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PRODUCTION AND EVALUATION OF KHOA AS A NEW SWEET DAIRY PRODUCT FOR EGYPTIAN MARKET.

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ABSTRACT

A trial was carried out to produce a new traditional Indian dairy product (Khoa), to be introduced to the Egyptian market as a new kind of confectionery. The preparation of Khoa was made with some modification. In this study four treatments were carried out as follows: First treatment (K1)Khoa was made from raw buffalos' milk . In the second one (K2) Khoa was made from retentate buffalos' milk , the third (K3) and the fourth treatment (K4) were made from raw buffalos' milk with addition of 20 and 40 % skim milk powder respectively before heat treatment .All treatments of Khoa were evaluated process time and value of yield. All the samples were tested for organoleptic, chemical and microbiological parameters. The chemical analyses indicated that significant differences among four treatments of samples were found for protein, fat, carbohydrate, and ash, ($p<0.05$), except moisture contents. In addition, Microbial analysis, different treatments of Khoa had low Total bacterial cout in fresh while it had slightly increased in the storage period. All treatments were free of pathogenic bacteria until three weeks. On the other hand the treatment K2 had recorded the highest yield and the lowest processing time. The organoleptic of all treatments were accepted by all judging members and consumers.

Keywords : Khoa, confectionery, essential amino acids, processing time , yield , organoleptic, pathogenic bacteria , quality , shelf life.

INTRODUCTION.

Today, children influence the majority of purchase decisions in the household, and although children play a pivotal role in purchase decisions, parents over the next few year want nutritious, delicious foods that contribute to their child's health throughout the day, including breakfast and snacks. Parents actively seek foods that can satisfy their children's hunger and also be nutritious. They look for sweet dairy product, mineral, vitamins, high value from unsaturated that include high protein value fatty acids, and sweeteners. This is significant because these ingredients can play a role in the child's immune, digestive, and general healthy growth. Khoa contains fairly large quantities of muscle building proteins, bone-forming minerals and energy-giving fat and lactose. It also retains most of the fat-soluble vitamins A and D and also fairly large quantities of water soluble vitamins B contained in the original milk. Additives to sweetmeats further increase the calorific value of the product (Aneja *et al.,* 2002). Khoa is a traditional Indian dairy sweet having semi solid consistency very popular in south – central regions of India. For Khoa manufacture, milk is taken in a (large, open, bowl) and heated to boiling. The milk is continuously stirred and scraped to avoid sticking of denatured proteins to the large, open, bowl walls. After removal of about 65-70% of moisture, a semisolid mass is obtained and is called Khoa. . Mahalingaiah *et al*. (2000), Bandyo, *et al.,*(2006). Thus, it is clear that Khoa,

manufacturing process involves a lot of heat consumption because of continuous evaporation of water for long period of time. This heat energy consumption during the process adds to the final cost of the product and also burdens the energy generating unit of dairy. Since energy saving is needed and influences cost of production. An experiment was done to produce a new kind of confectionery (Khoa) containing mixture sugar and cinnamon to be introduced to the Egyptian market. In this respect, some deification was done to give a product with an acceptable taste for the Egyptian preferability. So, The objectives of this study are to try to reduce the energy required to manufacturing process using minor time khoa processing by using buffalo's milk to fortify 20 -40 %of skim milk powder were added respectively and Khoa made from buffalos' milk ultrafiltration (retentate) which can be considered as a new sweet dairy product to the Egyptian market . Additionally, it was aimed to evaluate products quality, nutrition, yield, and shelf life of different treatments Khoa.

MATERIALS AND METHODS

Materials: Buffalo's milk and retentate Buffalo's milk concentrated obtained from the Dairy Production Unit of the Ministry of Agriculture, Dokki, and Giza, Egypt. Milk chemical composition was as follow: Total solid content 16 .11 %, lactose 4.8%, fat 5.9%, Protein 4.6% and ash 0.81. Retentate buffalo's milk was obtained by ultrafiltration technique to produce UFR using Carbosep, The Tech. Sep UF was fitted with 2s 151 (Model Tubular). Concentration of milk up to four times (4X). Other ingredient such as skimmed milk powder, sugar and cinnamon were purchased from local markets.

