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## ISOLATION OF YERSINIA ENTEROCOLITICA FROM RAW MILK AND SOFT CHEESE IN ASSIUT CITY

(With One Table)

By

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دراسة عن تواجده ميكروب اليارسينيا انتيروكوليتيك  
 في اللبن والجبن في مدينة أسيوط

مصطفى خليل

أجريت الدراسة على مائة عينة من اللبن الخام ، عدد ٢٧ عينة من الجبن الأبيض الدهياني ، عدد ٢٠ عينة من الجبن القريش جمعت من مدينة أسيوط لإيجاد نسبة تواجده ميكروب اليارسينيا فيها . وكانت النسبة في هذه العينات ١٠ ، صفر ، ٦٧٪ على التوالي كذلك نوقشت أهمية تواجده هذه الميكروبات والإشتراطات الصحية اللازمة لتفادي تواجدها في الأغذية .

### SUMMARY

A total of 157 samples of raw milk and soft cheese (Damietta & Kareish cheese), obtained from different retail outlets in Assiut City, were examined for presence of *Yersinia enterocolitica*.

The organism was isolated from 10 and 6.7% of raw milk and kareish cheese samples, respectively. No *Y. enterocolitica* was recovered from Damietta cheese. the results indicate that fresh milk or cheese may be a source of *Y. enterocolitica*.

The public health importance of isolated organisms as well as the recommended hygienic measures have been discussed.

### INTRODUCTION

*Yersinia enterocolitica* infections in humans have been recognized with increasing frequency in recent years (WINBLAD, 1973). Acute gastroenteritis is the most common clinical association, followed by an acute syndrome of the right iliac fossa (pseudo-appendicitis, mesenteric lymphadenitis or terminal ileitis).

The organism is apparently ubiquitous in the animal environment and has been isolated from the faeces of both sick and healthy animals and man (SONNENWIRTH and WEAVER, 1970).

The epidemiology of yersinia infection is still not clear. It has been suggested (GUTMAN *et al.*, 1973; TOMA and DEIDRICK, 1975) that the major mode of transmission occurs through foods contaminated by faeces or urine, contact with infected animals, and person to person transmission in and infected family.

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Foodborne transmission has been suggested due to isolation of the organisms from variety of foods, including raw beef, poultry, fish, milk and ice-cream (MERRIS & FEELEY, 1976 and SWAMINATHAN *et al.*, 1982).

Many outbreaks of yersiniosis have been associated with consumption of unpasteurized milk (ANONYMOUS, 1976). Delmas & Vidon, 1982 examined 233 raw milk samples and found that *Y. enterocolitica* was present in 127 (54.5%) samples. In another study (CHRISTENSEN, 1982) a recovery rate of 10% was obtained. In addition, *Y. enterocolitica* has been isolated from raw milk by many workers (FRANZIN & FANTINO, 1984; BOER *et al.*, 1986 and MERCADO & IBANEZ, 1986).

On the other hand, there have been a few reports of isolation of *Y. enterocolitica* from cheese. In 1978, Schiemann found that the incidence of *Y. enterocolitica* was lower in cheese curd samples (9.2%) than in raw milk used for manufacture of cheese (18.2%). He also found that all collected retail Cheeder and Italian cheese samples were negative for *Y. enterocolitica*. However, the recent work of BOER *et al.* (1986) has isolated *Y. enterocolitica* from 4.5% of 89 Brie and Camembert cheeses, 2% of 50 blue veined cheese samples.

The purpose of this study was to determine the incidence of *Y. enterocolitica* in raw milk and Damietta and Kareish cheese, the most popular varieties of cheese in Assiut City as well as in Egypt.

## **MATERIALS and METHODS**

### **Sampling :**

100 raw milk, 27 Damietta cheese and 30 kareish cheese samples, were obtained from different retailers in Assiut City. All samples were dispatched directly to the laboratory and were held refrigerated until they were examined. Preparation and handling of samples were done according to Standard Methods for the examination of Dairy Products (RICHARDSON, 1985).

### **Isolation and identification of *Y. enterocolitica* :**

Enrichment in phosphate-sorbitol-bile medium (MEHLMAN *et al.*, 1978) ending with alkali treatment (AULISIO *et al.*, 1980) was used before isolation onto casulodin-Irgasan-Novobiocin (CIN) agar (Oxoid) (SCHIEMANN, 1979). After incubation, colonies having characteristics of *Y. enterocolitica* were identified according to the procedures described in the Compendium of Methods for the Microbiological Examination of Foods (SPECK, 1984).

## **RESULTS**

The obtained results are in Table 1.

## YERSINIA IN MILK AND CHEESE

**Table (1):** Prevalence of *Y. enterocolitica* in collected raw milk, Damietta and kareish cheese samples.

Samples	No. of samples examined	No. of samples <i>Y. enterocolitica</i> positive	%
Raw milk	100	10	10.0
Damietta cheese	27	-	-
Kareish cheese	30	2	6.7
Total	157	12	7.6

## DISCUSSION

*Y. enterocolitica* occurred more frequently in examined samples of raw milk than in soft cheese samples (Table 1). A total of 10 isolates of *Y. enterocolitica* were obtained from 100 samples of raw milk. On the other hand, in 27 Damietta cheese samples, no yersinia were detected. However, *Y. enterocolitica* was found in 6.7% of 30 samples of Kareish cheese. These results show an average contamination rate of 7.6%. A similar isolation rates of *Y. enterocolitica* from raw milk was obtained by CHRISTENSEN, 1982 and BOER *et al.*, 1986. In contrast, the work carried out by DELMAS & VIDON, 1982, indicated that the examined raw milk samples were frequently contaminated with *Y. enterocolitica*.

