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the Effect of Adding Different Proportions of Retentate and Tomato Juice Extract on the Quality of Labneh

Gomaa, M. S. ; M. E. Abdel-Aziz ; Esraa M. Al-Amir* and M. M. M. Refaey



Dairy Department, Faculty of Agriculture Mansoura University, Mansoura, Egypt

ABSTRACT

This study aimed to improve the properties of labneh from skim milk fortified at (25%, 50%, 75%, and 100%). The best treatment was also selected and supplemented with tomato juice extract in proportions. The aim of fortification with tomato juice extract was to improve the product and increase the nutritional and health value. Properties were determined in fresh and stored. The data showed that the chemical properties increased while the acidity decreased in labneh compared to other treatments. The results showed that the rheological properties including hardness decrease with increasing storage period for all treatments. Microbiological examination of the labneh showed an increase in total bacterial throughout the storage. As for Molds and yeasts, they were not detected in fresh labneh and were detected slightly at the end of the storage. Coliform bacteria were not observed in all treatments. The data showed that the sensory qualities of labneh decrease with increasing storage period. The best treatments in terms of sensory are (Labneh made fresh buffalo's skim milk without adding milk retentate Labneh made 25% milk retentate and 75% buffalo's skim milk and Labneh made 50% milk retentate and 50% buffalo's skim milk for fresh labneh, respectively. In the end, the best treatment was Labneh made 25% milk retentate and 75% buffalo's skim milk) compared to the other samples. Sensory tests conducted on labneh made with 25% retentate and fortified with tomato juice showed that labneh fortified with 8% tomato juice was highly similar to the control.

Keywords: labneh, Retentate, Cheese, tomato, Juice.



INTRODUCTION

Labneh, the old fermented milk product that is consumed in the Middle East countries, is gained from yogurt after removing part of the whey. Likewise, due to the presence of acidic flavour and milky white colour, the labneh is smooth, soft, and dispersible in a cream-like consistency. Labneh is formed by strains of lactic acid bacteria, which ferment the lactose present and produce organic acids, mainly lactic acid Otaibi M.A. (2008). The labneh shelf life was commonly short even if it stored at the coldness Sayed, S.M and El, Youssef, A.M. (2009). The high microbial load of a labneh during storage and packaging leads to unfamiliar Flavors and unwanted physical-chemical changes that eventually lead to product rejection Otaibi, M.A. (2008).

Retentate from ultrafiltered milk can be dried and used to make cheese (23), fermented milk products, or other products based on milk protein Hung and J. F. Zayas (1991). During UP of milk, proteins are retained in the retentate, and lactose and mineral constituents pass into the permeate. The true digestibility, biological value, and net protein utilization of low lactose milk powder produced from UP retentate are better than those of regular skim milk powder. Also, when membrane filtration is used to concentrate protein and to remove lactose from milk prior to spray drying, some functional proper- ties, such as foaming capacity of the retentate powder, are improved. The unique physicochemical characteristics of UP retentate powder are desirable in food. Emulsifying capacity, gel water-holding capacity, acid gel strength, and foaming capacity of high protein milk powder may influence processing and quality of dairy products such

as cheese, yogurt, ice cream, and dairy-based desserts. One of the main veggies that is consumed widely over the world is the tomato. The tomato's abundance of antioxidative components, such as lutein, β -carotene, phenolics, and ascorbic acid, is thought to be responsible for its health advantages Kinsella. (1988).

Heart disease, including heart attacks and strokes, is the world's most common cause of death. A study in middle-aged men linked low blood levels of lycopene and beta-carotene to increased risk of heart attacks and strokes, is the world's most common cause of death. Increasing evidence from clinical trials suggests that supplementing with lycopene may help lower LDL (bad) cholesterol. Clinical studies of tomato products indicate benefits against inflammation and markers of oxidative stress. They also show a protective effect on the inner layer of blood vessels and may decrease your risk of blood clotting. Chua K.J *et al.*, (2017).

Aim of the study, to determine the best concentration of retentate that best affects the technological properties of the labneh. Then the labneh to which the best concentration of retentate was added was fortified with tomato juice extract in order to improve the sensory properties and increase the nutritional and health value of the resulting labneh.

