

Dept. of Food Hygiene Tanta University
Fac. Vet. Med. Kafr El-Sheikh
Head of Dept. Dr. I.M. Aman

MICROBIOLOGICAL QUALITY OF KAREISH CHEESE IN KAFR EL-SHEIKH CITY

(With 2 Tables)

By

I.M. AMAN

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الحالة الميكروبيولوجية للجبن القريش في مدينة كفر الشيخ

أ.إ.أمان

أربعون عينة عشوائية من الجبن القريش جمعت من أسواق مدينة كفر الشيخ فحصت ميكروبيولوجياً ووجد ان تواجد المستعمرات البكتيرية ، البكتيريا المحبة للبرودة ، بكتيريا القولون ، الخمائر ، العفن ، الميكروب السبحى المعوى ، الكوليفورم والميكروب السبحى العنقودى كان بنسبة ١٠٠ ر ٤٠ ، ٩١ ر ٨٧ ، ٨٠ ، ٣٥ ، ٥٧ ر ٨٠ ، ٥ ر ٤٢ فى المائة وبمتوسط عدد كلى ٢٦ X ١٠ ، ٤٤ X ١٠ ، ٩٠ X ١٠ ، ٢٥ X ١٠ ، ٣٩ X ١٠ ، ٣٠ X ١٠ ، ٤١ X ١٠ و ٩٣ X ١٠ على التوالى ستربتوكوكس انترمديات ، ستربتوكوكس فيكم و ستربتوكوكس فيكالز امكن عزلها من ٧٧ ر ٧٠ و ٥٢ ر ٥٢ فى المائة من العينات على التوالى . الايشريشيا كولاى ، الانتيروباكتر اجلوميرانس ، كلواكا و كليبيسيلا اوكسيٹوكا ، نيمونى و ستروباكتر دايفرسس تواجدوا فى ١٩ ، ٤ ، ٣ ، ٢ و ١ عينة من الجبن على التوالى بينما الميكروب السبحى العنقودى من جنس الاوريس امكن عزله من ٨ عينات من الجبن .

وقد نوقشت اهمية الميكروبات المعزولة من الناحية الصحية الاقتصادية . واقترح ما يجب ان يتبع فى انتاج وتداول هذا المنتج .

SUMMARY

Forty random kareish cheese samples were examined microbiologically. The average values of aerobic colony, psychrotrophic, enterobacteriaceae, yeast, mould, enterococci, coliform and staphylococci counts were 2.6×10^8 ; 5.4×10^7 ; 8.9×10^7 ; 2.5×10^7 ; 3.9×10^5 ; 3.0×10^7 ; 4.1×10^7 ; and 9.3×10^7 with incidence percentages of 100, 91.4, 87.0, 80, 35, 87.5, 80 and 42.5 of examined cheese samples, respectively. *Escherichia Coli*, *Enterobacter agglomerans*, *Ent. cloacae*, *Klebsiella oxytoca*, *Citrobacter diversus* and *K. pneumoniae* were found in 47.5%, 10%, 7.5%, 7.5%, 5% and 2.5% of examined cheese samples, respectively while coagulase positive *Staphylococcus aureus* was detected in 20% of samples examined. *Streptococcus intermediate*, *Str. faecium* and *Str. faecalis* were present in 77.5%, 70% and 52.5% of examined samples, respectively. The public health importance of the isolated microorganisms as well as the suggested control measures for production and handling of the product were discussed.

Keywords: microbiology, kareish cheese

INTRODUCTION

Kareish cheese is an excellent dietary source of protein, calcium, phosphorus and many micronutrients. Such product is a popular food article used in Egypt due to its low price and its high nutritive value. Manufacture of such product is made at home from naturally fermented skim milk by lactic acid bacteria. Such method expose the product to contamination with several types of microorganisms especially with organisms discharged from diseased udder or unhealthy animals. These organisms may be responsible for food poisoning or render the product of inferior quality and unfit for human consumption (ROPINSON, 1983).

Therefore, this investigation was planned to evaluate the microbiological quality of Kareishh cheese in Kafr El-Sheikh City.

