

A Study of Some Chemical and Microbial Properties of Labenah Sold in Suez Canal Area

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Abstract

This research was carried to evaluate the quality of labenah (concentrated yoghurt) sold in Suez canal province by determining some chemical and microbial properties of sixty samples, collected from different places in Ismailia and Portsaid Governorate in between December 2013 and July 2014 . The chemical examination revealed that the mean value of Titratable acidity percent, total solids, fat and salt content was 1.934 ± 0.076 %, 32.21 ± 0.56 %, 16.93 ± 0.60 % and 2.15 ± 0.03 % respectively. The results showed that 25 % and 35 % of samples did not comply with the (GSO) and (S.D.) respectively. Bacteriological examination of samples declared that the mean value of total Mesophylic, Psychrotrophic, Coliforms and *Escherichia coli* count was $3.18 \times 10^5 \pm 6.1 \times 10^4$, $9.2 \times 10^6 \pm 2.4 \times 10^5$, $1.13 \times 10^4 \pm 1.63 \times 10^3$, and $3 \times 10^3 \pm 3.7 \times 10^2$ respectively. Salmonella were not detected in all the examined samples of labenah. Mycological examination of samples revealed that, yeast and mould count were high in all samples with mean value of $4.5 \times 10^4 \pm 9 \times 10^3$, $5.3 \times 10^3 \pm 1.4 \times 10^3$, respectively. The results revealed that the more frequent isolated yeast was the candida albican and candida tropicalis, while the most frequent isolated molud was Aspergillus and Mucor spp. Public health importances of isolated micro-organisms as well as measures for improving the quality of the product were discussed.

Introduction

Labenah (concentrated yoghurt) is a popular fermented milk product in the Middle East, which has a significant role in family nutrition. It is also known as skyr (Iceland), Shrikhand (India), torba (Turkey) and Greek yoghurt (Greece and other countries) (Ramos et al, 2009, and Abd El-Salam et al, 2011). Also, it can be defined as yoghurt which has been strained to remove

its whey, resulting in a relatively thick consistency product. By another definition, it is a soft, tangy and nutritious cream cheese substitute made from yoghurt (Fayed, 2009).

Good Labenah has a creamy or white colour, soft and smooth body with a clean flavor, slight acidity and good spread ability (Nsabimana et al, 2005). Concentrated yoghurt has chemical

properties superior to those of regular yoghurt, with higher total solids, protein, minerals and titratable acidity and with very low lactose content, the presence of salt and relatively low moisture content in Labenah might help in sustaining the quality if held under good storage conditions. *Otaibi and Demerdash (2008)* agree that, the shelf life of traditional labenah is short, even if stored at low temperatures due to mold and yeast contamination. The presence of live starter bacteria that accompanied with improper packaging and storage conditions leads to the formation of off-flavors and other undesirable physicochemical changes (*Muir and Banks, 2000*). Also packaged labenah, as a concentrated product with a high lactic acid concentration as well as limited access to air during storage, is thought to be most suitable for the growth of yeasts (*Nsabimana et al., 2005*). Labenah produced from goat's milk had the highest texture integrity among all other types of Labenah. Economically, bovine milk is the most widely used type of milk today because it is the least expensive and the most available at the same time. The majority of Labenah brands in the market are of bovine origin (*Özer, et al. 1997, and Mehaia & El-khadragy 1999*). Nutritional value and therapeutic benefits of labenah are considered better than those of yoghurt. Labenah has 2.5 time higher protein

content and 50% more minerals (*Nsabimana et al., 2005*). In addition, as the lactose content of labenah is low due to its fermentation into lactic acid, which makes it more suitable for use by lactose intolerant individual (*Özer & Robinson, 1999*). However, several factors promote bacterial growth in Labenah and thus lead to its deterioration. Hygienic, bad package/storage and production conditions were among these factors (*AL-Kadamany, et. al., 2001*). Therefore, the present study was planned to clarify the compositional and microbiological properties of labenah sold in public markets in Egypt.