MATERIALS AND METHODS

Materials:

Raw milk:

Fresh skim buffalo's milk and Whole buffalo's milk were obtained from of the Dairy Department, Faculty of Agriculture Mansoura University. Table (1) shows the chemical composition of milk.

* Corresponding author.

E-mail address: esraaalamir314@gmail.com

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Table 1. chemical composition of milk

Type of milk	TS %	Fat %	TP %	pH	Acidity %	Lactose %
skim buffalo's milk	10	0.65	3.85	6.40	0.17	4.83
Whole buffalo's milk	15.38	5.85	4.38	6.55	0.19	4.19

Ultrafiltration (UF) Milk Retentates:

(U.F) Retentates were obtained from the dairy industry unit, Misr company of dairy and food products, Egypt. Table (2) shows the Ultrafiltration (UF) Milk Retentates.

Table 3. Chemical composition of tomato juice extract

Nutrient	Protein	Fat	Sugars	Dietary fiber	Sodium	Calcium	Potassium	Vitamin A	Lycopene
Value per 400 ml	4.4 g	0 g	14.4g	3.6g	32 mg	46 mg	1260 mg	92 µg	44 mg

Starter:

Yogurt starter cultures were added directly to the cheese vat for all milk treatments. It consists of *Streptococcus salvarius sub sp. thermophilus*, *Lactobacillus delbreuckii sub sp. bulgaricus*, Yo-Mix 495 LYO 250 DCY. It obtained from Hansen's Lab, Denmark.

Salt (Sodium Chloride):

Dry commercial food grade sodium chloride obtained from El-Nasr Salines Company, Egypt.

Methods:**Manufacture of labneh:****Experimental work:**

- 1-Labneh made fresh buffalo's skim milk without adding milk retentate(control). (L1).
- 2- Labneh made 25% milk retentate and 75% buffalo's skim milk. (L2).
- 3- Labneh made 50% milk retentate and 50% buffalo's skim milk. (L3).
- 4- Labneh made 75% milk retentate and 25% buffalo's skim milk. (L4).

Chemical composition of tomato juice extract

Tomato juice extract consists of several components including: protein, fat, sugars, dietary fiber, sodium, calcium, potassium, Vitamin A and Lycopene. Table (3) shows the Chemical composition of tomato juice extract.

Table 2. Chemical composition of UF-milk Retentates:

Constituent	pH %	Acidity %	Ash %	Lactose %	Fat %	Protein %
UF-milk Retentate	6.5	0.18	1.7	0.9	4	12.9

5. Labneh made milk retentate (100%). (L5).

- 6- Labneh made 25% milk retentate and 75% buffalo's skim milk and 1% tomato juice extract.

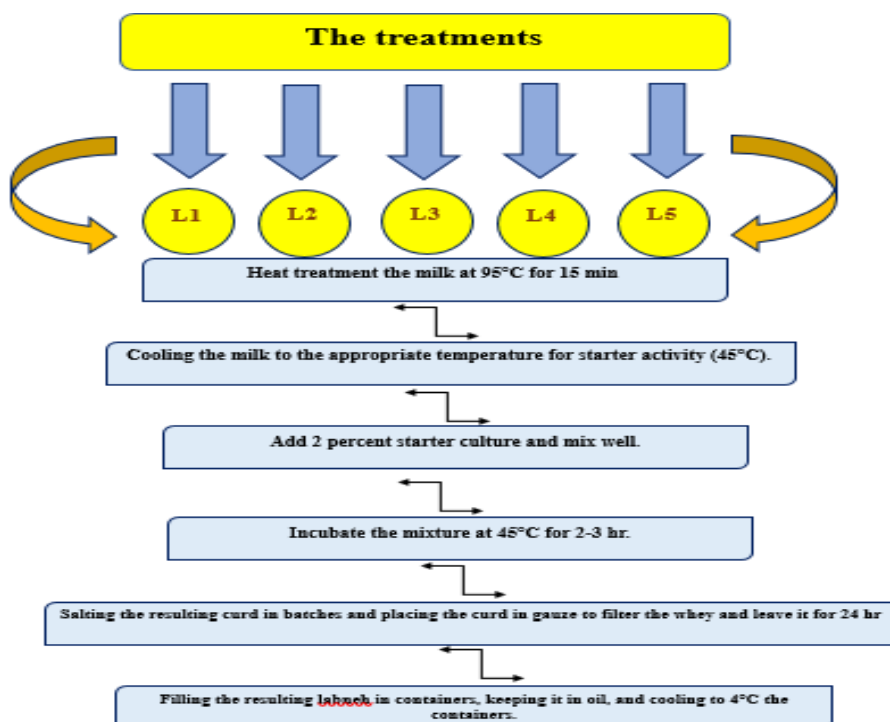
- 7- Labneh made 25% milk retentate and 75% buffalo's skim milk and 2% tomato juice extract.