MATERIAL and METHODS

Forty random samples of Kareish cheese were collected from

Kafr El-Sheikh City markets in clean, dry and sterile wide mouth jars. The collected samples were transferred to the laboratory with a minimum of delay. Preparation of the samples for microbiological examination was carried out according to American Public Health Association (A.P.H.A., 1985) and subjected to the following examinations.

- 1- Total colony count was carried according to A.P.H.A. (1985).
- 2-Coliform count was carried using Violet Red Bile Lactose agar (V.R.B.L.) and the technique applied was recommended by A.P.H.A. (1985). Isolated coliforms were identified according to Baily and Scott's. Diagnostic microbiology modified by FINEGOLD and MARTINE (1982).
- 3-Enterobacteriaceae count was done on Violet Red Bile Glucose agar (V.R.B.G.) according to ICMSF (1980).
- 4- Enumeration of psychrotrophic bacteria was adopted by using plate count agar (Oxoid) and incubation at 7C for 10 days (BEEBE *et al.*, 1976).
- 5- Enterococcus count was done according to EFTHMIOUS and JOSEPH (1974).
- 6- Yeast and mould counts were done according to A.P.H.A. (1985).
- 7- Staphylococci count was performed according to A.P.H.A. (1985). Coagulase positive staphylococcus aureus was detected by using Tube Coagulase Test as described by CRUICKSHANK *et al.* (1973).

RESULTS

All results obtained are recorded in Tables 1 & 2.

DISCUSSION

The results given table (1) show that the average value of colony count. Psychrotrophic count, enterobacteriaceae count, yeast count and mould count were $2.6 \times 10^8 \pm 0.7 \times 10^8$; $5.4 \times 10^7 \pm 1.9 \times 10^7$; $8.9 \times 10^7 \pm 4.3 \times 10^7$; $2.5 \times 10^7 \pm 0.8 \times 10^7$ and $3.9 \times 10^5 \pm 1.4 \times 10^5$ /g. with incidence percentages of 100, 91.4, 87.0, 80 and 35, respectively. The percentages of enterococci, coliform and staphylococci were 87.5%, 80% and 42.5% with a mean counts of $3.0 \times 10^7 \pm 1.2 \times 10^7$; $4.1 \times 10^7 \pm 2.6 \times 10^7$ and $9.3 \times 10^7 \pm 6.8 \times 10^7$ /g. examined Kareish cheese, respectively. These incidence and counts were nearly similar to those reported by AHMED *et al.*, (1987) and TAWFEK *et al.*, (1988).

Regarding table (2); Streptococcus intermediate. Str. faecium and Str. faecalis were found at percentages of 77.5,

MICROBIOLOGICAL QUALITY KAREISH CHEESE

70 and 52.5, respectively while *E. Coli*, *Enterobacter agglomerans*, *Ent. cloacae*, *Klebsiella oxytoca*, *Citrobacter diversus* and *K.pneumoniae* were detected in 47.5%, 10%, 7.5%, 7.5%, 5% and 2.5% of examined samples, respectively. Nearly similar isolates were isolated from Kareish cheese by *HAFEZ (1984)* and *AHMED, et al., (1987)* while lower incidence was detected by *TAWFEK et al., (1988)*. Coagulase positive *staphylococcus aureus* was isolated from 20% of examined samples of cheese. Nearly similar findings were reported by *AMER (1982)*.

Most foods especially dairy products should be regarded as unsatisfactory when they have a large population of microorganisms even if the organisms are not known to be pathogens for several reasons. High aerobic plate counts often indicate contaminated raw materials or unsatisfactory processing from sanitary point of view. Some strains not usually regarded as causing food borne diseases (e.g. *Enterococci*) have been reported to cause illness when excessive numbers of living cells were present in food beside its spoilage.

