

Isolation Rate of *Salmonella* in Dead Chickens from Commercial Poultry Farms in Chittagong, Bangladesh

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Abstract

A cross-sectional survey was undertaken to know the isolation rate of *Salmonella* in dead broiler and layer chickens in the district of Chittagong. Altogether, 100 dead chickens were sampled of which 35 and 65 were broiler and layer chickens, respectively. The isolation and identification of *Salmonella* from liver samples of these birds were done using standard bacteriological procedures where MacConkey and/or Salmonella-Shigella agar were used as the primary selection media. The results showed that the overall isolation rate of *Salmonella* was 32% and the isolation rates of *Salmonella* in broiler and layer chickens were 9% and 91%, respectively. The rates of *Salmonella* isolation in dead chickens belonging to three different age groups (≤ 8 wk, 9-20 wk and >20 wk) varied; however, the rate was significantly higher in the chickens of >20 weeks of age compared with ≤ 8 weeks ($P < 0.05$).

Key word: Dead chickens, Isolation, *Salmonella*

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1. INTRODUCTION

Salmonellae are non-motile, slender rod shaped Gram-negative organisms. On noninhibitory media, colonies are small, round, glistening, dome shaped, smooth, and 1-2 mm in diameter after 24-48 hours' incubation (Pomery and Nagaraja, 1991). There are >2500 serovars of *Salmonella enterica* of which the non-motile serovars – *S. Pullorum* and *S. Gallinarum* are poultry specific and cause two economically important diseases in them namely, pullorum disease and fowl typhoid. All other motile *Salmonella* are zoonotic and poultry are considered as a major source for some of them. *Salmonella* can be transmitted vertically from breeder to commercial farms.

There is limited information on the prevalence of *Salmonella* in chickens in Bangladesh, although antimicrobials of different kinds are used to deal with *Salmonella*-induced and other bacterial diseases. Vaccines against certain serovars are also commercially available and some farmers have been using them, although their efficacies at the field level have never been evaluated in Bangladesh. Whether the above mentioned two approaches are economically cost-effective or not can be guessed, if the overall load of *Salmonella* is known in the commercial chickens. With this background, a cross-sectional survey was carried out to generate some base-line information on the isolation rate of *Salmonella* in dead commercial chickens in the district of Chittagong.

2. MATERIALS AND METHODS

A cross-sectional survey was undertaken on the isolation rate of *Salmonella* from dead chickens of commercial broiler and layer farms' origins in the district of Chittagong, during the period of September to December 2010. The material of investigation was liver from dead chickens. In total, 35 dead broiler and 65 layer chickens were sampled. Freshly dead chickens were collected, and from them, taking all aseptic measures livers were taken on individual plastic bags, coded with sample numbers and then shipped to the department of microbiology where they were kept frozen until investigations.

Initial isolation of *Salmonella* was made on MacConkey or Salmonella-Shigella (SS) agar where characteristic colonial growth was suspected for *Salmonella* and

identification was made based on standard bacteriological procedures applied for *Salmonella*, according to OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (2010).

3. RESULTS AND DISCUSSION

The overall isolation rate of *Salmonella* was 32% and the isolation rates in the layer and broiler chickens were 91% and 9%, respectively. The numbers of samples investigated - according to the three age groups, regardless of production discriminations, and their status for *Salmonella* are shown in Table 1. The isolation rates in different age groups varied from 20 to 32. The rate of isolation in chickens of > 20 weeks of age was significantly higher from the rate observed in the age group of ≤ 8 weeks ($P < 0.05$).

Table 1. Isolation rate of *Salmonella* in dead chickens under two commercial production systems in Chittagong, Bangladesh

Group	Age (Weeks)	No. of Sample	No. positive for <i>Salmonella</i>
A	≤ 8	50	15
B	9-20	30	12
C	>20	20	5
Total		100	32

The overall isolation rate of *Salmonella* in this study is similar to Hoque *et al.* (1996), but is slightly higher than of Sikder *et al.* (2005) who reported 23.8 %. In some other countries the rates however varied: Torzolo *et al.* (1977), Prukner (1987), Ghosh (1988), Waltman and Horne (1993) and Yang *et al.* (1996) reported 9%, 13.9%, 7.5%, 10% and 15% *Salmonella* positive cases, respectively. These variations might be attributable to different management and ecological factors. A higher isolation rate of *Salmonella* in adult chickens in this study is corroborated with Islam *et al.* (2006), Lee *et al.* (2001) and Hoque *et al.* (1996).

4. CONCLUSION

This cross-sectional short period of survey with a small sample size shows that the isolation rate of *Salmonella* in both dead broiler and layer chickens is quite high. Because of resource limitations we were unable to serotype the isolates obtained through this survey. More structured epidemiological studies are recommended to explore the different serotypes of *Salmonella* that are circulating in commercial chickens in Bangladesh, their zoonotic impacts and antimicrobial resistance profiles.

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