

قسم : المراقبة الصحية على الأغذية
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مدى تواجد الميكروبات المعوية في بعض أنواع الأغذية

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عدد .
أجريت هذه الدراسة على ١٢٠ عينة من اللبن الخام ، الجبن الدمياطي والقريش
والهامبورجر والسجق جمعت عشوائيا من أسواق مدينة أسيوط والسوبر ماركت ومحلات
البقالة وذلك لمعرفة مدى تواجد الميكروبات المعوية .

وقد تبين من الدراسة أن ٧٠ ، ٣٥ ، ٨٠ ، ٩٠ ، ٣٥ % من العينات المفحوصة على
التوالي تحتوي على الميكروبات المعوية Enterobacteriaceae بينما وجد أن
ميكروب الـ *E. coli* ، *Proteus* تم عزلها على التوالي من ٧٠ ، ٣٠ % من اللبن الخام ،
٢٠ و ١٠ % من الجبن الدمياطي ، ٨٠ و ١٢ ، ٥ % من الجبن القريش ، ٨٥ ، ١٠ % من
الهامبورجر ، ٥٠ و ١٢ ، ٥ % من السجق . وقد تم عزل ميكروب السالمونيلا من ٥ ، ١٠ ، ٥ %
من عينات الجبن الدمياطي القاريش والسجق بالترتيب .

كذلك تم تصنيف مجموعة الـ Enterobacteriaceae والتي تم عزلها من العينات
وهي كالتالي:

Enterobacter hafniae & *Liquefacient*; *Citrobacter diversus* & *Freundii*;
Alkaligenes faecalis; *Klebsiella* spp., *Providencia* spp.; *Edardsiella tarda*;
Proteus (*Mirabilis*, *rettergi* & *vulgaris*); *Acinetobacter* spp., *Serratia*
Liquefaciens & *Marcescens*, *Arizona hinshawii* and *Pseudomonas aerogenosa*.

ولقد تم مناقشة خطورة هذه الميكروبات على الصحة العامة وكذلك الشروط التي
يجب توافرها لمنع تلوث الأغذية بهذه الميكروبات .

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**INCIDENCE OF ENTEROBACTERIACEAE
IN SOME SELECTED FOOD STUFFS**
(With 3 Tables)

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SUMMARY

One hundred and twenty random samples of some selected food items, including, raw milk, Damietta and Kareish cheese, hamburger and fresh sausage, collected from different localities in Assiut City, were screened for Enterobacteriaceae. The obtained results revealed that 70, 35, 80, 90 and 35% of the examined samples, respectively, were contaminated by Enterobacteriaceae. The different isolates recovered from the examined food samples were identified as *E.coli*; *Enterobacter hafniae* and *liquefaciens*; *Citrobacter diversus* and *freundii*; *Alkaligenes faecalis*; *Klebsiella* spp.; *Providencia* spp.; *Enterobacteriaceae tarda*; *Proteus mirabilis*, *rettergi* and *Vulgaris*; *Acinetobacter* spp.; *Serratia liquefaciens* and *marcescens*; *Salmonella* spp.; *Arizona hinshawii* and *Pseudomonas aerogenosa*. The public healths and suggestive measures were discussed.

INTRODUCTION

The safety of food depends on its freedom from bacteria known to cause food poisoning and also from mass bacterial contamination resulting from careless storage. Coliform bacteria have received more attention than most other groups of bacteria occurring in foods; they have been used as indicators of unsatisfactory manufacturing practices. More recently determination of any or all members of the family Enterobacteriaceae as a microbiological guide line and indicator of food quality and sanitation has attracted the attention of several food scientists.

Many species of family Enterobacteriaceae may constitute, if contaminate the food, a public health hazard. Many cases of food poisoning outbreaks were traced to the members of family Enterobacteriaceae (RIDGE and THOMAS, 1955; BREED *et al.*, 1957; THOMASON *et al.*, 1961; MAKIE and MacCARTNEY, 1962; FRAZIER, 1967; IRODANOV *et al.*, 1970; EDWARD and EWING, 1972; TULLOCH *et al.*, 1973; FINEGOLD and MARTIN, 1974; FANTASIA *et al.*, 1975 and HOBBS and GILBERT, 1978). Different food items including milk, cheeses, hamburger and sausage were screened for Enterobacteriaceae by several investigators: HALL *et al.* (1967); MOUSTAFA *et al.* (1975); EL-BASSIONY (1977); SHELAIH (1979); SAUDI (1980); HEFNAWY (1980); EL-KHATEIB (1982) and GADEL-RAB (1983).