Psychrotrophic bacteria are generally non pathogenic to man but in dairy products they can cause a variety of off flavours, including fruity, stale, bitter, putrid and rancid flavours, as well as other physical defects (*THOMAS, 1969*). Refrigerated storage of foods permits the psychrotrophic bacteria to reach tremendous number per gram within few days depending mainly upon the sanitary conditions prevailing during production and upon time and temperature of milk storage before processing (*I.C.M.S.E., 1980*).

Yeast and mould counts in cheese are used as an index of the proper sanitation quality. Defects in these unripened soft cheese such as rancidity, softness and colour defects arise mainly from contamination by yeast and mould. Moreover, some species constitute a public health hazard due to production of mycotoxins (*RIPPON, 1982*).

Enterococci are normally present in feces and also occur in environment. Their detection in dairy products in large numbers implies either inadequate sanitary practices or exposure of the food to condition that would permit extensive multiplication of such undesirable bacteria. Also, they have been implicated in some cases of food poisoning (*GEORGE and UTTLEY, 1989*).

The public health importance of coliforms isolated has been recorded by many authors as enteropathogenic *E. coli* which has been implicated in cases of gastroenteritis, epidemic

diarrhoea in infants and food poisoning (KORNACKI and MARTH, 1982). *Klebsiella pneumoniae* were implicated in cases of lobar pneumonia and other infections of the respiratory tract (CRUICKSHANK *et al.*, 1973).

The presence of *Staphylococcus aureus* in Kareish cheese usually indicate contamination of milk from diseased udder or external surface of the dairy animals, or from hand, sneezing and coughing of dairy workers, SABIONI, *et al.*, (1988) reported an outbreak of food poisoning in Brazil from cheese contaminated with *Staph. aureus* to the level of 9.3×10^7 /g.

Regarding the standard tolerance for microorganisms in dairy products, the IDF, 1982 permit count of Coliform in soft cheese not exceed 10^3 C.F.U./g, OOTTOGALLI *et al.*, (1985) proposed max. limits for aerobic colony count & faecal Streptococci (10^4 - 10^5 C.F.U. /g); Coliforms (10^2 - 10^3 /g); coagulase positive Staphylococci (absent). Moulds (10^2 - 10^3 /g) and Yeasts (10^4 - 10^5 /g) in some fresh cheeses, while A.P.H.A. (1985) require limit of 10^7 /ml or g. for psychrotrophic bacteria to cause defects. Data obtained during this investigation exceed the bacterial limits recommended by IDF (1982) and OTTOGALLI *et al.*, (1985), while only 16% of the samples exceeds the psychrotrophic limits recommended by A.P.H.A. (1985).

In conclusion, the results obtained allow to conclude that the Kareish cheese in Kafr El-Sheikh was manufactured, handled and stored under neglected sanitary measures. Therefore, strict hygienic measures should be adopted during production of such valuable product.

REFERENCES

- Ahmed. A.A.H.; Moustafa, M.K. and Abdel-Hakim, F.H. (1987): Sanitary condition of Kareish cheese manufactured in Assiut City. Assiut Vet. Med. J. 19 (37) 75-81.
- Amer. I. (1982): Microbiological studies on locally manufactured cheese in Zagazig markets, Ph.D. thesis, Fac. Vet. Med. Zagazig Univ.
- American public Health Association "APHA" (1985): Standard methods for the examination of dairy products. INC., 15 ed. New York.
- Beebe, S.D.; Vanderzant, C.; Hanna, M.O.; Carpenter, Z.L. and Smith, C.C. (1976): Effect of initial temperature and storage temperature on the microbial flora of vacuum packaged beef. J. Milk Fd. Technol., 39, 600-605.