Preparation of Khoa:

Khoa was prepared as follow by Bandyo, *et al.,*(2006). It was prepared by continuous heating milk in a large, open, bowl - shaped metal and simmered over direct non-smoky fire with constant over vigorous stirring and occasional scraping of the heating surface to avoid building of scale scorching. Milk thickness with progressive heating and coagulated solidified portion was seen on the heating surface, then added (4% sugar and 0,2%cinnamon) and vigorous stirring and until a desirable solids concentration (65-7o% total solids)was obtaine .Our experimental four-processed types of Khoa were prepared as follow:

Process (K1): Row buffalos' milk was exposed to heat treatment 80°C to convert to khoa with (4%suger +0,2% cinnamon powder) in open-pan (followed as traditional method).

Process (K2): Retentate was exposed to heat treatment 80°C to convert to Khoa with (4%suger +0,2% cinnamon powder) in open- pan. (followed as traditional method).

Process (K3): Row_buffalos' milk + 20% Skim milk powder was exposed to heat treatment 80^{o} C to convert to Khoa with (4%suger +0,2% cinnamon powder) in open- pan. (followed as traditional method).

Process (K4): Row buffalos' milk + 40% Skim milk powder was exposed to heat treatment 80^{o} C to convert to Khoa with (4%suger +0,2% cinnamon powder) in open- pan. (followed as traditional method).

The products were, wrapped in stretch film and stored at 5±1ºC/ 4 weeks. All samples were analyzed in triplicate when fresh and during storage period .

Chemical composition:

Moisture content, crude fat and total protein of khoa was determined by methods given by Egan *et al*. (1991).Ash content ,and total sugar content were determined following the standard procedure mentioned in AOAC(2005). Amino acids were determined according to the method described by Pellet and Young(1980)using a Beckman Amino Acid Analyzer Model 7300with integrator Beckman 7000 data system. Approximate energy value was presented as calories /100g of the product calculated on the base of 1g of total sugar, or protein equals 4.0 calories and 1g of fat equals 9 calories as mentioned by Lawrence (1965).

Microbiological evaluation:

Total bacterial count, total coliform count, total yeast & total fungi, *Staphylococcus aureus, Bacillus cerues* and *Listeria monocytogenes* were determine according Marshall (1993). Lipolytic bacteria were enumerated according to the method described by Zaki (1988) using nutrient agar medium and the plates were incubated at 37°C for 4 days. Lipolytic colonies were identified by copper sulphate (20%) flooded after incubation. Proteolytic bacteria were counted according to Frank *et al.* (1992) using plate count agar plus 1ml sterile skim milk 10%. The plates were incubated at 37°C for 4 days.

Preliminary study for sensory evaluation

To get acceptable Khoa, pre-experiments were conducted with different ratio sugar and cinnamon. The favorite ratio were 4%suger +0,2% cinnamon powder.

Sensory evaluation:

Thirteen trained panelists (4 men and9 women, between the ages of 30 and 60 years) were selected among the staff of Dairy tech. Dept., Animal Production Research Institute, Agric .Res. Center, Egypt. All members were highly trained and had participated in evaluation of dairy products for at least the previous 5 years continuously; they were familiar with terms, standards, and food examples. Scores were on a 5-point scale, where 1 = the absence of the attribute and 5 = exist extremely (Mainfreni et al., 2002). In addition, The khoa samples were evaluated for their colour and appearance, body and texture and flavor for their overall acceptability. Khoa was evaluated on the following10point scale: excellent 9-10. good 7-8, fair 4-6, poor 1-3(Ailkanh and Sukumar . 1979).(Vogbra1 ,V.R. and G.S. Rajorbia (1983).

