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List of abbreviations

APHA	American Public Health Association.
Cit.	Citrobacter.
E.coli	Escherichia coli.
Ent.	Enterobacter.
FAO	Food and Agriculture Organization.
Hrs.	Hours.
ICMSF	International Commission on Micro-Specification for Food.
Klb.	Klebsiella.
NAS	National Academy of Science.
Sal.	Salmonella.
Spp.	Species.
Staph.	Staphylococcus.
WHO	World Health Organization.
Y.	Yersinia.

6-Conclusion and Recommendations

The general purpose of the present study was to get on overview of the hygienic conditions under which the meat was prepared, roasted and served in food serving establishments.

From results and discussion of the present study, it is concluded that roast beef samples collected from different food serving establishments in Kafr El-Sheikh governorate were contaminated with many of microorganisms.

This may be due to inadequate roasting of meat at sufficient high time temperature factors (internal temperature of meat must be at least 80 °C for a minimum 3 minutes); and also may be due to unsanitary conditions under which roast beef is roasted and handed and/or due to post roasting contamination mostly from contaminated meat contact surfaces specially workers hands at the distribution process. Many investigators reported that the equipments, tools and other meat contact surfaces play an important role in the contamination of the meat serving establishments, so, meat contact surfaces must be cleaned and disinfected frequently to prevent or reduce this contamination.

Recommendation:

The most important concern in food serving system is the food safety and whole someness, to keep free of bacterial contaminants and/or to prevent growth of bacterial that may be invade food during storage, preparation and service.

The following regulations must be taken in consideration in food service system to protect consumers against public health hazards:

1- Raw meat must be come from safe sources officially inspected, approved and of bacteriological examination results.

2- Proper chilling of meat.

3- Proper handling of raw meat and proper preparation till roasting.

4- Roasting of meat at sufficient high time temperature factors; the internal temperature of meat must be at least 80 °C for a minimum 3 minutes; roasting must be in closed system far away direct contact with (street dusts, flies..etc)external environment.

5- Handling of roast beef must be conducted in the following manner: no direct contact of roast beef with raw one, equipment used for raw meat not used for roasted and separated workers for raw and roasted beef.

6- Roast beef should reach to consumer as soon as possible after preparation.

7- Restaurants equipment must be effectively washed, rinsed and sanitized; the centralized food preparation system must include central sanitation of all equipment and utensils particularly those which come into contact with roast beef in the dining hall under supervision of food service establishment in ideal situation by frequent cleaning and disinfection of food contact surfaces and associates work areas at regular constant intervals.

8- Hygiene of food service establishment workers including periodical examination of workers and any one show (diarrhea, fever, rhinitis, jaundice, septic sore throat) or carrier of *Salmonella* or *Shigella* are either sent homes or restricted to no food contact activities depending on the nature of the disease or infection.

*No infected lesions (boils and other pus containing lesions) on workers who touch food.

*Workers must wash their hands thoroughly (generate lather) after visiting the toilet, smoking, coughing sneezing, blowing or picking nose, or touching throat or bandages.

*Adequate facilities (lavatory with hot water, soap. And single service towels) in food preparation.

*Adequate toilet facilities for workers and approved sewage disposal.

9-Adding of organic acid as lactic acid and acetic acid during preparation of roas beef at concenteration of 3% with proper roasting of meat to reduce bacterial population.

10- Safe water supply of periodical chemical and bacteriological examination.

11- Environment standards which ensure that safe air, water and deratization of rodents and control of flies.

12- Education training programmers of establishment workers.

13- Periodical bacteriological investigation of finished product as well as meat contact surfaces.

14- Hazard analysis and critical control points (HACCP) should be applied.

ENGLSH SUMMERY (200 WORDS)

FURTHER STUDIES ON HAZARD ANALYSIS OF ROAST BEEF IN

FOOD SERVICE ESTABLISHMENTS

100 random samples of roast beef were collected from food services establishments under examination in Kafr Elsheikh governorate and subjected to the enumeration of total mesophylic bacterial count and Staphylococcal count, as well as isolation and identification of isolated was carried out. The mean value of total mesophilic bacterial count of examined roast beef samples was $1.87 \times 10^2 \pm 0.178 \times 10^2$ cfu/g, regarding *Enterobacteriaceae* the mean value was $1.97 \times 10^4 \pm 0.412 \times 10^4$ cfu/g and the mean value of total Staphylococcal count was $4.03 \times 10^4 \pm 0.37 \times 10^4$ cfu/g.

The identified enteric bacteria isolated from examined roast beef samples were: *E.coli* 19 (19%), *Cit.diversus* 2 (2%), *Enterobacter agglomerans* 13 (13%), *Ent.cloacal* 2 (2%), *Ent.gerogvial* 2 (2%), *Klb.oxytoca* 2 (2%) and *Klb.pneumoniae* 1 (1%).

Serotyping of *E.coli* isolated from the examined samples of roast beef was declared in Table (10). Accurately, out of 1g strains of *E.coli* were serologically identified as $O_{26}:K_{60}$ (B_6), $O_{86}:K_{61}$ (B_{17}), $O_{111}:K_{58}$ (B_9), $O_{124}:K_{72}$ (B_{17}), $O_{128}:K_{67}$ (B_{12}) and untypable at an incidence of 2(2%), 3(3%), 2(2%), 5(5%), 3(3%) and 4(4%), respectively.
The isolated *Staph.aureus* from samples was 42 (85.7%) coagulase positive and 7 (13.7%) coagulase negative.

Salmonella could not be detected in all roast beef samples under this study. *Yersinia spp.* were isolated with incidence of *Y.enterocolitica* 10 (10%), *Y.pestis* 20 (20%) and *Y.enteromedia* 8 (8%).

The identified isolated *Y.enterocolitica* biotypes isolated from examined roast beef were: IA, IB, 2, 3, 4 and 5 with incidence of 2 (20%), 2 (20%), 1 (10%), 2 (20%), 1 (10%) and 2 (20%) respectively.

We concluded from this study that acetic acid 3% with heat treatment is the best method to reduce the number of inoculated *Staphy.aureus* (5×10^2/g) to (0.24×10/g) with reduction % (96%).

Also, the inoculated *Y.enterocolitica* (5×10^2/g) can not be detected with applying lactic acid (3%) and acetic acid (2%, 3%) with heat treatment.

These results indicate unsanitary conditions under which roast beef is prepared and handled in addition to post-roasting contamination mostly from meat contact surfaces.