ENHANCEMENT OF LABNEH QUALITY BY ADDING ESSENTIAL OIL AND AQUEOUS EXTRACTS OF PEPPERMINT

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Abstract

Concentrated yogurt (Labneh) was produced from cows'milk. The aim of this work was to investigate the effect of adding essential oil and aqueous extracts (0.5, 1.0 and 1.5%) of peppermint to concentrated yoghurt on extending the quality of Labneh. The chemical, microbiological, textural profile analysis and organoleptic properties of the Labneh stored at 6±1ºC up to 30 days were determined. Also, the titratable acidity and antioxidants activity of the prepared Labneh were also determined. No significant differences (P≤ 0.05) were observed in the total solids (TS) and fat content of the different Labneh treatments. Total bacterial count in the treated Labneh increased and reached the maximum after 10 days of storage, and decreased thereafter until the end of the storage period. Coliform bacteria were not detected, while yeasts and moulds were detected in some treated Labneh. Addition of essential oil or aqueous extracts increased springines**,**while hardness,cohesiveness, gumminess and chewiness parameters decreased in treated samples. Labneh containing1.0% essential oils or 1.5% aqueous extracts were organoleptically the most acceptable. Therefore, it can be concluded that addition of 1.0%essential oil or 1.5% aqueous extracts of peppermint could be used in order to increase the flavor and quality of Labneh up to 30 days, with low level of total viable, molds and yeast count**.**

Keywords: labneh, essential oil, aqueous extracts, peppermint, texture profile analysis

INTRODUCTION

Labneh is a semisolid product produced by removing part of the whey from yoghurt to reach total solid levels between 23 and 25 g /100 g, of which 8–11 g/100 g is fat (Hilali *et al.* , 2011). In addition to having an acidic flavor and milky white colour, labneh is soft, smooth and spreadable with a consistency that resembles cultured cream. Labneh is produced by strains of thermophilic lactic acid bacteria (LAB), which ferment the lactose present to produce organic acids, mainly lactic acid ,the traditional method of producing labneh consists of straining whole milk yoghurt in a cheese cloth bag to the desired total solids level. Industrially, excess liquid is removed from the yoghurt by mechanical separators (Tamime and Robinson , 1999).

In the traditional process, the yoghurt is not subjected to heat and , therefore labneh would apparently have higher counts of lactic acid bacteria and a more complex flavor as compared to the product processed by the other procedure. On the other hand, the traditional process involves more manual handling and provides more opportunities for contamination by yeasts and molds. The shelf life of traditional labneh is short, even if stored at low temperature . This may be due to the sanitary problems usually associated with the cloth bags used in its production and due to unhygienic handling of the product, which increases microbial contamination (EL- Samragy *et al.,* 1988). The high microbial load of labneh , coupled with the packaging and storage condition , result in the formation of off – flavors and undesirable physicochemical changes that eventually lead to rejection of the product .

The differences in hygienic standards of labneh production system are largely responsible for differential use of additives by processors in managing the shelf life of the product. One of the most accepted ways to extend the shelf life of perishable food products is through the use of biopreservatives (Burt,2004). Currently, there is a strong debate about the safety aspects of chemical preservatives since they are considered responsible for many carcinogenic and teratogenicity attributes. For these reasons , consumers tend to be suspicious of chemical additives and thus the demand for natural and socially more acceptable preservatives has been intensified. Essential oils are aromatic, which obtained from plant materials, the effect of different concentrations of essential oils on different microorganisms present in food have been varied , ranging from partial to complete inhibition (Khaleel,2000). The antimicrobial effect of essential oils has been attributed to the presence of phenols (Ismail *et al* ., 2006). Many spices and herbs exert antimicrobial activity due to their essential oil fractions (Daferera *et al.,* 2003). The most common herb in the Mediterranean region is peppermint (*Menthapiperita* L.), it is widely used as a source of essential oils for flavoring and recently has been used as a valuable source of the potent antioxidant for the nutraceuticals and cosmetic industries. The aim of the present study was to investigate the effect of essential oil or aqueous extracts of peppermint on the shelf life extension of the labneh. Also, The changes in chemical, microbiological, rheological and were also assessed organoleptic properties of labneh during storage.

