be} \pm 0.20$	$18.01^{Ce} \pm 0.22$
TR 4	$3.65^{Bd} \pm 0.06$	$3.77^{ABc} \pm 0.08$	$3.86^{Ab} \pm 0.13$	$27.06^{Aa} \pm 0.23$	$24.50^{Ba} \pm 0.25$	$22.82^{Ca} \pm 0.27$
TR 5	$3.66^{Bcd} \pm 0.02$	$3.81^{Ac} \pm 0.06$	$3.92^{Ab} \pm 0.10$	$26.88^{Aa} \pm 0.16$	$23.76^{Bb} \pm 0.18$	$21.56^{Cb} \pm 0.20$

Water Holding Capacity of collected samples from the Egyptian market:

Data in a Table (4) revealed that the water holding capacity (%) of all zabady and rayeb milk samples decreased during storage. The WHC% of fresh zabady and rayeb milk samples range from 20.70 ± 0.18 to 45.92 ± 0.19%. These results agree with those reported by (Lunardello *et al.*, 2011). The decreasing of the water holding capacity (%) in all samples during storage is due to the water loss as a direct result of the syneresis process.

Rheological properties changes of collected samples from the Egyptian market (zabady and rayeb milk) during storage:

Textural profile analysis of collected samples from the Egyptian market:

The textural profile analysis of zabady samples is presented in Tables (5, 6).

Hardness (force necessary to attain a given deformation)

Hardness is a commonly evaluated parameter while determining zabady texture. The hardness of fresh zabady samples ranged from 0.62 ± 0.03 to 2.39 ± 0.02 N, these results fall in the range reported for the hardness of zabady (Assem *et al.*, 2013; Paseephol *et al.*, 2008 and Kumar & Mishra, 2004). During storage the hardness of zabady increased gradually. A similar finding was reported (Salvador and Fiszmann, 2004). The increase in hardness could be due to the reduction of pH during storage, causing the gel to contract and consequently increase gel firmness (Coggins *et al.*, 2010).

Springiness

Springiness is the rate at which the sample returns to its original shape when the deforming force is removed. Generally, springiness tended to increase slightly during storage time in samples stored. Also, differences were found in the springiness of zabady from the different brands. The springiness of fresh zabady samples ranged from 0.65 ± 0.01 to 0.84 ± **0.**04 mm, these results fall in the range reported for springiness of zabady (Assem *et al.*, 2013).

Cohesiveness

Cohesiveness, which is defined as the extent to which a material can be deformed before its rupture, depends upon the strength of internal bonds. The cohesiveness of fresh zabady samples ranged from 0.41 ± 0.01 to 0.57 ± 0.01, These results fall in the range reported for the cohesiveness of zabady (Assem *et al.,* 2013). During storage, the cohesiveness of zabady decreased gradually in all samples. Decreasing of cohesiveness of zabady samples was affected by the zabady brand and storage time. Domagala *et al.* (2005) found that cohesiveness of zabady decreases during storage. Differences in the nature of the protein matrix and/or added stabilizers may be responsible for the observed differences in the cohesiveness of the analyzed brands.

Gumminess

The gumminess of fresh zabady samples ranged from 0.29 ± **0.**05 to 1.12 ± **0.**05 N. During storage the gumminess of zabady increased slightly in zabady non-fat and little, while it decreased in the rest of the samples (Assem *et al.*, 2013).

Chewiness

The chewiness of fresh zabady samples ranged from 0.24 ± **0.**04 to 0.79 ± **0.**01 (N*mm), During storage the chewiness of industrial zabady increased gradually, while the chewiness decreased for traditional zabady. These results fall in the range reported for chewiness of zabady (Lunardello *et al.*, 2011).

Table 5. Textural profile analysis of collected industrial zabady samples at storage period (days).

