Staphylococcus aureus and E.coli in some street vended products

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Abstract

One hundred and sixty samples of street vended ready -to - ea meat products sandwitches were collected from different districts ir Minufiya Governorate. Collected samples include luncheon, sausage pasterma and liver (40 of each). The mean values of Staph.aureus coun per g. were 9.1 X 103 ±1.3 X103; 1.0 X 103 ± 0.16 X 103; 2.8 X 103 ± 0.54 X 103and 0.63 X 103 ± 0.092 X 103 for luncheon, sausage pasterma and liver , respectively. E.coli was isolated according to the number of samples in percentage of 20 %, 25 %,15 % and 17.5% from luncheon, sausage, pasterma and liver samples, respectively Serological typing of fifty six isolated strains of E. coli proved that they were belonged to six serovars O111: K58 (B4), O55: K59 (B5), O126 K71 (B16), O26: K60 (B6), O86: K61 (B7), O114: K90 (B).

Introduction:

Meat and meat products is an important food item in most countries d contribution in solving the problem of animal protein shortage . Meat ar products contain high amount of protein of high biological value that contain e amino acids , many vitamins and minerals which are required for gro maintenance of body health (Siriken et al., 2006) .

Street vended meat products are convenient source of nourishment availal factories, offices, markets and public places, thereby they have an importan assuring an adequate nutritional status of large section of working popul addition to generating a very substantial economic activity.

In Egypt , most of street vendors are using either the pavement, the adjoin or the cart itself for cooking and washing dishes & utensils in contaminated wa buckets. The food provided by them is often of questionable microbiological q it was prepared in large quantities early in the day and hold for hours until sol control, so can facilitate the growth of microorganisms which contamina products from numerous sources during handling, transportation, processing, and serving (Hegazy-Salwa 1999).

Meat products have implicated in many cases of foodborne diseases, par Staphylococcal food poisoning and Coliforms infections (Koutsoumanis et al ., The global spread of Escherichia coli has well documented . The incidence o E . coli infection is one of the major outbreak resulting from contaminat products(Madden et al . 2001).

Presence of large number of Staphylococci , in general , and pa Staphylococcus aureus in meat products is considered as a good indic inadequate sanitation and less temperature control. The possibility of pres

enterotoxin producing strains of S . aureus may be due to food handlers , w the primary source of contamination in the processing plant (ICMSF, 1978) . In Egypt , the most common ready -to - eat meat products and offals sold vendors are luncheon, cooked sausage, pasterma and cooked liver which ar sold in the form of sandwiches .

This study was planned out to detect the rate of contamination of such proc S.aureus and E.coli.

Materials and methods

1-Sampling:

A total of 160 random samples of street vended meat products as luncheor sausage, pasterma and cooked liver which are sold in form of sandwiches (4) were collected from different street vendors in Minufiya Governorate.

All collected samples were aseptically transferred without any delay in an ins box to the laboratory.

2- Preparation of the samples (A.P.H.A., 1992) :

Twenty five grams of each examined sample (the content of sandwiche remaining of it was hygienically discarded) were homogenized with 225ml buffered peptone water (0.1%) in a sterile blender jar (Moulinex ,France) dilution of (10-1) , one ml of the clear homogenate was mixed carefully wit buffered peptone water (0.1%) , then decimal serial dilutions were prepared.

3- Isolation and identification of S. aureus. The technique applied recommended by FAO(1992) using Baird parker agar medium for isolation.

4- Isolation and identification of E.coli as recommended by A.P.H.A.(1984).

5- Serological identification of isolated E.coli ,by using diagnostic sera as des Varnam and Evans (1991).

* Statistical analysis procedure:

All data were subjected to statistical analysis according to the procedures re Snedecor and Cochran (1980).

Results

Table (1) : Statistical analytical results of S.aureus count of ex street vended meat product samples (n = 40).