- 8- Labneh made 25% milk retentate and 75% buffalo's skim milk and 4% tomato juice extract.

- 9- Labneh made 25% milk retentate and 75% buffalo's skim milk and 8% tomato juice extract.

Labneh industry

Labneh was made according to Robinson and Tamime (1987). Was heated the milk at 95°C for 15 min, Cooling the milk to the appropriate temperature for the starter activity (45°C), add 2 percent starter culture and mix well, Incubate the mixture at 45°C for 2-3 hr, salting the resulting curd in batches and placing the curd in gauze to filter the whey and leave it for 24 hr, and filling the resulting labneh in containers, keeping it in oil, and cooling to 4°C the containers. (Fig.1) shows the steps for making Labneh from retentate.

**Fig. 1. Steps for making labneh.****Treatments:**

Sampling was carried out according to AOAC (2019). Representative treatments of labneh were collected for chemical, rheological, functional, and sensorial analysis during the storage period. Treatments were taken at Fresh and after 7, 14, and 21 days.

Chemical analysis:**Total solids content:**

The Total solids content of Labneh was determined according to the AOAC (2019). Titratable acidity:

For the estimation of titratable acidity, 10 ml. of Labneh, was titrated with N/9 NaOH using phenolphthalein

as an indicator. In the case of cheese, titratable acidity was determined according to the method described by AOAC (2019). The results were expressed as a lactic acid percentage.

pH value:

The pH value of Labneh was determined by using a glass electrode pH-meter (Model 810 Fisher Scientific) according to AOAC (2019).

Ash content:

Ash was determined using the electric muffle furnace at 550°C as described by AOAC (2019). Labneh was determined ash by weighing 10 gm of the treatment, then preheating step by evaporation after that transferred to the muffle 3 – 5 gm. The cheese of the treatment was weighed and then pre-washed after that transferred into the muffle. The treatments gradually heated from 150 – 600°C in 5 hours then stayed at 600°C for 3 hours. The next day, the treatments were weighted to estimate the ash percentage.

Total nitrogen (TN).

The total nitrogen content of Labneh was estimated as described by AOAC (2019).

Soluble nitrogen (SN).

Water soluble nitrogen was estimated in the Labneh treatments as described by AOAC (2019).

Textural Characteristics of the Labneh:

Experimental Labneh was estimated by texture analyzer Lab pro (FTC TMS-pro, USA). The cheese treatments presented to the instrument were each of 30 mm diameter and 20mm elevation. A TA15-45° Perspex cone was used as a plumbline with a permeation of 10 mm at 1mm/s. Treatments were permitted to be in equilibrium at room temperature for around 30-45 min. before testing. Textural characteristics were described by Szczesniak *et al.*, (1963) in which the following terms are shown as follow:

Hardness is the force required to achieve a change in shape or distortion.

Cohesiveness is the force of interior bonds making up the cheese shape.

Springiness is the ratio of distorted material returns to its main shape at the removal of the distorting force.

Chewiness is the power required to chew the food product to a state where it is ready for swallowing: it is expressed in terms of hardness × cohesiveness × springiness.

Gumminess is the power required to disintegrate a semisolid food for swallowing.

Organoleptic properties:

A panel of 10 judges was formed from the staff and students of the Dairy Department, Faculty of Agriculture. The parameters evaluated were flavor (40 points), body & texture (30 points), and appearance (30 points) according to the scorecard suggested by Fathi and Fatma (1999).