MATERIALS AND METHODS

Materials

Fresh cows milk with acidity 0.16-0.17%, fat 3.5%, lactose 4.4% and pH 6.6 - 6.8 was obtained from the farm of the Animal Production Research Institute, Giza, Egypt. Spray dried skim milk powder was purchased from local market. The essential oil obtained from National Research Center, Dokki, Giza, Egypt. Yoghurt starter culture obtained from the Egyptian microbial culture collection (EMCC) at Cairo Microbiological Resources Center (Cairo Mircen), Faculty of Agriculture, Ain Shams University.

Preparation of aqueous extracts

The dried peppermint obtained from local market was washed thoroughly with sterile double distilled water to make completely free from any possible contamination. Aqueous extracts was prepared according to Vaishnavi *et al*, (2007) with slight modification by soaking 20 g of dry peppermint in 100ml boiled sterile hot distilled water overnight. The aqueous extract was cooled, filtered through Whatman No.1 filter paper and then kept in sterile screw capped glass vials at 4ºC.

Manufacture of labneh

Labneh was manufactured using the method outlined by Tamime and Robinson, (1999) with some modifications. Milk was batch heated at 90ºC for 20 minutes, cooled to 42ºC and then inoculated with 3% of the yoghurt starter culture (*Streptococcus salivarius sub sp. thermophilus* and *L. bulgaricus* delbruckii sub sp. bulgaricus (1:1) Chr. Hansens Lab A / s Copenhagen, Denmark were used , and then the milk incubated at 40ºC until pH 4.6 it was completely coagulated. The resultant coagulant was mixed and put into cheese cloth bags, which were hung in the refrigerator at 6±1ºC for 16 h, to allow drainage of the whey. Then 0.5% NaCl, was added and mixed well. The resulting Labneh was divided into seven treatments one of them made without essential oils or aqueous extracts served as control (T1),Essential oil was added to three portions at ratio of 0.5 ,1.0 and 1.5% (T2,T3and T4, respectively)The last three portions were made with aqueous extracts at ratios 0.5,1.0 and 1.5% (T5,T6 and T7, respectively).The fresh labneh from each bag was ad quoted into small plastic containers (50g) and stored at 6±1ºC for 30 days. The Samples were taken at day 1, 10, 20, 30 for chemical, microbial, organoleptic properties and textural profile analysis.

Methods of Analysis:

Chemical Analysis:

The total solids, total protein, fat and titratable acidity content were determined according to AOAC (2000). Antioxidant activity as (%) indicator of antioxidant contents was determined according to Olivera *et al.,* (2006)

Microbiological Analysis :

Total bacterial counts were determined according to the method described by Houghtby *et al*. (1992). Molds, yeast and coliforms were determined according to Marshail (1992).

Textural profile analysis:

Texture profile of Labneh was measured at 23ºC as described by Bourne (1982) using an Instron Universal Testing Machine model 1195, Stable Micro System. (SMS) LTD., Godalming, UK, loaded with Dimension software SMS program. Likewise, Penetration value was measured as mentioned by Bourne (1982).

Sensory Evaluation:

All innovative Labneh treatments were evaluated for flavor (50 points), body and texture (40 points), and appearance(10 points) when fresh and after 10, 20 and 30 days of refrigerator storage at (6±1°C) by staff members of the Dairy Department, Food Technology Institute, Agricultural, Research Center according to Keating and Rand-white (1990).

Statistical analysis:

Factorial experiment was used to analyze all the data, and the Student Newman Keuls test was followed to make the multiple comparisons (Steel and Torrie, 1980) using Costat program. Significant differences were calculated at $p \leq .05$.

