DETECTION OF *E. COLI* AND *SALMONELLA* ORGANISMS IN CATTLE AND CAMEL MEAT

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A B S T R A C T

One hundred and twenty random samples of cattle and camel meat (60 0f each) were collected from 3 different abattoirs namely Elbagour, Menouf and Shibin-Elkom (40 0f each) located in Menofia governorate. All collected samples were subjected to bacterial examination for detection of *E.coli* and *Salmonella* organisms The obtained results indicated that Enteropathogenic *E.coli* were serologically identified from the examined samples of cattle meat as O26: K60 (10%), O86: K61 (5%), O111: K58 (15%), O124: K72 (5%) & O128: K67 (5%) for Elbagour abattoir, O26: K60 (5%), O86: K61 (10%), O111: K58 (5%) & untypable (5%) for Menouf abattoir & O111: K58 (5%), O119: K69 (5%), O124: K72 (5%) and O128: K67 (5%) for Shibin Elkom abattoir. *Salmonella* organisms were isolated from 25%, 20% and 10% of the examined samples of cattle meat at Elbagour, Menouf, and Shibin Elkom abattoirs, respectively. In regard to camel meat, *Salmonellae* were detected in 20%, 10% and 5% of the examined samples of camel meat at Elbagour, Menouf, and Shibin Elkom abattoirs, respectively. Furthermore, the identified serotypes were *S enteritidis, S. typhimurium, S. muenster* and *S. virchow*

KEY WORDS: Cattle meat, camel meat, *E.coli*, *Salmonella*.

(BVMJ-24(2): 198-204, 2013)

1- I N T R O D U C T I O N

Microbiological contamination of carcasses occurs mainly during processing and handling, such as skinning, evisceration, storage and distribution at slaughterhouses and retail establishments (Abdallah *et al.*, 2009). Every treatment done to the food animal carcass from the point of slaughtering until it ready for consumption, including preparation of the carcass, transportation and handling, will add to the bacterial load of its meat (Ali, 1992). The external contamination of meat constitutes a constant problem in most developing countries, in the abattoir itself where there are large numbers of potential sources of contamination by microorganisms (Davis *et al.*, 2002). Historically, *Salmonella typhimurium* and *Salmonella enteritidis* have been the most frequently serotypes which act as causative agents of human gastroenteritis throughout the world. An annual average of 186 cases was recorded during 1982 -1986 in Norway (Sierra *et al.*, 1995). *Salmonella* organisms may be commonly carried by human and animal, when those bacteria are multiplied in the intestine they become pathogenic and causing intestinal disorder and slight or sever infection and may even cause death (Frederick *et al.*, 2010). The symptoms of salmonellosis include diarrhea, nausea, vomiting, fever and abdominal cramps (Kahraman *et al.*, 2005). In general, EPEC strains are the major cause for many infantile diarrhea, in typical cases, symptoms appear within 12 to 36 hours. Clinically, EPEC illness is characterized by fever, nausea, vomition and watery stools, which occasionally contain mucous, but without gross blood (Jay, 1996). Furthermore, EPEC was implicated in cases of gastroenteritis, cystitis, colitis, pyelonephritis, and peritonitis as well as food poisoning outbreaks (Sumner *et al.*, 2003). Therefore, EPEC showed to be the

first bacterial cause of diarrhea in infants and its proportion may reach 54% (Varnam and Evans, 1991).The presence of *E. coli* is thought to give an indication of fecal contamination (enteric pathogens in particular) than the entire group of *Enterobacteriaceae* (Kalchayanand *et al.*, 2007).

2. MATERIAL AND METHODS:

2.1. Collection of samples:

A grand total of 120 random samples of cattle and camel meats (60 0f each) were collected from 3 different abattoirs namely Elbagour, Menouf and Shibin-Elkom (40 of each) located in Menofia governorate. In other words, each abattoir was represented by 20 samples of cattle meat and other 20 samples of camel meat. The collected samples were subjected to the following examinations.

