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Short Communication

Prevalence of food borne pathogens in market samples of chicken meat in Bangalore

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Abstract

A study on the prevalence of common food borne pathogens (*Salmonella*, *Staphylococcus* and *E. Coli*) in chicken meat obtained from wet market in Bangalore under different processing conditions was carried out. Results revealed higher prevalence of *Salmonella* in the range of 25 to 65 per cent and the level of contamination of meat with *Salmonella* decreased with increase in sophistication of slaughter facility and that thigh muscle were highly prone for contamination compared to the breast muscle irrespective of the processing condition. Cent percent prevalence of *Staphylococcus* was observed in outlets with minimum facilities compared to those meat obtained from outlets with better facilities and hygiene. The prevalence of *E. Coli* followed a similar trend with a range between 42 to 88 per cent indicating the lower hygiene of the meat obtained from the wet market. Lack of hygiene and better facilities have been major cause of poor microbial quality of meat.

Introduction

Ensuring safe food supply has been a continuous challenge following the recognition of more and more pathogenic bacteria. In spite of modern innovations in slaughter hygiene and food production techniques, food safety has been the fore front public health issue (WHO, 2002). The safety of commercially processed poultry products is a major area of concern for producers, consumers and public health officials worldwide for products excessively contaminated with microorganisms are undesirable from the standpoint of public health, storage quality and general aesthetics (Cunningham, 1982). The contamination of chicken meat with microorganisms during processing, handling and transportation is undesirable, though inevitable. A higher bacterial load on the carcass could be expected when carcasses are handled unhygenically at the abattoir (Bacchil, 1998). Hardly 5 per cent of the poultry meat produced in India is from organized processing units whereas, the rest is from the birds slaughtered in unorganized sector (retail shops) where due to poor hygiene there is ample scope for contamination (Kumar *et al*., 2001).

Several studies have indicated that consumption of poultry meat has been associated with incidence of outbreaks of food borne illnesses (Lunden *et al*., 2003; Prakash *et al.*, 2005). Reduction of initial bacterial load in meat is of prime importance in an attempt to improve the shelf-life of the product (Lillard *et al.*, 1984). The absence of centralized slaughter facility and the small volume of retail business, prohibitive capital costs on mechanized infrastructure and recurring expenditure have been the hurdles for hygienic production of chicken meat. Hence the present study was undertaken to bring to lime light the ground realities about the prevalence of food pathogens in poultry meat slaughtered under different processing conditions in wet market of Bangalore.

Materials and Methods

Chicken carcasses for the present study were sourced from different processing facilities and local chicken vendors in and around Bangalore and the sources from which samples were collected were designated as: **NS** – Non-sophisticated outlets, where a minimal facility was available and the same area

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Table 1. Prevalence of common food borne pathogens in market samples of chicken meat obtained from different processing facilities in Bangalore

Processing Condition	% Prevalence Breast			% Prevalence Thigh		
	Salmonella	*E. coli*	*Staphylococcus*	*Salmonella*	*E. coli*	*Staphylococcus*
NS	65.71	85.71	100	71.43	88.57	100
MF	48.57	68.58	100	51.43	77.14	100
SOF	48.57	60.00	88.57	48.57	74.29	91.43
PP	22.86	42.86	82.86	25.71	42.86	85.71

NS- Non-Sophisticated outlets, MF- Moderate Facility, SOF - Sophisticated outlets, PP- Poultry Processing facility

was utilized for slaughter, cleaning and evisceration. Water from bore wells is used in these outlets for cleaning. **MF**- Moderated facility outlets, where separate units are available for scalding, defeathering, evisceration and portioning of the carcass. They have their own water facility. **SOF**- Sophisticated outlets, where tiled floors and walls are available, all modern facilities for slaughter of birds is available and they have water purifying systems for better quality of water used for cleaning. **PP**- Poultry processing plants, where birds are slaughtered on rail and strict hygiene measures are in place. RO plant supplies water for all these operations.

A total of 35 samples (200 gm) were drawn from each of the processing facility from both breast and thigh region, equally. A total 280 samples were drawn and were subjected to microbial analysis for the enumeration of *Staphylococcus*, *E. coli* and *Salmonella*. Microbial evaluation was carried out based on the standard protocol prescribed by APHA (1984). The isolated colonies were identified based on growth in selective media and biochemical tests.

Results and Discussion

The incidence of various food borne pathogens (*Salmonella*, *E coli*, and *Staphylococcus*) in chicken breast and thigh muscles procured from different processing conditions viz., NS, MF, SOF and PP are presented in Table 1.

The percent prevalence of *Salmonella* spp. in chicken breast muscle from NS, MF, SOF and PP were 65.71, 48.57, 48.57 and 22.86, respectively and that of thigh muscle were 71.43, 51.43, 48.57 and 25.71, respectively. The results of the study revealed that contamination of meat with *Salmonella* decreased with increase in sophistication of slaughter facility and that thigh muscle were highly prone for contamination compared to the breast muscle irrespective of the processing condition. The higher rate of incidence of Salmonella could be attributed to lack of proper cold chains, inadequate power supply, and low levels of hygiene in retail outlets (Bhattacharya and Dash 2007). The results were in concurrence with those reported by Padungtod and Kaneene (2006) in chicken carcasses in Northern Thailand (57 per cent) a. Similar prevalence was reported by Bajaj *et al*. (2003) in India (69 per cent). Contrary to the findings of the present study, lower incidence of *Salmonella* in chicken carcasses have been reported by Maharjan *et al*. (2006) (14.5 per cent) and Vaidya *et al*. (2005) (negligible).

The prevalence of *E. coli* in chicken meat was higher in all facilities ranging from 42 to 88 per cent with lower incidence in processing units where strict hygiene is was in place. The lower prevalence of *E. coli* with increase in the level of sophistication could be due to the fact that carcasses from processing facilities are maintained under strict hygiene and cold chain till they reached the consumer and the findings are in agreement with Abu Ruwaida *et al*. (1994).

Prevalence of *Staphylococcus* was recorded in both NS and MF, whereas comparatively lower prevalence was recorded in other facilities. Thigh samples recorded higher prevalence compared to the breast muscle, which might be due to their proximity to the evisceration point and maximal handling of the thigh region during the dressing operations. The results of the study were in concurrence with Capita *et al*. (2001), who recorded 90 percent and Kreyenschmidt *et al*. (2002) who reported 95 per cent prevalence of Staphylococcus in market samples of chicken meat.

Conclusion

The results of the present study indicate that the prevalence of common food borne pathogens in the market samples of chicken meat in Bangalore city is on the higher levels. Irrespective of the facilities thigh meat had higher prevalence compared to meat obtained form breast and that increase in levels of hygiene and facilities during processing has been found to be effective in reducing their prevalence. Hence, maintenance of strict hygiene during slaughter and processing is of prime importance to produce meat with good microbial quality and better shelf life, thereby ensuring safety to the consumers.

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