Material and methods

1. Sampling:

Sixty commercial labenah samples were randomly collected from supermarkets and dairy shops from different localities at Ismailia and Port-said governorate, Egypt. Collected samples were obtained in plastic containers as sold to the public under possible aseptic conditions and were transferred in ice boxes directly to the laboratory of Food hygiene department, Faculty of veterinary medicine, Suez canal-university as soon as possible to be immediately examined.

2. Chemical examination of labenah samples:

2.1. Preparation of the samples for chemical analysis (APHA, 1992):

Each sample was about 250 gm, the samples were mixed well by clean and sterilized spoon using a rotatory motion which passed from the lower layers to the surface of the samples for both chemical and microbiological analysis.

2.2. Determination of Titratable acidity % according to the method described by the AOAC (1990).

2.3. Determination of fat % according to (AOAC, 2000).

2.4. Determination of total solids and moisture percentage (ISO 6731:1989).

2.5. Determination of sodium chloride content (FAO, 1977).

3. Bacteriological examination:

3.1. Preparation of samples (APHA, 1992):

25 grams of each sample were aseptically transferred to a sterile homogenizer flask containing 225 ml of sterile buffered peptone water (1%) then the contents were homogenized thoroughly using stomacher. One ml from labenah homogenate was transferred to sterile test tube containing 9 ml of sterile peptone water (1%), from which ten-fold serial dilutions up to 10^{-10} were prepared.

3.2. Enumeration of total aerobic mesophilic (FDA, 1992):

Aliquots of 0.1 ml of each tube of the previously prepared ten-fold serial dilution was inoculated on the surface of standard plate count agar plates in duplicate using surface plating technique by a sterile bent glass rod and incubated with the

control dish in an inverted position at 37 °C for 48 hours. After the incubation period, the visible colonies were counted and the results were expressed as colony forming unit / gm of sample.

3.3. Total Psychrotrophic count (APHA, 1978).

3.4. Total coliform count (Christen et al., 1992):

3.5. Detection and enumeration of Escherichia coli:

3.5.1- Isolation of *E. coli* (ISO, 2001):

Detection and isolation of *E.coli* were performed on Eosin Methylene Blue agar (EMB) plates (LAB) which prepared as described on the label of manufacturer. 0.1ml of each tube of the previously prepared ten-fold serial dilution was inoculated on the surface of EMB agar plates in duplicates using surface plating technique by a sterile bent glass rod and the plates were incubated with the control one in an inverted position at 37 °C for 24 hours. The plates examined for typical large dark blue-black with green metallic sheen *E.coli* colonies and these suspected colonies were counted in each dish contain typical colonies between 30 to 300 cfu. Purification of the isolated colonies was done according to (*Barrow and Feltham, 1993*): A Pure culture from the suspected colonies streaked on a new EMB agar plates and the plates incubated in an inverted position at 37°C for 24 hours, the sub-culturing was

repeated until a pure colony is obtained.

3.5.2- Confirmatory tests for the isolated *E. coli* (ISO, 2001):

3.6. Detection of Salmonella species (ISO 6579-2002):

3.6.1- Pre-enrichment in non-selective liquid media (sterile buffered peptone water):

2.5 g. of prepared sample were diluted and homogenized with 25 ml of sterile buffered peptone water then incubated at 37 °C for 24 hours.

3.6.2- Selective enrichment of the sample in Rappaport Vassiliadis soy peptone broth:

1 ml of the pre-enriched sample was transferred after incubation into sterile test tube with 10 ml Rappaport- vassiliadis soy peptone broth (RVS) then the tubes were incubated at 37°C for 18 hours.

3.6.3-Selective plating:

0.1 ml of selective enriched sample tubes was inoculated on the surface of Xylose lysine desoxycholate agar plates (XLD) using surface plating technique and incubated the plates in an inverted position at 37 °C for 24 hours. After incubation, the plates examined for typical salmonella spp colonies (slightly transparent zone of reddish color and black center colonies). In case of negative plates, extra 24 hours applied.

3.6.4- Identification of the suspected colonies (Biochemical identification):

3.6.4.1- TSI Agar test (ISO 2002b).

