Salmonella Contamination in Poultry

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Salmonella contamination in chicken meat and egg products poses a threat to human health. The present work reports the presence of Salmonella organisms in poultry and their products.

Materials and Methods

During the year 2009-10, a total of 923 samples such as feed (144), feed ingredients (81), water (216), faeces (122), boot swab (126), drag swab (72), liver (21), spleen (18), intestinal contents (18), yolk (18), visceral organs (60) and muconium (27) received from poultry farms and feed suppliers were processed at Avian Disease Laboratory, Namakkal for the isolation of Salmonella spp. organisms as per the procedures described by Andrews and Hammack (2007). The samples were inoculated in pre-enrichment medium, incubated at 37°C for 24 h, and inoculated in tetraionate broth for selective enrichment, incubated at 37°C or 41.5°C for 24 h. A loopful culture from the selective enrichment medium was streaked onto Brilliant Green Agar plate (BGA) and incubated for 24-48 h at 37°C. Three to five well isolated pink coloured colonies from the BGA plate were subjected to further biochemical tests such as TSI, lysine utilization, urease test, citrate utilization, lactose fermentation test, ONPG, MRVP, indole and sugar fermentation tests for identification of Salmonella organisms. The isolates were sent to National Salmonella and E.coli Centre, Central Research Institute, Kasauli for serotyping. Antimicrobial susceptibility was tested by a standard disk diffusion method (Simmons 2002). The antimicrobial agents used were amoxicillin (30 μg), ampicillin (10 μg), cephotaxime (30 μg) chloramphenicol (30 μg), ciprofloxacin (30 μg), contrimoxazole (23.75 μg/ 1.25 μg), enrofloxacin (10 μg), norfloxacin (10 μg) and oxytetracycline (30 μg).

Results and Discussion

Out of the 923 samples screened for the isolation of Salmonella organisms from poultry, 14 isolates were obtained. Salmonella organisms were detected in 4.4 per cent (10/225), 2.6 per cent (3/122) and 5.5 per cent (1/18) of the feed, faeces and spleen samples tested respectively. Biochemical reactions of the isolates revealed alkaline nature, acid but with hydrogen sulphide gas production on triple sugar iron slant. The isolates were tested positive for methyl red, citrate and lysine utilization. The reactions were negative for indole production, Voges Proskauer's test, urease and ONPG tests. The organisms fermented arabinose, maltose, sorbitol and dulcitol and produced acids and negative for lactose fermentation. The serotyping of the isolates was found to be S. Newport 6, 8: e, h: 1, 2 based on O, H phase I and II antigens. Poultry are commonly infected with a wide variety of Salmonella serovars. Infections are generally subclinical and one serovar may be a predominant isolate in a country for several years before it is replaced by another serovar (Wray et al., 1996). Though S. Typhimurium and S. Enteritidis are the predominant serovars among the Salmonellae causing food borne infection, human illnesses attributable to Salmonella Newport began to rise in the recent past. S. Newport is detected in many animal products and most commonly isolated serotype from ground beef (Anon, 2008). The percentage of Salmonella isolated from poultry and its products in the present report may be of significance because of its zoonotic potential.

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The isolates obtained from the samples in the present study were sensitive to ciprofloxacin, enrofloxacin, cepotaxime and norfloxacin antibiotics, intermediate to oxytetracycline, and chloramphenicol and resistant to ampicillin, cotrimoxazole and amoxicillin antibiotics. The findings were concurrent with the reports of Simmons (loc. cit) and Deepak Arora et al., (2010) regarding intermediate or resistance pattern for oxytetracycline, cholaramphenicol, ampicillin and sulphonamides antibiotics. Presumably, the development of multiple antimicrobial resistant strains of S. Newport was the cause for the differences in the pattern of antibiogram (Steve Yan et al., 2004). Inadvertent use of antibiotics for a long duration in sub optimal doses causes development of antibiotic resistance properties in Salmonella organisms (Swaminathan, 2001; Batabyal et al., 2003; Lee et al., 2003, Prakash et al., 2005). Salmonellae are difficult to eradicate from the environment. However, because the major reservoir for human infection is poultry and livestock, reducing the number of salmonellae harbored in these animals would significantly reduce human exposure.

References