Prevalence of some pathogenic organisms in cattle carcasses

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A B S T R A C T

One hundred random samples of cattle meat, liver, kidney and heart (25 of each) were collected from Shibin El-Kom abattoir, Menoufia, Egypt. All the collected samples were examined for demonstration of *E. coli*, Salmonellae and *S. aureus.* The result indicated that incidence of E coli, Salmonella and *S. aureus* were 36%, 28% & 56% for meat samples; 40%, 36% and 60% for heart samples; 52%, 44% and 72% for liver samples and 68%, 48% and 80% for kidney samples respectively. Further, *E. coli*, Salmonellae and *S. aureus* were serologically identified. The incidences of *S. aureus* enterotoxins in the examined samples of cattle were recorded. Enterotoxin A was detected in meat, liver and kidney samples and enterotoxin B from the kidney sample, enterotoxin D from the meat samples, A & C from heart and kidney and C & D from liver samples. Accurately, *E coli* strains were the resistant antibiotics against Erythromycin and Streptomycin. While, Salmonellae was resistant to Oxacillin and Streptomycin, however, *S. aureus* strains were resistant to Neomycine and Kanamycine.

Keywords: *E. coli*, Salmonellae, *S. aureus* enterotoxins and antibiotics

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1. INTRODUCTION

Meat is the most palatable of food article of healthy animals, which may be contaminated during different slaughtering steps as well as during transporting to meat retailers (Ercolini et al. 2006). Meat has high nutritive value for human consumption because it is important source for protein, fat, essential amino acids, minerals, vitamins and other nutrients. On the other hand, meat is considered as an ideal culture media for growth of many organisms because of the high moisture content , the high percentage of nitrogenous compounds, good supply of minerals, glycogen and of a favorable pH for most microorganisms (Al-Mutairi, 2011). Meat may be contaminated with numerous types of pathogenic microorganisms as *E. coli*, Salmonellae and *S. aureus* which render meat hazardous to human health (Nørrung et al. 2009). Moreover, *E. coli* causes several human foodborne diseases these diseases resulting in gastrointestinal symptoms (diarrhea to bloody diarrhea and dysentery), urinary tract complication (hemolytic uremic syndrome (HUS)), pneumonia and meningitis (Johnson et al. 2006). Salmonella has been considered as a significant food-borne disease and could be isolated from raw meat, poultry and their products. Incomplete cooking, inappropriate food processing and reheating food are predisposing factors for occurrence of Salmonella disease (Gorman et al. 2002). Staphylococcal foodborne intoxication occurs all over the world and caused by ingestion of already formed *S. aureus* enterotoxins in food causing clinical signs as vomition, diarrhea and even death in older people and children (Baumgartner et al. 2014). The circumstances at which the animal raised up, slaughtered and carcass preparation are mostly affect the microbial load of the carcass in the abattoir. At first, carcass contamination takes place at the point of first skin cut and the following contamination occurs due to dust produced by removal of hide, workers hands or by contact between dirty hide and subcutaneous connective tissue (Zweifel et al. 2008). The degree of bacterial contamination of animal carcass differs according to plant sanitation. It is also affected by numerous factors as plant lay out, rapidity of slaughtering operation, good

manufacture practices performed and skillfulness of the slaughtering plant workers (Alegre and Buncic, 2004). The current study was applied to investigate *E. coli*, Salmonellae and *S. aureus* as well as Enterotoxins produced by some isolated *S.aureus* strains in cattle carcasses at Menofia governorate.

2. Materials and methods

2.1. Collection of samples:

A total of 100 random samples of cattle carcasses represented by meat (neck region), heart, liver and kidney (25 of each) were collected from Shibin El-Kom abattoir, Menoufia, Egypt. Each sample was kept in a separate sterile plastic bag and preserved in an ice box then transferred to the laboratory under complete aseptic conditions without undue delay. The collected samples were subjected to bacteriological examination.

2.2. Preparation of sample (APHA, 2001):

Twenty five grams of each sample were transferred to a sterile blender jar and 225 ml of 0.1 % sterile buffered peptone water were aseptically added to the content of the jar. Each sample was then homogenized in the blender at 2000 rpm for 1-2 minutes to provide a homogenate, from which tenth-fold serial dilutions were prepared.

