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**PREVALENCE OF YERSINIA ENTEROCOLITICA IN
RAW MILK IN ASSIUT CITY
(With Two Tables)**

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مدى تواجد ميكروب البروسينيا انيتروكولونيكا فى اللبن الخام نسي
مدينة أسيوط

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يحتمل اللبن مكانة مرموقة كقيمة غذائية عالية إلا أنه قد يكون ناقلاً ومسبباً لكثير من الأمراض التي تصيب الإنسان ومن الميكروبات التي تسبب التسمم الغذائي البروسينيا انيتروكولونيكا . لذلك تم جمع 120 عينة من مزارع الألبان بمدينة أسيوط وبالفحص البكتريولوجي أمكن عزل الميكروب من 9 عينات بنسبة 7.5% من العينات المفحوصة . وكذلك تم إختبار مدى حساسية عترات الروسينيا انيتروكولونيكا المعزولة من اللبن لبعض المضادات الحيوية ولقد وجد أن العترات حساسة للكلورامفينكول والكلنداميسين ، الأريترومييسين الجنتاميسين ، النيوميسين والستربتومييسين بنسبة 77.7% ، 88.8% ، 77.7% ، 88.8% ، 77.7% و 88.8% على التوالي . وقد تم مناقشة الأهمية الصحية لوجود هذا الميكروب كمسبب للتسمم الغذائي والإشتراطات الصحية الواجب إتخاذها لمنع تلوث اللبن فى المزارع وإثناء تداوله وتوزيعه .

SUMMARY

A sum of 120 raw milk samples were obtained from Assiut dairy farms under sterile condition and examined bacteriologically for presence of Yersinia enterocolitica. The obtained results revealed that Y. enterocolitica was recovered from 9 samples (7.5%). The isolated strains were tested for their antibiotic sensitivity. Most of the isolated Y. enterocolitica strains were sensitive to chloramphenicol, clindamycin, erythromycin, gentamicin, neomycin and streptomycin in a ratio of 77.7%, 88.8%, 77.7%, 88.8%, 77.7% and 88.8% respectively. The significance of Y. enterocolitica as a cause of foodborne- illness was discussed.

INTRODUCTION

Yersinia enterocolitica is a ubiquitous bacterium that has been receiving increasing attention as an important cause of food-borne illness. The most common clinical symp-

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toms of illness in human are gastroenteritis and terminal ileitis (FEELY and SCHIEMANN, 1984). In addition to causing illness *Yersinia enterocolitica* is also capable of causing septicemia, meningitis and skin and eye infections (WINBLAD, 1973 and BOTTONE, 1977). Major outbreaks of food borne infection caused by *Y. enterocolitica* have been occurred in Japan, Canada, and the United States (ASAKAWA, *et al.* 1973; Health and WELFARE Canada, 1976; and BLACK, *et al.* 1978). The bacterium has been isolated from a variety of food. The organism could be isolated from milk and milk products, including raw and pasteurized milk, cream ice-cream, and cheese by LEE (1977 b); SCHIEMANN (1978); SCHIEMANN and TOMA (1978); and MOUSTAFA, *et al.* (1983b). HUGHES (1979) obtained 16 isolates of *Y. enterocolitica* from a dairy farm and from two raw milk collection depots in Australia. SCHIEMANN (1978) reported that the incidence of *Y. enterocolitica* in raw milk was 18.2% in the Southern Ontario region of Canada.

In 1982 Christensen isolated *Y. enterocolitica* from 10% of 251 raw milk samples examined in Denmark. In a survey of 100 samples raw milk MOUSTAFA, *et al.* (1983 a) recovered 12 strains of *Y. enterocolitica* produced detectable levels of heatstable enterotoxin. The dangerous nature of *Y. enterocolitica* is magnified by its ability to survive and multiply in refrigerated foods at zero to 4°C (LEE, 1977 a and 1977 b).

The little information regarding the incidence of *Y. enterocolitica* in milk and its products in Assiut governorate, initiated us to report the prevalence of *Y. enterocolitica* in raw milk, as well as the sensitivity of the isolated strains to different antibiotics.

MATERIAL and METHODS

120 raw milk samples originating from different dairy farms at Assiut were collected under sterile conditions, and examined for occurrence of *Y. enterocolitica*.

Enrichment procedure:

One milliliter of each milk sample was transferred to 10 ml. of enrichment trypticase soya broth, then incubated at 4°C for 14 days.

Isolation and identification of *Y. enterocolitica*:

After incubation, a loopful of enrichment broth was streaked directly onto a MacConkey agar plate. Agar plates were incubated for 48 h at 27°C. After incubation, colonies having characteristics of *Y. enterocolitica* (non pigmented to pinkish, smooth, edge entire, sometimes rough or granular) were Gram stained and identified biochemically according to the procedure described by FEELY and SCHIEMANN (1984).

Antimicrobial susceptibility testing:

All isolates obtained in this study were tested for antimicrobial susceptibility according to the recommended manufacturer's instructions using the following antibiotics: Ampicillin 10 mcg, Carbencillin 100 mcg, Cephalothin 30 mcg, Chloramphenicol 30 mcg, Clindamycin 2 mcg, Erythromycin 15 mcg, Gentamicin 10 mcg, Neomycin 30 mcg, Piperacillin 100 mcg, Stretomycin 10 mcg, Tetracycline 30 mcg and Tobramycin 10 mcg per disc (Difco Laboratories, Deteriot Michigan, USA).

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RESULTS

The results obtained from the examined samples are recorded in Table 1 & 2.

