

Microbiological Quality of Different Poultry Feeds from a Retail Outlet at Thrissur, Kerala

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A study was conducted to evaluate microbiological quality of different locally available poultry feeds viz., one crumb (F 1), one pellet (F 2) and two mash feeds (F 3 and F 4). The samples were analysed for Total Viable Count, Coliform Count, *Escherichia coli* count, Yeast and Mould Count and isolation of *Salmonella* spp., *Staphylococcus* spp., *Listeria* spp., and *Pseudomonas* spp. Mean Total Viable Count was 6.52 ± 0.33 , 6.93 ± 0.30 , 6.85 ± 0.27 and $6.90 \pm 0.30 \log_{10}$ cfu/g of feed. Mean Coliform Count was 0.67 ± 0.33 , 0.49 ± 0.49 , 3.04 ± 0.52 and $3.15 \pm 0.46 \log_{10}$ cfu/g of feed respectively. Mean Yeast and Mould Count was 3.22 ± 0.07 , 2.55 ± 0.29 , 4.03 ± 0.02 and $4.31 \pm 0.01 \log_{10}$ cfu/g of feed respectively. *Staphylococcus* spp. was present in all four feeds. Statistical analysis revealed significantly ($p < 0.05$) higher Coliform Count and Yeast and Mould Count in mash feed. It can be concluded that microbiological quality of crumb and pellet is superior when compared to mash feed.

Key words: Microbiological examination, Poultry Feeds, Retail Outlet.

The efficiency of feed utilization in poultry and livestock depends on the quality of feed. Feeds may contain diverse microflora that is acquired from multiple environmental sources. Feed materials may be inoculated at any time during growing, harvesting, processing, storage and dispersal of the feed. Microflora can decrease feed value through nutritional changes, physical damage, or the production of toxins deleterious to animal health¹. The infectious agents can be transmitted to animals through ingestion of contaminated feed and bacteria from colonized food animals can be

transmitted to humans through the food supply². Considering the health hazard posed to animal and poultry and the unsuspecting consumers of such contaminated feeds and its overwhelming socioeconomic impact, it is pertinent to undertake this study. This study was therefore designed to evaluate microbiological quality of different poultry feeds from a retail outlet at Thrissur, Kerala.

MATERIALS AND METHODS

Sample collection

Triplicate samples of four different brands of poultry feeds designated as F 1 (crumb), F 2 (pellet), F 3 (mash feed) and F 4 (mash feed) were collected during October 2011. Sampling was carried out at interval of one week. Samples were collected in sterile containers and transported to laboratory within 30 minutes and processed immediately.

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Microbiological Analysis

Samples were processed by homogenizing 5 grams in 45ml sterile buffered peptone water³. From this serial dilutions were prepared by transferring 1ml to 9 ml buffered peptone water. The Total Viable Count (TVC) was estimated by pour plate technique⁴ using Standard Plate Count Agar (Himedia, India). Coliform Count (CC) and *Escherichia coli* count was (EC) estimated by spread plate technique⁵ using Violet Red Bile Agar (Himedia, India) and Eosin Methylene Blue Agar respectively (Himedia, India). Yeast and Mould Counts (YMC) were also estimated by spread plate technique⁶ using potato Dextrose Agar (Himedia, India). For isolation of *Salmonella* spp., *Staphylococcus* spp., *Listeria* spp., and *Pseudomonas* spp., samples were inoculated in selective agar and colonies were confirmed using morphological, cultural and biochemical characteristics⁷.

Statistical Analysis

Data obtained were analysed using SPSS software and comparison between groups was done by one way analysis of variance (ANOVA)⁸.

RESULTS AND DISCUSSION

Mean bacterial counts are given in table 1

Staphylococcus spp. was isolated from all samples, whereas *Escherichia coli*, *Salmonella* spp., *Listeria* spp., and *Pseudomonas* spp. was not isolated. TVC gives a measurement of total number of viable organisms present, but not the type of bacteria. Statistical analysis revealed no significant difference between feeds for TVC. These microorganisms might probably have originated from the raw materials from which feed

being produced. Package and packaging materials, environment and handling circumstances may also influence the source and degree of contamination. With respect to CC, F 1 and F 2 were significantly different from F 3 and F 4. This could be attributed to heat treatment during processing of crumb and pellet. Heat treatment, usually during conditioning, pelleting or extrusion has been shown to be an effective way to reduce microbial loads and toxins in feed materials and compound feed⁹. Presence of coliforms indicates faecal contamination. So care must be taken to avoid such organisms. Coliforms might also have derived from dried fish, which was one of the ingredients in F 4. YMC of F2, was significantly lower than other three. Pelleting can reduce mould counts¹⁰ (by a factor of about 100 to 10,000). Mould growth is associated primarily with the moisture content of feed ingredients¹¹, but may also be associated with surface area available for mycofloral attack¹². This could account for higher YMC of crumb and mash feeds, which are of greater surface area when compared to pellet. Animals consuming mycotoxins may suffer from symptoms ranging from decreased growth rates, hepatic and nephritic toxicities, reproductive failures, neurological degeneration and death. Presence of *Staphylococcus* spp. may suggest both bad manufacturing practice and contamination through handling¹³. Studies have shown that staphylococcal contamination to be hazardous¹⁴.

CONCLUSION

From the study it could be concluded that microbiological quality of crumb and pellet is superior when compared to mash feed. Microbial contamination of poultry feed causes disease in birds and is a potential pathway for entry of pathogens into the human food supply. Considering the health hazards posed to birds and the direct link between feed safety and safety of foods of animal origin, it is essential that feed production and manufacture be considered as an integral part of the food production chain. Feed production must therefore be subject, in the same way as food production, to quality assurance including food safety systems based on the Hazard Analysis and Critical Control Point (HACCP) system.

Table 1. Mean bacterial counts of different feeds

Feed	Mean bacterial count, log ₁₀ cfu/g		
	TVC	CC	YMC
F 1	6.52±0.33 ^a	0.67±0.33 ^a	3.22±0.07 ^a
F 2	6.93±0.30 ^a	0.49±0.49 ^a	2.55±0.29 ^b
F 3	6.85±0.27 ^a	3.04±0.52 ^b	4.03±0.02 ^c
F 4	6.90±0.30 ^a	3.15±0.46 ^b	4.31±0.01 ^c

Mean values in a column bearing different superscripts differ significantly, (p<0.05)

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