The failure to detect this organism from examined Damietta cheese samples differ from results reported by BOER *et al.*, 1986 which indicated that, 4.5% of 89 Brie and Camembert cheeses and 2% of 50 blue veined cheese samples, were positive for *Y. enterocolitica*. These differences may be due to the higher percentage of salt usually added to Damietta cheese during manufacture. AHMED, 1989 could not recover inoculated virulent *Y. enterocolitica* in Damietta cheese after 2 weeks storage.

The presence of *Y. enterocolitica* in examined Kareish cheese samples is in conformity with earlier observations of (SCHIEMANN, 1978), that 9.2% of cheese curd samples were contained *Y. enterocolitica*.

From these findings, the consumption of raw milk and the manufacture of cheese or other dairy products from raw milk are practices that allow for transmission of human yersiniosis.

The contamination of raw milk and kareish cheese with *Y. enterocolitica* suggests that attention to hygienic milk-handling practices may be an important preventive measure. Likewise, avoidance of direct contact with excreta from domestic animals that may potentially harbor the organism. Proper heat treatment of raw milk would eliminate the risk of infection from this organism.

## REFERENCES

- Ahmed, A.A-H. (1989): Behavior of virulent *Yersinia enterocolitica* in Damietta cheese. Assiut Vet. Med. J. 22, No. 43 (1989).

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- Anonymous (1976): *Yersinia enterocolitica* gastroenteritis outbreak—Montreal. Can. Dis. Weekly Rep. 2(11): 41-44 (Cited after Lee, 1977).
- Aulisio, C.C.G.; Mehlman, I.J. and Sanders, A.C. (1980): Alkali method for rapid recovery of *Yersinia enterocolitica* and *Yersinia pseudotuberculosis* from foods. App. Environ. Microbiol. 39: 135-140.
- Boer, E.De.; Seldam, W.M. and Oosterom, J. (1986): Characterization of *Yersinia enterocolitica* and related species isolated from foods and porcine tonsils in the Netherlands. Intern. J. of Food Microbiol. 3(4) 217-227. D. Sci. Abst., (1986) 48 (10) 5702.
- Christensen, S.G. (1982): The prevalence of *Yersinia enterocolitica* in slaughter animals, water and raw milk in Denmark. IN T.A. Roberts, G. Hobbs, J.H.B. Christian and N. Skovgaard (eds.), Psychrotrophic microorganisms in spoilage and pathogenicity. Academic Press, N.Y.
- Delmas, C.L. and Vidon, D.J.M. (1982): Contamination of milk in Alsace by *Yersinia enterocolitica* lait, 62 (621/622) 688-704. D. Sci. Abst. (1983) 45(4) 2172.
- Franzin, L. and Fantino, P. (1984): Isolation of *Yersinia enterocolitica* from raw milk. Igiene Moderna 81(3) 459-482. D. Sci. Abst. (1985) 47(2) 766.
- Gutman, L.T.; Ottesen, E.A.; Quan, T.J.; Noce, P.S. and Katz, S.L. (1973): An inter-familial outbreak of *Yersinia enterocolitica* enteritis. New Engl. J. Med. 288: 1372.
- Lee, W.H. (1977): An assessment of *Yersinia enterocolitica* and its presence in foods. J. Food protect. 40(7) 486-489.
- Mehlman, I.J.; Aulisio, C.C.G. and Sanders, A.C. (1978): Problems in the recovery and identification of *Yersinia* from food. J. Assoc. Off. Anal. chem. 61: 761-771.
- Mercado, E.C. and Ibanez, S.B. (1986): Isolation of *Yersinia enterocolitica* from raw cow milk in Argentina. Intern. J. Food Microbiol. 3(4) 237-242. D. Sci. Abst. (1986) 48(10) 5703.
- Morris, G.K. and Feeley, J.C. (1976): *Yersinia enterocolitica*: a review of its role in food hygiene. Bull. WHO, 54: 79-85.
- Richardson, G.H., ed. (1985): Standard Methods for the Examination of Dairy Products, 15th ed. Washington, D.C. Amer. Public Health Assoc.
- Schiemann, D.A. (1978): Association of *Yersinia enterocolitica* with the manufacture of cheese and occurrence in pasteurized milk. Appl. Environ. Microbiol. 36: 274-277.
- Schiemann, D.A. (1979): Synthesis of a selective agar medium for *Yersinia enterocolitica*. Can. J. Microbiol. 25: 1298-1304.
- Sonenwirth, A.C. and Weaver, R.E. (1970): *Yersinia enterocolitica*. New Engl. J. Med. 283: 1468.
- Speck, M.L., ed. (1984): Compendium of methods for the Microbiological Examination of foods, 2nd ed., Washington, D.C., Amer. Public Health Assoc.
- Swaminathan, B.; Harmon, M.C. and Mehlman, I.J. (1982): A review of *Yersinia enterocolitica*. J. Appl. Bacteriol. 52: 151-183.
- Toma, S. and Deidrick, V.R. (1975): Isolation of *Yersinia enterocolitica* from swine. J. Clin. Microbiol. 2: 478.
- Winblad, S. (1973): The clinical panorama of human *Yersiniosis enterocolitica*. Contrib. Microbiol. Immunol. 2: 129-132 (Cited after Lee, 1977).