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INCIDENCE OF ENTEROBACTERIACEAE IN MARKET MILK IN CAIRO AND ITS SUBURBS

(With 3 Tables)

By

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مدى تواجد الميكروبات المعوية في الألبان
بأسواق مدينة القاهرة وضواحيها

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اجريت التجارب العملية على ١٥٠ عينة من اللبن الخام جمعت من إماكن متفرقة بالقاهرة وضواحيها لتحديد مدى تلوثها بالميكروبات المعوية. واثبتت النتائج تواجد الميكروبات المعوية وميكروبات الكوليفورم في جميع العينات بمتوسط قدره ٢٨٣٫٦ × 10^{11} في الملليتر الواحد و ١٦٧٫٦ × 10^{3} (MPN/100 mL) على التوالي. وقد أسفرت تصنيف ميكروبات الكوليفورم المعزولة عن تواجد الكيبلا، الانتيروباكتر والستروباكتر بنسب مختلفة تراوحت بين ٦٧٫٤ ٪ الى ٣٤٫٦٧ ٪ من العينات المختبرة. كما تم عزل ميكروب اشيريشياكولاى من ١٤ عينة (٩٫٣٣ ٪) وأسفر تصنيفها سيرولوجيا عن انتمائها الى سبعة أنواع ممرضة هي : (٤ عترات) $O_{55}: K_{59}: B_5$ (عترتين) ، (٣ عترات) $O_{26}: K_{60}: B_6$ ، $O_{124}: K_{72}: B_{17}$ (عترة واحدة) ، $O_{86}: K_{61}: B_7$ (عترة واحده) ، $O_{111}: K_{58}: B_4$ (عترتين) $O_{114}: K_{90}: B_-$ و(عترة واحدة) ، $O_{126}: K_{70}: B_{15}$ ، كما تم عزل ميكروب السالمونيلا = Salmonella muenster = من احدى عينات اللبن لأول مرة في مصر. كما أمكن عزل عدة أنواع من ميكروبات بروتيس ، بروفيدينشيا وسراتيا بنسب تراوحت بين ٦٧٫٦ ٪ ، ٨ ٪ من العينات التي تم فحصها. هذا وقد تمت مناقشة النتائج لبيان اهميتها الصحية والاقتصادية مع اقتراح مايمكن اتخاذه من اجراءات حماية المستهلك وحفاظا على المنتج من الفساد.

SUMMARY

One hundred and fifty random samples of market milk collected from different localities in Cairo and its Suburbs, were examined bacteriologically for detection, count, isolation and identification of Enterobacteriaceae.

All examined samples proved to be contaminated with Enterobacteriaceae with a mean value of 283.6×10^{11} /ml. Out of the 150 samples examined, 14 proved to be contaminated with E.coli serologically identified as: $O_{55}: K_{59}$: (4), $O_{111}: B_4$ (3), $O_{114}: K_{90}: B_-$(2), $O_{26}: K_{60}: B_6$ (2), $O_{86}: K_{61}: B_7$(1), $O_{124}: K_{72}: B_{17}$ (1) and $O_{125}: K_{70}: B_{15}$(1).

Klebsiella oxytoca, K.rhinoscleromatis, K.pneumaniae, K.ozoenae, Enterobacter cloacae, Ent. aerogenes, Ent.agglomerans, Citrobacter freundii, Cit.diversus and Cit.amalonaticus could be isolated at various rates ranging from 4.67% to 34.67%.

Salmonella muenster could be isolated for the first time from market milk in Egypt.

Proteus mirabilis, P.vulgaris, Providenceia rettgeri, Provid. Stuartii, Serratia odorifera and S.marcescens could be isolated at varying percentages ranging from 0.67% to 8%.

The public health importance and hygienic significance of isolates as well as the suggested measures for improving the quality of produced milk have been mentioned.

INTRODUCTION

Milk and dairy products are subjected to contamination with several types of microorganisms, particularly of Enterobacteriaceae, from different sources. Such contaminants may render the milk and its products unsafe to use or may impair its utility.

The presence of Enterobacteriaceae in milk and its products is always taken as a definite index of faecal contamination (THACHER and CLARK, 1968), besides, the possible occurrance of enteric pathogens which may expose the consumers to the risk of infection.

Practically, any food of animal origin can be considered as a vehicle for transmission of Salmonellae to consumers. Therefore, Salmonellosis continues to be of importance among food - brone outbreaks, specially in tropical and subtropical countries (MARTH, 1969 and IORDANOV, et al. 1970).

Therefore, it is the duty of concerned authorities, to ensure that milk and dairy products are produced properly and protected from contamination, even of a type likely to cause their deterioration.

