

The Microbial Quality of Poultry Paste as Raw Material, Cooked and Raw Meats in Iran

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Microbial quality of poultry paste, raw and cooked meats is very important. The goal of this study is to investigate the presence of the indicator micro organisms in poultry paste, raw and cooked meats and to propose different methods for controlling them. In 2006, 38 poultry pastes samples, 119 meat samples containing 56 cooked meat and 63 raw meat samples have been examined microbiologically. Among 38 samples of poultry pastes, total bacterial counts in one sample (2.6%) and *Staphylococcus aureus* count in 14 (36.8%) samples were higher than the national microbial limits for poultry pastes. 10 (26.3%) samples also contained *Salmonella* species. 12 samples (21.4%) of cooked meats and 16 samples (25.3%) of raw meats didn't meet the required microbial specifications. From 12 unaccepted cooked meats, 3 samples contained *Escherichia coli*, all samples had total mesophilic bacterial counts, 2 samples contained *Staphylococcus aureus* counts, and 8 samples showed coliform counts more than the standard limitations. From 16 unaccepted raw meats, 6 samples contained *Salmonella* and 10 samples had total mesophilic bacterial counts higher than the standard limitation. To control microbial contamination of raw meats, after slaughtering of cattle, skinning, evisceration, washing and butchery should be done quickly under aseptic conditions and the flesh should be kept at cold temperature. To control microbial contamination of cooked meats, cooking should be performed completely and uniformly and the left over foods must be reheated thoroughly. Educating food handlers and preventing post contamination are the other important factors to control microbial contamination in cooked meats.

Key words: Poultry paste, Raw meat, Cooked meat, Microbial quality.

Poultry paste is one of the raw materials which are used on the production of chicken sausages and burgers. Most of the times poultry pastes contain

high microbial contaminations. Due to the probable presence of heat stable toxin of *Staphylococcus aureus* and insufficient temperature during barbecuing or frying to control pathogenic bacteria, like *Salmonella*, it is required to increase the microbial quality of poultry pastes. To control microbial contamination of raw meats, after slaughtering of cattle, skinning, evisceration, washing and butchery should be done quickly under aseptic conditions and the flesh should be kept at cold temperature. To control microbial

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contamination of cooked meats, cooking should be performed completely and uniformly and the left over foods must be reheated thoroughly. Educating food handlers and preventing post contamination are the other important factors to control microbial contamination in cooked meats.

MATERIAL AND METHODS

119 meat samples containing 56 cooked meat, 63 raw meat samples and 38 samples of imported poultry pastes have been examined microbiologically. The microbial criteria for this purpose were total bacterial counts per gram, *Staphylococcus aureus* and coliforms specification per gram and the presence of *Escherichia coli* per 1 gram and *Salmonella* species in 25 grams. 90 ml of Ringer solution was added to 10 grams of the samples. After mixing and homogenizing, 1 ml of specific dilutions was cultured on Plate count agar for total bacterial counts and on Baird Parker agar for *Staphylococcus aureus*, following coagulase test as confirmation test. For the detection of *Salmonella*, 225 ml of Buffered peptone water was

added to 25 grams of samples and then they were enriched in selective enrichment broth like Rappaport vassiliadis broth, Selenite cystine broth. After that, they were streaked on selective agars like Xylose lysine desoxycholate agar, Hecton enteric agar, *Salmonella-Shigella* agar. Then the complete biochemical and serological tests were performed.

RESULTS

12 samples (21.4%) of cooked meats and 16 samples (25.3%) of raw meats didn't meet the required microbial specifications. From 12 unaccepted cooked meats, 3 samples contained *Escherichia coli*, all samples had total mesophilic bacterial counts, 2 samples contained *Staphylococcus aureus* counts, and 8 samples showed coliform counts more than the standard limitations. From 16 unaccepted raw meats, 6 samples contained *Salmonella* and 10 samples had total mesophilic bacterial counts higher than the standard limitation. Table 1 and 2 show the results of cooked and raw meats briefly.

Table 1. The results of microbial quality of cooked meats

Total number of cooked meats	Number of samples with higher total bacterial count	Number of samples with higher coliforms count	Number of samples with higher <i>S. aureus</i> count	Number of samples which contain <i>Escherichia coli</i>
56	12	8	2	3

Table 2. The results of microbial quality of raw meats

Total number of cooked meats	Number of samples with higher total bacterial count	Number of samples which contain <i>Salmonella</i>
63	10	6

Table 3. The results of microbial quality of poultry pastes

Total number of poultry paste samples	Number of samples with higher total bacterial count	Number of samples with higher <i>S. aureus</i> count	Number of samples which contain <i>Salmonella</i>
38	1 (2.6%)	14 (36.8%)	10 (26.3%)

Among 38 samples of poultry pastes, total bacterial counts in one sample and *Staphylococcus aureus* count in 14 samples were higher than the national microbial limits for poultry pastes. 10 samples also contained *Salmonella* species. Table 3 shows the results of microbial quality of poultry pastes briefly.

DISCUSSION

Poultry pastes are one of the raw materials which are used in different chicken foods like chicken burgers and sausages; therefore, its microbial quality is important. In this study 36.8% of the poultry pastes were contaminated by *Staphylococcus aureus* and 26.3% were contaminated by *Salmonella*. *Staphylococcus aureus* can produce heat stable enterotoxins which can tolerate 100°C temperature. If the prepared food is too thick, sufficient temperature may not get into the center of the food during cooking. This way, *Salmonella* may still remain in the food. So, due to the probable presence of heat stable toxin and the low temperature during frying or barbequing, it is suggested to use healthy and especially *Salmonella* free chicken meats for

poultry paste production. Beside that, during paste production and after that, aseptic techniques should be used to prevent *Staphylococcal* contamination. 12 samples (21.4%) of cooked meats and 16 samples (25.3%) of raw meats didn't meet the required microbial specifications. To control microbial contamination of raw meats, after slaughtering of cattle, skinning, evisceration, washing and butchery should be done quickly under aseptic conditions and the flesh should be kept at cold temperature. To control microbial contamination of cooked meats, cooking should be performed completely and uniformly and the left over foods must be reheated thoroughly. Educating food handlers and preventing post

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