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BACTERIOLOGICAL QUALITY OF FROZEN DESSERTS IN DAKAHLIA GOVERNORATE

(With 3 Tables)

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التقييم البكتريولوجي للمثلوجات اللبنية في محافظة الدقهلية

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تمتاز المثلوجات اللبنية وخاصة الآيس كريم بالقيمة الغذائية العاليه وحيث لا توجد الى الآن مواصفات قياسيه لانتاج المثلوجات اللبنيه فى مصر فقد اجريت هذه الدراسه فى محافظة الدقهليه على مائة عينه جمعت من الباعه الجائلين السوبر ماركت ومحلات بيع الألبان فى مدينة المنصوره واجرى عليها الفحوص البكتريولوجيه لعزل وتصنيف تلك الميكروبات واجراء الفحص السيرولوجى على معزولات الايشيريشيا كولاى - عزل وتصنيف المكور العنقودى الذهبى والسالمونيلا واسفرت النتائج على ما يلى :

أمكن عزل ١١٠ عتره من الميكروبات القولونيه من جميع عينات الآيس كريم وصنفت كما يلى :

E. coli, *Enterobacter aerogens*, *Ent. cloacae*, *Ent. agglomerans*, *Citrobacter Freundii*, *Cit. amalonaticus*, *Cit. diversus*, *Klebsiella Pneumoniae*, *K. ozoenae* and *K. oxytoca*.

بنسبة ٩% ، ١٢% ، ٢١% ، ٥% ، ١٦% ، ٤% ، ٣% ، ٢٣% ، ٨% ، ٩% ، على التوالي . وكذلك صنفت الايشيريشيا كولاى سيرولوجيا وقد وجد ميكروب المكور العنقودى الذهبى فى (٥٤%) من العينات المأخوذه من المعامل الصغيره بينما تم عزله بنسبة (١٨%) من المعامل الكبيره كذلك تم عزل ميكروب *Staph. epidermidis* بنسبة (٢١%) من جميع العينات .

SUMMARY

One hundred and ten strains of coliforms were obtained from ice-cream samples. Nine strains of *E. Coli* were serologically identified. The overall results of ice-cream samples indicated that *Staph. aureus* were detected in 36% while *Staph. epidermidis* proved to be detected in 21% of ice-cream samples. The trails applied for isolation of salmonellae fail to recover these organisms. The public healthy significance of each isolate as well as suggested measures for improving the quality of the products are discussed.

Keywords: Bacteriology, frozen desserts, Dakahlia, Egypt.

INTRODUCTION

Ice-cream is considered among the most popular dairy products all over the world. It is normally made from cream (or vegetable fat), milk, sugar and flavouring.

The hygienic production of ice-cream is based on its microbiological quality. The microorganisms that may be present in ice-cream are of importance mainly from the stand point of health or as criteria of the quality of the ingredients and method of handling within the factory. There have been periodic outbreaks of food poisoning in which ice-cream has been incriminated (BARRETT, 1986).

There are no legal standards for bacteriological quality of ice-cream in Egypt to enable to control its hygienic quality.

Therefore the investigation embodies the results of the survey to determine the bacteriological quality of the commercial ice-cream in Mansoura City by applying the following:

- Incidence and identification of isolated coliforms.
- Incidence of salmonellae and Enteropathogenic *E. Coli* as well as *Staph. aureus*.

MATERIAL AND METHODS

One hundred random samples of ice-cream collected from groceries, super-markets and pedlars in Mansoura City, Dakahlia, were checked bacteriologically.
Collection of samples

a- Large scale manufactures products:
Fifty random ice-cream samples were collected in their carton or plastic containers.

b- Small scale manufactures products:
Fifty random samples not less than 50g were aseptically collected in wide mouth sampling jars

Preparation of samples for plating:

The technique adopted is that recommended by American Public Health Association "APHA" (1985).

Identification of coliforms, Staphylococci and Salmonellae according to (KRIEG and HOLT, 1984), while serological identification of E.Coli according to (SOJKA, 1985).