Types of examined samples	+ve samples		Minimum	Maximum	Mean ± SEM
	No.	%			
Luncheon	40	100	8.0×10^2	3.5×10^4	$9.1 \times 10^3 \pm 1.3 \times 10^3$
Sausage	34	85	$< 10^2$	4.6×10^3	$1.0 \times 10^3 \pm 0.16 \times 10$
Pasterma	40	100	3.0×10^2	1.6×10^4	$2.8 \times 10^3 \pm 0.54 \times 10$
Liver	34	85	$< 10^2$	2.5×10^3	$0.63 \times 10^3 \pm 0.092 \times$

Fig. (1) : Staphylococcus aureus count of examined street vende product samples.

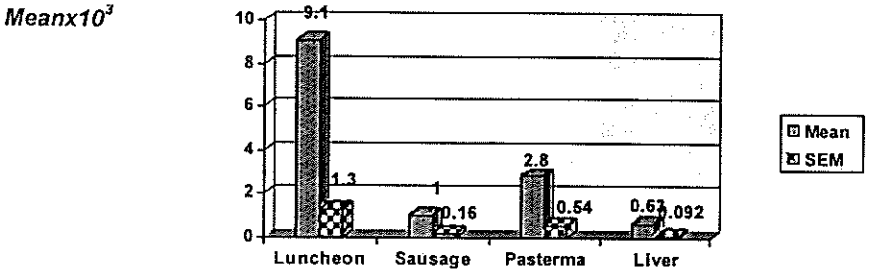

Table (2) : Frequency distribution of examined street vende product samples based on their S.aureus count (n = 40) .

Examined samples / Intervals	Luncheon		Sausage		Pasterma		Liver	
	No.	%	No.	%	No.	%	No.	%
$< 10^2$	0	0	6	15	0	0	6	15
$10^2 < 10^3$	3	7.5	19	47.5	15	37.5	25	62.5
$10^3 < 10^4$	24	60	15	37.5	23	57.5	9	22.5
$10^4 < 10^5$	13	32.5	0	0	2	5	0	0

Fig. (2) : Incidence of E.coli serovars isolated from examined stre vended meat product isolates.

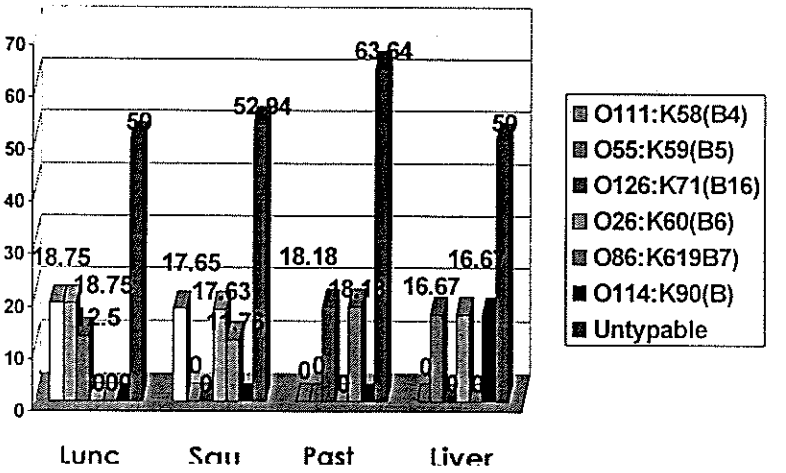

Table (3): Incidence of E.coli isolated from examined street vende meat product samples and isolates.

Examined products	Total No. of samples	Total No. of isolates	Positive No. of		%	
			Samples	Isolates	Samples	Isola
Luncheon	40	240	8	16	20	6.6
Sausage	40	240	10	17	25	7.1
Pasterma	40	240	6	11	15	4.5
Liver	40	192	7	12	17.5	6.2

Fig.(3): unacceptability of the examined samples base bacteriological criteria of Egyptian Organization for Standardizati Quality Control

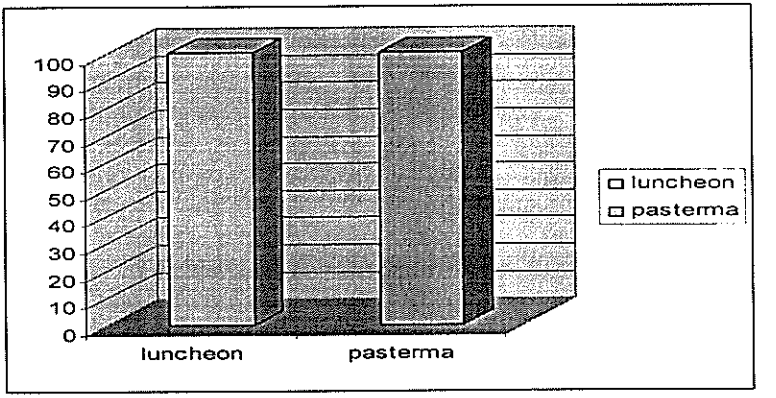

Table (4) : Serological identification of E.coli isolated from ex street vended meat product isolates.

