THE MICROBIOLOGICAL QUALITY OF SOME RAW MILK PRODUCTS

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ABSTRACT

Seventy five white cheese, semi-white cheese and cream (25 samples of each)were randomly collected from different area in basrah city and were investigated for microbiological quality.In these samples, the numbers of microorganisms were found as follows:$14.13x10^4$ cfu/g ,$16.46x10^3$ cfu/g and $12.36x10^3$ cfu/g for total mesophilic bacteria , 9.87 $X10^2$ cfu/g total Psychrotrophic bacteria of cream , 12.92 $X10^3$ cfu/g, $6.97X10^2$ cfu/g and 6.13 $X10^2$ cfu/g staphylococcus aureus, 98.72 $X10^3$ cfu/g,10.55 $X10^2$ cfu/g and 6.54 $X10^2$ cfu/g coliform count , 21.77 $X10^2$ cfu/g , 6.47 $X10^2$ cfu/g and 6.40 $X10^2$ cfu/g Escherichia coli .Total Psychrotrophic bacteria were not detected in white cheese and semi-white cheese . Significant ($p<0.05$) variations were found between raw white cheese, semi-white cheese and cream whereas no Significant variations were found between semi-white cheese and cream for all microbial group. The microbiological findings showed the presence of high counts of microorganisms investigated and the poor hygienic quality.

INTRODUCTION

Milk, is one of our most nutritionally complete foods adding high quality protein, fat, milk sugar, essential minerals and vitamines to our diet[1]. However, milk contains bacteria that when improperly handled may create conditions for multiplication, most of bacteria in fresh milk of healthy animals are either harmless or beneficial but rapid changes in health of an animal or milk handler or contaminanted from polutted water, dir, manure, air, cuts and wound can make raw milk potentially dangerous[2]. Raw milk cheese is more likely to harbor harmful bacteria because raw milk cheese is made with milk that has not been pasteurized as a result, if the milk becomes contaminated with any bacteria during milking or cheese making processes that bacteria will present in the final product and consumers would then be exposed to a bacteria which could cause anything from mild stomach distress to death[3]. For this reason, the aime of this study were done to evaluate the hygienic quality of these product collected randomly from local area in basrah city.

MATERIALS AND METHODS

Seventy five white cheese, semi-white cheese and cream (25 samples of each) were randomly collected from local area in basrah city. Microbiological analysis of these samples were made. Investigation were take place in the laboratory of microbiology college of veterinary medicine, Basrah University.Samples were transported in an ice chest and stored at 5C° before alysis.

Bacteriological Examination :

After appropriate dilutions of homogenized samples were made by transferring 10g in 90ml of aqueous solution of 2% sodium citrate. serial dilutions were prepared using 9ml of 0.1% pepton water in each tube taking aseptic precautions. In Nutrient agar and MaCconkey agar, 1ml

of each dilution was inoculated in duplicate plate and mixed before solidification.In Mannitol salt agar and Eosin methylen Blue agar 0,1 ml of each dilution were surface plated in duplicate plate.Total mesophilic bacteria in Nutrient agar incubated for 2days at 32Cº, total psychrotrophic bacteria incubted for 10days at 1±7Cº, total coliform in MaCconkey agar incubated for 24h at 32C°, Escherichia coli in Eosin methylen Blue agar incubated for 2±24 h at 1±32C°, Staphylococcus aureus in Manitol Salt agar incubated for 24-48h at 37 Cº following the incubation, the colonies on duplicate plates with 30 to 300 colonies were counted.These results were averaged and reported as number per gm, as recommended by American Public Health Association [4,5] and all data were analyzed using SPSS statistical software [6]

RESULTS AND DISCUSSION

The data recorded in table 1,2, 3 and 4 showed that the total mesophilic bacteria count of white cheese, semi-white cheese and cream varried from 30.00-29.900x10^4, 2.45-3.00X10^3 and 3.200-25.500x10^3 ,respectively with mean values 14.13 x10^4 cfu/gm, 16.46 X10^3 cfu/gm and 12.36 X10^3 cfu/gm. Statistical analysis showed that there were significant differences in total mesophilic bacteria of different samples.These results were nearly similar those repoerted by other investigators[7,8]. The high total mesophilic bacterial count in this study might be due to low quality of the milk used in cheese and cream making or could be due to unsanitary conditions during processing and handling of the raw milk products.