TPA	Sample	Storage period (day)		
		fresh	7	15
Hardness (N)	IZ 1	1.64^{Bb} ± 0.05	1.75^{Bb} ± 0.03	1.92^{Aa} ± 0.09
	IZ 2	0.62^{Cd} ± 0.03	0.76^{Bd} ± 0.07	0.95^{Ac} ± 0.05
	IZ 3	1.68^{Bb} ± 0.06	1.77^{Bb} ± 0.05	1.95^{Aa} ± 0.13
	IZ 4	1.76^{Ca} ± 0.03	1.88^{Ba} ± 0.07	2.04^{Aa} ± 0.05
	IZ 5	0.84^{Cc} ± 0.04	0.97^{Bc} ± 0.02	1.16^{Ab} ± 0.08
Springiness (mm)	IZ 1	0.79^{Bb} ± 0.01	0.89^{Aab} ± 0.05	0.98^{Aa} ± 0.07
	IZ 2	0.84^{Ba} ± 0.04	0.89^{Bab} ± 0.07	1.01^{Aa} ± 0.05
	IZ 3	0.78^{Bb} ± 0.03	0.82^{Bb} ± 0.01	0.96^{Aa} ± 0.02
	IZ 4	0.79^{Cb} ± 0.02	0.85^{Bab} ± 0.03	0.99^{Aa} ± 0.01
	IZ 5	0.81^{Cab} ± 0.01	0.91^{Ba} ± 0.04	1.02^{Aa} ± 0.02
Cohesiveness	IZ 1	0.54^{Aa} ± 0.01	0.49^{ABa} ± 0.04	0.46^{Ba} ± 0.03
	IZ 2	0.46^{Ab} ± 0.03	0.39^{ABb} ± 0.05	0.37^{Bb} ± 0.02
	IZ 3	0.55^{Aa} ± 0.05	0.48^{Ba} ± 0.01	0.45^{Ba} ± 0.01
	IZ 4	0.57^{Aa} ± 0.01	0.49^{Ba} ± 0.02	0.46^{Ba} ± 0.03
	IZ 5	0.54^{Aa} ± 0.02	0.48^{Ba} ± 0.03	0.43^{Ca} ± 0.01
Gumminess (N)	IZ 1	0.89^{Ab} ± 0.04	0.86^{Aa} ± 0.07	0.88^{Aa} ± 0.05
	IZ 2	0.29^{Ad} ± 0.05	0.30^{Ac} ± 0.04	0.35^{Ac} ± 0.01
	IZ 3	0.92^{Ab} ± 0.04	0.85^{Ba} ± 0.01	0.88^{ABa} ± 0. 02
	IZ 4	1.01^{Aa} ± 0.01	0.92^{Ba} ± 0.03	0.94^{Ba} ± 0.05
	IZ 5	0.45^{Ac} ± 0.04	0.47^{Ab} ± 0.02	0.50^{Ab} ± 0.01
Chewiness (N*mm)	IZ 1	0.70^{Bb} ± 0.02	0.77^{Ba} ± 0.05	0.86^{Ab} ± 0.04
	IZ 2	0.24^{Bd} ± 0.04	0.27^{Bd} ± 0.03	0.35^{Ad} ± 0.01
	IZ 3	0.72^{Bb} ± 0.03	0.70^{Bb} ± 0.01	0.84^{Ab} ±0.05
	IZ 4	0.79^{Ba} ± 0.01	0.78^{Ba} ± 0.02	0.93^{Aa} ± 0.04
	IZ 5	0.36^{Cc} ± 0.03	0.43^{Bc} ± 0.03	0.51^{Ac} ± 0.01

Table 6. Textural profile analysis of collected traditional zabady samples at storage period (days).