Consumer Assessment

Consumer preference testing took on a blind basis between the employees at Animal Production Research Institute, Ministry of Agriculture, Cairo, Egypt)Different aged consumers were participated .Evaluate the Khoa samples were presented to consumers at room temperature and asked to rinse thoroughly after tasting each sample to clean their palate. Khoa score

were: flavour, body & texture and color & appearance (out of 50, 35, 15 points respectively.)

Statistical analyses

Statistical analyses were performed using the GLM procedure with SAS [2004] software. Duncan's multiple comparison procedure was used to compare the means. A probability to $p \leq 0.05$ was used to establish the statistical significance.

RESULTS AND DISCUSSION

Khoa processing:

Manufacturing parameters for buffalos' milk Khoa were summarized in Table (1).Processing time reduced drastically by 50% for (K2), 38.9 % for(K3) and 44.4% for(K4) treatments products, respectively. This decrease in processing time was significant ($P \geq 0.05$) compared to control as well as between the different treatments. Mahalingaiah *et al*.,(2008) report that the utilization of heat with UF milk provide saving in energy .

Yield of Khoa increased drastically by 132% for (K2), 32% for (K3) and 64 % for(K4) treatments products, compared to treatment(K1).

Table(1) Effect of different treatments of Khoa on processing time and yield.

Treatments / Parameters	K_1	K_2	K_3	K_4
Processing time (min)	90.0^{a}	45^{d}	55^{b}	50^{c}
Reduction %	--	50	38.9	44.4
Yield (%)	25^{d}	58^{a}	33^{c}	41^{b}
Increasing (%)	--	132	32	64

Means with the same small letters are not significantly ($p \leq 0.05$)

***K1: Raw buffalos' milk.**

K2:Retentate buffalos' milk.

K3: Raw buffalos' milk + 20% Skim milk powder .

K4: Raw buffalos' milk + 40% Skim milk powder.

The increase of yield was significant ($P \geq 0.05$) compared to control as well as between the different treatment. UF technology has proven its success in concentrating milk proteins for cheese making especially for soft type cheeses such as cream cheese. Thus UF will lead to an increase in cheese yield as compared to cream cheese manufactured in the traditional manner might be expected due to the application of membrane processing (Dejmek 1986).The main factor that contributes to cheese yield increase is the whey protein recovery By increasing the concentration ratio of UF retentate the quarg cheese yield was increased. Retentate enriched with calcium resulted in a higher ratio of these yield than the control [Omar *et al.* 1998].Cheese yield is defined as the amount of cheese, expressed in kilograms, obtained from 100 kg of milk. It is a very important parameter: the higher the recovered percentage of solids, the greater is the amount of cheese obtained and therefore gains in economic terms. The definition of cheese yield, or how to express yield, is important in two main applications: 1. Economic control of cheese making; 2. expressing the results of cheese making experiments. Cheese yield is affected by many factors including milk composition, amount and genetic variants of casein, milk quality, somatic cell

count (SCC) in milk, milk pasteurization, coagulant type, vat design, curd firmness at cutting, and manufacturing parameters. Mona A.M. Abd El-Gawad ,and Nawal S. Ahmed,2011, The yield of khoa depends on several factors, including the type and quality of milk, the extent of dehydration, the type of khoa manufactured and its moisture content and handling losses (Thakur and Joshi, 2002).