3.6.4.2- Biochemical confirmation using urease test and IMVC test.

3.7. Mycological examination (APHA, 1992):

3.7.1. Preparation of ten folds serial dilution (APHA, 1992).

Eleven grams of each sample were removed aseptically and transferred to sterile homogenizer flask containing 99 ml of sterile sodium citrate 2%, the contents were homogenized at 1400 rpm. for 2.5 minute to provide a 1: 10 dilution. 1 ml from the homogenate was transferred to a separate sterile phosphate buffer tubes from which up to 10⁻⁹ tenfold dilutions were prepared.

3.7.2. Enumeration of mould and yeast (APHA, 1992).

1 ml from the prepared dilutions was inoculated into 15 ml of sterile melted malt extract agar media (pH 4.5) as duplicate palates. After solidification the plates were incubated at 25°C for 7 days, the plates examined every day after 2 days of incubation to count the yeast and from the 5th day to examine the mould count.

3.7.2.1. Identification of isolated moulds according to Larone (1987).

All positive mould cultures were purified by subculturing on Sabaroud's Dextrose agar plates and incubated at 25 °C for 5 days and examined morphologically and microscopically (*Collins and Lyne 1984*).

3.7.2.2. identification of isolated yeasts.

The identification of isolated yeasts was carried out according to *Lodder and Kreder (1970)*, *Deak and Beuchate (1996)*.

Results & Discussion

1-Chemical quality evaluation of Labenah:

1.1. Acidity percentage.

Table 1 showed that the titratable acidity % of examined samples was ranged from 0.75% to 3.3% with mean value $1.93 \pm 0.076\%$. Nearly similar results were obtained by *Al-Kadamany, et al (2001)* and *Cardak (2012)*. Variable percentages were obtained by *Haj et al. (2007)*, *Attita Alla et al. (2010)*, *Mukisa and Kyoshabire (2010)*.

Due to the Egyptian standards for labenah not established up till now, therefore I compared these results with Gulf Standard organization (*GSO 05/FDS 816/2008*) and *Syrian Standard (174/1984)*. The results revealed that 25 % (15 samples) of the examined Egyptian labneh samples failed to complied with the (GSO) standard legal requirements, which mentioned that the titratable acidity % of labenah must be not less than 1.2% and not more than 2.5%. Also the results revealed that 35 % (21 samples) of the examined Egyptian labenah samples failed to confirm with the (S.D.) which stated that the titratable acidity % of labneh must be not less than 1.8% and not more than 2.2% *Harfouch (2011)*. The relatively high acidity % of

Egyptian labenah may be attributed to large amounts of starter or failure to keep the final product in the suitable coolers. The level of acidity should be based on market research, because consumers may prefer different levels of acidity (*Tamime and Robinson, 1985*).

1.2. Total solid content.

Results of table (1) revealed that the total solids content of labenah samples were ranged from 22 to 45 % with mean value $32.21 \pm 0.564\%$, these results was in agreement with results of *Caglar et al. (1997)* who examined 13 samples and reported that average value of total solids was 32.36 % and similar to results also were detected by *Seckin and Ozkilinc (2011)*. Lower results reported by *Ozer et al. (1997)* they found that total solids content in concentrated yoghurt was 19.41 %. It has been reported that the variations in total solids content of labenah samples can be due to chemical composition of the milk used in the production of labenah especially fat content and the manufacture technique as temperature level and pressing method during the straining stage (*Tekinşen et Al., 2008*). None of the examined samples failed to confirm with the *Syrian Standard (174/1984)* which mentioned that the total solids % must not less than 22 %.

