

دراسة عن الجبن القريش في الصعيد  
٢- الفحص البكتريولوجي

ع ١٠٠ أحمد ، ت ١٠٠ البسيوني

قد ثبت بالتحليل البكتريولوجي أن نسبة الملح العالية في الجبن القديم  
عنها في الطازج لها تأثير مهبط على الميكروبات حيث وجد أن عدد  
الميكروبات الكلية من الجبن الطازج أعلى بكثير منه في الجبن القديم .

وقد أمكن عزل بعض ميكروبات القولون ومنها الميكروب العصري القولوني  
والميكروب السبحي القولوني بنسبة ٧٦ - ١٨% في الجبن الطازج بينما  
تواجدت في الجبن القديم بنسبة ٢٨ - ١٢% على التوالي .



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STUDIES ON KAREISH CHEESE IN UPPER EGYPT  
II- MICROBIOLOGICAL STUDIES  
(With Two Tables)

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SUMMARY

One hundred random samples of fresh and pickled kareish cheese (50 each) collected from Assiut markets, were subjected to bacteriological tests to determine their sanitary conditions.

The total colony and yeast & mold counts Per gram of fresh kareish cheese ranged between  $28 \times 10^9$  and  $86 \times 10^6$  and from  $103 \times 10^6$  to  $35 \times 10^2$ , respectively, while the counts in pickled kareish cheese ranged from  $230 \times 10^5$  to  $93 \times 10^2$  and from  $450 \times 10^3$  to  $1 \times 10^1$ , respectively.

Coliform titre in fresh and pickled kareish cheese samples ranged from  $10^{-1}$  to  $10^{-9}$  and from  $10^{-1}$  to  $10^{-5}$  with a mean value of  $10^{-5.68}$  and  $10^{-2.25}$ , respectively.

The incidence percentage of *E. coli* and *Strept. faecalis* in fresh cheese samples was 76 and 18, while in pickled cheese was 28 and 12, respectively.

Haemolytic *staph. aureus* could be detected in 4% of fresh cheese samples.

Anaerobes could be isolated from 60% of fresh cheese samples and from 40% of pickled cheese samples.

INTRODUCTION

Although Kareish cheese proved to be an excellent source of animal protein and minerals, yet the methods usually adopted in manufacturing and handling are still very primitive and

unhygienic, a fact that may expose the product to serious contamination.

YALE and MARQUARDT (1943) found that yeasts and molds were responsible for spoilage of cottage cheese. They concluded that the presence of large numbers of yeasts and molds in fresh products is an indication of unhygienic manufacture. MORGAN et al. (1952) examined samples of cottage cheese bacteriologically and found that 2.4% of samples had coliform count of 100,000/ gram, 73.4% of samples had yeast count of more than 10,000/ gram and 77.3% of samples had mold count of 100,000 or more/ gram. WAHBY and ROUSHDY (1955) found that *Sal. typhi* and *Sal. paratyphi* survived for 23 and 30 days, respectively in mish kept at 10 - 20°C and pH value of 5.38 - 5.2, while *Sal. enteritidis* Gartner survived for 113 days at pH value 5.38 - 5.8. EL-SADEK and ABDEL MOTTELEB (1958) revealed that the average colony count of raw separated milk cheese, on milk agar, was 442.25 millions per gram, while in pasteurized separated milk cheese it was 52.25 millions per gram. THOMASON (1961) reported that certain serological groups of *E. coli* were concerned in causing acute gastro - enteritis disturbances among infants and children. MOURSY and NASR 1964 examined samples of Kareish cheese bacteriologically and found that the mean value of total colony count was 1368. 30 / gram and coliforms organisms were present in all samples examined with a mean value of  $10^{-6}$ . The faecal coli proved to exist in 95% of samples. *Sal. typhimurium* was found in 2.5%, while *Staph. aureus* was isolated from 5% of samples ABDEL RAHMAN (1972) found that the average total colony as well as yeast and mold counts per gram kareish cheese were  $127 \times 10^8$  and  $134 \times 10^5$ , respectively. While coliform titre in 90% of samples ranged from  $10^{-8}$  with a mean value of  $10^{-3.83}$ . *E. coli* proved to exist in 75% of samples. He also detected anaerobic micro-organisms in 60% of the samples examined, while *Staph. Assiut Vet. Med. J. Vol. 4, No. 8, 1977.*

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aureus and Salmonellae could not be isolated. HEGAZI (1972) reported that kareish cheese is one of the main sources of food poisoning in Egypt.

