

## MICROBIAL QUALITY OF FRESH CHEVON AND BEEF IN RETAIL OUTLETS OF PONDICHERRY

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Fresh raw meat like chevon and beef have been implicated for number of meat borne infections and intoxications in several countries. Microbial population that comes in contact with fresh meat during slaughtering, dressing and processing presents a challenging problem to the meat industry. Therefore intermittent microbial analysis and constant monitoring are necessary to produce hygienic and wholesome meat to ensure safe public health. Hence the present study was planned for the first time in Pondicherry to assess the microbial load in chevon and beef by aerobic plate count, coliform count and yeast and mould count. Attempts were also made to detect the common meat borne pathogens like *Staphylococcus aureus*, *Salmonella* spp., *Vibrio* spp. and *Clostridium* spp. in the samples tested.

Twenty three chevon and twelve beef samples of approximately not less than 25g each were collected aseptically from different retail outlets in and around Pondicherry and brought to the laboratory on ice for immediate processing. Twenty-five grams of each sample was minced into small pieces using sterile scissors and forceps and then homogenized in a sterile pestle and mortar with 225ml of 0.1% peptone water (10% w/v). Enumeration of aerobic plate count was carried out

in Plate count agar as suggested by Cruickshank et al. (1975) and Andrews (1992). Serial ten fold dilutions of the homogenates were made in normal saline solution and subjected to aerobic plate count by standard pour plate method. Similarly, coliform count and yeast and mould count were carried out in MacConkey agar and Sabouraud Dextrose agar respectively. All the chevon and beef samples were analysed for detection of possible meat borne pathogens like *Staphylococcus aureus*, *Salmonella* spp., *Vibrio* spp. and *Clostridium* spp. by morphological and biochemical characterization as per Carter (1995) and Cruickshank et al. (1975).

Enumeration of microbial load in chevon and beef: The aerobic plate count, coliform count and yeast and mould count for chevon samples ranged from  $\log_{10}$  5.93 to  $\log_{10}$  10.94 (mean  $\log_{10}$  7.76),  $\log_{10}$  3.30 to  $\log_{10}$  8.36 (mean  $\log_{10}$  6.40) and  $\log_{10}$  5.50 to  $\log_{10}$  9.05 (mean  $\log_{10}$  6.90) cfu /g respectively. The detailed results are depicted in Table 1. The three counts with regard to beef were  $\log_{10}$  5.46 to  $\log_{10}$  8.59 (mean  $\log_{10}$  6.66),  $\log_{10}$  3.00 to  $\log_{10}$  7.54 (mean  $\log_{10}$  5.84) and  $\log_{10}$  5.12 to  $\log_{10}$  7.75 (mean  $\log_{10}$  6.25). The detailed results are furnished in Table 2.

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Rao and Sreenivasamurthy (1985) reported a slightly lower initial total viable count ranging from  $\log_{10}$  5.6 to 5.8 /cm<sup>2</sup> or g in sheep or goat carcasses. In an earlier study, Mukhopadhyay et al. (1998) found similar aerobic plate count, coliform count and yeast and mould count as  $\log_{10}$  8.08,  $\log_{10}$  7.78 and  $\log_{10}$  2.90 cfu /g respectively. Mean ( $\log$  cfu / ml) aerobic plate count and coliform count were 4.42 and 1.18 respectively in lamb carcasses processed in United States (Duffy et al., 2001). The mean total viable count, mean yeast count and mean Enterobacteriaceae counts were  $\log$  2.75  $\pm$  0.64, 0.46  $\pm$  0.5 and 0.04  $\pm$  0.30/g respectively in beef (Murray et al., 2001).

As per Raw Meat Grading and Marketing Rules (1991), 60% of the samples tested should have aerobic plate count not more than  $\log_{10}$  6.00/g, whereas 40% of the samples can show a count up to  $\log_{10}$  7.00/g (Joshi, 1994). But in this study, 70% of the chevon samples (mean aerobic plate count,  $\log_{10}$  7.76/g) showed aerobic plate counts above  $\log_{10}$  6.00 /g whereas 30% of the samples revealed counts above  $\log_{10}$  7.00/g, which were much above the acceptable limit. In case of beef (mean  $\log_{10}$  6.66/g), 75% of the samples showed aerobic plate count less than or equal to  $\log_{10}$  6.00/g but the rest 25% of the samples recorded aerobic plate counts more than or equal to  $\log_{10}$  7.00/g which was again not within the acceptable limit. But in comparison to chevon, beef samples were found to be slightly better in microbial quality as the values of the aerobic plate count were closer to the acceptable limit. The marginally lower aerobic plate count in beef might be due to a comparatively secluded and isolated area, far from road/ market, human habitat etc., used for slaughtering and less frequent washing of carcasses with repeatedly used water as experienced by the authors. Statistical analysis with one-way ANOVA revealed that there were significant differences (P $\leq$  0.05) between chevon and beef samples regarding aerobic plate count and yeast and mould count. But

no significant difference (P $\leq$ 0.05) could be observed between them with regard to coliform count.