TPA	Sample	Storage period (day)		
		fresh	3	5
Hardness (N)	TZ 1	2.26^{Bb} ± 0.05	2.35^{ABb} ± 0.07	2.51^{Aa} ± 0.12
	TZ 2	1.88^{Cc} ± 0.03	2.01^{Bc} ± 0.09	2.14^{Ab} ± 0.05
	TZ 3	1.94^{Bc} ± 0.03	2.03^{ABc} ± 0.10	2.15^{Ab} ± 0.05
	TZ 4	2.39^{Ca} ± 0.02	2.51^{Ba} ± 0.03	2.62^{Aa} ± 0.05
	TZ 5	2.31^{Bb} ± 0.05	2.42^{Bab} ± 0.03	2.55^{Aa} ± 0.09
Springiness (mm)	TZ 1	0.69^{Cb} ± 0.01	0.75^{Bb} ± 0.01	0.81^{Ac} ± 0.05
	TZ 2	0.75^{Ca} ± 0.03	0.86^{Ba} ± 0.05	0.94^{Aa} ± 0.02
	TZ 3	0.74^{Ba} ± 0.1	0.76^{Bb} ± 0.03	0.84^{Abc} ± 0.04
	TZ 4	0.65^{Cc} ± 0.01	0.71^{Bb} ± 0.04	0.90^{Aab} ± 0.02
	TZ 5	0.66^{Bbc} ± 0.02	0.70^{Bb} ± 0.01	0.79^{Ac} ± 0.03
Cohesiveness	TZ 1	0.48^{Aa} ± 0.01	0.39^{Ba} ± 0.01	0.32^{Ca} ± 0.05
	TZ 2	0.44^{Abc} ± 0.02	0.37^{Ba} ± 0.04	0.30^{Ca} ± 0.01
	TZ 3	0.41^{Ac} ± 0.01	0.34^{Ba} ± 0.02	0.29^{Ca} ± 0.03
	TZ 4	0.47^{Aab} ± 0.03	0.39^{Ba} ±0.05	0.31^{Ca} ± 0.01
	TZ 5	0.48^{Aa} ± 0.01	0.38^{Ba} ± 0.01	0.32^{Ca} ± 0.02
Gumminess (N)	TZ 1	1.08^{Aa} ± 0.04	0.92^{Ba} ± 0.05	0.80^{Ca} ± 0.04
	TZ 2	0.83^{Ab} ± 0.01	0.74^{Bb} ± 0.03	0.64^{Cb} ± 0.02
	TZ 3	0.80^{Ab} ± 0.02	0.69^{Bb} ± 0.01	0.62^{Bb} ± 0.06
	TZ 4	1.12^{Aa} ± 0.05	0.98^{Ba} ± 0.04	0.81^{Ca} ± 0.02
	TZ 5	1.11^{Aa} ± 0.03	0.92^{Ba} ± 0.04	0.82^{Ca} ± 0.05
Chewiness (N*mm)	TZ 1	0.75^{Aa} ± 0.04	0.69^{ABab} ± 0.04	0.65^{Bb} ± 0.03
	TZ 2	0.62^{ABb} ± 0.01	0.64^{Ab} ± 0.02	0.60^{Bb} ± 0.01
	TZ 3	0.59^{Ab} ± 0.05	0.52^{Ac} ± 0.01	0.52^{Ac} ± 0.04
	TZ 4	0.73^{Aa} ± 0.04	0.70^{Aa} ± 0.03	0.73^{Aa} ± 0.01
	TZ 5	0.73^{Aa} ± 0.02	0.64^{Bb} ± 0.03	0.65^{Bb} ± 0.04

Viscosity (cP) of collected samples from the Egyptian market:

Table 7. Viscosity (cP) of collected samples (zabady and rayeb milk) at storage period (days).

Sample	Viscosity (cP) Storage period (days)		
	fresh	**7**	**15**
IZ 1	$7717^{Ba} \pm 2.00$	$8235^{Aa} \pm 5.00$	$7148^{Ca} \pm 6.00$
IZ 2	$5363^{Be} \pm 7.00$	$5686^{Ae} \pm 4.00$	$4801^{Ce} \pm 5.00$
IZ 3	$6904^{Bc} \pm 5.00$	$7409^{Ac} \pm 3.00$	$6697^{Cc} \pm 4.00$
IZ 4	$7691^{Bb} \pm 6.00$	$8011^{Ab} \pm 5.00$	$7104^{Cb} \pm 7.00$
IZ 5	$5951^{Bd} \pm 8.00$	$6476^{Ad} \pm 4.00$	$5581^{Cd} \pm 5.00$
IR 1	$4904^{Bb} \pm 5.00$	$5422^{Ab} \pm 7.00$	$4397^{Cb} \pm 9.00$
IR 2	$4487^{Bc} \pm 3.00$	$4881^{Ac} \pm 6.00$	$4009^{Cc} \pm 8.00$
IR 3	$3393^{Be} \pm 7.00$	$3709^{Ae} \pm 4.00$	$3132^{Ce} \pm 5.00$
IR 4	$4966^{Ba} \pm 4.00$	$5592^{Aa} \pm 5.00$	$4481^{Ca} \pm 7.00$
IR 5	$3539^{Bd} \pm 8.00$	$3909^{Ad} \pm 11.00$	$3306^{Cd} \pm 15.00$
Sample	Viscosity (cP) Storage period (days)		
	fresh	3	5
TZ 1	$8320^{Bc} \pm 12.00$	$8787^{Ab} \pm 15.00$	$7938^{Cc} \pm 14.00$
TZ 2	$7705^{Be} \pm 3.00$	$8112^{Ae} \pm 4.00$	$7424^{Ce} \pm 5.00$
TZ 3	$8091^{Bd} \pm 11.00$	$8404^{Ad} \pm 12.00$	$7632^{Cd} \pm 14.00$
TZ 4	$8535^{Ba} \pm 9.00$	$8894^{Aa} \pm 12.00$	$8301^{Ca} \pm 14.00$
TZ 5	$8448^{Bb} \pm 10.00$	$8687^{Ac} \pm 13.00$	$8112^{Cb} \pm 15.00$
TR 1	$5422^{Bd} \pm 6.00$	$5887^{Ad} \pm 8.00$	$5241^{Cd} \pm 11.00$
TR 2	$5917^{Bc} \pm 4.00$	$6479^{Ac} \pm 7.00$	$5620^{Cc} \pm 9.00$
TR 3	$4613^{Be} \pm 7.00$	$4983^{Ae} \pm 9.00$	$4109^{Ce} \pm 12.00$
TR 4	$6353^{Ba} \pm 4.00$	$6694^{Aa} \pm 5.00$	$5912^{Ca} \pm 7.00$
TR 5	$6130^{Bb} \pm 9.00$	$6573^{Ab} \pm 12.00$	$5710^{Cb} \pm 10.00$

The viscosity of zabady and rayeb milk samples is presented in Table (7).