As the sanitary condition of this popular food article has not yet been tackled in upper Egypt. Therefore, this work was conducted to secure informations regarding the sanitary condition of both fresh and pickled kareish cheese.

### MATERIAL AND METHODS

One hundred random samples of fresh and pickled kareish cheese (50 each) were collected from Assiut markets. Each sample was transferred to the laboratory in a clean, dry and sterile glass stoppered jars.

Each sample was thoroughly mashed in a sterile mortar and subjected to the following bacteriological examinations:

#### Total colony count (A.P.H.A., 1972):

In a sterile mortar, 11 grams of the previously prepared samples were taken and triturated with 99 ml sterile 2% sodium citrate solution to make a dilution 1:10. Ten - fold serial dilutions were prepared using sterile normal saline solution. After thorough mixing, one ml of each dilution was carefully mixed with about 10 ml of melted and cooled to 45°C dextrose tryptone agar, so that the organisms were uniformly distributed throughout the medium. After solidification, inoculated plates were incubated at  $30 \pm 0.5^{\circ}\text{C}$  for 3 days. Total colony count per gram cheese was calculated.

#### Total yeast and mold count:

Sabauroud agar medium was used in a similar manner as previously described for estimation of the total colony count. The plates were incubated at  $21 \pm 2^{\circ}\text{C}$  for 5 days after which the colonies were counted according to A.P.H.A. (1972).

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Presumptive coliform test (CHALMERS, 1962):

One ml from each of the previously prepared dilutions was separately inoculated into 5 ml of McConkey's bile salt lactose broth tubes supplied with Durham's tubes. Inoculated tubes were incubated at 37°C for 2 days and then examined for acid and gas production.

Detection of E. coli and Strept. faecalis:

Loopfuls from the highest dilution of positive the (acid and gas) were streaked on McConkey's agar plates and then incubated at 37°C for 24 hours. Suspected colonies were picked up and isolated in pure culture to be identified according to CRUICKSHANK et al. (1969).

Detection of haemolytic staphylococci and streptococci:

A loopful of 1 : 10 dilution, previously prepared, was streaked on salt milk agar (CRUICKSHANK et al. 1969) and blood agar plates. After incubation of plates at 37°C for 24 hours, suspected colonies were picked up and isolated in pure culture for further identification. (CRUICKSHANK et al., 1969).

Detection of salmonellae:

Five grams of the prepared sample were inoculated into 50 ml of Selenite F broth and then incubated at 37°C for 16 hours. Loopfuls from the enriched media were streaked on Brilliant green and McConkey's agar plates then incubated at 37°C. After 24 hours incubation the plates were examined. Suspected colonies were picked up to be identified morphologically, biochemically and serologically (EDWARDS and EWING, 1962).

Detection of anaerobes (CRUICKSHANK et al., 1969):

Stormy fermentation test was adopted using sterile skim milk and paraffin wax.

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### RESULTS AND DISCUSSION

The results obtained are recorded in Tables 1 and 2. The results recorded in Table 1, revealed that the total colony count per gram fresh kareish cheese ranged from  $285 \times 10^6$  with mean value of  $244.91 \times 10^8$ , while those in pickled cheese varied from  $230 \times 10^5$  to  $93 \times 10^2$  with a mean value of  $137.66 \times 10^4$ . The results obtained are higher than those reported by EL SADEK and ABDEL MOTTELEB (1958) and MOURSY & NASR (1964) but Lower than that obtained by ABDHMAN (1972). Realizing that cheese manufacturing, handling and distribution in our country, especially in Upper Egypt, are processed under primitive conditions, therefore, such higher bacterial count met with in this work is expected as the product is liable to heavy contamination from different sources before being consumed. Moreover, the prevailing climatic conditions enhance the growth and multiplication of existing organisms resulting in a product of inferior quality. The higher colony count in fresh cheese as compared with that in pickled cheese may be attributed to the high salt content in the later that hindered the growth and multiplication of microorganisms.

For certain dairy products, the yeast and mold count is used as an index of its proper sanitation quality. The results obtained from this work revealed a maximum yeast and mold count of  $103 \times 10^6$  and a minimum of  $35 \times 10^2$  with a mean value of  $302.23 \times 10^4$  per gram fresh cheese, while in pickled cheese, the maximum count was  $450 \times 10^3$  and a minimum of  $1 \times 10^1$  with a mean value of  $341.78 \times 10^2$  (Table 2).