The higher incidence of microbial load in fresh meat obtained in this study might be attributed to unhygienic and improper handling of animals during slaughter, dressing and evisceration. The usual practice of washing the carcass with the same water in which intestines and offal had been washed was considered as one of the predominant reasons for increased microbial counts of the carcasses. A complete ignorance on the part of the meat handlers/ butchers in hygienic handling of carcasses during slaughter and retailing processes might be the main factors for producing meat with high microbial load. Hot and humid climate of this coastal area would have contributed in increasing the microbial load.

Analysis of chevon and beef samples for detection of common meat borne bacteria: Out of 23 chevon samples tested, five samples (21.74%) yielded *Staphylococcus aureus*. No *Salmonella* spp., *Vibrio* spp. and *Clostridium* spp. could be isolated from any chevon and beef samples. However *Corynebacterium* spp. was isolated from 2 chevon and 1 beef samples.

Several authors like Sharma et al. (1993), Mukhopadhyay et al. (1998) identified different organisms like *Staphylococcus aureus*, *E.coli*, *Bacillus* spp. etc. from chevon and beef carcasses. Similarly isolation of *Staphylococcus aureus* and *Corynebacterium* spp. from the meat samples signifies the public health importance of this study. Hence, the retail meat shop owners, butchers and slaughterhouse workers were educated and trained in hygienic slaughtering and processing of food animals in an one day demonstration cum training programme organized in this college. They were also advised to maintain strict hygienic conditions in their retail outlets for marketing wholesome meat

Backyard system of practice exposes the ducks to different weather changes, infectious and non-infectious diseases. Poor husbandry practice and feed quality together with unheard disease problems are the major constraints in the growth of duck farming. Besides these, circulation of infectious agents of poultry diseases among free roaming ducks has been reported to be one of the factors responsible for sporadic outbreaks of poultry disease (Mai *et al.*, 2004). Keeping in this view, the study was aimed to detect the presence of antibodies against Newcastle disease (ND), infectious bursal disease (IBD) and Egg drop syndrome 76 (EDS 76) in ducks.

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**Table-1**  
**Microbial load analysis in chevon (in log<sub>10</sub> cfu/g)**

| Sample no. | Aerobic plate count | Coliform count | Yeast and mould count | Details of isolation                             |
|------------|---------------------|----------------|-----------------------|--|
| 1          | 9.47                | 5.49           | 8.60                  | <i>S.aureus</i> ,<br><i>Corynebacterium</i> spp. |
| 2          | 10.94               | 3.30           | 6.34                  | <i>S.aureus</i>                                  |
| 3          | 7.78                | 4.56           | 6.36                  | <i>S.aureus</i> ,<br><i>Corynebacterium</i> spp. |
| 4          | 5.93                | 5.43           | 5.50                  | <i>S.aureus</i>                                  |
| 5          | 6.27                | 5.75           | 5.71                  | --   |
| 6          | 7.25                | 6.75           | 6.84                  | --   |
| 7          | 6.68                | 5.95           | 5.61                  | <i>S.aureus</i>                                  |
| 8          | 6.99                | 6.18           | 6.02                  | --   |
| 9          | 7.91                | 6.89           | 7.43                  | --   |
| 10         | 8.64                | 5.86           | 6.18                  | --   |
| 11         | 7.19                | 5.08           | 7.04                  | --   |
| 12         | 7.04                | 6.11           | 6.59                  | --   |
| 13         | 6.50                | 6.66           | 7.88                  | --   |
| 14         | 7.71                | 7.48           | 6.84                  | --   |
| 15         | 6.49                | 5.84           | 5.95                  | --   |
| 16         | 7.79                | 6.60           | 6.81                  | --   |
| 17         | 7.66                | 7.23           | 6.29                  | --   |
| 18         | 7.94                | 7.59           | 6.98                  | --   |
| 19         | 9.16                | 8.36           | 9.05                  | --   |
| 20         | 8.56                | 7.58           | 7.71                  | --   |
| 21         | 8.83                | 7.68           | 8.64                  | --   |
| 22         | 6.76                | 6.95           | 6.73                  | --   |
| 23         | 8.91                | 7.83           | 7.64                  | --   |

**Table 2**  
**Microbial load analysis in beef (in log<sub>10</sub> cfu /g)**

| Sample no. |
|------------|
| 1          |
| 2          |
| 3          |
| 4          |
| 5          |
| 6          |
| 7          |
| 8          |
| 9          |
| 10         |
| 11         |
| 12         |