RESULTS AND DISCUSSION

Titratable Acidity and PH

It is known that the relation between acidity and pH is inverse. The higher the acidity value, the lower the pH value and correct versa.

From Table (4), it was noted that the acidity value of the control treatment increased compared to the treatments with retentate, and this was until the end of storage. On the other hand, it was observed that the acidity value of all treatments increased at the end of storage. It was also noted that as the concentration of retentate increased, this to a decrease in the acidity value in the treatments. It was also noted that the treatment with the highest acidity value were

(Labneh made fresh buffalo's skim milk without adding milk retentate) at the end of storage, while the treatment (Labneh made milk retentate) was the lowest in acidity value at the fresh time. This may due to increased lactose percentage in retentate. the obtained results are in accordance with El-Smaragy and Zall (1988)

Total solid

Table No. (4), it noted that the value of the total solid in the Labneh increases as the storage period advances for all treatments. The moisture content decreased clearly as the storage period progressed. It also noted that the percentage of total solids in treatment (Labneh made fresh buffalo's skim milk without adding milk retentate) was lower than that of treatments (Labneh made 25% milk retentate and 75% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk, Labneh made 75% milk retentate and 25% buffalo's skim milk and Labneh made milk retentate), respectively. Also it noted that the percentage of total solids in treatment (Labneh made milk retentate) was higher compare to the control and labneh other treatments. It is a result of the increased content of protein, fat and ash in the resulting Labneh. It happened by adding retentate. The results obtained are consistent with El-Smaragy and Zall (1988)

Fat content

Any type of cheese is affected by fat content, it can also influence and be responsible for the softness, firmness, and texture.

From Table (4) the addition of retentate during labneh manufacturing increases the fat value for all treatments (Labneh made 25% milk retentate and 75% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk, Labneh made 75% milk retentate and 25% buffalo's skim milk and Labneh made milk retentate), respectively. These results due to an increase in the percentage of fat in the Labneh. The fat content in the control was lower than in all treatments. The fat content in all treatments increases as the storage period progresses. The highest treatment in fat content was (Labneh made milk retentate), followed by (Labneh made 75% milk retentate and 25% buffalo's skim milk Labneh made 75% milk retentate and 25% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk and Labneh made 25% milk retentate and 75% buffalo's skim milk), respectively as the storage period progressed. The results obtained are consistent with Aumara and Farahat (2007).

Nitrogen content

From Table (4), the addition of retentate during the manufacture of labneh increased the total nitrogen value for all treatments (Labneh made 25% milk retentate and 75% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk, Labneh made 75% milk retentate and 25% buffalo's skim milk and Labneh made milk retentate), respectively. The total nitrogen content in the control was lower than in all treatments. The total nitrogen content of all treatments increases as the storage period progresses. The highest treatment in total nitrogen content was (Labneh made milk retentate), followed by (Labneh made 75% milk retentate and 25% buffalo's skim milk Labneh made 75% milk retentate and 25% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk and Labneh made 25% milk retentate and 75% buffalo's skim milk), respectively as the storage period progresses. The present results were in line with El-Smaragy and Zall (1988) who stated that the total nitrogen content gradually increased during storage period progresses.

Table 4. Effect of different percentage of milk retentate (25%, 50%, 75% and 100%) on the Chemical composition (pH value T.A%, T.S%, T.F%, T.P%, S.N%, N.P.N% and Ash content) in Labneh.