1.3. Fat content.

Regarding the fat content in examined labenah samples there was variations among the fat

content as it ranged from 10 % to 26 % with mean value 16.93 ± 0.605 % as shown in table (1); these results relatively similar to results reported by *Seckin and Ozkilinc (2011)* they reported that fat % was from 10.91 % to 12.42, also *Ammar El-Tahra (1995)* found that the fat % was ranged from 15.1 to 15.5 % for whole buffalo's milk labenah. These result was higher than those reported by *Kesekas (2010)* who reported that fat % of torba (labenah) was from 6.5 to 7.90 % , and *AL Kadamany et al. (2001)* they reported that the mean value of fat % for labenah was around 9.0%. None of Egyptian labenah samples failed to confirm with (*GSO 05/FDS 816/2008 standard*) and *Syrian Standard (174/1984)* for fat content , which mentioned that the fat % of the labenah must be not less than 7% (as a minimum), and 10 %. The difference in fat level of the labneh samples was most probably may be due to the difference in composition of the milk used for labenah production, and the level of cream separation.

1.4. Salt content.

The salt percentage results in examined samples were ranged from 1.47 % to 2.60 % with mean value of 2.15 ± 0.034 %. Nearly similar results were reported by *Guler (2006)* who detected salts with mean of $2.02 \pm 0.02\%$, and results of *Mehana et al. (2004)*. Lower results were detected by (*Soltani and Guzeler (2012)*). While higher results was detected by

Sahan and Say (2003), they detected salt with mean value 2.53 ± 0.09 %. These results indicated that 75 % of examined samples failed to confirm with *Syrian Standard (174/1984)* which stated that the salt content must not more than 2 % table (1). The relatively high salt content in examined labenah samples might due to procedure habits to increase the salt content to slow down or prevent the growth of microorganisms in the final product.

2. Microbiological examination:

2.1. Total mesophilic count

The results of microbiological analysis of labenah samples were shown in table (2). The total aerobic mesophilic bacterial count varied between 6×10^3 cfu/g. and 1.7×10^6 cfu/g. with the mean value of $3.18 \times 10^5 \pm 6.1 \times 10^4$ cfu/g.; these results are in agreement with the finding of *Caglar et al (1997)* and *Yerlikay, et al (2015)*. Higher counts were obtained by *Thabet et al (2014)*, they found that the total aerobic mesophilic bacterial count of 30 torba (strained yoghurt) samples was ranged from 95 to 92×10^6 cfu/g, Lower results obtained by *Guizani, et al (2000)*, *Younus, et al (2002)*, *Eissa, et al (2010)*, *SÖmer and Kilic (2012)* and *Saleh (2013)*. High aerobic mesophilic bacterial load in labenah samples may be attributed to inadequate hygienic measures during production or post-processing contamination. As in most foods, the total bacterial count

is often, an indication for the sanitary quality, safety and utility of foods. It may reflect the conditions under which the product is manufactured such as contamination of raw materials and ingredients.

2.2. Total Psychrotrophic count.

It is clearly evident from table (2) that the examined labenah samples were contaminated with psychrotrophic bacteria with a count ranged from 2×10^2 cfu/g. to 7.04×10^7 cfu/g. with mean value $9.2 \times 10^6 \pm 2.4 \times 10^5$ cfu/g. Similar finding was detected by **Sabreen (2001)**, while lower finding was obtained by **Farid, et al (1992)**. The high incidence of psychrotrophic bacteria detected in labenah sample could be attributed to the absence of heat treatment; carelessness during processing, unsatisfactory handling which leads to presence of large counts of psychrotrophs, its presence causes lipolytic changes due to lipases produced, and absence of typical aroma in the final product. Instead, an Atypical flavor is formed which can be described as bitter, rancid, unclean and fruity **Sorhaug and Stepaniak (1997)**.

2.2. Total coliform count.

According to the table (2) the results revealed that the examined labenah samples were contaminated with coliforms, the count of coliforms in the current study ranged from 2×10^2 cfu/g. to 5×10^4 cfu/g. with mean value $1.13 \times 10^4 \pm 1.63 \times 10^3$ cfu/gm. similar

results were reported by **El-kholy et al. (2014)** and **Makut et al. (2014)** they reported coliform count 2.47×10^2 cfu/g., and 2.5×10^3 cfu/g., respectively. Lower counts were reported by **ALKadamany et al. (2001)** and **El-Ashmawy et al. (1991)** they reported coliforms count in fresh labenah at a level of 1.5×10^2 cfu/g, and 1.4×10^2 cfu/g, respectively, while higher results were reported by **Al-Hadethi et al. (1992)** 5×10^4 cfu/g. **Yerlikaya et al. (2015)** detected counts ranged from 1.4×10^2 to 8.1×10^5 cfu/g., respectively.

