



EVALUATION OF BACTERIOLOGICAL QUALITY OF PROCESSED CHICKEN

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Abstract

*Bacteriological quality of 60 poultry carcasses selected from a meat processing plant located at Kochi in Kerala was assessed during the present investigation. The sample consisted of 30 carcasses each randomly collected after the removal of head and fore feet (AR HF) and after evisceration (AE) to evaluate the bacterial quality as well as isolation and identification of salmonella. The samples were collected and brought to the laboratory in thermocool containers and processed immediately. The samples had an overall mean Coliform count, Escherichia coli count, Total viable count and Faecal streptococcal count of 3.81 ± 0.09 , 0.89 ± 0.23 , 5.88 ± 0.13 and 3.89 ± 0.06 , $0.89 \log_{10}$ cfu/cm² respectively in samples collected from ARHF and 3.92 ± 0.12 , $2.15 \times \pm 0.24$, $4.44 \times \pm 0.10$, $3.91 \pm 0.07 \log_{10}$ cfu/cm² respectively in AE samples. The salmonella was isolated from ten per cent carcasses from ARHF and positive isolates belonged to *S. enteritidis*.*

Key words: Poultry carcasses, meat processing plant, total viable count, coliform count, *Escherichia coli* count, faecal streptococcal count, *Salmonella*.

The shelf life of chicken carcasses, its products and the consumer safety primarily depend on their microbial quality. The microbial quality of the carcasses depends on the level of contamination from the feathers,

defeathering machines, hygienic practices of personal engaged in the slaughter and dressing of chicken and also the environment. Considering the above factors bacterial quality of chicken carcasses produced in a meat processing plant located at Kochi was evaluated at two points on the production line.

Materials and Methods

During the investigation a total of 60 poultry carcasses were randomly selected from a meat processing plant located at Kochi in Kerala during a period from April to June 2002. The sample consisted of 30 carcasses each, randomly collected after the removal of head and fore feet (ARHF) and after evisceration (AE) to evaluate the bacterial quality as well as isolation and identification of salmonella. The samples were collected and brought to the laboratory in thermocool containers and processed immediately to evaluate the bacterial quality. The selected serial dilution of each sample was used to estimate Total viable count (TVC), Coliform count (CC), *E. coli* count (ECC) and Faecal streptococcal count (FSC) according to the procedures described by Swanson *et al.* (2001); Anon(1968), Anon (1973)and BIS (1980), respectively. The samples were identified by the cultural, morphological and biochemical characteristics described by Barrow and Feltham (1993). All the suspected isolates of *Salmonella* were

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Results and Discussion

The mean Coliform count, *E.coli* count, Total viable count, and Faecal streptococcal count of the samples taken after the removal of head and feet (ARHF) and also after evisceration (AE) are presented in the table.

The Coliform count of eviscerated carcass in the present study was higher than that reported by Fluckey *et al.* (2003) who had recorded the count as $3.27 \log_{10}$ cfu/ml. Coliform may be faecal or nonfaecal in origin. The high count on carcasses taken after

evisceration might be due to the contamination of the carcasses from the intestinal contents and cross contamination from the eviscerating table. Coliform count is used as an index of the overall hygienic condition prevailing during the processing of food (Koenacki and Johnson 2001).

Statistical analysis of variance of the data revealed significant ($P < 0.05$) difference between the mean *E.coli* count of samples taken from the carcass ARHF and AE. The ECC of the carcasses taken ARHF was two log lower than that reported by Berrang *et al.* (2000). The high count of the organism on the eviscerated carcass might be attributed to the contamination with intestinal content of chicken

Table : Mean bacterial counts of samples

Sample		CC	ECC	TVC	FSC
No.of samples	Step	Mean \pm SE (\log_{10} cfu/ ml.)			
30	ARHF	$3.81^a \pm 0.09^x$	$0.89^a \pm 0.23^x$	$5.88^a \pm 0.13^x$	3.89 ± 0.06
30	AE	3.92 ± 0.12^x	2.15 ± 0.24^x	4.44 ± 0.10^x	3.91 ± 0.07

since the organism is found in the intestinal tract of broiler chicken. (Vorster *et al.*, 1994). The contamination of carcass might have occurred from contaminated water and the personal engaged in various dressing process.

The samples taken from ARHF had a higher mean count ($5.58 \pm 0.13 \log_{10}$ cfu/ml) and was one log greater than that reported by Berrang *et al.* (2000) and Fluckey *et al.* (2003). However the count in the AE group of carcass was $4.44 \pm 0.10 \log_{10}$ cfu/ml was also one log greater than that reported by Fluckey *et al.* (2003). In the case of samples taken ARHF, only two percent had count at the level of 10^7 cfu/ml. The count of all the samples from both groups was within the limits recommended by ICMSF (1986) (Gracey *et al.*, 1999). Total viable count is used as an index of sanitary quality in handling of foods (Jay, 1978). The high count in the carcasses after the removal of head and feet (ARHF) is an indication of poor hygiene product followed during dressing. Reduction of the count in the carcass after evisceration (AE) could be attributed to thorough washing and immersion in chilled water.

All samples taken after the removal of head and feet and after evisceration had faecal streptococci, but the mean count of the samples belonging to both groups did not differ

significantly. Faecal streptococci are normally present in mammal's faeces and act as indicators of faecal contamination. (Brown and Baird -Parker, 1982). The high count of the organism in eviscerated carcasses indicates poor evisceration technique. Analysis of variance test revealed significant ($P < 0.05$) and positive correlation between the mean TVC and FSC, CC and ECC, CC and FSC and ECC and FSC in samples taken from ARHF & AE samples. However a negative non-significant association was observed between the mean TVC and CC and TVC and ECC.

Salmonella enteritidis was isolated from 3 rinse samples of carcass obtained ARHF but none of the samples from the eviscerated carcasses revealed the presence of the organism. The isolation of the serotype from raw chicken meat was reported by Jerngklinchan *et al.* (1994), from imported poultry meat by Telco *et al.* (1998) and Duffy *et al.* (1999) and from retail earlier chicken samples by Chang (2000). As per Government of India standards for raw meat (chilled, frozen) *Salmonella* should be absent in all the five samples examined (Berrang *et al.*, 2000; Brown and Baird -Parker, 1982). According to the food act, Government of Mauritius (1998) *Salmonella* should be absent in 25 g of raw meat and poultry.

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