RESULTS AND DISCUSSION

Chemical properties

No significant differences ($P \leq 0.05$) were observed in the TS and Fat content of the different Labneh, either when fresh or during the storage period (table 1). During storage, TS slightly increased due to moisture loss. Similarly, Mutlag and Hassan (2008) reported that there were no observed difference in TS and fat content of Labneh produced by addition of three different essential oils. Protein in all samples gradually increased with no significant differences ($P \leq 0.05$) till 20 days storage, and slightly decreased within 30 days. These results are in agreement with that obtained by Mutlag and Hassan (2008). The total acidity (TA) values of the treatments of Labneh significantly ($P \geq 0.05$) and gradually increased in all treatments during the storage period. As the change in total acidity one factors, which affect the shelf life of Labneh (Habib*et al.,* 2014) It was observed that the highest values of (TA) were obtained with Labneh untreated (control), suggesting that the essential oil had a reducing effect on the starter culture and total viable count (Habib *et al.,* 2014).The Labneh treated with aqueous extracts had higher (TA) than that treated by essential oil.

Labneh made with essential oil or aqueous extracts of peppermint had the highest values of antioxidant activity compared to control. In addition antioxidant activity increased with increasing essential oil or aqueous extracts of addition. This variation could be attributed to the high antioxidant activity in peppermint. These results are in line with those reported by (Habib *et al.,* 2014; Burt, 2004), they reported that some essential oils have antioxidants activity and antimicrobial properties and that they can be used as food flavoring agents or preservatives, and for medicinal purposes, In addition treated Labneh with essential oils had higher antioxidant activity than that treated by aqueous extracts (Table 1).

Microbiological analysis

The total viable count (TVC) decreased in the presence of essential oil and aqueous extracts compared with the control samples (Table 2).The results might be due to the antibacterial effect of peppermint during storage period. On the other hand total viable bacterial count increased until (the10^{th} day) then decreased till the end of storage period (30days) to reach 88 × 10^6cfu/g in the control sample, while in the treated Labneh the TVC was 70, 65 and 40 × 10^6 for Labneh treated with 0.5%,1.0% and 1.5% essential oil respectively, but the TVC was 78,68 and 63 × 10^6 for Labneh treated with 0.5%,1.0% and 1.5% aqueous extracts, respectively, at end of storage period. Sahan *et al.,* (2004) report that, the total aerobic bacterial counts decreased during the storage. These results show that the best inhibitory effects were noticed with essential oil addition, due to the highest concentration of active compounds. Aqueous extract inhibited the growth of microorganisms but less than essential oil (Dostálová *et al.,* 2013). The quality and the shelf life of Labneh evaluated with yeasts and moulds counts, so yeasts and moulds were not detected in Labneh containing essential oil or aqueous extracts of peppermint until the 20^{th} days of the storage period. Yeasts and moulds were detected in the untreated sample, only after 10^{th}daysof storage (4×10^2cfu/g), these results might be due to the antimicrobial effect of peppermint essential oil in treated Labneh. These results are in agreement with Mutlag and Hassan (2008), who reported that essential oil from thyme had antifungal and antimicrobial activities.

Results of this work proved that the best alternative to preserve the Labneh by using the essential oil instead of chemicals preservatives. Mihyar *et al.,* (1999) reported that more than 400 mg of sodium benzoate per Kg of Labneh were needed to control the counts of yeasts and moulds such as *Pichia farinose, Candida blankii* and *Trichosporonbrassicae* to 105 cfu/g after 14 days at 5°C., while 150 and 300 mg of sodium benzoate per Kg of labneh were needed for *Geotrichum candidum* and

*Trichosporoncutaneum,*respectively. Notably, coliform were not detected in fresh Labneh and during storage period in all resultant Labneh which indicated the good hygienic condition followed in its production.

Textural profile analysis

Hardness is described as the force required to penetrate the sample with the molar teeth (from soft to firm) Lee *et al.,* 1978. From the obtained results (Table, 3), it could be seen that, essential oil and aqueous extracts of peppermint cause a decrease in hardness, cohesivness, springiness, chewiness and gumminess compared to control in fresh. Springiness is described to the panelists as bouncing properties of the sample through several consecutive bites. The obtained values of this property for Labneh with different treatments ranged from 5.42 to 4.24 mm which meaning that the springiness took the reverse trend of hardness.