E.coli serovars	Luncheon		Sausage		Pasterma		Liver	
	No.	%	No.	%	No.	%	No.	
O_{111} : $K_{58}(B_4)$	3	18.75	3	17.65	0	-	0	
O_{55} : K_{59} (B_5)	3	18.75	0	-	0	-	2	1
O_{126} : K_{71} (B_{16})	2	12.5	0	-	2	18.18	0	
O_{26} : K_{60} (B_6)	0	-	3	17.63	0	-	2	1
O_{86} : K_{61} (B_7)	0	-	2	11.76	2	18.18	0	
O_{114} : K_{90} (B)	0	-	0	-	0	-	2	1
Untypable	8	50	9	52.94	7	63.64	6	
Total	16	100	17	100	11	100	12	

Table (5) :Unacceptability of the examined some street vended product samples based on bacteriological criteria of Eg Organization for Standardization and Quality Control (n=40) .

Organisms / Examined samples	*S. aureus*			*E.coli*		
	E.O.S limit	Unacceptable samples		E.O.S limit	Unacceptab samples	
		No.	%		No.	
Luncheon	0	40	100	0	8	2
pasterma	0	40	100	0	6	1

Discussion

It is evident from the results recorded in table (1) and fig. (1) that the incid S. aureus were 100% , 85 % , 100 % and 85 % of the examined samples of lu sausage, pasterma and liver , respectively. Regarding the recorded S.aureus c of the examined samples of meat products varied from 8.0 X 102 to 3.5 X 104 to 4.6 X 103 ; 3.0 X 102 to 1.6 X 104 and. < 102 to 2.5 X 103 for luncheon , sa pasterma and liver samples , respectively .

The mean count values of S.aureus in the examined meat products sampl 9.1 X 103 ± 1.3 X 103 ; 1.0 X 103 ± 0.16 X 103 ; 2.8 X 103± 0.54 X 103 anc 103 ± 0.092 X 103 , respectively.

The present results of luncheon samples were nearly similar to those obta Gab - Allah (1990) (5.51 X 103 ± 2.64 X 103 cfu/g.) and Shaltout & Ibrahim-H (1997)(7.91 X 103 cfu/ g.).

The obtained results are comparatively higher than those reported by Tolba (2 X 102 cfu / g.) and Aiedia-Hoda (1995) (< 102 to 3 X 103 cfu / g. with mea of 4.8 X 102 cfu/g.) , while the obtained results were lower than those obta Saleh (1991) (3.4 X 104 cfu/g.) and Nassar (1999) (2.9 X 104 ± 0.82 cfu/g.).S.aureus failed to be detected in luncheon samples by Hemeida et al. (but S.aureus could be detected in percentage of 14.29 % by Abd El- Aal (199 El – Aziz et al . (1996) (5 %) ; Nassar (1999) (10%) ; Ouf-Jehan (2001) (15 Abou – Hussien-Reham (2004) (56 %).

The obtained results of examined sausage samples were comparatively s those obtained by El – Sherif-Amal (1983) (1.53 X 103 cfu/g.) , while higher recorded by Gouda (1991) (3.6 X 104 cfu/g.) and Hussein et al . (1998) (0.15 X 11 X 106 cfu/g.) , but lower results were recorded by Hegazy-Salwa (1999) (<

S.aureus failed to be detected by Sachindra et al.(2005),while could be d by Mousa et al. (1993) (43 %); Ouf-Jehan (2001) (10 %) and Abou – Hussien (2004) (72 %) .