2.2. Screening for Enteropathogenic Escherichia coli:

2.2.1. Pre-enrichment (8):

From the original dilution, one ml was inoculated into MacConkey broth tubes supplemented with inverted Durham's tubes. Inoculated tubes were incubated at 37°C for 24 hours.

2.2.2. Enrichment broth:

One ml from positive MacConkey tube was inoculated into another MacConkey broth tubes and incubated at 44°C for 24 hours.

2.2.3. Plating media:

Loopfuls from positive MacConkey broth tubes were separately streaked onto Eosin Methylene Blue agar medium (E.M.B.), which was then incubated at 37°C for24 hours. Suspected colonies were metallic green in color. Suspected colonies were purified and inoculated into slope nutrient agar tubes for further identification.

2.2.4. Morphological identification:

Films of pure suspected cultures were stained with grams stain and examined microscopically (ICMSF, 1996).

2.2.5. Biochemical identification:

It was carried out according to (MacFaddin, 1976).

2.2.6. Serodiagnosis of E. coli:

The isolates were serologically identified according to (Cliver, 1990) by using rapid diagnostic *E. coli* antisera sets (DIFCO Laboratories, DetroitMichigan 48232-7058, USA) for diagnosis of the Enteropathogenic types.

2.3. Screening for Salmonellae:

2.3.1. Pre-enrichment broth:

Twenty five grams of examined samples were homogenized in 225 ml of sterile peptone water and incubated at 37°C for 18 hours.

2.3.2. Enrichment broth:

One ml of the original dilution was inoculated into 9 ml Rappaport Vassilidis broth tube, and then the tube was incubated at 43°C for 24 hours (ICMSF, 1996).

2.3.3. Selective Plating:

Xylose lysine desoxychoclate agar (X.L.D) was used. Loopfuls from the inoculated tubes were separately streaked onto X.L.D. agar medium and incubated at 37°C for 24 hours.

2.3.4. Serological identification of Salmenollae:

Isolates proved biochemically to be *Salmonella* microorganisms were subjected to serological identification according to Kauffman white scheme (Kauffman, 1974) by using rapid diagnostic *Salmonella* antisera sets (Welcome Diagnostic, a Division of the Wellcome Foundation Limited, Dartford England DA15 AH).

3. RESULTS:

Table (1): Incidence and serotyping of Enteropathogenic *E.coli* isolated from the examined samples of cattle meat at Menofia abattoirs (n=20)

Abattoir / *E.coli* Strains	Elbagour		Menouf		ShibinElkom		Strain Characteristics
	No.	%	No.	%	No.	%	
O26 : K60(B6)	2	10	1	5	-	-	EHEC
O86 : K61(B7)	1	5	2	10	-	-	EPEC
O111 : K58(B9)	3	15	1	5	1	5	EHEC
O119 : K69(B19)	-	-	-	-	1	5	EPEC
O124 : K72(B17)	1	5	-	-	-	-	EIEC
O128: K67(B12)	1	5	-	-	1	5	ETEC
Untypable	-	-	1	5	-	-	---------
Total	8	40	5	25	3	15	

Table (2): Incidence and serotyping of Enteropathogenic *E.coli* isolated from the examined samples of camel meat at Menofia abattoirs (n=20).

Abattoir / E.coli Strains	Elbagour		Menouf		ShibinElkom		Strain Characteristics
	No.	%	No.	%	No.	%	
O26 : K60(B6)	2	10	1	5	1	5	EHEC
O86 : K61(B7)	-	-	1	5	-	-	EPEC
O111 : K58(B9)	2	10	2	10	1	5	EHEC
O124 : K72(B17)	1	5	-	-	-	-	EIEC
O128: K67(B12)	1	5	-	-	1	5	ETEC
Total	6	30	4	20	3	15	

Table (3): Incidence and serotyping of *Salmonella* organisms isolated from the examined samples of cattle meat at Menofia abattoirs (n=20).