The viscosity of fresh zabady and rayeb milk samples ranges from 3393 ± 7.00 to 8535 ± 9.00 cP. During storage, the viscosity of all samples increased until storage middle, but it decreased again at the end of storage. These results were close to the results obtained by Al Mijan *et al*., (2014)

Sahan *et al.* (2008) reported that due to the rearrangement of the protein molecules, the viscosity of zabady might increase during storage. However, on the final day of storage, the viscosities of all samples decreased considerably. The decrease in viscosity might have been caused by the whey separation with increasing storage time.

Antioxidant activity of collected samples from the Egyptian market:

The antioxidant activity of zabady and rayeb milk samples is presented in Table (8). The antioxidant activity of fresh zabady and rayeb milk samples ranges from 14.69 ± 0.13 to 21.62 ± 0.12%.

Antioxidant activities in zabady may result from bioactive (antioxidative) peptides released from protein digestion by bacterial fermentation. Several bioactive peptides have been identified in milk proteins, such as casein and whey proteins, where they are presented in an encrypted form, stored as propertied or mature C-terminal peptides only released upon proteolysis. Peptides generated in milk digestion may act as electron donors reacting with free radicals to form more stable products (Shears *et al.*, 1987). In addition, lactic acid bacteria produce metabolic compounds acting as scavengers or degraded products of milk proteins acting as hydroxyl radicals (Kullisaar *et al*., 2002).

Table 8. Radical Scavenging Activity (RSA%) of collected samples (zabady and rayeb milk) at storage period (days).

Sample	Radical Scavenging Activity (R.S.A%) Storage period (days)		
	fresh	**7**	**15**
IZ 1	$15.21^{Aa} \pm 0.10$	$15.19^{Aa} \pm 0.11$	$15.09^{Aa} \pm 0.08$
IZ 2	$14.69^{Ac} \pm 0.13$	$14.62^{Ac} \pm 0.14$	$14.60^{Ad} \pm 0.10$
IZ 3	$15.11^{Aa} \pm 0.12$	$14.99^{Aab} \pm 0.11$	$14.92^{Ab} \pm 0.08$
IZ 4	$14.87^{Abc} \pm 0.13$	$14.80^{Abc} \pm 0.14$	$14.75^{Acd} \pm 0.10$
IZ 5	$15.03^{Aab} \pm 0.11$	$14.96^{Aab} \pm 0.10$	$14.90^{Abc} \pm 0.08$
IR 1	$16.40^{Ae} \pm 0.09$	$16.34^{Ad} \pm 0.14$	$16.31^{Ae} \pm 0.10$
IR 2	$17.09^{Ac} \pm 0.12$	$17.01^{Ac} \pm 0.13$	$16.98^{Ac} \pm 0.09$
IR 3	$17.29^{Ab} \pm 0.11$	$17.24^{Ab} \pm 0.12$	$17.21^{Ab} \pm 0.08$
IR 4	$16.87^{Ad} \pm 0.10$	$16.82^{Ac} \pm 0.11$	$16.81^{Ad} \pm 0.07$
IR 5	$17.55^{Aa} \pm 0.08$	$17.54^{Aa} \pm 0.10$	$17.53^{Aa} \pm 0.08$
Sample	fresh	3	5
TZ 1	$18.77^{Ab} \pm 0.12$	$18.72^{Aa} \pm 0.11$	$18.76^{Aa} \pm 0.10$
TZ 2	$16.15^{Ad} \pm 0.10$	$16.11^{Ac} \pm 0.11$	$16.10^{Ac} \pm 0.08$
TZ 3	$18.99^{Aa} \pm 0.12$	$18.89^{Aa} \pm 0.13$	$18.82^{Aa} \pm 0.09$
TZ 4	$17.11^{Ac} \pm 0.10$	$17.07^{Ab} \pm 0.11$	$17.00^{Ab} \pm 0.10$
TZ 5	$17.01^{Ac} \pm 0.13$	$17.00^{Ab} \pm 0.12$	$16.99^{Ab} \pm 0.15$
TR 1	$21.40^{Ab} \pm 0.08$	$21.36^{Ab} \pm 0.07$	$21.29^{Ab} \pm 0.06$
TR 2	$21.09^{Ac} \pm 0.10$	$21.04^{Ac} \pm 0.12$	$21.03^{Ac} \pm 0.08$
TR 3	$18.04^{Ad} \pm 0.10$	$18.01^{Ad} \pm 0.11$	$18.01^{Ad} \pm 0.07$
TR 4	$21.62^{Aa} \pm 0.12$	$21.60^{Aa} \pm 0.13$	$21.57^{Aa} \pm 0.09$
TR 5	$17.31^{Ae} \pm 0.08$	$17.27^{Ae} \pm 0.10$	$17.25^{Ae} \pm 0.07$