The recorded results of examined pasterma samples were relatively si those reported by El – Sherif-Amal (1983) (13.62 X 102 ± 8X102 cfu/g.) , whil

results were recorded by Rageh (1980) (1.7 X 107 cfu/g.) ; Yassa (1985) (1 cfu/g.) and Tolba (1986) (44 X 105 to 13 X 106 cfu/g.) , but lower resu recorded by Abd El – Aziz (1987) (5.75 cfu/g.) ; Mahmoud (1987) (9 X 102 Tolba (1994) (5.5 X 102 cfu/g.) and Aiedia-Hoda (1995) (5.3 X 102 cfu/g.) .

S.aureus failed to be detected by Hemaide et al . (1986) , while could be by Tolba (1986) (70 %); El – Sherbeeny et al. (1989) (30 %);Salem (1989) Abd El-Aal (1993) ; Mousa et al. (1993) (40 %) and Abd El- Aziz et al . (1996

The achieved results of examined liver samples were higher than those by Lotfi et al . (1988) (up to102 cfu/g.) and Hegazy-Salwa (1999) (< 10 cfu/g.

Thatcher and Clark (1968) stated that even as low as 5 X 104 S. aureu had been implicated as food poisoning agent relatively from fresh food , r processed meat revealed large population of S.aureus had been destroyed b , might be the less cause of food poisoning owing to the heat resistant en produced . So, according to the mean values of the examined luncheon , s pasterma and liver samples which under 5 X 104 so became more safe consumers and may be due to the less handling in ready – to - eat meat meals

S.aureus plays a great role in bacterial contamination of cooked meat workers during preparation and processing may touch cooked meat that ar eaten without further cooking or heating (Al -Tawab , 2004) .

In small number of cases , cooked sausage is known to have been respo S.aureus food poisoning (Varnam and Jane, 1995) .

S.aureus is responsible for food poisoning by the production of one or m stable extracellular toxins which lead to the symptoms of the disease (Bergdol

Several Staphylococci food poisoning outbreaks were attributed to the u hands in preparation of food (Soliman , 1988) .

Table (2) showed the frequency distribution of S.aureus count in the samples of luncheon , sausage , pasterma and liver were (92.5 %) at freque 103 < 105 ; (85%) at frequency range 102 < 104 ; (95 %) at frequency rang <104 and (85 %) at frequency range 102 < 104 , respectively .

Table(3) The recorded results point out that E.coli was isolated accordi number of samples in percentage of 20 %, 25 %,15 % and 17.5% from sausage, pasterma and liver samples , respectively, and isolated accordi number of isolates in percentage of 6.67%, 7.1 %, 4.58% and 6.25% from sausage, pasterma and liver isolates. Regarding the examined luncheon sa . coli failed to be detected by Hemeida et al . (1986) ; Tolba (1994) and (2001) , E.coli was previously isolated from luncheon by Rafaei and Nash (66 %) ; El- Daly (1990) (30 %) ; Gouda (1991) (52 %) ; Fathi et al . (19 %) ; Ghoniem (1992) (18 %) ; Abd El-Aal (1993) (28.57 %); Mousa et (52 %) ; Fathi et al . (1994) (41.6 %) Sayed et al. (2001) (30 %); Eleiwa (2003) (4%) and Abou-Hussien-Reham (2004) (40 %) .

Furthermore the sausage samples revealed that E . coli failed to be by Palic et al . (1982) , while E.coli could be isolated by Catsaras and Greb (16 %); Gobran (1985)(60 %); Hassan (1986) (30 %) ; Lotfi et al . (1986 Tolba (1986) (52.5 %) ; Abd El – Aziz (1987) (50%); Zaki-Eman (1990) Fathi et al . (1992) (25 %) ; Mohamed (1997) (10 %) ; Yassien et al . (19) ; Fathi and Thabet (2001) (16.67 %) ; Ouf-Jehan (2001) (25%); Eleiwa- 2003)(12 %); Zaki-Eman (2003) (40 %) and Abou – Hussien-Reham (2004

Regarding pasterma samples, E.coli failed to be detected previously Sherif-Amal (1983) ; Hemeida et al . (1986) and Tolba (1986) , while detected by Gobran (1985) (12 %) ;

Abd El – Aziz (1987) (80%) ; Rafaie and Nashed (1989) ; Edris an (1990) (14.3 %) ; Zaki-Eman (1990) (84 %) ; Ghoniem (1992) (11 %) ; Al (1993) ; Edris (1993) (8.57 %) and Mousa et al . (1993) (27 %) .