In contrast to our findings all of **Nogueira et al. (1998)**, **Sahan et al. (2003)**, **Soltani & Guzeler (2012)** and **Zaky et al. (2013)** could not detect coliforms in there examined samples . Occurrence of coliform bacteria have been used as an indicator microorganisms for bacteriological quality of milk and its products (**ICMSF, 1986**) and showed improper sanitation as its presence indicated fecal contamination or post-process contamination, often caused by a lack of hands hygiene of food handlers (**El Bakri and El Zubier, 2009**). With respect to the present data, it is observed that hygienic measures are not applied during production, storage and distribution of labenah sold in Egyptian public markets.

2.4. E.coli:

The count of *E.coli* bacteria in this study was ranged from 1×10^2 cfu/g. to 9×10^3 cfu/g. with a mean value of

$3 \times 10^3 \pm 3.7 \times 10^2$ cfu/gm as shown in table (2). This is a high count of *E.coli* comparing with the finding of *Okpalugo et al. (2008)* who reported that the mean value of *E.coli* in examined yoghurt samples was 1.2×10^2 cfu/g.. While similar count was reported by *Makut et al. (2014)* from zero to 2.5×10^3 cfu/g. These results are disagreed with the findings of *Tamine & McNulty (1999)*, *Soltani & Guzeler (2012)* and *Ahmed et al. (2014)* they could not detect *E.coli* the examined samples.

Although *Nader de macias et al. (1993)* and *Massa et al. (1996)* found that most of starter culture (*L. casei* and *L. acidophilus*) of yoghurt have antibacterial activities against *E.coli*, *Quinto et al. (1999)* found that *E.coli* is able to survive for several days at low pH and temperature in commercial plain yoghurt, also *Lefoka (2009)* reported that *E.coli* is highly tolerant to acidic foods such as yoghurt. So that the variation between results showed by other investigators can be attributed to the fact that the survival of *E.coli* in fermented dairy products is highly variable depending on starter cultures used, pH value and temperature of storage and composition of the products. Detection of *E.coli* in milk products indicates presence of other Enteropathogenic microorganisms which constitute a public health hazard (*Singh and Prakash, 2008*).

Such rate of contamination of the examined Egyptian labenah samples is indicative of post processing contamination as these organisms unable to survive the heat treatment applied during yoghurt and labenah manufacture. Enteropathogenic *Escherichia coli* have been incriminated as a potential food poisoning agent and are associated with infantile diarrhea and gastroenteritis in adults (*WHO, 2008*).

2.6. Salmonella count:

From table (2), it is clearly evident that salmonella organisms were not detected in all the examined samples of labenah. Similar results were recorded by *Abdalla and Hussain (2010)* and *Eissa et al. (2011)*, while *Cardak (2012)* found salmonella spp in one torba (strained yoghurt) sample only. Presence of salmonella spp in any food sample indicated unhygienic condition and fecal contamination of the product through processing, transportation and storage. Its presence concern a public health hazard (*Durango et al., 2004* and *Foley & Lynne, 2008*).

2.7. Total count and frequency distribution of yeast and mould:

In this study, the yeasts were isolated from the examined labenah samples with a count ranged from 6.5×10^2 cfu/g. to 9×10^5 cfu/g., with a mean value of $4.5 \times 10^4 \pm 9 \times 10^3$ cfu/g., as shown in table (2). Nearly similar results was reported by *El-Ansary (2014)* who isolated yeasts from yoghurt samples with mean

value $5.6 \times 10^4 \pm 4.98 \times 10^3$ cfu/g. Higher results was reported by *Abu-Jaber (1990)* who found that the mean value of yeasts count in examined labenah samples directly after packaging was 4.4×10^6 /g and at the day 14 of storage was 1.4×10^7 /g, and another higher results reported by *Ahmed, et al (2014)*, he reported yeasts count $42.1 \times 10^8 \pm 26.1 \times 10^2$ cfu g. Lower results mentioned by *Nogueira et al. (1998)* who found that yeasts count in examined yoghurt samples was $< 1.0 \times 10^2$ cfu/ g. Regarding the frequency distribution of the isolated yeast illustrated in table 3 revealed that the *Candida* spp are the most frequently isolated from labenh especially *Candida albicans* and *Candida Tropicalis* with incidence rate 35.30 %, and 23.53 %, respectively.

