Microbiological Quality of Chicken Meat Samples Collected from Durg (C.G.)

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ABSTRACT

The present study was undertaken to assess the bacteriological quality of raw chicken meat in Durg (C.G.) city. A total of 200 samples comprising 50 samples each of muscle, liver, heart and gizzard were subject to total viable count (TVC) and isolation of microbes. The average TVC in muscle, liver, heart and lung were found to be 5.47±2.13, 6.78±1.27, 6.36±1.19 and 6.92±1.35 log_{10} cfu/g ±S.E, respectively. E. coli, Staphylococcus aureus and Salmonella spp. organisms were found in 45 (22.7%), 15 (7.5%) and 7 (3.5%) samples, respectively. E. coli was present in muscle (8), liver (14), heart (11) and gizzard (2) samples, respectively. Staph. aureus were recovered from 3, 6, 4 and 2 samples of muscle, liver, heart and gizzard, respectively, whereas, Salmonella were noticed in 2, 1, 2, 2 samples of muscle, liver, heart and lung, respectively.

Keywords: Chicken meat, E.coli, Salmonella and Staphylococcus aureus

Chicken meat is more popular in the consumer market due to easy digestibility and acceptance by the majority of people (Yasoda et al., 2001). At present only 4% of poultry processing in India is carried out in modern processing plants (Anon, 1994), remaining 96% are processed in small poultry slaughtering and dressing units involving 300-500 birds/day, where prevailing hygienic and sanitary conditions are far from satisfactory.

It is a well known fact that the microbial population that comes in contact with meat during production, processing, transportation and distribution present a challenge to meat industry and problem of infection, spoilage and intoxication (Pattanaik et al., 1996, Ramasastry et al., 1999). Present study was conducted in order to evaluate the bacteriological quality of chicken meat.

A total of 200 chicken meat samples comprising 50 each of muscle, liver, heart and gizzard were collected aseptically from different chicken shops in Durg, Madhya Pradesh and transported to the laboratory for further processing.

Total viable counts of the different samples were determined as per the method described by APHA (1984). The samples were also subjected for isolation, identification and confirmation of E. coli, Staph. aureus and Salmonella spp.

For isolation and identification of E. coli, Staph. aureus and Salmonella spp. selective media and kits used were Hi-Motility™ Biochemical Test kit (Himedia, Mumbai), Baird-Parker agar (Himedia, Mumbai) and Hi-chrome RajHans Medium (Himedia, Mumbai), respectively.

The quality of the meat is directly related to the presence of the total number of microbes and the type of organisms present in meat. Contamination with microorganisms may lead to
spoilage of meat and economic losses, while presence of pathogens and/or their toxins may cause meat borne diseases.

To evaluate total viable count, standard pour plate technique was followed using suitable dilutions, which were determined on the basis of the results of the pilot study.

The analysis of microbes in chicken’s muscle, liver, heart and gizzard samples revealed the total viable counts ($\log_{10}$ cfu/g±S.E) in the range of 4.66 to 6.16 (average 5.47±2.13), 5.43 to 8.4 (average 6.78±1.27), 4.70 to 7.80 (average 6.36±1.19) and 4.95 to 8.60 (average 6.92 ± 0.35), respectively (Table 1).

The study on prevalence of *E. coli* revealed that out of 50 muscle, liver, heart and gizzard samples analyzed, 8 (16%), 14(28%), 11(22%) and 12 (24%), respectively, were positive (Table 2). Occurrence of *Staph. aureus* was found in 3 (6%), 6 (12%), 4 (8%) and 2 (4%) samples of muscle, liver heart and gizzard, respectively (Table 2). The investigation revealed that *Salmonella* were present in muscle (4%), liver (2%), heart (4%) and gizard (4%) samples (Table 2).

In the present investigation the microbiological quality of chicken meat as observed by TVC was in the range of 4.66 to 8.60 log$_{10}$ cfu/g with average TVC 5.47±2.13 to 6.92±0.35 log$_{10}$ cfu/g. The results are comparable to previous reports of Cohen et al. (2007) and Asmara et al. (1994) who reported TVC in raw chicken meat in the range of 6.55 – 7.15 log$_{10}$ cfu/g. Recommended microbiological standards for raw meat is between $10^5$-$10^7$ log$_{10}$ cfu/g (Jay, 1986). The result of the study are in agreement with the findings of Amara et al. (1994), Capita et al. (2002), Cohen et al. (2007), Chaiba et al.

### Table 1: Total Viable count of chicken samples collected from poultry shops of Durg (C.G.)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Samples</th>
<th>Total No. of samples analyzed</th>
<th>No. of samples in acceptable range</th>
<th>Total viable count ($\log_{10}$) range</th>
<th>Average viable count ($\log_{10}$ cfu/g) mean ± S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Muscle</td>
<td>50</td>
<td>25</td>
<td>4.66 - 6.16</td>
<td>5.47 ± 2.13</td>
</tr>
<tr>
<td>2.</td>
<td>Liver</td>
<td>50</td>
<td>32</td>
<td>5.43 - 8.40</td>
<td>6.78 ± 1.27</td>
</tr>
<tr>
<td>3.</td>
<td>Heart</td>
<td>50</td>
<td>21</td>
<td>4.70 - 7.80</td>
<td>6.36 ± 1.19</td>
</tr>
<tr>
<td>4.</td>
<td>Gizzard</td>
<td>50</td>
<td>28</td>
<td>4.95 - 8.60</td>
<td>6.92 ± 0.35</td>
</tr>
</tbody>
</table>

### Table 2: Prevalence of *Escherichia coli*, *Staphylococcus aureus* and *Salmonella* spp. in meat samples collected from poultry shops of Durg (C.G.)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Samples</th>
<th>Total No. of samples analyzed</th>
<th>E. coli positive for micro-organisms</th>
<th>Total No. of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Muscle</td>
<td>50</td>
<td>06 (16%)</td>
<td>13 (26%)</td>
</tr>
<tr>
<td>2.</td>
<td>Liver</td>
<td>50</td>
<td>04 (12%)</td>
<td>21 (42%)</td>
</tr>
<tr>
<td>3.</td>
<td>Heart</td>
<td>50</td>
<td>04 (8%)</td>
<td>17 (34%)</td>
</tr>
<tr>
<td>4.</td>
<td>Gizzard</td>
<td>50</td>
<td>02 (4%)</td>
<td>16 (32%)</td>
</tr>
</tbody>
</table>

200 45 (22.5%) 15 (7.5%) 07 (3.5%) 67 (33.5%)
Vaidya et al. (2007) who reported the presence of *E. coli*, *Staph. aureus* and *Salmonella* in raw chicken meat.

In the roadside poultry meat shops improper infrastructure, drainage systems, poor ventilation, unhygienic knife/platform, use of nonpotable water, contaminated feed, unhygienic slaughter procedure and free access to predators, birds, rodents, etc. are common features. These factors significantly contribute to the microflora of the slaughtered poultry birds meant for human consumption thus posing health risk to consumers. Therefore, personal hygiene and education of butchers would play a significant role towards supplying safe and potentially non-hazardous meat to the society.

References


