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Commonly occurring bacterial pathogens affecting the quality of Chicken meat

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Abstract

The present study was undertaken to determine the microbial quality of chicken meat and its public health implications. Positive isolates of *E. coli* and *Staphylococcus* spp. have been studied morphologically, physiologically and biochemically which proved to be confirmatory. Mean standard plate count (SPC), coliform count and *Staphylococcus* count of chicken meat obtained from semi-urban markets was higher (243.90×10^4 CFU/gm, 32.30×10^2 CFU/gm and 49.70×10^2 CFU/gm, respectively) as compared to urban markets

Key words: Microbial quality, chicken meat, coliform counts, SPC, Staphylococcal counts

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1. Introduction

Special attention should be given to the hygienic production and storage of chicken meat for its increasing consumer demand. Total count of aerobic mesophilic bacteria (Standard Plate Count), enterobacteria and *Escherichia coli* are considered indicators of microbiological quality [1, 9-12]. Total count of aerobic mesophilic bacteria in ground chicken meat is always high and consequently, the risks of spoilage in the sense of microbiological disintegration are higher. *E. coli* is a normal inhabitant of birds which causes colibacillosis, colisepticaemia, coligranuloma, pericarditis, peritonitis, synovitis, omphalitis and air sac disease in poultry under predisposing conditions. In the present study, total bacterial count by standard plate count (SPC) and population density of *E. coli* and *Staphylococcus* spp. have been found out in fresh chicken meat procured from commercial markets.

2. Materials and Methods

Chicken meat (10 gm samples) were collected in UV sterilized sample vials and transported in ice at 4˚C to laboratory till processed for microbial analyses. All the samples were processed for microbial analyses within 24 h of collection. 10 gm chicken meat sample was weighed and transferred in sterilized mortar and minced in sterilized Ringer's solution with the help of sterile pestle and then transferred to sterile conical flask aseptically and then total volume was made up to 100 ml. The subsequent ten-fold dilutions were prepared for determining the group of microflora. Isolation of *Staphylococcus* spp. and *E. coli* were attempted [2]. Samples were put in 10 ml nutrient broth for isolation of *Staphylococcus* spp. and *E. coli*. These were then incubated at 37˚C for 18-24 h.

After 18-24 h of incubation, one loopful of culture was inoculated into Mc Conkey's agar plate and salt agar plates, respectively and incubated at 37˚C for 24 h. Inoculated salt agar plates were incubated for 48 h. Typical large (2-3 mm) lactose fermenting pink colonies on Mc Conkey's agar plates were Gram stained and were streaked on Eosin-methylene blue agar plates. Colonies showing characteristic metallic sheen suggestive of *E. coli* were picked on nutrient agar slants in duplicate and stored at 4˚C for further study.Salt agar plates were checked after 24-48 h of incubation and circular, smooth colonies (2-3 mm dia) were Gram stained and picked up and inoculated in Mannitol salt agar. The colonies showing yellow and red

colonies were picked up in nutrient agar slants in duplicate and stored at 4˚C for further study.

All the pure isolates in Nutrient agar slants were put to systematic studies for identification. Those were studied on the basis of morphology, cultural characteristics, biochemical and sugar fermentation reactions [3]. The isolates were identified on the basis of Gram's staining, motility, cultural characterization and biochemical screening by indole test, methyl red (MR) test, Voges Proskauer (VP) test, citrate utilization test, urease production test, TSI agar test, H_2S production test and nitrate reduction test. Suggestive isolates of *E. coli* were identified by IMViC reaction, TSI test, H_2S production test, nitrate reduction test and other fermentative and non-fermentative sugar reactions [4].

3. Results

SPC for total aerobic bacterial count in chicken meat procured from semi-urban and urban markets ranged from 51-55 × 10^4 and 4-250 × 10^4 CFU/gm of chicken meat respectively. Mean SPC of chicken meat of semi-urban and urban markets were 243.90 × 10^4 CFU and 69.60 × 10^4 CFU/gm of chicken meat respectively. Coliform count of poultry meat ranged from 4-70 × 10^2 and 1-17 × 10^2 CFU/gm of chicken meat from semi-urban and urban markets respectively. Mean coliform count per gram of poultry meat from semi-urban and urban markets were 32.30 × 10^2 CFU/gm and 6.50 × 10^2 CFU/gm of chicken meat respectively. *Staphylococcus* count from semi-urban and urban markets ranged from 12-82 × 10^2 CFU/g and 9-32 × 10^2 CFU/gm of chicken meat respectively. Mean *Staphylococcus* count per gram of poultry meat from semi-urban and urban markets were 49.70 × 10^2 CFU/gm and 21.20 × 10^2 CFU/gm of chicken meat, respectively.

4. Discussion

The findings of the present study correlated with Yashoda et al. [5] who examined dressed broiler chickens for microbiological quality. Enterotoxin produced by *Staphylococcus* spp. at favorable temperature is the common cause of food-borne human illnesses throughout the world [6,10-12]. All the strains showed positive reactions to indole test, MR test and negative reactions to VP test and citrate utilization teat. All were positive to nitrate reduction test and TSI test and negative to urease and H_2S production test. All the strains produced acidic slants in TSI slants. There were no variant strains found [7]. All *E. coli* isolates were subjected to fermentation of six different sugar solutions viz. glucose, sucrose, salicin, adonitol and inocitol of which all the strains fermented glucose and lactose with production of acid with or without gas formation within 24 h, seven strains fermented salicin within 24 h, one strain fermented salicin in 48 h, one strain fermented adonitol in 48 h and none of the strains fermented inositol [3,8,12].

5. Conclusion

In the present study, it was revealed that the bacteriological quality of chicken meat obtained from semi-urban markets was objectionable in comparison to urban market meat. It was attributed due to low level of hygienic handling of birds and chicken carcass. Proper cleanliness and hygiene should be maintained in market areas and slaughter places for providing quality chicken meat to consumers [2, 9-12].

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