It is evident from table (2) moulds count was ranged from 2.6×10^2 to 8×10^4 with mean value $5.3 \times 10^3 \pm 1.4 \times 10^3$ cfu/gm, higher results obtained by *Ahmed et al. (2014)* who isolated moulds from labneh samples with mean value $21.2 \times 10^3 \pm 61.1 \times 10^2$ cfu g, and *El-Ansary (2014)* who found moulds in examined yoghurt samples with mean value $5.3 \times 10^4 \pm 3.33 \times 10$ cfu/ml. lower results mentioned by *Nogueira et al. (1998)* who found

that the mean mould count in the examined yoghurt samples was less than $6.8 \times 10^2 \pm 1.0 \times 10^2$ cfu/ g. Regarding the frequency distribution of the isolated mould illustrated in table (3) revealed that the *Aspergillus* spp and *Mucor* spp. are the most frequently isolated mould from labenah especially *Aspergillus flavus*.

The presence of moulds in relatively high counts in examined labenah samples may indicate insufficient pre-heating process during manufacturing, using unsatisfactory sterilized instruments and plastic cups in packing or inefficient chilling during storage, poor cleaning practices and the use of unhygienic techniques (*Montagna et al., 1998*) and (*El Bakri and El Zubeir, 2009*), while *Abou-Donia et al. (1980)* attributed the contamination with yeast and mould in Egypt to post production contamination. Mould and yeast contamination not only causes deterioration of food but also can adversely affect the health of humans. Moreover, fungi influence the biochemical characters and flavors of the products and its appearance is commercially undesirable and often results in down grading of the product.

Table 1: Statistical analytical results of chemical analysis of the examined of labenah samples (n=60) in comparison with GSO (2008) and S.D. (1984).

	Min.	Max.	Mean ± S.E.M	GSO	Samples failed to confirm GSO.		Syrian Standard	Samples failed to confirm Syrian St.	
					No.	%		No.	%
Titratable acidity %	0.75	3.3	1.934 ± 0.0764	Not less than 1.2%. and not more 2.5%	15	25	From 1.8 with max. 2.2 %	21	35
Total solids %	22	45	32.21 ±0.5640	Not mentioned	--	--	Not less than 22 %	0	0
Fat %	10	26	16.93 ±0.6059	Not less than 7%.	0	0	Not less than 10 %	0	0
Salt %	1.47	2.60	2..154 ±.034	According to manufacturer	--	--	Not more than 2 %	45	75

Table 2: Statistical analytical results of microbiological examination of examined labenah samples (n=60).

	Minimum Cfu/gm	Maximum Cfu/gm	Mean±SEM Cfu/gm
Mesophilic Count	6x10 ³	1.7x10 ⁶	3.18x10 ⁵ ±6.1x10 ⁴
Psychrotrophic Count	2x10 ²	7.04x10 ⁷	9.2x10 ⁶ ±2.4x10 ⁵
Coliform bacteria	2x10 ²	5X10 ⁴	1.13x10 ⁴ ±1.63x10 ³
<i>E.coli</i> Count	1x10 ²	9x10 ³	3x10 ³ ± 3.7x10 ²
Salmonella spp	ND	-	-
Yeast Count	6.5x10 ²	9x10 ⁵	4.5x10 ⁴ ± 9x10 ³
Mould Count	2.6x10 ²	8x10 ⁴	5.3x10 ³ ±1.4x10 ³

ND= not detected.