Properties	Storage period (days)	Treatment				
		L1	L2	L3	L4	L5
PH	Fresh	5.01	5.12	5.1	5.21	5.38
	7	4.84	5.07	5.06	5.06	5.14
	14	4.82	5.02	5.03	5.02	5.2
	21	4.67	5.03	4.97	4.97	5.03
Acidity%	Fresh	1.78	1.33	1.22	1.02	1.12
	7	1.83	1.52	1.27	1.08	1.68
	14	1.85	1.64	1.46	1.64	1.72
	21	1.92	1.75	1.51	1.74	1.75
T.S%	Fresh	20.58	24.51	.8152	.5162	.1672
	7	20.69	24.25	.8752	.5762	.2072
	14	20.75	24.35	.9352	.7062	.2772
	21	21.17	24.48	.9852	.7562	.3572
T.F%	Fresh	3.66	8.88	9.25	.679	73.9
	7	3.78	8.92	9.29	.699	77.9
	14	3.83	8.96	9.32	.739	9.79
	21	3.93	9.05	9.36	.829	58.9
T.N%	Fresh	1.84	1.89	2.25	2.43	2.49
	7	1.85	1.90	2.26	2.44	2.50
	14	1.87	1.91	2.27	2.45	2.51
	21	1.74	1.92	2.28	2.46	2.56
S.N%	Fresh	1.32	1.35	1.35	1.31	1.29
	7	1.33	1.36	1.36	1.32	1.28
	14	1.35	1.37	1.37	1.34	1.36
	21	1.36	1.41	1.41	1.35	1.28
N.P.N%	Fresh	0.95	1.15	1.09	0.93	0.88
	7	1.00	1.17	1.13	0.94	0.91
	14	1.09	1.23	1.17	0.96	0.92
	21	1.13	1.35	1.21	0.98	0.95
Ash%	Fresh	333.	543.	3.54	263.	173.
	7	633.	843.	3.55	463.	573.
	14	243.	353.	3.58	763.	183.
	21	843.	953.	3.62	173.	783.

L1: Labneh made fresh buffalo's skim milk without adding milk retentate (control). L2: Labneh made 25% milk retentate and 75% buffalo's skim milk. L3: Labneh made 50% milk retentate and 50% buffalo's skim milk. L4: Labneh made 75% milk retentate and 25% buffalo's skim milk. L5: Labneh made milk retentate (100%).

S.N content

From Table (4), the addition of retentate during the manufacture of labneh caused an increase in the S.N value for all treatments L2, L3, L4 and L5, respectively. The S.N content in the control was lower than in all treatments. The S.N content of all treatments increases as the storage period progresses. The highest treatment in S.N content was L2, followed by L3, L4 and L5, respectively as the storage period progresses. The obtained results are in accordance with El-Smaragy and Zall (1988)

N.P.N content

From Table (4), the addition of retentate during the manufacture of labneh caused an increase in the N.P.N value for all treatments (Labneh made 25% milk retentate and 75% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk, Labneh made 75% milk retentate and 25% buffalo's skim milk and Labneh made milk retentate), respectively. The N.P.N content in the control labneh was lower than in all treatments. The N.P.N content of all treatments increases as the storage period progresses. The highest treatment in N.P.N content was (Labneh made 25% milk retentate and 75% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk, Labneh made 75% milk retentate and 25% buffalo's skim milk and Labneh made milk retentate), respectively as the storage

period progresses. The obtained results are in according to with El-Smaragy and Zall (1988)

Ash content

In Table 4, the addition of retardant during Labneh manufacturing increases the ash content for all treatments (Labneh made 25% milk retentate and 75% buffalo's skim milk, Labneh made 50% milk retentate and 50% buffalo's skim milk, Labneh made 75% milk retentate and 25% buffalo's skim milk and Labneh made milk retentate), respectively. The ash content in the control was lower than all treatments. Treatment (Labneh made milk retentate) was the highest in ash content, followed by (Labneh made 75% milk retentate and 25% buffalo's skim milk, Labneh made 75% milk retentate and 25% buffalo's skim milk, Labneh made 25% milk retentate and 75% buffalo's skim milk and Labneh made fresh buffalo's skim milk without adding milk retentate), respectively. The ash content increases in all treatments as the storage period progresses. The results obtained are consistent with El-Smaragy and Zall (1988)

Microbiological Analysis:

Table (5) shows the microbiological analysis of the labneh treatments, where the total Count content of the labneh, Escherichia coli and Moulds & Yeast. Microbiological analysis was conducted during the storage period, starting with fresh treatments, and the analysis process continued of 7 days and 14 days until the end of the storage period at 21 days.