The lower total yeast and mold count met with in this work as compared with that reported by ABDEL RAHMAN (1972) may be due to the difference in the acidity content.

The results given in Table 1, revealed that coliform titre in fresh kareish ranged from  $10^{-1}$  to  $10^{-9}$  with a mean of  $10^{-5.68}$ , while in pickled kareish cheese the titre ranged from  $10^{-1}$  to  $10^{-5}$  with a mean of  $10^{-2.25}$ .

*E. coli* could be isolated from 76 % of fresh cheese samples, while in pickled cheese 28% of samples contained the organism (Table 2).

The presence of *E. coli* in cheese samples is indicative of faecal pollution. Moreover, these organisms can grow in this product especially in hot climatic conditions resulting in undesirable changes in the product besides they constitute a public health hazard. (THOMASON et al. , 1961).

*Streptococcus faecalis* could be isolated from 18 % of fresh cheese samples and from 12% of pickled cheese samples (Table 2). The presence of this organism in cheese is a definite proof of faecal contamination. (CRUICKSHANK et al. , 1969). *Staphylococcus aureus*, which is considered one of the causative organisms of food poisoning outbreaks among human beings (WAHBY and ROUADY, 1955 and CRUICKSHANK et al. 1969) could be isolated from 4% of fresh cheese samples (Table 2).

Table 2 shows that anaerobes could be detected in 30 samples (60%) of fresh cheese as well as in 40% of pickled cheese samples.

In conclusion, the bacteriological findings reported here point out that the presence of high percentage of sodium chloride, spices and increased acidity in pickled cheese are inhibitory factors governing the growth rate of existing contaminants, and hence lower counts and isolates were obtained from this product than from fresh cheese samples.



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### REFERENCES

- Abdel Rahman, H. A. (1972): "Studies on the Egyptian white cheese". M.Sc. Thesis, Fac.Vet. Med., Cairo University.
- A.P.H.A. (1972): " Standard methods for examination of dairy products ". 13<sup>th</sup> Ed., American Public Health Association, Washington, D.C. Chalmers, C.H.(1962): "Bacteria in relation to milk supply". 5<sup>th</sup> Ed . Lond. Arnold, LTD.
- Cruickshank, R.; Duguid, J.P. and Swain, R.H.A. (1969): "Medical Microbiology". 11<sup>th</sup> Ed., E. & S. Livingston Limited, Edinburgh and London.
- Edwards, P.R. and Ewing, W.H. (1962): "Identification of Enterobacteriaceae". 2<sup>nd</sup> Ed., Burgers publishing Company, Minneapolis 15, Minnesota.
- El Sadek, G.M. and Abdel Motteleb, L.Y. (1958) "Effect of heat treatment of milk on the yield and quality and certain properties of standardized separated milk cheese". J. Dairy Res., 25 , 85.
- Hegazi, F.Z.(1972): " Bacteriological studies on fresh and pickled white cheese". M.Sc.Thesis Assiut Univ.
- Morgan, et al., (1952) Conn. (Storrs) Agri.Expt.Sta.Bull., 284 (cited after Hammer, B. W. and Babele, F.J., Dairy Bacteriology, 4<sup>th</sup>, 1957, John Wiley & Sons , Inc, U. S.A. ).
- Moursy, A.W. and Nasr, S.(1964): "Studies on sanitary conditions of fresh kareish cheese with special reference to the incidence of food poisoning organisms". J.Arab. Vet.Med. Ass., 24 : 99.
- Thomason, B.M.; Cherry, W.B.; Davis, B.R. and Romales-Lehron A. (1961): Bull.Wld. Hlth.Org., 25, 137.
- Assiut Vet.Med. J. Vol. 4, No. 8, 1977.
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Wahby, A.M. and Roushdy, A. ; (1955): Viability of enteric fever organisms in some Egyptian dairy products". Zbl. Vet. Med., 2, 57.

Yale, M.W. and Marquardt (1943): N.Y. (Geneva ) Agric.Expt. Tech. Bull.270. (cited after Hammer, B.W.and Bablele, F. J., Dairy Bacteriology, 4 th Ed., 1957, John Wiley & Sons, Inc.) U.S.A.).