

Abstract

A comprehensive ecological survey was conducted from April 1997 to June 1999 on four turkey flocks (F5-F8) to identify the preharvest sources of *Salmonella* colonization. Generic *E. coli* and total coliforms were enumerated as indicators of fecal contamination in F7 and F8. Turkey cecal and crop contents, litter, drinkers, air, feed, feeder contents, and environmental swabs were sampled and tested for *Salmonella* and *E. coli*. *Salmonella* was isolated from 13% of litter, 11% of turkey ceca, 10% of drinkers, and 5% of swabs. *Escherichia coli* and total coliforms were detected in 45 and 53% of samples, respectively. *Salmonella heidelberg* was the major serotype isolated from the sampled flocks. About 25% of the *Salmonella* isolates were resistant to antibiotic(s). Identifying preharvest sources of *Salmonella* and *E. coli* colonization would assist integrators and producers in designing hazard analysis and critical control point (HACCP) Protocols. On-farm reduction of these pathogens will assist processors in reducing positive carcasses at the plant.

A skin attachment model was used to examine the ability of ZnCl₂ to reverse or inhibit *Salmonella* attachment to broiler skin. In reversal experiments, skin samples were first treated with 1 mL of *S. typhimurium* culture (10⁸ CFU/mL) for 30 min, followed by the addition of 1 mL of 25 or 50 mM ZnCl₂ for 5 or 15 min. For inhibition experiments, this order was reversed. "Firmly" and "loosely" attached salmonellae were enumerated on the skin. Treated skin samples were observed under a scanning electron microscope. In reversal experiments, 25 and 50 mM ZnCl₂ reduced ($p < 0.01$) "firmly" attached cells by 77 and 89%, respectively, when compared to the control (water). At 25 and 50 mM concentration, ZnCl₂ reduced ($p < 0.0001$) cells in the "discard" by 99.4 and 99.9%, respectively. Micrographs indicated that 25 and 50 mM ZnCl₂ reduced ($p < 0.1$) *Salmonella* attachment by 69 and 99.9%, respectively, in the reversal experiments. In the inhibition experiments, 25 and 50 mM ZnCl₂ reduced ($p < 0.01$) "firmly" attached cells by 82 and 91%, respectively. Reduction of *Salmonella* may be attributed, in part, to the bactericidal activity of ZnCl₂ in addition to detachment of the bacterial cells on skin.