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*Assessment of Microbiological Status of Some Meat  
Products*

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## **7. SUMMARY**

As the level of contamination of meat products with different food-borne pathogens constitutes serious problems for consumers, therefore, the present study was carried out on 100 random samples of meat products viz: Minced meat, beef kofta, beef burger and sausage (25 for each), collected from different shops at Kaliobia Governorate, to evaluate the bacterial quality and the hygienic health hazard of them with some food borne pathogens.

The bacteriological examination of meat products (minced meat, beef kofta, beef burger and sausage) revealed that, the mean value of APC, total Coliform, total Staphylococcus and total *S. aureus* counts in minced meat samples were  $0.95 \times 10^5 \pm 0.16 \times 10^5$  ;  $0.58 \times 10^2 \pm 0.21 \times 10^2$ ;  $1.2 \times 10^3 \pm 0.18 \times 10^3$  and  $0.63 \times 10^2 \pm 0.19 \times 10^2$ , respectively; for beef kofta samples were  $1.7 \times 10^5 \pm 0.39 \times 10^5$  ;  $0.39 \times 10^2 \pm 0.10 \times 10^2$  ;  $1.06 \times 10^3 \pm 0.22 \times 10^3$  and  $0.16 \times 10^2 \pm 0.06 \times 10^2$ , respectively; for beef burger samples were  $3.1 \times 10^4 \pm 0.41 \times 10^4$  ;  $0.34 \times 10^2 \pm 0.09 \times 10^2$  ;  $1.09 \times 10^3 \pm 0.17 \times 10^3$  and  $0.96 \times 10^2 \pm 0.24 \times 10^2$ , respectively and for sausage samples were  $1.1 \times 10^5 \pm 0.18 \times 10^5$  ;  $0.32 \times 10^2 \pm 0.11 \times 10^2$  ;  $0.97 \times 10^3 \pm 0.18 \times 10^3$  and  $1.1 \times 10^2 \pm 0.15 \times 10^2$ , respectively.

Regarding to the bacterial species isolated, the results appeared that, 16 isolates of *E. coli* were isolated from examined meat products samples represented as 4(16%) from minced meat with serotypes 2 O55:H7, 1 O125:H18 and 1 O26:H11 ; 3(12%) from beef kofta with serotypes 1 O55:H7 , 1 O125:H18 and 1 O26:H11 ; 3(12%) from beef burger with serotypes 1 O55:H7 , 1 O125:H18 and 1 O26:H11 and 6 (24%) from sausage samples with serotypes 2 O55:H7, 1 O125:H18, 1 O26:H11 and 2 O111:H4. Moreover, 84 samples out of 100 ones were accepted, as they were free from *E. coli* isolates. In addition, 16 isolates of Coagulase



positive *S. aureus* were isolated from examined meat samples represented as 4(16%) from minced meat; 3(12%) from kofta; 4 (16%) from burger and 5(20%) from sausage samples, as they were free from Coagulase Positive *S. aureus* isolates. Moreover, only one isolate of Salmonella (4%) was isolated from examined minced meat samples but, it was failed to be isolated from other meat product samples by conventional method, and 99 samples out of 100 ones were accepted as they were free from Salmonella isolates.

The use of PCR with *phoA* gene in *E. coli* revealed that, the it was amplified in all 4 studied *E. coli* samples So, two samples of beef kofta and beef burger were false negative results (negative by conventional method and positive by PCR). Moreover, the m-PCR results showed that, the *stx1* gene was amplified in *E. coli* minced meat sample only but other samples failed to be detected. Meanwhile, the *stx2* gene failed to be amplified in all 4 studied *E. coli* samples. In addition, *clfA* gene was amplified 3 out of 4 studied *S. aureus* samples; i.e., one sample of burger, was a false negative result (negative by conventional method and positive by PCR). Moreover, the m-PCR results showed that, the enterotoxin *seb* gene was amplified in minced meat sample only and the enterotoxin *sed* gene was amplified in sausage sample only but other studied genes failed to be detected in both minced meat and sausage sample. Also, burger sample was negative for all classic enterotoxin genes. Moreover, the *invA* gene was amplified in the 2 studied Salmonella samples; so, sausage sample was false negative result and the *stn* gene was amplified in the 2 studied Salmonella strain samples.

Finally, the present study proved that, meat products are considered of public health hazard due to presence of aerobic bacteria; coliforms; *E. coli*; Staphylococci mainly Coagulase Positive *S. aureus* and Salmonella this may be due to mishandling and the negligence of hygienic aspects

either at production levels where most workers did not have medical certificates or selling of meat with expired dates. In addition, PCR technique is reliable and easy to perform, and has a high ability for species identification, that can be an alternative or complementary method to traditional conventional identification of food borne pathogen in meat products samples especially in case of outbreaks. Moreover, the hygienic measures are suggested for obtaining meat and meat products with controlled bacterial pathogens to be fit for human consumption.