Chemical composition of Khoa:

Chemical compositions of Khoa by different treatments are shown in Table (2). Significant differences (P≤0.05) between different treatments of Khoa were clearly founded in total protein , Crude fat ,total sugar , moisture and ash content .It can be observed that Khoa (K4) had the highest one of protein followed by Khoa (K2) ,then Khoa (K3)and lowest value was 18.1 mg/100mg in Khoa(K1) . It can be noticed that the ratio of protein increased by using buffalos' milk retentat and skimmed milk powder . It was also noticed that Khoa (K2) had the highest one of curd fat followed by Khoa (K1) ,then Khoa (K3)and lowest value was 13.2 mg/100mg in Khoa(K4) . the decrease of curd fat in K3 and K4 might be due to the addition of 20 %-40% skimmed milk powder respectively. In the same table Khoa (K1) was the highest one of total sugar and lowest was in (K2). This data indicated that using buffalos' milk retentat was the lowest values of total sugar. The same trend was observed with ash. A similar observation was reported by Mohamed (,2005) . The benefits of using UF process in dairy products have been summarized and reported by several authors (Glover,1985, Kosikowsh,1986, Cheryan,1998). Protein fortification of the milk base is elemental. It greatly enhances yogurt nutritional and functional properties. Protein enrichment can be achieved by either concentration process (evaporation under vacuum and membrane processing: reverse osmosis and/or ultrafiltration) or by addition of dairy ingredients. Traditionally, skim milk powder (SMP) is used to enrich the milk base .However, increased quality and availability of other dairy ingredients (Karam ,*et al.,*2013).The nutritional composition of Khoa is highly complex, and it contains almost every single nutrient that the human body needs. Data reported in Table (2)that the products were considered as excellent source of valuable energy. The calorie value of the products ranged from 472.8 to 325.2 cal/100g.

Table (2) Chemical composition of Khoa by different treatments

Type of Khoa*	Protein %	Crude Fat %	Total sugar	Ash %	Moisture %	Calorie value (Cal/100g)
K1	19.20^{d}	22.00^{b}	26.0^{a}	3.20^{a}	32.6^{a}	472.8^{a}
K2	27.0^{b}	34.5^{a}	4.0^{d}	1.3^{d}	32.2^{a}	434.5^{b}
K3	25.2^{c}	17.7^{c}	21.8^{b}	2.5^{c}	32.9^{a}	347.3^{c}
K4	34.0^{a}	13.2^{d}	17.6^{c}	2.6^{b}	32.6^{a}	325.2^{d}

Means with the same small letters are not significantly (p≤ 0.05).

***K1: Raw buffalos' milk.**

K2:Retentate buffalos' milk.

K3: Raw buffalos' milk + 20% Skim milk powder .

K4: Raw buffalos' milk + 40% Skim milk powder

Amino acid content of treatments of Khoa

Results in Table (3) indicate that the predominant amino acid adhering in all the treatments were glutamic acid followed by proline, leucine and aspartic acids. On the other hand cysteine was the lowest content in all treatments. These results are in agreement with Assous, *et al*.(2009). As already mentioned, dairy products are an important source of proteins and amino acids. It is well documented that milk provides all essential amino acids except methionine and cysteine in more than the recommended quantities for children or adults (Tome D., 2002,FAO., 2013). Not only the proteins and amino acids play an important role in human nutrition; during the last 30 years an intermediate product of proteolysis of proteins into amino acids has moved to the center of interest – bioactive peptides. These are special amino acid sequences within the proteins. As long as they are bound in the proteins they are biologically inactive. A wide range of biological activities have been described, including opioid, blood pressure-lowering, mineral binding, antimicrobial, immunomodulation, cell-modulating, anti-carcinogenic, anti-cariogenic, anti-thrombotic, anti-inflammatory and cholesterol-lowering activities(Bachmann H.P *et al.,(*2003).