Cohesiveness known as the degree to which the Labneh samples deforms before rupturing, therefore, cohesiveness values is a direct function of the work needed to overcome the internal bonds of the material. Gumminess values had the same direction of hardness and cohesiveness. It can be seen from the obtained data (Table. 3) that the average gumminess of control was the highest in the treatments. Treatments with 1.5 % essential oil and 1.5% aqueous extracts showed the lowest gumminess. Chewiness is described to be the number of chews required to swallow a certain amount of sample. This property expressed mathematically as the product of gumminess & springiness, therefore, it took the same trend of these property. These include those factors that affect the curd moisture content cheese composition, pH, Ca content, ionic strength, salt content, and manufacturing protocol, especially rate and extent of acid development. Fat content in the Labneh is responsible for its many desirable functional and texture. In addition, increasing moisture content might result in increase in the level of free moisture in Labneh; this increased the hardness (Awad, 2011).

Organoleptic properties

Results given in Table (4) shows the organoleptic evaluation of Labneh treated with essential oil or aqueous extracts of peppermint compared with the untreated control. The highest score points were in Labneh treated with 1.0% essential oil and 1.5% aqueous extracts till the end of storage compared with untreated Labneh (control). In addition, the total scores of the sensory evaluation decreased gradually during storage. The control and treated Labneh samples treated with 1.5% essential oil and 0.5% aqueous extracts had lowest points by most of the plane lists. There were considerable and significant differences ($P \leq 0.05$) in the

samples treated with either essential oils or aqueous extracts compared with the untreated control.

CONCLUSION

The results of the present study showed that, the addition of essential oils or aqueous extracts of peppermint can be used to increase the quality of labneh, the peppermint oil at 1.0% and aqueous extracts 1.5% has shown to extend the shelf life for up to 30 day at 6±1ºC with acceptable taste, flavor and without any microbial spoilage.

Table 1. Chemical composition and Antioxidant activity (%)of labneh made by adding essential oil or aqueous extracts of peppermint during the storage period at 6±1ºC

