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**OCCURRENCE OF YERSINIA ENTEROCOLITICA  
IN ICE-CREAM AND YOGHURT**  
(With 2 Tables)

By

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مدى تواجد ميكروب اليارسينيا أنتيروكوليتكا في الأيس كريم  
والزبادي

عادل الخولي

أجريت هذه الدراسة على مائة عينة من الأيس كريم والزبادي ( ٥٠ من كل منها )  
تم جمعها بطريقة عشوائية من أماكن مختلفة في مدينة بني سويف لمعرفة مدى تواجد  
ميكروب اليارسينيا أنتيروكوليتكا . وتبين من النتائج أن ٦% من عينات الأيس كريم  
كانت ملوثة بينما كانت عينات الزبادي خالية . كذلك تم إختبار مدى حساسية  
العترات المعزولة لبعض المضادات الحيوية ولقد وجد أن العترات كانت حساسة لجميع  
المضادات الحيوية المستعملة فيما عدا الأريثروميسين . هذا وقد تم مناقشة الفتاوى  
وأهمية وخطورة تواجد هذا الميكروب على الصحة العامة وما يجب إتخاذها لمنع إنتشار  
هذا الميكروب .

**SUMMARY**

A total of 100 random samples of ice-cream and yoghurt (50 of each) collected from different localities in Beni-Suef City, were examined for the occurrence of *Y. enterocolitica*. Three samples of ice-cream (6%) contained *Y. enterocolitica*, while the organism failed to recover from yoghurt samples. The isolated strains were tested for their antibiotics sensitivity, in which the tested strains were sensitive to all used antibiotics except Erythromycin. The importance of *Y. enterocolitica* as a public health hazard was discussed.

**INTRODUCTION**

*Yersinia enterocolitica* has been well documented as an etiological agent for several clinical forms of diseases, especially acute gastro-enteritis, mesenteric lymph-

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denitis and terminal ileitis (FEELY and SCHIEMANN, 1984). In addition to causing illness. *Y. enterocolitica* has been well documented as an etiological agents of major outbreaks of food-borne infections in different localities of the world (ASAKAWA *et al.*, 1973; HEALTH and WELFARE CANADA, 1976 and BLACK *et al.*, 1978).

Presence of this organism in milk and milk products including cheese has been reported by several authors (SCHIEMANN, 1978; VIDON and DELMAS, 1981; AHMED, 1989 and EL-KHOLY *et al.*, 1991). However, there have been few surveys for the occurrence of *Y. enterocolitica* in some dairy products such as ice-cream (WAUTERS, 1970; MOLLARET *et al.* 1972; DELMAS *et al.*, 1985; BOER *et al.*, 1986 and MOUSTAFA, 1990). Although the organism has not been isolated from fermented milk (KARPLYUK *et al.*, 1985), *Y. enterocolitica* survived in yoghurt for a week at a population of 8000-1000 cells/ml (Ahmed *et al.*, 1986).

As the psychrotrophic nature of this organism presents an unique problem in maintaining safety (LEE, 1977 a,b). Therefore, this work was carried out to investigate the incidence of *Y. enterocolitica* in ice-cream and yoghurt sold in Beni-Suef City.

**MATERIAL and METHODS****Collection and preparation of samples:**

One hundred random samples of machine ice-cream and yoghurt (50 of each) were collected from different localities in Beni-Suef City, where they were transferred to the laboratory without delay and examined bacteriologically for the presence of *Y. enterocolitica*. Ice-cream samples were brought to room temperature by setting the containers in warm water bath, then thoroughly mixed (A.P.H.A., 1972).

**Isolation and identification:**

Christenson's Cold Enrichment (CE) followed by Modified Rappaport Broth (MRB) was used for isolation of *Y. enterocolitica* from the two kinds of dairy products according to SCHIEMANN (1978). After which, a loopful of enrichment medium was streaked directly on plates of *Yersinia* Selective Agar medium (oxid) and then incubated at 32°C for 24 hrs (SCHIEMANN, 1979). Characteristic colonies of *Yersinia* were purified and identified according to NOEL and JOHN (1984).

**Antibiotics sensitivity testing:**

Isolates obtained in this study were tested for antimicrobial susceptibility according to the recommended manufacturer's instruction using the following antibiotics: Ampicillin 10 ug, Tetracycline 30 ug, Doxycycline 30 ug, Chloramphenicol 10 ug, Newmycin 30 ug, Erythromycin 15 ug (oxid) Kanamycin 30 ug and Streptomycin 10 ug (bioMerieux).



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## RESULTS

All results obtained and recorded in Tables 1 & 2.

## DISCUSSION

Results in table (1) reveal that *Y. enterocolitica* was recovered from 3(6%) samples of ice-cream. The present results are somewhat similar to those obtained by BOER *et al.* (1986), who found that 5% of 121 ice-cream samples were contaminated with *Y. enterocolitica*. On the other hand, MOUSTAFA (1990) recorded somewhat higher results (8.9%). However, DELMAS *et al.* (1985) reported that prevalence of *Y. enterocolitica* in ice-cream was 22% in the northeastern region of France. The difference in these results may be attributed to various temperatures used in storing the product, as the freezing to -18 and -75°C resulted in 7 and 42% cell inactivation, respectively (GRECZ and EL-ZAWAHRY, 1984).

Although, there are no documented outbreaks of food-borne illness caused by *Y. enterocolitica* associated with ice-cream, BLACK *et al.* (1978) reported an outbreak of Yersiniosis due to consumption of chocolate milk, moreover enterotoxigenic strains of *Y. enterocolitica* have been isolated from milk products (BOYCE *et al.*, 1979 and FRANCIS *et al.*, 1980).

On the other hand, *Y. enterocolitica* was not isolated from the examined yoghurt samples. Similar findings were reported by KARPLYUK *et al.* (1985). This may have resulted from heating of milk during manufacturing of yoghurt and/or from the activity of lactic acid bacteria against *Y. enterocolitica* (GILLILAND and SPECK, 1977; HANNA *et al.*, 1977; STERN *et al.*, 1980 and AHMED *et al.*, 1986).

Table (2) shows the sensitivity of the isolated strains to different antibiotics and the results reveal that the tested strains were sensitive with different degrees to all used antibiotics except Erythromycin.

In conclusion, occurrence of *Y. enterocolitica* in ice-cream may constitute a public health hazard and contamination of yoghurt by this organism from the view point of a public health should not be ignored. A proper sanitation and strict hygienic measures during processing, rapid development of lactic acid by good starter culture use of clean milk and storage temperature are essential for controlling disease caused by the organism.

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Table (1): Isolation rate of *Yersinia enterocolitica* from examined ice-cream and yoghurt samples

Samples	No. of examined samples	Positive samples No.	Positive samples %
Ice-cream	50	3.0	6.0
Yoghurt	50	-	-

Table (2): Antibiotic sensitivity for isolated strains of *Y. enterocolitica*

Antibiotics	Zone of inhibition in mm. for isolated strains
Ampicillin	10.0 ± 1.22
Tetracycline	12.0 ± 1.55
Doxycycline	9.0 ± 1.44
Chloramphenicol	12.0 ± 1.50
Newmycin	8.0 ± 0.85
Erythromycin	-
Kanamycin	9.0 ± 0.29
Streptomycin	13.0 ± 0.48