2.3. Examination of samples for bacterial contamination and S. aureus entertoxins :

Determination of total Staphylococci count was carried out according to ICMSF (1996). Isolation and identification of E. coli was done according to APHA (1984). Isolation and identification of E. coli was done according to APHA (1984). Serological Identification was applied according to Kok et al. (1996). Isolation and identification of Salmonellae was done according to ISO 6579 (2002). Serological identification of Salmonellae was applied according to Kauffman white scheme (Kauffman. 1974).

2.4. Antimicrobial Sensitivity test:

It was performed to E. coli, Salmonellae and S. aureus, according to Koneman et al. (1997).

3. RESULTS

Table(1) indicated that the incidence of *S. aureus* in cattle samples was 56%, 60%, 72% and 80% , while incidence of Salmonella was 28%, 36%, 44% and 48% but incidence of *E. coli* was 36%, 40%, 52% and 68% from meat, heart, liver and kidney, respectively. Table(2) declared that enterotoxins in examined samples of meat, heart, liver and kidney samples were 0%, 4% , 4% and 8% for enterotoxins A, respectively and 0%, 0% , 0% and 4% for enterotoxins B. Also, 4%, 0%, 0% and 0% for enterotoxins C. 0% , 4% , 0% & 4% for enterotoxins A & C and 0% , 0% , 4% & 0% for enterotoxins C & D, respectively.

Results recorded in table (3) indicated that *S. aureus* count (cfu/g) in examined samples of meat, heart, liver and kidney was $4.03\times10^2 \pm 0.75\times10^{2,}$ $9.61\times10^2 \pm 2.12\times10^{3,}$ $1.44\times10^3 \pm 0.60\times10^3$ and $3.83\times10^3 \pm 0.47\times10^3$

Table (1) Incidence of *S. aureus*, Salmonellae and *E. coli* in the examined samples of bovine carcasses at Shibin El Kom abattoir

Bovine samples	S.aureus	Salmonella	*E. coli*
Meat	56%	28%	36%
Heart	60%	36%	40%
Liver	72%	44%	52%
Kidney	80%	48%	68%

Table (2) incidence of enterotoxins of *S. aureus* detected in the examined samples of bovine carcasses at Shibin El Kom abattoir

Enterotoxins	Meat (25)	Heart (25)	Liver (25)	Kidney (25)
A	0	4	4	8
B	0	0	0	4
D	4	0	0	0
A & C	0	4	0	4
C & D	0	0	4	0

Table (3) Statistical analysis of *S. aureus* counts/g in the examined samples of bovine carcass at Shibin El Kom abattoir (n=25)

Bovine samples	Min	Max	Mean ± S.E*
Meat	$10^2\times1.0$	$10^2\times7.0$	$10^2 \pm \times4.03$ $10^2\times0.75$
Heart	$10^2\times1.0$	$10^3\times3.0$	$10^2 \pm \times9.61$ $10^3\times2.12$
Liver	$10^2\times1.0$	$10^3\times4.0$	$10^3 \pm \times1.44$ $10^3\times0.60$
Kidney	$10^2\times1.0$	$10^3\times9.0$	$10^3 \pm \times3.83$ $10^3\times0.47$

4. DISCUSSION

Incidence of *S. aureus* was the highest Incidence of the all isolates in examined samples while Salmonella was higher than *E. coli.* These results were due to mishandling of the carcasses in slaughterhouse and bad hygienic condition. These findings were agreed with those recorded by

Elshafay (2014) and Adwan et al. (2015). While, such results disagreed with those reported by Adugna (2014).The presence of staphylococci including *S. aureus* is considered as a good indicator for personal hygiene of factory workers with respiratory infection and suppurative lesions. Therefore, Staphylococci continue to be an important problem for food processors, food service works and consumers. Incidence of S. aureus, Salmonellae and E. coli in kidney and liver samples is higher than that in meat and heart samples.Incidence of SE_S A was more than other types of SE_S. Nearly similar results were obtained by Ibrahim Rahmi et al. (2013) and Mohammed et al. (2014). Statistical analysis of *S. aureus* count indicated that kidney and liver samples were highly contaminated as compares with meat and heart samples. Concerning antibiotic susceptibility of the isolated pathogens, *E coli* strains were the resistant antibiotics against Erythromycin and Streptomycin. While, Salmonellae was resistant to Oxacillin and Streptomycin, however, *S. aureus* strains were resistant to Neomycine and Kanamycine.

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