The fermented milk also contained reductions formed during fermentation, which could react with free radicals to stabilize and terminate radical chain reactions (Sabeena *et al.*, 2010)**.**

Tong *et al.* (2000) reported that the bacterial strains do not have any negative effects on antioxidant activities since the same proteolytic system may be found in both monoculture and two cultures used to produce zabady, rather, the zabady has more oxidative stability than milk because microorganism action could yield antioxidant peptides acting as electron donors. Studies have shown that caseins, especially β- and αs-2 casein, and whey protein have good antioxidant properties, presumably based on their ability to bind transition metals, and scavenge free radicals (Ouwehand *et al*., 1998). During storage, the antioxidant activity of all samples decreased very slightly. These results were close to the results obtained by Rahmawati and Suntornsuk (2016), Which found that fermentation of all types of milk increased antioxidant activities compared to the milk produced from it, also storage had no effects on antioxidant activities in zabady.

CONCLUSION

The foregoing results led to conclude that, The WHC% of industrial samples was higher than that of traditional samples and syneresis was high in all samples, some of the traditional samples contain fungi, yeasts, and coliform bacteria count, which indicates the low microbial quality and also their non-conformity with the Egyptian standards, Also all samples had antioxidant capacity because of the components resulting from fermentation, that decreased with the progression of the storage period.

Therefore, the current study recommends Egyptian standard specifications be applied to the traditional fermented milk with a recommendation to the Food Control Authority to follow up to ensure the application of these standards, also the synergy defect be reduced and treated by adding stabilizers that interact with the casein network.

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تقدير جودة بعض منتجات الألبان المتخمرة بمحافظتي القاهرة والجيزة

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تم جمع عشرين عينة من أنواع مختلفة من لبن الزبادي والرايب من الأسواق المحلية في محافظتي القاهرة والجيزة وحفظها في الثلاجة عند درجة حرارة 5 ± 1 درجة مئوية. تمت دراسة الخواص الميكروبيولوجية والفيزيائية والكيميائية والريولوجية للعينات التي تم جمعها في بداية ووسط ونهاية فترة التخزين. أظهرت النتائج أن متوسط قيم الحموضة ، وال pH، واللزوجة ، والتشريش ، و سعة الاحتفاظ بالماء ٪ و قدرة مضادات الأكسدة٪ للعينات الطازجة تراوحت بين 0.72 ± 0.02 إلى 0.82 ± 0.04٪ ، 4.52 ± 0.05 - 4.61 ± 0.02 ، 3393 ± 7.00 - 8535 ± 9.00 سنتي بواز، (ml / 5g) 0.07 ± 3.88 - 0.04 ± 2.70، 0.19 ± 45.92 - 0.18 ± 20.70٪ و 14.69 ± 0.13 - 21.62 ± 0.12٪ على التوالي. احتوت العينات الطازجة المجمعة على 11.25 ± 0.15 - 14.86 ± 0.19٪ من المواد الصلبة الكلية. أظهر التحليل الميكروبيولوجي أن العينات الطازجة التي تم جمعها تحتوي على 7.95 إلى 8.52 (log cfu / g) من بكتيريا حمض اللاكتيك ، و 2.16 إلى 2.62 (log cfu / g) بكتيريا القولون و 2.25 إلى 2.33 (log cfu / g) من الخمائر والفطريات. كانت الصلابة والصمغية في عينات الزبادي التقليدية عالية الدسم أعلى من بقية عينات الزبادي ، بينما كانت مقاومة الضغط والتماسك والمضغ في عينات الزبادي المنتجة بطريقة آلية أعلى من عينات الزبادي التقليدية. مع تقدم فترة التخزين ، حدثت تغيرات كيميائية وفيزيائية وميكروبيولوجية وريولوجية.

الكلمات الاسترشادية: الزبادي, اللبن الرايب, الصفات الريولوجية, مضادات الأكسدة.