MICROBIOLOGICAL QUALITY KAREISH CHEESE

- Cruickshank, R.; Duguid, J.P.; Marmion, B.P. and Swain, R.H.A. (1973): Medical Microbiology, 12 ed. Vol. 1 E. and S. Livingstone Ltd., Endinburgh.
- Efthymiou, C.J. and Joseph, S.W. (1974): Development of a selective enterococcus medium based on manganese ion deficiency, sod. azid and alkaline pH Appl. Microbiol., 28, 3: 411-416.
- Finegold, S.H. and Martin, W.J. (1982): Diagnostic Microbiology, 6th ed. C.V. Mosby Co. St. Louis. Toronto-london.
- George, R.C. and Uttley, A.H.C. (1989): Susceptibility of enterococci and epidemiology of enterococcal infections in the 1980 S. Epid. Inf., 102, 403-441.
- Hafez, N.M. (1984): Incidence and public health importance of coliforms with special references to enteropathogenic serotypes of E. coli in milk and some dairy products. M. V. Sc. Thesis, Fac. Vet. Med. Cairo Univ.
- International Commission for Microbiological Specifications for Food "ICMSF" (1980) Microbial ecology of foods. Vol. II. Academic Press, N.Y.
- International Dairy Federation "IDF" (1982): Document No. 122. Bruxelles. Belgium.
- Kornacki, J.L. and Marth, E.H. (1982): Food borne illness caused by E. coli, A review. J. Fd. Prot. 45, 1051.
- Ottogalli, G.; Rondinini, G. and Patano, C. (1985): Microbial count in some soft cheeses, what tests and what limits? Latte 10 (6) 556-562. Dairy Sci., Abst., 89(9) 667.
- Rippon, J. W. (1982): Medical mycology. The pathogenic fungi and pathogenic actinomycetes. W.B. Saunders Co., Philadelphia.
- Robinson, R.K. (1983): Dairy Microbiology, 1st. ed. El-Sevier Sci., Publ. Co. INC. New York. London.
- Sabioni, J. G.; Hirooka, E.Y. and Souza, M.De.L.De. (1988): Food poisoning from Minas type cheese contaminated with staphylococcus aureus. Revista de Saude Publica 22(5) 458-46. Dairy Sci., Abst., 51(10) 474.
- Tawfek, N.F.; Sharaf, O.M. and Hewedy, M.M. (1988): Incidence of pathogens and staphylococcal enterotoxins in Kareish cheese. Egyptian J. Dairy Sci., 16(2) 295-298.
- Thomas, S.B. (1969): Methods of assessing the psychrotrophic bacterial count of milk J. Appl. Bacteriol., 32: 269-296.

Table 1: Statistical analytical results of microbiological results/g Kareish cheese

Test	No. of exa. + ve samples		Min.	Max.	Mean.	S.E.M.±
	samples	No. %				
Total colony count	40	40	1.5x10 ⁶	5.0x10 ⁹	2.6x10 ⁶	0.7x10 ⁶
Psychrotrophic count	40	37	3.0x10 ⁴	6.0x10 ⁸	5.4x10 ⁷	1.9x10 ⁷
Enterobacteriaceae	40	35	7.5x10 ⁵	1.3x10 ⁹	8.9x10 ⁷	4.3x10 ⁷
Yeast count	40	32	7.0x10 ⁴	1.2x10 ⁸	2.5x10 ⁷	0.8x10 ⁷
Mould count	40	14	2.0x10 ⁴	4.0x10 ⁶	3.9x10 ⁵	1.4x10 ⁵
Enterococci count	40	35	2.0x10 ³	3.5x10 ⁶	3.0x10 ⁷	1.2x10 ⁷
Coliform count	40	32	1.0x10 ³	7.0x10 ⁸	4.1x10 ⁷	2.6x10 ⁷
Staphylococci count	40	17	2.2x10 ⁴	1.2x10 ⁹	9.3x10 ⁷	6.8x10 ⁷

Table 2: Frequency distribution of isolated strains from examined Kareish cheese

Organisms	Frequency	
	No. of samples	%
<u>Enterococci</u>	35	87.5
Str. intermediae	31	77.5
Str. faecium	28	70
Str. faecalis	21	52.5
<u>Coliforms</u>	32	80
Escherichia coli	19	47.5
Enterobacter agglomerans	4	10
Ent. cloaca	3	7.5
Klebsiella oxytoca	3	7.5
Citrobacter diversus	2	5
K. pneumoniae	1	2.5
<u>Staphylococci</u>	17	42.5
Coagulase +ve staphylococci	8	20