Treatments	Storage period (days)	T.S (%)	Fat (%)	Total protein (%)	Acidity (%)	Antioxidant activity(%)
T1*	Fresh	$24.30^{A,a}$	$9.10^{A,a}$	$11.33^{A,a}$	$1.16^{A,c}$	10.5^{G}
T2		$24.25^{A,a}$	$9.10^{A,a}$	$11.40^{A,a}$	$1.15^{A,c}$	18.6^{C}
T3		$24.21^{A,a}$	$9.15^{A,a}$	$11.42^{A,a}$	$1.15^{A,c}$	29.5^{B}
T4		$24.10^{A,a}$	$9.20^{A,a}$	$11.50^{A,a}$	$1.14^{A,c}$	42.7^{A}
T5		$24.22^{A,a}$	$9.10^{A,a}$	$11.35^{A,a}$	$1.15^{A,c}$	12.5^{E}
T6		$24.15^{A,a}$	$9.10^{A,a}$	$11.39^{A,a}$	$1.15^{A,c}$	15.3^{D}
T7		$24.13^{A,a}$	$9.15^{A,a}$	$11.44^{A,a}$	$1.15^{A,c}$	19.2^{C}
T1	10	$24.35^{A,a}$	$9.10^{A,a}$	$11.42^{A,a}$	$1.29^{A,b}$	-
T2		$24.31^{A,a}$	$9.15^{A,a}$	$11.48^{A,a}$	$1.22^{B,b}$	-
T3		$24.26^{A,a}$	$9.20^{A,a}$	$11.50^{A,a}$	$1.20^{C,b}$	-
T4		$24.19^{A,a}$	$9.25^{A,a}$	$11.58^{A,a}$	$1.17^{C,b}$	-
T5		$24.30^{A,a}$	$9.10^{A,a}$	$15.46^{A,a}$	$1.27^{A,b}$	-
T6		$24.22^{A,a}$	$9.15^{A,a}$	$11.47^{A,a}$	$1.24^{B,b}$	-
T7		$24.20^{A,a}$	$9.20^{A,a}$	$11.51^{A,a}$	$1.23^{B,b}$	-
T1	20	$24.40^{A,a}$	$9.15^{A,a}$	$11.48^{A,a}$	$1.33^{A,a}$	-
T2		$24.35^{A,a}$	$9.20^{A,a}$	$11.55^{A,a}$	$1.26^{D,a}$	-
T3		$24.30^{A,a}$	$9.20^{A,a}$	$11.56^{A,a}$	$1.24^{D,a}$	-
T4		$24.22^{A,a}$	$9.25^{A,a}$	$11.62^{A,a}$	$1.21^{E,a}$	-
T5		$24.33^{A,a}$	$9.10^{A,a}$	$11.50^{A,a}$	$1.30^{B,a}$	-
T6		$24.25^{A,a}$	$9.20^{A,a}$	$11.51^{A,a}$	$1.27^{C,a}$	-
T7		$24.23^{A,a}$	$9.25^{A,a}$	$11.55^{A,a}$	$1.25^{C,a}$	-
T1	30	$24.42^{A,a}$	$9.15^{A,a}$	$11.50^{A,a}$	$1.34^{A,a}$	-
T2		$24.41^{A,a}$	$9.20^{A,a}$	$11.56^{A,a}$	$1.26^{C,a}$	-
T3		$24.37^{A,a}$	$9.25^{A,a}$	$11.56^{A,a}$	$1.24^{D,a}$	-
T4		$24.28^{A,a}$	$9.25^{A,a}$	$11.63^{A,a}$	$1.22^{D,a}$	-
T5		$24.38^{A,a}$	$9.20^{A,a}$	$11.51^{A,a}$	$1.31^{B,a}$	-
T6		$24.32^{A,a}$	$9.20^{A,a}$	$11.52^{A,a}$	$1.27^{C,a}$	-
T7		$24.28^{A,a}$	$9.25^{A,a}$	$11.57^{A,a}$	$1.26^{C,a}$	-

T1: Labneh without essential oil or aqueous extracts of peppermint as control.

T2: Labneh with 0.5 %essential oil of peppermint.

T3: Labneh with 1 % essential oil of peppermint.

T4:Labneh with 1.5 %essential oil of peppermint.

T5: Labneh with 0.5 % aqueous extracts of peppermint.

T6Labneh with 1.0 % aqueous extracts of peppermint.

T7Labneh with 1.5 % aqueous extracts of peppermint.

Different capital letters in the same Colum means the treatments are significantly different from each other, while the small letters in the same Colum means the treatments are significantly different during storage period.

Table 2. Microbiological analysis of Labneh made by adding essential oil or aqueous extracts of peppermint during the storage period at 6±1ºC

Treatments	Storage period	Total bacterial count(10^6) / cfu/g	Yeasts and molds(10^2)	Coliforms(10^2)
T1*	Fresh	90	ND**	ND
T2		80	ND	ND
T3		72	ND	ND
T4		65	ND	ND
T5		88	ND	ND
T6		85	ND	ND
T7		79	ND	ND
T1	10 days	111	4	ND
T2		99	ND	ND
T3		89	ND	ND
T4		62	ND	ND
T5		106	ND	ND
T6		101	ND	ND
T7		95	ND	ND
T1	20 days	96	8	ND
T2		84	ND	ND
T3		73	ND	ND
T4		48	ND	ND
T5		91	5	ND
T6		82	2	ND
T7		78	ND	ND
T1	30 days	88	19	ND
T2		70	8	ND
T3		65	5	ND
T4		40	3	ND
T5		78	16	ND
T6		68	12	ND
T7		63	9	ND

*__T1__: Labneh without essential oil or aqueous extracts of peppermint.