Therefore, this work was planned to screen some selected food stuffs available at retail outlets in Assiut City for the members of Enterobacteriaceae to assess their quality and sanitation.

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MATERIAL and METHODS

Collection of samples :

A total of 120 random samples of some selected food items, including, 20 each of raw milk and Domietta cheese, 40 kareish cheese, 20 each of frozen hamburger and fresh sausage were collected from Assiut City markets, different groceries and supermarkets. Raw milk samples were obtained from different dairy farms in Assiut City. The samples were dispatched to the laboratory with a minimum of delay.

Preparation of the samples :

Milk and cheese samples were handled and prepared for examination according to standard methods for the examination of dairy products (A.P.H.A., 1978). Hamburger and fresh sausage samples were aseptically freed from their casing and thoroughly ground, mixed and homogenized using sterile blenders. All samples after preparation were subjected to the following examination:

1- Detection and identification of salmonella and shigella organisms according to the methods recommended by SPECK (1976).

2- Isolation and identification of *E.coli* according to SPECK (1976).

3- Isolation and identification of other members of Enterobacteriaceae.

25 g of the afore mentioned prepared food samples were aseptically inoculated into 225 ml selenite cystine broth. Inoculated broth flasks were incubated at 37°C for 24 h. Loopfuls of 24 h enrichment media were streaked on Brilliant green and MacConkey's agar plates in a way to obtain separate colonies, and incubated at 37°C for 24 h. Different colonies of both lactose and non lactose fermenting bacteria were picked up onto agar slants for further purification and identification according to EDWARDS and EWING (1972) and FINEGELD and MARTIN (1974).

Serological identification of strains presumed to be salmonella or shigella was carried out in the Dept. of Bacteriology, Faculty of Medicine, Assiut University.

RESULTS

The obtained results were recorded in Tables 1, 2 and 3.

DISCUSSION

Tables 1 & 2 showed that 70, 35, 80, 90 and 85% of the examined raw milk, Damietta and Kareish cheese, hamburger and sausage samples were contaminated by Enterobacteriaceae, respectively. *E.coli* and proteus spp. could be detected in 70, 30% of raw milk; 20 & 10% of Damietta cheese; 80 & 12.5% of kareish cheese; 85 & 10% of hamburger and 50 & 12.5% of sausage samples, respectively. Higher incidence of Enterobacteriaceae and *E.coli*, as well as, lower incidence of Proteus spp. were recorded in raw milk, Damietta and kareish cheese samples examined by GADEL-Rab (1983). Also, a lower incidence of *E.coli* was detected in Damietta and kareish cheese samples examined by EL-BASSIONY (1975) and AHMED *et al.* (1987), respectively. Salmonella spp. did not recover from the examined raw milk and hamburger samples, while the organism could be isolated from 5, 10 and 5% of Damietta and kareish cheese and sausage samples, respectively. Such results disagreed with those obtained by ABDEL-RAHMAN (1972); EL-KHATEIB (1982) and GADEL-RAB (1983), who failed to isolate Salmonella spp. from

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Table (1): Incidence of Enterobacteriaceae in some selected food samples.

Food samples	No. of samples	Positive samples	
		No	%
Raw milk	20	14	70
Damietta cheese	20	7	35
Kareish cheese	40	32	80
Hamburger	20	18	90
Sausage	20	17	85
Total	120	88	73.3

Table (2): Incidence of *E.coli*, *Salmonella* and proteus in the examined food samples.

