

FOOD POISONING MICROORGANISMS IN SOME LOCAL MEAT PRODUCTS

A. S. ABD EL-AZIZ; EIS-EL-NEKLAWY; AZZA HUSSEIN and ZEINEB NIAZI

Food Hygiene Department, Animal Health Research Institute, Dokki, Giza.

SUMMARY

One hundred samples of Minced meat, Beef burger, Sausage, Basterma and Luncheon (20 samples each) collected from different shops in Cairo and Giza were examined for the presence of Salmonellae, EPEC, Staph aureus, Yersinia enterocolitica and Listeria monocytogenes. Antibiotic sensitivity to the isolated organisms was tested. Salmonellae were detected in both minced meat and sausage with 5% for each whereas, EPEC were detected in beef burger and sausage with 5% and 10% respectively. Staph aureus was detected in all types of samples examined with different percentages. Neither Y. enterocolitica nor L. monocytogenes could be detected. The public health importance of the studied microorganisms were discussed.

INTRODUCTION

Technological development in food processing, preservation and handling have given consumers

a much greater choice over the foods they can buy. Meat products are easily prepared food rich in protein containing a wide variety of easily digested nutrients widely consumed now in Egypt and to somewhat of low cost price.

The implication of meat products in food poisoning outbreaks all over the world was evidently by many authors (Bryan, 1980).

Salmonella, EPEC, Y. enterocolitica, Listeria monocytogenes and Staph. aureus are the most important microorganisms implicated in food poisoning outbreaks. Staph aureus is one of the specific microorganism responsible for food poisoning among human beings due to production of powerful enterotoxins as stated by Hobbs and Gilbert (1981). Bersani et al (1990) found that 13.2% of the tested meat products samples were salmonellae positive. Many authors have emphasized the importance of Enteropathogenic E.coli (EPEC) as it has been implicated in cases of food poisoning (Bryan 1982). Yersinia enterocolitica has emerged as the organism of considerable public health significance, the infection of human is caused

mainly by the consumption of contaminated food, Green wood and Hooper (1990). *Listeria monocytogenes* has recently become recognized as important food-borne pathogen. It is widely distributed in the environment and occurs widely in various foods. Kwiatek et al (1992) concluded that raw food of animal origin could be a source of *Listeria* infection to man.

The present work was carried out to identify some food poisoning microorganisms (*Salmonella*, *E. coli*, *Staph aureus*, *Yersinia enterocolitica* and *Listeria monocytogenes*) in samples of Minced meat, Beef burger, Sausage, Basterma and Luncheon.

MATERIAL AND METHODS

A total of one hundred random samples of meat products, 20 each of frozen minced meat, frozen beef burger, frozen sausage, basterma and luncheon were collected from different shops in Cairo and Giza. Samples were transferred without delay to the laboratory and subjected to the following examinations.

1- Isolation and identification of Salmonellae

The technique recommended by Harvey and Price (1981) was carried. Suspected colonies were identified morphologically according to Cruick-shank et al (1975). Biochemically according to Edwards and Ewing (1972) and Serologically according to Kauffman white Scheme (Kauffmann, 1974).

2- Isolation and Identification of (EPEC)

Were carried out according to the method recommended by Mehlmen and Romervo (1982). The *E. coli* isolates were identified by the method of Eddwards and Ewing (1972).

3- Isolation and Identification of Staph aureus

Were carried according to the method recommended by ICMSF (1978). Coagulas positive staph aureus recovered strains were tested for their ability to produce enterotoxins using sac culture method recommended by Donnelly et al (1967). The detection of serological types of enterotoxins were carried out using Reverse Passive Latex Agglutination technique (RPLA) recommended by Shingakiet et al (1981) using Oxoid SET-Repla Kits.

4- Isolation and identification of Yersinia Enterocolitica:

The technique recommended by Lee et al (1980) was applied.

5- Isolation and identification of Listeria monocytogene:

Was done according to the method recommended by MCcline and lee (1989).