__T2__: Labneh with 0.5 % essential oils of peppermint.

__T3__: Labneh with 1.0 % essential oils of peppermint.

__T4:__Labneh with 1.5 % essential oils of peppermint.

__T5__: Labneh with 0.5 % aqueous extracts of peppermint.

__T6__:Labneh with 1.0 % aqueous extracts of peppermint.

__T7__: Labneh with 1.5 % aqueous extracts of peppermint.

**ND: Not detected.

Table 3. Textural profile analysis of Labneh made by adding essential oil or aqueous extracts of peppermint at fresh time.

Treatments	Parameters				
	Hardness (N)	Cohesiveness (-)	Springiness (mm)	Gumminess (N)	Chewiness (N/m)
T1*	8.5^{A}	0.63^{A}	5.24^{D}	5.4^{A}	28.08^{A}
T2	6.5^{B}	0.61^{B}	5.34^{B}	4.5^{B}	22.20^{B}
T3	6.1^{C}	0.58^{C}	5.37^{C}	3.5^{D}	15.94^{C}
T4	5.8^{D}	0.55^{D}	5.41^{A}	3.0^{E}	11.21^{D}
T5	6.4^{B}	0.61^{B}	5.35^{B}	4.2^{C}	22.29^{B}
T6	6.1^{C}	0.59^{C}	5.39^{C}	3.6^{D}	14.67^{CD}
T7	5.8^{D}	0.54^{D}	5.42^{A}	3.0^{E}	12.40^{D}

*__T1__: Labneh without essential oil or aqueous extracts of peppermint.
__T2__: Labneh with 0.5 % essential oils of peppermint.
__T3__: Labneh with 1.0 % essential oils of peppermint.
__T4__: Labneh with 1.5 % essential oils of peppermint.
__T5__: Labneh with 0.5 % aqueous extracts of peppermint.
__T6__:Labneh with 1.0 % aqueous extracts of peppermint.
__T7__:Labneh with 1.5 % aqueous extracts of peppermint.
Different letters in the same Colum means the treatments are significantly different from each other.

Table 4. Organoleptic properties of Labneh made by adding essential oil or aqueous extracts ofpeppermint during the storage period at 6±1ºC

Treatments	Storage period(days)	Flavor (50)	Body& Texture (40)	Appearance (10)	Total (100)
T1*	Fresh	$43^{B,a}$	$35^{A,a}$	$9^{A,a}$	$87^{C,a}$
	10	$43^{B,a}$	$35^{A,a}$	$9^{A,a}$	$87^{C,a}$
	20	$36^{B,b}$	$34^{B,b}$	$9^{A,a}$	$79^{D,b}$
	30	$33^{B,b}$	$33^{C,c}$	$9^{A,a}$	$75^{E,c}$
T2	Fresh	$44^{A,a}$	$35^{A,a}$	$9^{A,a}$	$88^{B,a}$
	10	$44^{A,a}$	$35^{A,a}$	$9^{A,a}$	$88^{A,a}$
	20	$43^{A,b}$	$34^{B,b}$	$9^{A,a}$	$86^{B,b}$
	30	$41^{A,c}$	$34^{B,b}$	$9^{A,a}$	$84^{B,c}$
T3	Fresh	$45^{A,a}$	$36^{A,a}$	$9^{A,a}$	$90^{A,a}$
	10	$44^{A,a}$	$35^{A,a}$	$9^{A,a}$	$88^{A,b}$
	20	$41^{B,b}$	$35^{A,a}$	$9^{A,a}$	$85^{B,c}$
	30	$40^{B,b}$	$34^{B,b}$	$9^{A,a}$	$83^{C,d}$
T4	Fresh	$43^{B,a}$	$35^{A,a}$	$9^{A,a}$	$87^{C,a}$
	10	$39^{C,b}$	$35^{A,a}$	$9^{A,a}$	$83^{D,b}$
	20	$37^{C,c}$	$35^{A,a}$	$9^{A,a}$	$81^{C,c}$
	30	$36^{C,c}$	$34^{B,b}$	$9^{A,a}$	$79^{D,d}$
T5	Fresh	$43^{B,a}$	$35^{A,a}$	$9^{A,a}$	$87^{C,a}$
	10	$43^{B,a}$	$35^{A,a}$	$9^{A,a}$	$87^{C,a}$
	20	$41^{B,b}$	$35^{A,a}$	$9^{A,a}$	$85^{B,b}$
	30	$40^{B,b}$	$34^{B,b}$	$9^{A,a}$	$83^{C,c}$
T6	Fresh	$44^{A,a}$	$36^{A,a}$	$9^{A,a}$	$89^{A,a}$
	10	$43^{B,b}$	$36^{A,a}$	$9^{A,a}$	$88^{A,b}$
	20	$42^{A,b}$	$35^{A,b}$	$9^{A,a}$	$86^{B,c}$
	30	$41^{A,c}$	$35^{A,b}$	$9^{A,a}$	$85^{B,d}$
T7	Fresh	$45^{A,a}$	$36^{A,a}$	$9^{A,a}$	$90^{A,a}$
	10	$45^{A,a}$	$36^{A,a}$	$9^{A,a}$	$90^{A,a}$
	20	$43^{A,b}$	$36^{A,a}$	$9^{A,a}$	$88^{A,b}$
	30	$42^{A,c}$	$35^{A,b}$	$9^{A,a}$	$86^{A,c}$