Table (3) Amino acid contents of different treatments of Khoa

Amino acid gm/100g samples	K1	K2	K3	K4
Essential amino acids				
Tyrosine (Tyr)	0.85	1.49	1.30	1.89
Phenylalanine (Phe)	1,12	1.52	1.34	1.90
Total aromatic amino acids	1,97	3.01	2.64	3.79
Threonine (Thr)	0.89	1,33	1.17	1.66
Cystine (Cys)	0.19	0.26	0.21	0.30
Methionine (Met)	0.48	0.67	0.59	0.87
Total sulfur amino acids	1.56	2.26	1.97	2.83
Leucine (Leu)	1.33	2.62	2.43	3.45
Isoleucine (Ile)	.o.85	1.50	1.34	1.9
Lysine (Lys)	1.78	2.8	1.91	2.7
Valine (Val)	0.89	1.98	1.62	2.3
Tryptophan(Trp)	0.80	1.49	1.31	1.89
Total	4.65	7.59	6.70	9.84
Non-essential amino acids				
Aspartic (Asp)	1.59	2.23	2.07	2.94
Glutamic (Glu)	3.78	5.05	4.94	6.89
Proline (Pro)	1.31	2.79	2.53	3.06
Serine (Ser)	1.16	1.52	1.35	1.92
Glycine (Gly)	0.33	0.64	0.48	0.69
Alanine (Ala)	0.59	1.02	0.87	1.22
Arginine (Arg)	0.58	1.01	0.85	1.21
Histidine (His)	0.61	0.98	0.80	1.19
Total	9.85	14.73	12.92	19.12

***K1: Raw buffalos' milk.**
K2:Retentate buffalos' milk.
K3: Raw buffalos' milk + 20% Skim milk powder .
K4: Raw buffalos' milk + 40% Skim milk powder.

Microbiological evaluation:

Table (4) showed the microbiological analysis of treatments of Khoa . .It can be observed that different treatments had a low total bacterial count

that ranged from 1.7 to 3.0cfu/ g^{-2} when fresh and from 9.9 to 11.6 cfu/ g^{-2} after 4 weeks. This was also apparent from the absence of total coliform count , total fungi and total yeast, *Bacillus cereus, Lesteria,* and *staph aureus* until three weeks. While total yeast recorded 24 and12 cfu/g^{-1} inK1 and K2 respectively. *Bacillus sereus* recorded 12,9,10,3 cfu/g^{-1} inK1,K2 ,K3,K4 respectively after 4 weeks. From the same table it could be observed that the lipolytic bacteria count and proteolytic bacteria count were low count when fresh and during storage period. The microbiological results indicated that the treatment of Khoa during this investigation were of good microbiological quality.. These results are similar to Mahalingaiah, *et al.,* (2014). It can be attributed to the long time of high heat treatment during processing , high content of total solid , addition of cinnamon powder as an antimicrobial (Hong YJ.,*et al.,*2013) , the hygienic conditions during processing, handling , packing in sterilized packs, and the good storage conditions . A similar observation was reported by(Spector ,1998

Staphylococcus aureus and Bacillus cereus are main bacteria responsible for food borne illness in khoa. The microbial quality of khoa is initially good during the time of production and decreases gradually with storage and marketing. The presence of molds in khoa causes its fast deterioration by producing discoloration defects as well as disagreeable flavors. Efficacy of solar radiation on germicidal influence on khoa during storage was observed by Chavan *et al.,* (2006a).

Table (4): Microbiological analysis of different treatments of Khoa.

Treatments	The storage period	T.B.C cfu/10^{-2}	T.C.C. cfu/10^{-1}	T.fungi cfu/10^{-1}	T.yeast cfu/10^{-1}	*B. Cereus* cfu/10^{-1}	*Listeria spp.* cfu/10^{-1}	*Staph. aureus* cfu/10^{-1}	Lipo. bacteria cfu/10^{-1}	Pro. Bacteria cfu/10^{-1}
K1	fresh	٢.1	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	2 WEEKS	3.4	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	3WEEKS	6.9	N.D	N.D	N.D	N.D	N.D	__	7.0	6.0
	4 WEEKS	11.2	N.D	N.D	24.0	12.0	N.D	__	10.0	13.0
K2	fresh	3.0	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	2 WEEKS	3.8	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	3WEEKS	9.7	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	4WEEKS	11.6	N.D	N.D	12.0	9.0	N.D	__	3.0	6.0
K3	fresh	1.7	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	2 WEEKS	3.1	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	3WEEKS	5.6	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	4WEEKS	9.9	N.D	N.D	N.D	10	N.D	__	2	7
K4	fresh	2.2	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	2 WEEKS	5.2	N.D	N.D	N.D	N.D	N.D	__	N.D	N.D
	3 WEEKS	9.3	N.D	N.D	N.D	N.D	N.D	__	N.D	5.0
	4WEEKS	10.3	N.D	N.D	N.D	3.0	N.D	__	3.0	9.0