6- Antibiotic sensitivity to the isolated organisms:

Were done using Disc Agar Diffusion Technique according to Sojka et al (1972).

RESULTS AND DISCUSSION

Meat and meat products are subjected to contamination with several types of microorganisms from different sources during the period that elapses from the time of slaughtering till consumed. Such contamination may render the product inferior quality or even unfit for consumption and at times may constitute a public health hazard.

It is evident from the results achieved in table (1) that the incidence of salmonellae were 5% in both minced meat and sausage. The isolated servares are one strain of *S.typhimurium* in minced meat and one strain of *S. schelisium* from sausage samples. No salmonellae could be detected from examined beef burger, basterma and luncheon samples. Tolba (1994) failed to detect salmonella in examined minced meat samples whereas Abd-El-Aziz (1988) and Khalafalla (1988) found that the incidence of salmonella in minced meat was 6% and 8% respectively. Tolba (1986) and khalafalla (1988) failed to detect salmonella in beef burger ; on the other hand Darwish et al (1988) and Abd-El-Aziz (1988) found that the incidence of salmonella was 5% and 6% respectively in beef burger. El-Khateb (1982) failed to detect salmonella in examined sausage whereas Tolba (1986) and Khalafalla (1988) found that the incidence of salmonella in sausage was 10% and 8% respectively. Abd-El-Aziz (1988) and Tolba (1994) failed to detect salmonella in examined basterma where Tolba (1986) found that salmonella was detected with percentage (10%). Mousa et al (1993), Abd-El-All (1993) and Fathi

et al (1994) failed to detect salmonella in luncheon samples. FAO (1983) reported that cases of food poisoning outbreaks due to *S.typhimurium* were 277 cases in Denmark, 3 in Belgium, 80 in Ireland, 715 in Norway, 237 in Poland, 407 in Spain and 22 cases in England.

The present investigation proved that the incidence of *E.coli* in Beef burger and sausage was 5% and 10% respectively. The isolated servares were one strain $O_{44} K_{74}$ in bef burger, and two strains $O_{119} K_{69}$ and $O_{111} K_{58}$ in sausage (Tables 1,2). Marzouk (1985) in Alexandria found that *E. coli* cause 54% of infantile diarrhoea. When the bacteriological safety of food is assessed, the presence of *E.coli* is used as indication of the possible contamination by enteric pathogens. *Staph aureus* coagulase positive proved to be 15% in minced meat, 10% in Beef burger, 15% in Sausage and 5% in both Basterma and Luncheon samples. Concerning the enterotoxigenicity of the isolated *Staph aureus* strains, it is evident from table (3) that only one isolate from sausage samples was able to produce enterotoxin type. A. In this respect, Sedik (1982) found that 36% of *staph aureus* strains examined were enterotoxigenic. The presence of *Staphylococcus aureus* remains one of the principal concenrns of microbiologists since staphylococcal enterotoxins can survive processing conditions (Lovell. 1981).

Hemida et al (1986) and Abd-El-All (1993) failed to detect *E. coli* and *Staph aureus* in Basterma whereas Edris and Salem (1990) found that the percentage of *Staph aureus* was 24% and *E. coli* 14.3%. Aiedia (1995) found that the percentage

Table (1): Incidence of food poisoning microorganisms in some local meat products samples

M.O	Minced Meat (20)		Beef burger (20)		Sausage (20)		Basterma (20)		Luncheon (20)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Salmonella	1	5	-	-	1	5	-	-	-	-
E.F.E.C.	-	-	1	5	2	10	-	-	-	-
Staph aureus	3	15	2	10	3	15	1	5	1	5
Y. enterocolitica	-	-	-	-	-	-	-	-	-	-
L. monocytogenes	-	-	-	-	-	-	-	-	-	-

() = number of samples examined

Table (2): Serovars of isolated Salmonellae and Enteropathogenic E. coli from examined meat products samples