*__T1__: Labneh without essential oil or aqueous extracts of peppermint.
__T2:__Labneh with 0.5 % essential oil of peppermint.
__T3:__Labneh with 1 % essential oil of peppermint.
__T4:__Labneh with 1.5 % essential oil of peppermint.
__T5:__Labneh with 0.5 % aqueous extracts of peppermint.
__T6__Labneh with 1.0 % aqueous extracts of peppermint.
__T7__Labneh with 1.5 % aqueous extracts of peppermint.

Different capital letters in the same Colum means the treatments are significantly different from each other, while the small letters in the same Colum means the treatments are significantly different during storage period.

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تعزيز جودة اللبنة باضافة الزيت والمستخلص المائى للنعناع

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تم دراسة تأثير اضافة كلا من الزيت والمستخلص المائي للنعناع على نكهة ومدة حفظ اللبنة ، حيث تم اضافة الزيت والمستخلص المائى للنعناع بنسب 0.5 و1.0 و1.5% كلا على حدة الى اللبنة بعد التخلص من الشرش الزائد وقبيل وضعها فى العبوات وحفظها فى الثلاجة لمدة 30 يوم. وتم تحليل اللبنة وهى طازجة ، وكذلك بعد 10 و20 و30 يوم أثناء التخزين . وقد أدى اضافة الزيت والمستخلص المائى للنعناع الى ما يلي :

1- لم يكن هناك تأثير معنوي على محتوى اللبنة من الجوامد الكلية والدهن والبروتين الكلى.
2- أدى اضافة الزيت والمستخلص المائي للنعناع الي انخفاض نسب كل من الحموضة والعدد الكلى للبكتريا وكذلك الفطريات والخمائر ، للبنة الناتجة .
3- لم تظهر بكتريا الكوليفورم فى جميع المعاملات ، وذلك لاتباع الشروط الصحية السليمة في تصنيع اللبنة.
4- زيادة قيم Springiness مع اضافة كلا من الزيت والمستخلص المائى للنعناع بينما نقصت قيم كلامنHardnessوCohesiveness و Gumminess و Chewiness.وكلما زادت نسبة الاضافة ازدادت درجة التاثير.
5 – أدت اضافة زيت النعناع الى زيادة قيم تحكيم اللبنة حتى نسبة اضافة 1 % ثم تتناقص قيم التحكيم بعد ذلك ، بينما زادت قيم التحكيم مع زيادة نسبة إضافة المستخلص المائى حتى 1.5 %.