***K1: Raw buffalos' milk.**
K2:Retentate buffalos' milk.
K3: Raw buffalos' milk + 20% Skim milk powder .
K4: Raw buffalos' milk + 40% Skim milk powder.

Sensory evaluation

Preparation of khoa involves three actions videlicet heating, concentration and vigorous stirring, and scraping. These actions cause following physico-chemical changes shown in Table (5) showed results of descriptive analysis for different treatments of Khoa when fresh and after 3 weeks of cold storage at 5 ±1° C. For, treatment (K1) , characterized by the tendency of the resultant khoa to have a brownish white colour, Soft body , smooth texture and rich nutty smell, sweetish taste, pronounced cooked flavour, it is clear that both quantity and quality depend on thermal processing parameters, , and quantitative ratio of amino nitrogen to reduce sugar glucose/glycine Maillard reaction adapted from Teranishi et al. (1999) .The treatment (K2)had a White color, Sweetish creamy flavor ,lumpy body and smooth texture due to the high fat content and low sugar content of treatment. The treatment (K3) ,and treatment (K4) had brown color, Cooked flavor, Slight week body and granular texture due to adding 20- 40% skimmed milk powder, respectively. Difference in the color ,flavor, body, and texture ,score might be due to wide variations in raw material, amount of sugar in products (during heat treatment reaction between sugar and amino acid produce mallard browning), and duration of heat treatment used for manufacture of Khoa.(Aneja R.P. 1992).In the other hand the score of different treatments of Khoa were summarized in Table (6)it can be observed that Khoa (K3) had the highest scores of overall acceptability followed by Khoa (K1) ,then Khoa (K2)and lowest score in Khoa(K4) .The same table showed that mean scores of sensory evaluation of all products were some decreased during storage .

Table (5) The effect of treatments of Khoa on The physical quality

Treatments	Color	Flavor	Body and Texture	Overall Acceptability
K_1	Brownish white	Rich nutty smell, sweetish taste, pronounced cooked flavor	Soft and smooth	Acceptable
K_2	White	Sweetish creamy taste	Lumpy and smooth	Acceptable
K_3	Brown	Cooked flavor	Slightly week and granular	Acceptable
K_4	Brown	Cooked flavor	Week and granular	Acceptable

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Consumer Assessment

Consumer preference testing scores were shown in Table (7) It indicated that, Khoa (K1) had the highest scores of flavor, followed by Khoa (K3), then Khoa (K2),. In the other hand the treatment (K4) had low score reflecting low acceptance by the consumers. From the same table we can also observe that the body and texture for treatment (K1) had the highest acceptance level among the consumers but the treatments (K3) had high score to be more accepted by the consumers ,then Khoa (K2). It was found

that treatment (K4) had low score to be less accepted by the consumers. The same trend can be noticed in color and appearance in all treatments. The total scores gained generally some decreased by the advancing of storage period in all treatments.

Table (6): Descriptive analysis by panelists for khoa made from different treatments during storage period.