RESULT

All results obtained are recorded in Tables 1-3

Table I: Incidence of isolated coliforms from examined samples of ice-cream.

Isolates	Small Scale					
	No of positive Samples	%	No of positive Samples	%	No of positive Samples	%
Escherichia coli	6	12	3	6	9	9
Enterobacter aerogenes	7	14	5	10	12	12
Ent. Cloacae	12	24	9	18	21	21
Ent. agglomerans	3	6	2	4	5	5
Citrobacter Freundii	9	18	7	14	16	16
Cit. amalonaticus	1	2	3	6	4	4
Cit. diversus	1	2	2	4	3	3
Klebsiella pneumoniae	13	26	10	20	23	23
Kleb. Ozoenae	4	8	4	8	8	8
Kleb. Oxytoca	3	6	6	12	9	9

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Table II: Frequency percentage of E.Coli Serotypes isolated from ice-cream samples

Isolates	Small Scale		Large Scale		Total Samples	
	No of positive samples	%	No of positive samples	%	No of positive samples	%
O ₅₅ :K ₉₉ :B ₆	1	16.66	-	-	1	11.11
O ₈₆ :K ₆₁ :B ₇	-	-	1	33.33	1	11.11
O ₁₁₁ :K ₅₈ :B ₄	1	16.66	-	-	1	11.11
O ₁₂₄ :K ₇₂ :B ₁₇	1	16.66	1	33.33	2	22.22
O ₁₂₅ :K ₇₀ :B ₁₅	1	16.66	-	-	1	11.11
O ₁₂₆ :K ₁₇ :B ₁₄	-	-	1	33.33	1	11.11
Untyped strains	2	33.33	-	-	2	22.22
Total	6	99.97	3	99.99	9	99.99

Table III: Incidence Percentage of Staphylococci from ice-cream samples.

Source of samples	No of samples	Staph.aureus		Staph.epidermidis	
		No of samples	%	No of samples	%
Small scale producers	50	27	54	18	36
Large scale producers	50	9	18	3	6
Total	100	36	36	21	21

DISCUSSION

Results recoded in Table I point out that all ice-cream samples from small and large scale producers were contaminated with coliforms. These results are in agreement with those reported by MOHAMED (1971) and HAFEZ (1979).

On the otherhand the incidence of enteropathogenic E. Coli in ice-cream was reported by SINGH et al (1978), EL-ESSAWY and RAID (1990) and AHMED (1991). Moreover, several members of coliforms were isolated from ice-cream by EL-ESSAWY and SAUDI (1990) and AHMED (1991).

The presence of coliforms particularly E. Coli are regarded as an indication of direct or indirect faecal pollution.

Enteropathogenic E. Coli are associated with severe diarrhoea in infants and young children, as well as cause food poisoning and gastroenteritis (LOVE et al, 1972; MOSSEL, 1975 and (MEHLMAN et al, 1976) beside some of isolated coliforms species may constitute a public health hazard (BAILEY and SCOTT, 1978).

Staphylococcus aureus is facultative anaerobic bacterium, resists freezing (DEMCHICK et al, 1982). Its presence in ice-cream would indicate poor sanitary practice, since located in the nose often causes contamination. The results obtained and recorded in table III show that Staph. aureus and Staph. epidermidis were detected in 36% and 21% respectively.

Growth of Staph aureus is accompanied by production of enzymes and enterotoxins (METAXOPOULOS et al, 1981). Enterotoxins are heat stable and remain active in food article to several months. Oral administration of enterotoxins suppress the functions of the immune system and develop the symptoms of poisoning (BERGDOLL, 1985 and OTANI et al, 1985).

The trials applied for the isolation of salmonellae in this study failed to recover these organisms from all examined samples of ice-cream. One can decided that the failure of isolation of salmonellae may be attributed to the smaller number of samples.

It is likely that high incidence of coliforms and Staph. aureus in ice-cream is indicative of neglected sanitary measures during production and handling of this products, moreover presence of these organisms could constitute a public health hazard.

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