Product	Salmonella		EPEC		
	Typhimurium B 4,12,27 b	Schellism B 4 III III,2	O44 :: K74	O111: K58	O119: K69
Minced meat	1	-	-	-	-
Beef burger	-	-	1	-	-
Sausage	-	1	-	1	1

Table (3) : Incidence of Staphylococcal enterotoxins in examined meat products

Product	Coagulase +ve staph aureus	Enterotoxigenic staph. aureus types			
		A	B	C	D
Minced meat	3	-	-	-	-
Beef burger	2	-	-	-	-
Sausage	3	1	-	-	-
Basterma	1	-	-	-	-
Lunchcon	1	-	-	-	-

Table (4) : Antibiotic sensitivity of isolated serovares from meat products

Antibiotic disc	Conc.	EPEC				Salmonellae				Coagulase +VE Staph. aureus	
		O ₄ K ₇	O ₁₁ K ₇	O ₁₁ K ₉ (B ₁)	O ₁₄ K ₉ (B ₁)	S. typhimurium	S. schelvisium	S	R	S	R
Ampicillin	10 Ug	0	100	100	0	0	100	0	100	20	80
Frylthromycin	15 Ug	0	100	0	100	0	100	0	100	100	0
Gentamycin	10 Ug	100	0	100	0	100	0	0	100	100	0
Kanamycin	30 Ug	100	0	0	100	0	100	0	100	20	80
Nalidixic acid	30 Ug	0	100	0	100	0	100	0	100	30	70
Neomycin	30 Ug	0	100	100	0	0	100	0	100	90	10
Streptomycin	30 Ug	0	100	100	0	0	100	0	100	70	30
Oxetracyclin	30 Ug	100	0	100	0	0	100	0	100	80	20
Tetracyclin	3 Ug	0	100	0	100	0	100	0	100	80	20
Kllex	30 Ug	100	0	100	0	100	0	100	0	100	0

of detected E.coli was 10%. Tolba (1994) isolated five strains of coagulase + ve Staph aureus from 20 examined Basterma samples. Concerning Luncheon. Hemida et al (1986) failed to detect E.coli nor Staph whereas Refaei and Nashed (1989) found that the percentage of E coli was 66%. Mousa et al 1993 found that the percentage of E.coli and Staph was 52% and 18% respectively. Abd-El-All (1993) found that the percentage was 28.5 for E.coli and 14.9 for Staph aureus. Fathi et al (1994) and Aiedia (1995) found that the percentage of E.coli was 41.6% and 15% respectively. Isigidi et al (1985) detect Staph aureus in 90.5% of examined minced meat samples while low percentage (5%) was detected by Tolba (1994). Petri et al (1989) found that the frequency of classical E. P. E. C. in ground beef was 93.78% where Tolba (1994) failed to detect E. Coli.

Neither *Yersinia enterocolitica* nor *Listeria monocytogenes* could be detected in all examined meat products samples. Fukushima (1985) found that 4.8% of ground pork contained *Yersinia enterocolitica*. Singh et al (1988) found that 0.8% of sausage samples were positive for *Y. enterocolitica*. Hefnawy (1989) failed to detect *Listeria monocytogenes* in examined meat products. Isolation of *Listeria monocytogenes* was proved by Weis (1989) in Sausage and minced meat (40-60%), also by Qvist and Liberski (1991) in Frankfurter (6%), Grau and Vanderline (1992) in vacuum packed processed meat (53.4%) and Casaleri et al (1992) in sausage (8%) and minced meat (19%).

Table (4) illustrates the antibiogram pattern of

isolated servovares from meat products. Most of the isolates were sensitive to Tetracycline, Oxytetracycline, Gentamycine and Kef whereas most of isolates were resistant to Ampicillin and Erythromycin. The resistance and sensitivity of microorganisms to some antibiotics were reported by Krumperman (1983), Tolba (1986) and Youssef (1981). Finally strict hygienic principles at the points where food undergoes its final preparation and good personal hygiene are prerequisites for safe food.

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