Treatments	Storage period	Flavor	Body and texture	Color and appearance	Overall acceptance
K1	Fresh	7.81^{bc}	7.39^{c}	7.55^{ad}	8.65^{ad}
K2		7.61^{bc}	7.40^{bc}	7.53^{cd}	8.23^{ab}
K3		7.69^{bc}	7.81^{ab}	7.59^{ad}	8.75^{ad}
K4		7.41^{c}	7.33^{abc}	7.42^{bc}	7.57^{d}
K1	3 weeks	7.47^{b}	7.57^{abc}	7.32^{cd}	7.55^{cd}
K2		7.37^{bc}	7.53^{abc}	7.31^{a}	7.54^{a}
K3		7.61^{ab}	7.40^{a}	7.43^{ab}	7.64^{bc}
K4		7.26^{d}	7.04^{d}	7.35^{b}	7.46^{cd}

Means with the same small letters are not significantly (p≤ 0.05).
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Table (7): Sensory evaluation score by consumers for different treatments of Khoa during storage period.

Treatments	Storage period	Flavour (50)	Body & texture (35)	Color& Appearance (15)	Total (100)
K1	Fresh	46.68^{a}	30.82^{a}	13.12^{a}	90.62^{a}
K2		45.96^{cd}	29.62^{b}	14.8^{ab}	89.38^{b}
K3		46.56^{b}	30.78^{b}	13.08^{a}	90.14^{b}
K4		42.64^{c}	28.06^{c}	12.88^{ab}	83.58
K1	3weeks	43.67^{a}	27.66^{a}	12.09^{a}	83.42^{b}
K2		42.99^{cd}	27.00^{bc}	12.83^{ab}	82.82^{a}
K3		43.87^{bc}	27.41^{a}	13.75^{b}	85.03^{a}
K4		41.48^{d}	26.99^{a}	12.33^{bc}	80.80^{a}

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CONCLUSION

From the previous analyses, it can be concluded that Khoa manufacture process using buffalo's milk ultrafiltration (K2) or buffalo's milk fortified with 20 % of skim milk powder(K3)consumed less time and consequently less energy .As well as ,the products of both treatments(K2) and (k3)had the highest yield .It can be recommended Khoa as a new sweet dairy product for Egyptian consumers with highly nutritive value and acceptable quality.

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إنتاج وتقييم كوا Khoa كمنتج لبني جديد للسوق المصري

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**** المركز الإقليمي للأغذية والأعلاف**

تهدف الدراسة إلي إنتاج منتج لبني جديد للسوق المصري كنوع من الحلوي - هذا المنتج من منتجات الألبان التقليدية في الهند- حيث تم إجراء أربعة معاملات من Khoa كالتالي :

الأولي بإستخدام لبن جاموسي كامل و الثانية بإستخدام ال Retentate الناتج من تركيز اللبن بإستخدام تكنتيك UF والثالثة والرابعة بإستخدام لبن جاموسي مدعم ب ٢٠ % - ٤٠% لبن فرز مجفف علي التوالي بهدف زيادة نسبة الجوامد الكلية في اللبن لتقليل وقت التصنيع وبالتالي تقليل الطاقة المستهلكه بالإضافة إلي دراسة الصفات الحسية والكيميائية والميكروبية للمنتجات المنتجة ومدي قبول المستهلك المصري لها .

وقد أوضحت النتائج وجود فروق معنوية كبيرة بين المعاملات حيث كانت أفضل المعاملات هي المعاملة الثانية ثم المعاملة الثالثة ثم الرابعة بالمقارنة بالمعاملة الأولي من حيث إنخفاض وقت التصنيع وزيادة نسبة التصافي وأن جميع العينات تحتوي علي الأحماض الأمينية الأساسية مثل حمض الجلوتاميك والإسبارتك وكذلك كمصدر للطاقة وأيضاً خالية من الميكروبات المرضية لمدة ٢١ يوم . كما أتضح من التقييم الحسي حصول كل العينات علي درجات عالية في التحكيم سواء من المحكمين أو المستهلكين .

لذا تنصح الدراسة إلي إنتاج هذا المنتج الجديد الذي يتميز بإرتفاع قيمتة الغذائية وقبولة للمستهلك كنوع جديد من منتجات الألبان كنوع من الحلوي .