The mean total Psychrotrophic bacteria count of cream samples was 9.87 X10^2 cfu/gm However, white cheese and semi-white cheese sampls showed no growth of the bacteria.

Staphylococcus aureus count varied from 10.00-29.900X10^3 , 3.00-30.00X10^2 and 2.50-9.30 X10^2 for white cheese, semi-white cheese and cream, respectively with mean values 12.92 X10^3 cfu/gm , 6.97 X10^2 cfu/gm and 6.13 X10^2 cfu/gm respectively. Nosignificent differences were found between semi-white cheese and cream.The present results were higher than the standard regulation for cheese(<10.000cfu/g)under typical stipulating conditions.The high count of Staphylococcus aureus found in some samples might be attributed to the high initial numbers of S.aureus in milk contamination during processing[9.10]

Coliform counts of each white cheese, semi-white cheese and cream ranged from 30.00-29.900 X10^3, 3.00-30.00X10^2 and 2.50-29.90X10^2, respectively with mean values 98.72 X10^3 cfu/gm,10.55 X10^2 cfu/gm and 6.54 X10^2 cfu/gm. Nosignificent differences were found in coliform counts between semi-white cheese and cream.The high coliform counts in these samples were probably due to production of cheese and cream under poor conditions. According to international standards white cheese should not contain more than 100 cfu/gm coliforms bacteria under typical stipulating conditions [11].

The mean Escherichia coli count of the white cheese,semi-white cheese and cream were 21.77 x10^2 cfu/gm,6.47 x10^2 cfu/gm and 6.40 x10^2 cfu/gm ranged from 15.90-29.90x10^2 ,2.80-21.20X10^2 and 2.50-14.90X10^2 ,respectively.Nosignificent differences were found in Escherichia coli counts between semi-white cheese and cream.The present results were lower than the standard regulation for cheese(<100 cfu/g) under typical stipulating conditions .It may indicate that products were manufactured away from any feacal contamination from either human or animal sources [9]

Table 1: Results of some microbiological quality of raw white cheese (cfu/g)

Microorganism groups	Statistical parameters		
	Mean	Range	Std.Dev
total mesophilic bacteria	**14.13**	**30.00-29.900x10^4**	**±10.39**
total Psychrotrophic bacteria	**-**	**-**	**-**
Staphylococcus aureus	**12.92**	**10.00-29.900X10^3**	**±10.38**
total coliform	**98.72**	**30.00-29.900 X10^3**	**±67.50**
Escherichia coli	**21.77**	**15.90-29.90x10^2**	**±4.78**

cfu/gm=colony forming units per gram of material analysed

Table 2: Results of some microbiological quality of semi-white cheese (cfu/g)

Microorganism groups	Statistical parameters		
	Mean	Range	Std.Dev
total mesophilic bacteria	16.46	2.45-3.00X X10^3	±98.58
total Psychrotrophic bacteria	-	-	-
Staphylococcus aureus	6.97	3.00-30.00X10^2	±7.26
total coliform	10.55	3.00-30.00X10^2	± 8.25
Escherichia coli	6.47	2.80-21.20X10^2	±4.78

Table 3: Results of some microbiological quality of cream (cfu/g)

Microorganism groups	Statistical parameters		
	Mean	Range	Std.Dev
total mesophilic bacteria	**12.36**	**3.200-25.500x10^3**	**±66.68**
total Psychrotrophic bacteria	**9.87**	**2.50-29.70 X10^2**	**±6.23**
Staphylococcus aureus	**6.13**	**2.50-9.30 X10^2**	**±2.21**
total coliform	**6.54**	**2.50-29.90 X10^2**	**±5.20**
Escherichia coli	**6.40**	**2.50-14.90 X10^2**	**±3.27**

Table 4: Microbiological contents (cfu/g) of raw white cheese, semi-white cheese and cream samples