Table 5. Microbiological analysis of different treatments as affected by retentates levels (Total Bacteria viable Count, Coliform Bacteria and Moulds & Yeast). (Cfu*10⁵)

Properties	Storage period (days)	Treatment				
		L1	L2	L3	L4	L5
TVBC cfu (10 ⁵)	Fresh	N.D	N.D	N.D	N.D	N.D
	7	5	8	N.D	8	7
	14	7	10	1	10	9
	21	10	11	2	13	12
Coliform Bacteria cfu(10 ⁵)	Fresh	N.D	N.D	N.D	N.D	N.D
	7	N.D	N.D	N.D	N.D	N.D
	14	N.D	N.D	N.D	N.D	N.D
	21	N.D	N.D	N.D	N.D	N.D
M & Y cfu (10 ⁵)	Fresh	N.D	N.D	N.D	N.D	N.D
	7	1	3	2	2	2
	14	3	4	2	3	3
	21	4	6	4	5	4

L1: Labneh made fresh buffalo skim milk without adding milk retentate (control). L2: Labneh made 25% milk retentate and 75% buffalo's skim milk. L3: Labneh made 50% milk retentate and 50% buffalo's skim milk. L4: Labneh made 75% milk retentate and 25% buffalo's skim milk. L5: Labneh made milk retentate (100%).

It noted in the following table that as the storage period increased, the total count content and the content of Muld and Yeast increased for all treatments. It also noted that all treatments undetected of coliform bacteria during A storage period.

Effect of retentates amount on the textural properties of labneh during 21 days of storage:

Hardness (N):

Defined as a measure of the amount of force required to compress the treatment of the cheese and related to the strength of the cheese matrix, also it is defined as a force required to attain a given deformation. After 21 days of storing the labneh in the refrigerator, a decrease in the hardness value was observed for all treatments. Sample (Labneh made 50% milk retentate and 50% buffalo's skim milk) is the highest sample in hardness. This is due to the addition of stabilizers that led to the formation of additional iso peptide bonds, and

the production of a gelatinous network with smaller aggregates and smaller pore sizes (Imm *et al.*, 2000).

Springiness (mm):

Defined as the ratio of which a distorted material returns to its main form when removing the distorting strength Szczesniak *et al.* (1963). On the other hand, the Springiness of the control treatment increased during the first 21 days, and the results showed an increase in the Springiness value for all treatments at the end of storage compared to the control treatment. An increase in the Springiness value for treatment (Labneh made milk retentate) at the end of storage compared to the control and the other treatment.

Cohesiveness (%)

Defined as the force of internal bonds forming the body of the product Szczesniak *et al.* (1963). Cohesiveness values increased gradually by the gradually addition of retentates amount in fresh labneh (Table, 10). On the other hand, the Cohesiveness of the control treatment increased during the first 21 days, and the results showed an increase in the Cohesiveness value for all treatments at the end of storage compared to the control treatment. An increase in the Cohesiveness value for treatment (Labneh made milk retentate) at the end of storage compared to the control and the other treatment. The obtained results are in accordance with Ossman (2018).

Gumminess (N):

Defined as the power required to disintegrate a semi-solid food for swallowing Szczesniak *et al.* (1963).

Table (6) showed that addition of retentates increase the labneh values of gumminess for some treatments, the gumminess decreased for fresh and 21 days of storage respectively. The results showed a decrease in the gumminess value for all treatments at the end of storage and an increase in the gumminess value for treatment (Labneh made 50% milk retentate and 50% buffalo's skim milk) in fresh compared to the control and other treatments. The obtained results are consistent with Ossman (2018).

Table 6. Some rheological properties of labneh as affected by retentates (25%, 50%, 75% and 100%).

Properties	Storage period (days)	Treatment				
		L1	L2	L3	L4	L5
Hardness (N)	Fresh	2.4	4.9	6.8	3.3	2.4
	21	1.61	3.01	5.2	2.05	1.7
Springiness (mm)	Fresh	0.66	0.66	0.46	0.88	0.89
	21	0.68	0.67	0.59	0.94	0.98
Cohesiveness	Fresh	0.57	0.51	0.47	0.67	0.83
	21	0.67	0.53	0.49	0.71	0.89
Gumminess (N)	Fresh	4.01	2.49	3.18	1.87	1.46
	21	2.93	2.14	2.51	0.63	1.22
Chewiness (N*mm)	Fresh	9.28	1.64	1.86	1.76	1.54
	21	4.28	1.43	1.51	1.63	1.18

L1: Labneh made fresh buffalo skim milk without adding milk retentate (control). L2: Labneh made 25% milk retentate and 75% buffalo's skim milk. L3: Labneh made 50% milk retentate and 50% buffalo's skim milk. L4: Labneh made 75% milk retentate and 25% buffalo's skim milk. L5: Labneh made milk retentate (100%).