Table 3: Frequency distribution of yeast and mould isolated from examined Labenah samples:

Yeast			Mould		
Species	Frequency	%	Species	Frequency	%
<i>Candida albican</i>	12	35.30	<i>Aspergillus niger</i>	4	10.52
<i>Candida Krusei</i>	2	5.89	<i>Aspergillus flavus</i>	13	34.23
<i>Candida tropicalis</i>	8	23.53	<i>Penicillium commune</i>	2	5.26
<i>Candida guillormondi</i>	4	11.76	<i>Penicillium chysogenus</i>	2	5.26
<i>Candida seudotropicalis</i>	2	5.88	<i>Mucor spp.</i>	12	31.58
<i>Cryptococcus neoformans</i>	2	5.88	<i>Cladosporium Spp.</i>	3	7.89
<i>Saccharomyces cerevisiae</i>	4	11.76	<i>Abcidia Spp.</i>	2	5.26
Total	34	100	Total	38	100

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الملخص العربي دراسة عن بعض الخصائص الكيميائية والميكروبية للبنة المباعة في منطقة قناة السويس

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قسم الرقابة الصحية على الأغذية- كلية الطب البيطري -جامعة قناة السويس.

كان الغرض من هذه الدراسة هو تقييم الحالة العامة للبنة المباعة في منطقة قناة السويس عن طريق إجراء بعض الأختبارات الكيميائية و الميكروبية على عدد ستون عينة نت اللبنة المجمعة من أماكن مختلفة و ذلك في الفترة من من ديسمبر ٢٠١٣ إلى يوليو ٢٠١٤ وتمت مقارنة النتائج المتحصل عليها مع المواصفات القياسية لمنطقة الخليج العربي و كذلك المواصفات القياسية لجمهورية سوريا العربية و ذلك لعدم وجود مواصفة مصرية خاصة بمنتج اللبنة. شملت التحاليل الكيميائية تحليل نسب الحموضة والمادة الجافة و الدهن و كذلك نسب الملح الموجود بالعينات و وتم عمل التحليل الأحصائي للنتائج لحساب المتوسط و معامل الخطاء النسبي و كانت النتائج كالاتي 9.34 ± 0.076 ، $2.15 \pm 0.03\%$ and $16.93 \pm 0.60\%$ ، $32.21 \pm 0.56\%$ ، على التوالي وكان حوالى ٢٥ % من العينات لا تتفق مع المواصفات القياسية لمنطقة الخليج العربي و كذلك المواصفات القياسية لجمهورية سوريا العربية. وقد شملت التحاليل الميكروبيولوجية قياس العدد الكلى من ميكروبات الميزوفيلك والسيكوتروبك والكولى فورم و كذلك ميكروب الأى كولاى وتم عمل التحليل الأحصائي للنتائج لحساب المتوسط و معامل الخطاء النسبي و كانت النتائج كالتالى $3.18 \times 10^5 \pm 6.1 \times 10^4$ ، $9.2 \times 10^6 \pm 2.4 \times 10^5$ ، $1.13 \times 10^4 \pm 1.63 \times 10^3$ ، and $3 \times 10^3 \pm 3.7 \times 10^2$ على التوالي. ولم يتم عزل أى نوع من ميكروبات السالمونيلا من عينات اللبنة. وشملت الدراسة أيضا العدد الكلى لكل من الفطريات والخمائر وقد جاءت النتائج كالاتي $4.5 \times 10^4 \pm 9 \times 10^3$ ، $5.3 \times 10^3 \pm 1.4 \times 10^3$ ، على التوالي ووجد ان من أكثر الخمائر المعزولة هي من نوع الكانديا البيكانز والكانديديا تروبيكال ووجد ان من أكثر الفطريات المعزولة هي من نوع الاسبرجلس وخاصة الأسبرجلس فلافيس وكذلك نوع الميوكار. ملخص الدراسة ان من النسب الجيدة فى العينات هي عدم توافق معظم نتائج التحاليل مع المواصفات القياسية ما عدا نتائج تحليل الدهن ونسبة المواد الجافة. و تم مناقشة النتائج و الأهمية الصحية والاقتصادية للميكروبات المعزولة.