Food samples	Positive samples						
	<i>E. coli</i>			<i>Salmonella</i>		<i>Proteus</i>	
	No.	No.	%	No.	%	No.	%
Raw milk	20	14	70	-	-	6	30
Damietta cheese	20	4	20	1	5	2	10
Kareish cheese	40	32	80	2	10	5	12.5
Hamburger	20	17	85	-	-	2	10
Sausage	20	10	50	1	5	5	12.5
Total	120	77	64.2	4	3.3	20	16.7

the examined samples of cheeses and sausage. On the otherhand, lower incidence of *E.coli* and *Proteus* spp. were detected in hamburger and sausage samples examined by Hefnawy (1981) and EL-KHATEIB (1982), respectively.

Different isolates of family Enterobacteriaceae could be isolated from the examined food samples (Table 3). Most of these isolates were previously detected in raw milk, cheeses, hamburger and sausage samples examined by GHONEIM (1963); HALL *et al.* (1967); MOUSTAFA *et al.* (1975); KUMAR *et al.* (1978); SHELAIH (1979); SAUDI (1980); HEFNAWY (1980); EL-KHATEIB (1982) and GADEL-RAB (1983). *Shigella* spp. could not be isolated from the examined food samples. The same finding was obtained by SKOUNTZONS *et al.* (1973); HEFNAWY (1980); EL-KHATEIB (1982) and GADEL-RAB (1983). Some of the isolated strains, including *E.coli*, *Citrobacter*, *Klebsiella*, *Providencia*, *Proteus* and *Salmonella* have been involved in many cases of food poisoning outbreaks (SMITH and CONANT, 1960; FRAZIER, 1967; IORDANOV *et al.*, 1970; EDWARDS and EWING, 1972; FINEGOLD and MARTIN, 1974 and FANTASIA, 1975).

In conclusion, the results of such investigation proved that the examined food samples were considered seriously contaminated by Enterobacteriaceae organisms, and thus reflex the unsatisfactory measures of food production and handling. Therefore, more care and more governmental supervision should be directed towards the quality and sanitation of foods available at retail outlets. Strict hygienic measures should be imposed during food production and handling to avoid additional outbreaks of food-borne illness caused by such organisms.

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Isolates	Raw milk		Damietta cheese		Kareish cheese		Hamburger		Susage	
	No.	%	No.	%	No.	%	No.	%	No.	%
<i>E. coli</i>	14	41.20	4	26.67	32	56	17	45	10	31.3
<i>Enterobacter</i> :										
<i>hafniae</i>	-	-	-	-	2	3.5	1	2.6	-	-
<i>liquefacient</i>	7	20.58	3	20	-	-	4	10.5	2	6.3
<i>Citrobacter</i>										
<i>diversus</i>	2	5.88	-	-	1	1.8	1	2.6		
<i>freundii</i>	1	2.94	-	-	3	5.3	1	2.6	1	3.1
<i>Alkaligenes faecalis</i>	-	-	3	20	-	-	1	2.6		
<i>Klebsiella sp.</i>	-	-	-	-	-	-	2	5.3	1	3.1
<i>Providencia sp.</i>	-	-	1	6.67	1	1.8	1	2.6	2	6.3
<i>Edwardsiella Tarda</i>	2	5.88	1	6.67	-	-	1	2.6	1	3.1
<i>Proteus</i>										
<i>micrabilis</i>	-	-	-	-	-	-	-	-	3	9.4
<i>rettergi</i>	3	8.82	1	6.67	2	3.5	1	2.6	1	3.1
<i>vulgaris</i>	3	8.82	1	6.67	3	5.3	1	2.6	1	3.1
<i>Acinetobacter sp.</i>	-	-	-	-	-	-	-	-	1	3.1
<i>Serratia</i>										
<i>liquefaciens</i>	1	2.94	-	-	2	3.5	4	10.5	1	3.1
<i>marcescens</i>	1	2.94	-	-	4	7	1	2.6	3	9.4
<i>Arizona hinshawii</i>	-	-	-	-	4	7	2	5.3	4	12.5
<i>Salmonella sp.</i>	-	-	1	6.67	2	3.5	-	-	1	3.1
<i>Ps. serogenosa</i>	-	-	-	-	1	1.8	-	-	-	-
Total	34	100	15	100	57	100	38	100	32	100

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