Chewiness (J):

Chewiness is known as the required energy amount to chew a solid food material that is associated to other textural properties including hardness, cohesiveness and springiness (Prakasan *et al.*, 2015 and Salinase-valdes *et al.*, 2015).

Chewiness values increased gradually by the gradually addition of retentates amount in fresh labneh (Table, 10). On the other hand values decreased by storage time, The results showed a decrease in the Chewiness value of (Labneh made milk retentate) at the end of storage compared to the control and other treatment and an increase

in the Chewiness value of (Labneh made fresh buffalo's skim milk without adding milk retentate) at the end of storage compared to the other treatment. The obtained results are in accordance with Salinas-Valdés *et al.* (2015).

Sensory evolution as affected by the amount of retentates on fresh labneh, 7 days, 14 days and after 21 days of storage:

Table (7) illustrated the summary opinions of ten well trained judges from faculty of agriculture and dairy plants. Treatments were offered under different unknown numbers from their origin and character. Their opinions were tabulated in Table (7).

Table 7. Organoleptic properties of the treatments (flavor, Body texture and Appearance).

Properties	Storage period (days)	Treatment				
		L1	L2	L3	L4	L5
Flavor (40)	Fresh	40	37	33	30	29
	7	37	35	30	23	20
	14	26	25	24	18	15
	21	23	20	12	10	10
Body and texture (30)	Fresh	30	27	23	22	21
	7	27	25	21	18	16
	14	22	20	17	15	10
	21	17	15	12	9	8
Appearance (30)	Fresh	30	27	23	21	20
	7	27	24	21	18	17
	14	22	20	17	15	10
	21	15	15	9	9	8
Total (100)	Fresh	100	91	79	73	70
	7	91	84	72	59	53
	14	70	65	58	48	35
	21	55	50	33	28	26

L1: Labneh made fresh buffalo skim milk without adding milk retentate (control). L2: Labneh made 25% milk retentate and 75% buffalo's skim milk.

L3: Labneh made 50% milk retentate and 50% buffalo's skim milk. L4: Labneh made 75% milk retentate and 25% buffalo's skim milk.

L5: Labneh made milk retentate (100%).

Table 7 shows that as treatments continue to be stored, the sensory qualities of the labneh decrease. It was also noted that the best parameters in treatments of flavor were (Labneh made fresh buffalo's skim milk without adding milk retentate and Labneh made 25% milk retentate and 75% buffalo's skim milk) for fresh labneh, respectively, while it was noted that the best parameters in treatments of texture and composition were (Labneh made fresh buffalo's skim milk without adding milk retentate, Labneh made 25% milk retentate and 75% buffalo's skim milk and Labneh made 50% milk retentate and 50% buffalo's skim milk) in fresh labneh, respectively, and the best treatments in treatments of appearance were (Labneh made fresh buffalo's skim milk without adding milk retentate and Labneh made 25% milk retentate and 75% buffalo's skim milk) in fresh labneh, respectively. At the end of the arbitration process, the best treatment was (Labneh made 25% milk retentate and 75% buffalo's skim milk) compared to the other treatments. From this results we conclude that the lower percentage of retentate added to labneh, the more this leads to improving the sensory properties of the product. The obtained results are in accordance with (Tamime and Robinson, 1978).

Fortifying labneh with tomato juice extract

Sensory evolution as affected by the amount of tomato juice extract on fresh labneh after 7 days, 14 days and after 21 days of storage:

Table (8) illustrated the summary opinions of ten well trained judges from faculty of agriculture and dairy plants. Treatments were offered under different unknown numbers from their origin and character. Their opinions were tabulated in Table (8). Table 8 shows that as the treatments continue to be stored, the sensory qualities of the labneh decrease. It was

also noted that all treatments were good in texture and body, as well as appearance. It was noted that the treatments similar to the control treatment in flavor were the treatment which 8% tomato juice extract was added. It is recommended to fortify labneh with tomato juice extract due to its good health benefits that have a positive effect on humans.