E.coli could be isolated from liver samples by Morshdy (1992) and Salwa(1999) (20 %).

Results recorded in table (4) and fig. (2) declared the incidence of E.coli s isolated from examined isolates of street vended meat products , 8 (50%) isolates of E.coli was identified as untypable strains from examined l samples , whilemean three serotypes could be recorded as O111 : K58 (E serotypes could be recorded as O55 : K59 (B5) and two serotypes could be as O126 : K71 (B16) . Regarding the sausage samples ,nine (52.94 %) isolates of E.coli were identified as untypable strains of examined sausage is whilemean three serotypes could be recorded as O111 K58 (B4) , three s could be recorded as O26 : K60 (B6) and two serotypes could be recorded as 61 (B7), Seven (63.64 %) out of 11 isolates of E.coli were identified from e pasterma samples could be recorded as untypable strains , whilemean two s could be recorded as O126 : k71 (B16) and two serotypes could be recorded K61 (B7) .

Moreover , six (50%) out of 12 isolates of E.coli were identified from e liver samples could be recorded as untypable strains , whilemean two serova be recorded as O55 : K59 (B5) , two serotypes could be recorded as O26 : H and two serotypes could be recorded as O114 : K90(B-).

Detection of Enteropathogenic E.coli even in low number, in food revealed health hazard and it may give rise to outbreaks of meat borne gastrointestinal with a significant mortality in infants (ICMSF , 1996 , Fraizer and Westhoff and heat treated foods must be free from E . coli (Gluck, 1995) .

According to Egyptian Organization for Standardization (E.O.S. , 2005) f examined street vended meat product samples showed in table (5) and fig . (3) samples which exceeded the legal standard for S.aureus count in lunch pasterma were 100% in both .

Furthermore the unacceptable samples for E.coli in luncheon and paster 20% and 15% , respectively .

There is no Egyptian Standardization for liver and sausage which sold b vendors in the form of sandwiches .

Conclusion and recommendations: *In conclusion , information given by the results indicate that the meat and meat products of street vendors ha prepared and handled under poor sanitary conditions due to lack of hygienic m as well as the use of poor quality ingredients. It is recommended that the co authorities should take steps to prohibit or improve street vended meat through activation the local food lows .*

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ل العربي

يكروب القولونى والميكروب المكور العنقودى الذهبى من بعض منتجات معروضه للبيع مع الباعه الجائلين .

لدراسةعلى١٦٠عينة من بعض منتجات اللحوم المعروضه للبيع مع الباعه الجائلين مثل
ت اللانشون، السجق ، البسطرمة و الكبدة) ٤٠ عينة من كل نوع جمعت بطريقة عشوائية
الجائلين من محافظة المنوفية لتحديد الميكروبات الدالة علي التلوث ودلت النتائج على ان
عدد الكلى للميكروب المكور العنقودى الذهبى هو ٩,١ × ١٠ ٣ ± ١,٣ × ١٠ ٣ ، ١ ×
٠,١٦ × ١٠ ٣ ، ٢,٨ × ١٠ ٣ ± ٠,٥٤ × ١٠ ٣ و ٠,٦٣ × ١٠ ٣ ± ٠,٠٩٢ × ١٠ ٣
ن ، السجق، البسطرمة ، الكبدة على التوالي.
الميكروب القولونى : (E.coli) من عينات سندوتشات كل من اللانشون والسجق والبسترمة
سبة ٢٠ % ، ٢٥ % ، ١٥ % ، ١٧,٥ % . وقد تم تصنيف العترات المعزولة سيرولوجيا و
الميكروب العنقودى الذهبى المتجلط من عينات سندوتشات كل من اللانشون والسجق
ة والكبدة بنسبة ٢٧,٣ % و ٢٧,٧ % و ٣٨,٣ % و ٢١,٦٥ % على التوالي. هذا وقد
أهمية الصحية للمعزولات وكذلك التوصيات الخاصة بتحسين أو منع تداول تلك المنتجات.