MATERIAL and METHODS

One hundred and fifty samples of market milk, collected from dairy shops in different localities in Cairo and its suburbs, were bacteriologically examined for determination of total Enterobacteriaceae count (ICMSF, 1982), coliform content (MPN/100 ml), (APHA, 1978). Identification of isolated Enterobacteriaceae according to KRIEG and HOLT (1984), Serological identificantion of isolated E.coli strains was applied using the available antisera. Salmonellae were isolated according to the technique recommended by EDWARDS and EWING (1972), using selective media (OXOID, 1982). Isolated

Salmonellae were typed serologically according to Kauftmann - whites scheme (KAUFFMANN, 1974).

RESULTS

Table (1)

Statistical analytical results of Enterobacteriaceae/ml and coliform content (MPN/100 ml) in market milk

	No. of examined samples	% of + ve samples	Statistical results of possitive samples			
			Min.	Max.	Mean	S.E.M. ±
Enterobact-eriaceae	150	100	30	36×10^{14}	283.6×10^{11}	241.96×10^{11}
Coliform	150	100	790	24×10^{16}	167.6×10^{13}	160.51×10^{13}

Table (2)

Incidence of isolated Enterobacteriaceae in examined market milk

Isolates	No.	%	Isolates	No.	%
Coliforms			Citrobacter diversus	18	12.00
Escherichia coli	14	9.33	Cit. amalonaticus	7	4.67
Klebsiella oxytoca	52	34.67	Non-lactose fermenters		
K.rhinoscleromatis	33	22.00	Proteus mirabilis	12	8.00
K.pneomoniae	11	7.33	Proteus vulgaris	11	7.33
K.ozoenae	9	6.00	Providencia rettgeri	11	7.33
Enterobacter	43	28.67	Provid. Stuartii	8	5.33
Ent. aerogenes	41	27.33	Serratia odorifera	6	4.00
Ent. agglomerans	36	24.00	Serratia marcesens	1	0.67
Citrobacter freundii	31	20.67	Salmonella muenster	1	0.67

Table (3)
Frequency distribution of E.coli and Salmonella serotypes isolated from examined market milk samples

Serotypes	Feequency	
	No. of samples	%
$O_{55} : K_{59} : B_5$	4	2.67
$O_{111} : K_{58} : B_4$	3	2.00
$O_{114} : K_{90} : B_{-}$	2	1.33
$O_{26} : K_{60} : B_6$	2	1.33
$O_{86} : K_{61} B_7$	1	0.67
$O_{124} : K_{12} B_{17}$	1	0.67
$O_{125} : K_{70} : B_{15}$	1	0.67
Salmonella muenster 3, 10 : e, h : 1, 5	1	0.67

DISCUSSION

Results given in Table (1) reveal that all samples examined proved to be highly contaminated with Enterobacteriaceae. The maximum total Enterobacteriaceae count/ml was $36x10^{14}$, the minimum was 30, with a mean value of $283.60x10^{11}$. A lower count was reported by GAD EL-RAB (1983).

All examined samples proved to be contaminated with coliforms, with a mean count of $167.60x10^{13}$/100 ml (Table 1). Nearly similar finding was reported by MANSOUR (1982) and FARAG (1987).

It is evident from the results recorded in Table (2) that E.coli could be isolated from 9.33% of examined samples, while klebsiella oxytoca, K.rhinoscleromatis, K.pneumoniae, K.ozoenae, Enterobacter cloacae, Ent. aerogene, Ent. agglomerans, Citrobacter

freundii, Cit. diversus and Cit. amalonaticus were isolated at varying percentages.

Similar members of coliform organisms could be isolated from raw milk by GOGOV and KALOYANOV (1978) and SAUDI (1978).

Serological typing of isolated E.coli strains revealed identification of 7 different serotypes : O_{55} : K_{59}, O_{111} K_{58}, O_{114} K_{90}, O_{26} K_{60}, O_{86} K_{61}, O_{124} K_{72} and O_{125} K_{70} (Table 3).

Nearly similar E.coli serotypes could be isolated from raw milk by STEPANKOVSKAY (1965) and FARAG (1987).

Enteropathogenic E.coli commonly associated with outbreaks of diarrhea in young children and infants, as well as different affections in man (MOSSEL, 1975 and PYATKIN and KRIVOSHEIN, 1980).

Proteus mirabilis, Proteus vulgaris, Providencia rettgeri, Provid. Stuartii, Serrattia odorifera and Serratia marcescens could be isolated at varying percentages ranging from 0.67% to 8% (Table 2).

Salmonella organisms according to their cultural and biochemical behaviour, could be isolated from one sample and could be typed serologically as salmonella muenster (Table 3).

NABBUT, et al. (1982) reported that Salmonella muenster affect 12 persons atending a home dinner in Riyada, Saudia Arabia, Furthermore, such organism has been reported to induce food poisoning among consumers (BARNUM, 1983 and STYLIADIS and BARNUM, 1984).

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