Abattoir	Elbagour		Menouf		ShibinElkom		Antigenic Structure	
Serotypes	No.	%	No.	%	No.	%	O	H
S.enteritidis	2	10	1	5	1	5	1,9,12	g,m : 1,7
S. typhimurium	1	5	2	10	1	5	1,4,5,12	i : 1,2
S. muenster	1	5	1	5	-	-	3,10,15,34	e,h : 1,5
S. virchow	1	5	-	-	-	-	6,7,14	r : 1,2
Total	5	25	4	20	2	10		

Table (4): Incidence and serotyping of *Salmonella* organisms isolated from the examined samples of camel meat at Menofia abattoirs (n=20).

Abattoir	Elbagour		Menouf		Elkom Shibin		Antigenic Structure	
Serotypes	No.	%	No.	%	No.	%	O	H
S.enteritidis	2	10	1	5	-	-	1,9,12	g,m : 1,7
S. typhimurium	1	5	1	5	1	5	1,4,5,12	i : 1,2
S. muenster	1	5	-	-	-	-	3,10,15,34	e,h : 1,5
Total	4	20	2	10	1	5		

According to table (1), Enteropathogenic *E.coli* were serologically identified as O_{26}: K_{60} (10%), O_{86}: K_{61} (5%), O_{111}: K_{58} (15%), O_{124}: K_{72} (5%) and O_{128}: K_{67} (5%) for Elbagour abattoir. While, Entero-pathogenic *E. coli* serotypes O_{26}: K_{60} (5%), O_{86}: K_{61} (10%), O_{111}:
K_{58} (5%) and untypable (5%) were identified from the examined samples of cattle meat at Menouf abattoir. In regard to Shibin Elkom abattoir, *E.coli* O_{111}: K_{58} (5%), O_{119}: K_{69} (5%), O_{124}: K_{72} (5%) and O_{128}: K_{67} (5%) were detected in the examined samples of cattle meat. Generally, Enteropathogenic *E.coli* was recovered from 40%, 25% and 15% of the examined samples of cattle meat at Elbagour, Menouf, and Shibin Elkom abattoirs, respectively. Table (2) indicated that Enteropathogenic *E.coli* organisms were isolated from 30%, 20% and 15% of the examined samples of camel meat at Elbagour, Menouf, and Shibin Elkom abattoirs, respectively. The identified serovars of pathogenic *E.coli* were O_{26}: K_{60} (10%), O_{111}: K_{58} (10%), O_{124}: K_{72} (5%) and O_{128}: K_{67} (5%) for Elbagour abattoir, O_{26}: K_{60} (5%), O_{86}: K_{61} (5%) and O_{111}: K_{58} (10%) for Menouf abattoir and O_{26}: K_{60} (5%), O_{111}: K_{58} (5%), O_{111}: K_{58} (5%) for Shibin Elkom abattoir.

Results achieved in Table (3) indicated that *Salmonella* organisms were isolated from 25%, 20% and 10% of the examined samples of cattle meat at Elbagour, Menouf, and Shibin Elkom abattoirs,

respectively. Salmonellae could be identified serologically as *Salmonella enteritidis* (10%), *Salmonella typhimurium* (5%), *Salmonella muenster* (5%) and *Salmonella virchow* (5%) for Elbagour abattoir, *Salmonella enteritidis* (5%), *Salmonella typhimurium* (10%) and *Salmonella muenster* (5%) for Menouf abattoir and *Salmonella enteritidis* (5%) and *Salmonella typhimurium* (5%) for Shibin Elkom abattoir.

According to table (4), *Salmonellae* were isolated from 20%, 10% and 5% of the examined samples of camel meat at Elbagour, Menouf, and Shibin Elkom abattoirs, respectively. *Salmonella* organisms were serologically identified as *Salmonella enteritidis* (10%), *Salmonella typhimurium* (5%) and *Salmonella muenster* (5%) for Elbagour abattoir and *Salmonella enteritidis* (5%) and *Salmonella typhimurium* (5%) for Menouf abattoir. Only one strain of *Salmonella typhimurium* (5%) could be serologically identified from the examined samples of camel meat at Shibin Elkom abattoir.