Table 8. Organoleptic properties of the treatments (flavor, Body texture).

Properties	Storage period (days)	Treatment				
		Control	1%	2%	4%	8%
Flavor (40)	Fresh	39	35	34	31	38
	7	37	33	31	24	36
	14	26	21	25	17	26
	21	23	21	13	10	21
	Fresh	29	27	22	21	28
Body and texture (30)	7	27	25	20	17	25
	14	22	20	16	14	22
	21	17	15	11	9	15
	Fresh	30	27	20	21	28
	7	26	24	19	17	26
Appearance (30)	14	22	20	14	13	20
	21	15	15	9	9	15
	Fresh	98	88	76	73	94
	7	90	82	70	58	87
	14	70	64	55	44	66
Total (100)	21	55	48	33	28	51

CONCLUSION

The labneh is manufactured from 25% milk retentate and 75% buffalo's skim milk due to its good effect on the quality characteristics of the resulting labneh in terms of chemical analysis, rheological and sensory properties. She indicated that it is the best compared to other treatments. The recommendation was to fortify the labneh with tomato juice extract at a rate of 8%, as it was noted that these treatments are the best compared to other treatments. Tomato juice extract also increases the nutritional and therapeutic value of the resulting Labneh.

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تأثير إضافة نسب مختلفة من اللبن المركز الناتج من الترشيح الفائق ومستخلص عصير الطماطم على جودة اللبنه

محمد شلبي جمعة، محمد الدسوقي عبد العزيز، إسماعيل محمد الأمير و محمود مصطفى رفاعي

قسم الألبان- كلية الزراعة- جامعة المنصورة- مصر.

المخلص

في هذه الدراسة تم تصنيع اللبنه من لبن فرز جاموسي مع إضافة نسب مختلفة من ال Retentate (25% مركز اللبن + 75% لبن فرز جاموسي، 50% مركز اللبن + 50% لبن فرز جاموسي، 75% مركز اللبن + 25% لبن فرز جاموسي، 100% مركز اللبن) على التوالي. وتم دراسة تأثير إضافة هذه النسب على كلا من: التركيب الكيميائي والتحليل الميكروبيولوجي والخواص الريولوجية والخواص الحسية للبنه الناتجة. أظهرت النتائج زيادة نسبة الحموضة في الكترول مقارنة بالمعاملات الأخرى. أظهرت النتائج أنه بزيادة نسبة الإضافة من ال Retentate تزداد المادة الصلبة الكلية والنيتروجين الكلي والدهن والرماد للمعاملات (25% مركز اللبن + 75% لبن فرز جاموسي، 50% مركز اللبن + 50% لبن فرز جاموسي، 75% مركز اللبن + 25% لبن فرز جاموسي، 100% مركز اللبن) على التوالي وكانت المعاملة (100% مركز اللبن) هي الأعلى مقارنة بالمعاملات الأخرى. كما أظهرت النتائج زيادة الأعداد البكتيرية بزيادة فترة التخزين. كانت اللبنه خالية تماماً من بكتريا القولون. في بداية التخزين كانت اللبنه خالية من الخمائر والفطريات ثم ظهرت أعداد طفيفة بزيادة مدة التخزين. أظهرت النتائج انخفاض الخواص الريولوجية بنهلية مدة التخزين لجميع المعاملات. أظهرت النتائج أن Retentate 25% كانت الأفضل في الخواص الحسية يليها ال Retentate 50%. تم صناعة اللبنه مع إضافة التركيز الأفضل من ال Retentate (25%) مع التدعيم بمستخلص عصير الطماطم بنسبة 1، 2، 4، 8، % على التوالي ودراسة الخواص الحسية للمعاملات. كانت المعاملة الأقرب للكترول هي المعاملة المدعمة ب 8 % من مستخلص عصير الطماطم من حيث الخواص الحسية. كان الهدف من التدعيم بمستخلص عصير الطماطم هو زيادة القيمة الغذائية والوظيفية للبنه وتحسين الخواص الحسية.