DISCUSSION

Table (1) shows that *Y. enterocolitica* was isolated and well identified from 9 raw milk samples. SCHIEMANN and TOMA (1978) and SCHIEMANN (1978) found a greater prevalence of *Y. enterocolitica*. Also, VIDON and DELMAS (1981) reported that 81.4% of raw milk samples contained *Y. enterocolitica*. Our results are agree with that mentioned by NORBERG (1981) and CHRISTENSEN (1982). While MOUSTAFA, *et al.* (1983 a) reported that of 100 raw milk samples tested, 12 samples contained *Y. enterocolitica*.

Data concerning the incidence of *Y. enterocolitica* in foods are well documented in many countries throughout the world. Nevertheless because of the rarity of isolation of human pathogenic serogroups from foods. The lack of success in recovering potentially pathogenic *Yersinia* species from foods may be due to the different behaviour of various *Y. enterocolitica* serogroups with regard to enrichment procedures (VIDON and DELMAS 1981 and SWAMINATHAN, *et al.* 1982).

Table (2) shows the sensitivity of the isolated strains to different antibiotics. Cephalothin chloramphenicol, clindamycin, erythromycin, gentamicin, neomycin, streptomycin and tobramycin were effective against *Y. enterocolitica* recovered from the examined samples, while ampicillin, carbencillin, piperacillin and tetracycline had slight inhibition.

Proper sanitation and strict hygienic measures during production, handling and distribution of milk and milk products is fundamental. Also storage at freezing temperature is highly recommended, as *Y. enterocolitica* is sensitive to freezing.

REFERENCES

- Asakawa, Y.; Akahane, S.; Kagaka, N.; Noguchi, M.; Sakazaki, R. and Tamura, K. (1973): Two community outbreaks of human infection with *Yersinia enterocolitica*. *Journal of Hygiene, Cambridge* 71, 715-723.
- Black, R.E.; Jackson, R.J.; Tasi, T.; Medvesky, M.; Shayegani, M.; Feeley, J.C.; Macleod, K.I.E. and Waskelee, A.M. (1978): Epidemic *Yersinia enterocolitica* infection due to contaminated chocolate milk. *New England J. of Medicine* 298, 76-79.
- Bottone, E.J. (1977): *Yersinia enterocolitica*: A panoramic view of a charismatic microorganism *CRC Critical Reviews in Microbiology* 5, 211-241.
- Christensen, S.G. (1982): The prevalence of *Yersinia enterocolitica* in slaughter animals, water and raw milk in Denmark cited after. Roberts, *et al.* (1982).
- Feeley, J.C. and Schiemann, D.A. (1984): *Yersinia enterocolitica*. In *Recommended Methods for Examination of foods* cited after. Speck, M.L., pp. 351-367. Washington DC; American public Health Association.
- Health and Welfare Canada (1976): *Yersinia enterocolitica* gastroenteritis outbreak-Montreal. *Can. Dis. Weekly Rep.* 2: 73-74.

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- Hughes, D. (1979): Isolation of *Yersinia enterocolitica* from milk and a dairy farm in Australia. *J. of Applied Bacteriology* 46, 125-130.
- Lee, W.H. (1977 a): Two plating media modified with twenn 80 for isolating *Yersinia enterocolitica*. *Applied and Environmental Microbiology* 33, 215-216.
- Lee, W.H. (1977 b): An assessment of *Yersinia enterocolitica* and its presence in foods. *J. of Food Protection* 40, 484-489.
- Moustafa, M.K.; A.A-H. Ahmed and E.H. Marth (1983 a): Occurrence of *Yersinia enterocolitica* in Raw and Pasteurized milk. *J. of Food Protection*, 46: 276-278.
- Moustafa, M.K.; A.A-H. Ahmed and E.H. Marth (1983 b): Behavior of virulent *Y. enterocolitica* during manufacture and storage of colby like cheese. *J. Food prot.* 46, 318-320.
- Norberg, P. (1981): *Yersinia* in unpasteurized milk. *Var Foda* 33: 45-51 (*Dairy Sci. Abst.* 44: 2147).
- Roberts, T.A.; Hobs, G.; Christian, J.H.B. and Skovgaard, N. (1982): *In Psychrotrophic Microorganisms in Spoilage and pathogenicity* Ed. London: Academic Press.
- Schiemann, D.A. (1978): Association of *Yersinia enterocolitica* with the manufacture of cheese and occurrence in pasteurized milk. *Applied and Environmental Microbiology* 36, 274-277.
- Schiemann, D.A. and Toma, S. (1978): Isolation of *Yersinia enterocolitica* from raw milk. *Appl. Environ. Microbiol.* 35: 54-58.
- Speck, M.L. (1984): *Compendium of methods for microbiological examination of food.* American Public Health Association, Washington, DC.
- Swaminathan, B.; Harmon, M.C. and Mehlman, I.J. (1982): *Yersinia enterocolitica*: A review. *J. Apl. Bacteriol.* 52: 151-183.

Table (1)
Prevalence of *Y. enterocolitica*
in the examined milk samples

No. of examined samples	No. of positive samples	%
120	9	7.5

Table (2)
Percent antibiotic sensitivity (S) of isolated *Y. enterocolitica* from milk samples

No. of isolates	Antibiotic S%
4 (44.4)	Ampicillin S%
5 (55.5)	Carbencillin S%
6 (66.6)	Cephalothin S%
7 (77.7)	Chloramphenicol S%
8 (88.8)	Clindamycin S%
7 (77.7)	Erythromycin S%
8 (88.8)	Gentamicin S%
7 (77.7)	Neomycin S%
5 (55.5)	Piperacillin S%
8 (88.8)	Streptomycin S%
4 (44.4)	Tetracycline S%
6 (66.6)	Tobramycin S%