Microbial groups	raw white cheese	semi-white cheese	cream	F value
total mesophilic bacteria	**14.13±10.39b**	**16.46±98.58a**	**12.36±66.68a**	**36.82**
total Psychrotrophic bacteria	**-**	**-**	**9.87±6.23**	**-**
Staphylococcus aureus	**12.92±10.38b**	**6.97 ±7.26a**	**6.13±2.21a**	**34.96**
total coliform	**98.72±67.50b**	**10.55± 8.25a**	**6.54±5.20a**	**34.23**
Escherichia coli	**21.77±4.78b**	**6.47±4.78a**	**6.40±3.27a**	**104.15**

a ,b denote significant at $P<0.05$

التقيم الجرثومي لبعض منتجات الحليب الخام

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الخلاصة

تم استقصاء النوعية الميكروبية في خمسه وسبعين عينه من الجبن الأبيض،الجبن الأبيض شبه الصلب و القيمر (25 عينه من كل نموذج) جمعت من مناطق مختلفة من مدينه البصرة ، أظهرت النتائج أن عد جراثيم المحبة لدرجات الحرارة المعتدلة لعينات الجبن الصلب،الجبن شبه الصلب و القيمر 14.13×10^4 ، 16.46×10^3 و 12.36×10^3 و.ت.م /غرام على التوالي ، عد جراثيم المحبة للبرودة لعينه القيمر 9.87×10^2 ، المكورات العنقودية الذهبية 12.92×10^3 ، 6.97×10^2 و 6.13×10^2 و.ت.م /غرام على التوالي ، معدل عد جراثيم القولون 98.72×10^3 ، 10.55×10^2 و 6.54×10^2 و.ت.م /غرام .على التوالي، الاشيريشيا القولونيه 21.77×10^2 ، 6.47×10^2 و 6.40×10^2 و.ت.م /غرام على التوالي ، ، هناك زياده معنويه في معدل عد جراثيم المحبة لدرجات الحرارة المعتدلة ، المكورات العنقودية الذهبية ، جراثيم القولون و الاشيريشيا القولونيه لعينات الجبن الابيض ،الجبن الأبيض شبه الصلب و القيمر بينما لم يكن هناك ارتفاعا معنويا في معدلات الأعداد الجرثومية بين الجبن الأبيض شبه الصلب و القيمر .ومن خلال هذه النتائج يمكن الاشاره بان منتجات الحليب الخام لم تكن مصنعه تحت ظروف صحيه جيده.

REFERENCES

1. Ǒconnor, C.B. and Teipathi. B.R.(1991). Teipathi.An introduction to milk .Audiotuorial module 1.1LCA(International Livestock center for Africa),Addis Ababa, Ethiopia .

2. Sheba, K. and Simon, R.(2002). Microbiological quality of cheese , Health Services - Food Survey Reports 2001-2002

3.Smith,P.W.(1981). Milk Pasteurization Fact Sheet Number57,U.S.Department of Agriculture Research service,Washington,D.C

4. Hausler, W.J.JR.(1972).Standard M ethods for the Examination Diary Products .American Puplic Health Ass.,Washington.D.C.

5. Speck, M.L.(1976). Compendium of methods for microbiological examination for foods. American puplic health Ass.Washington D.C.USA.

6. Coakes, S.J. and Steed, L.G. (1996). SPSS for windows analysis without anguish. Jacaranda wiley , Milton, Queensland.

7. Seran, T.; Şahsene,A.; Cem,S. and Pelin A. (2006). Determination of microbiological contamination sources during Turkish white cheese production

8. Urarte,E.;Fernandez, J.C. and Molinero, M.E.(2007). Microbiological quality of white cheeses from Basque country .

9. . http://www.specialistcheesemakers.co.uk/best_practice/index.htm

10.Bone, F.J.; Bogie, D. and Morgan-Jones, S.C. (1989). Staphylococcal food poisoning from sheep milk cheese. Epidemiology and Infection.

11. Law, B.A., 1999. Microbiological surveillance and control in cheese manufacture. In: Technology of Cheese Making (Law, B.A. ed.)st Ed. Academic press.