4. DISCUSSION

According to ((ICMSF, 1996), O128 serotype of *E. coli* is called Enterotoxigenic *E. coli* (ETEC), while strain cause dysentery like syndrome (O124) are known as Entero-invasive *E. coli* (EIEC). While, strains causing hemorrhagic colitis (O111) is recognized as Entero hemorrhagic *E. coli* (EHEC). In 1971, EIEC (O124) was responsible for gastroenteritis and dysentery in 387 persons. The severity of the disease may vary from a mild form resembling *Shigella sonnei* infection to an extreme form resembling classical dysentery. Clinically, the illness due to EIEC is marked by fever; sever abdominal cramps and watery diarrhea followed by gross bloody diarrhea (Yadav *et al.*, 2006).On the other hand, EHEC (O111) was implicated in 16 outbreaks of diarrhea in young children and infants. Illness caused by EHEC is typically quit sever and characterized by sudden onset of sever crampy abdominal pain followed by watery diarrhea, which later becomes grossly bloody. Typically, there is little or no fever and the duration of illness is 2 to 9 days. Death rate in some reported outbreaks may reach 36%. While in others no death had occurred (Sumner *et al.*, 2003).

For long time it was through that it was necessary to ingest 10^5 or more cells of *Salmonella* per gram of food to cause disease in man. However, studies in recent year found that as low as 3-10 cells / gm cause disease. *Salmonella typhimurium* is more widely distributed than any other serovars, this organism cause sever outbreaks of salmonellosis in all kinds of animals and was frequently the cause of both sporadic cases and outbreaks of gastroenteritis in man allover the world (ICMSF, 1996).

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كلية معتمدة 2013

مدى تواجد ميكروبات الايشيريشيا كولاى والسالمونيلا فى لحوم الماشية والجمال فى مجازر محافظة المنوفية

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الملخص العربي

أجرى هذا البحث عن الحالة الصحية للحوم داخل المجازر فى محافظة المنوفية وعليه تم تجميع العينات من ثلاثة مجازر وهم مجزر شبين الكوم ومجزر الباجور ومجزر منوف وكان عدد العينات هو 120 عينة تم تجميع 40 عينة من كل مجزر عشرون منهم للابقار وعشرون منهم للجمال وأجرى عليهم الاختبارات الميكروبيولوجية والكيميائية. وقد أوضحت النتائج أن البكتيريا المعوية الممرضة اى كولاى تم عزلها سيرولوجيا من عينات لحوم الابقار بنسب مختلفة و هى فى مجزر الباجور O26: K60 (10%), O86: K61 (5%), O111: K58 (15%), O124: K72 (5%) & O128: K67 (5%) والاجمالى 25% (5%) O26: K60 (5%), O86: K61 (10%), O111: K58 (5%) غير معرفة (5%) فى مجزر منوف والاجمالى 15%(5%) O111: K58 (5%), O119: K69 (5%), and O128: K67 (5%)فى مجزر شبين الكوم ولكن البكتيريا المعوية الممرضة اى كولاى تم عزلها سيرولوجيا من عينات لحوم الجمال بنسب مختلفة وهى فى مجزر الباجور,(5%) O26: K60 (10%), O111: K58 (10%), O124: K72 (5%) & O128: K67 (5%) والاجمالى 30% (10%) O26: K60 (5%), O86: K61 (5%) & O111: K58 (5%) فى مجزر منوف والاجمالى 20%1 O26: K60 (5%), O111: K58 (5%), O128: K28 67: (5%) فى مجزر شبين الكوم على الترتيب والاجمالى 15%. تم عزل ميكروب السالمونيلا بنسب 25%و20%و10% فى العينات المختبرة من لحوم الابقار فى كل من مجزر الباجور ومنوف وشبين الكوم على الترتيب وبالنظرة الى لحوم الجمال وجدت السالمونيلا بنسب 20%و10%و5% فى العينات المختبرة فى كل من مجزر الباجور ومجزر منوف وشبين الكوم على الترتيب علاوة على المعزولات المعرفة كانت سالمونيلا انترتيديس وسالمونيلا تايفى ميوريم وسالمونيلا مونستر وسالمونيلا فيرشو.

(مجلة بنها للعلوم الطبية البيطرية: عدد 25(2):198–204, ديسمبر 2013)