

Detection of *Salmonella* Throughout a South African Poultry Slaughtering Facility

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Abstract

Poultry is commonly associated with foodborne pathogens, including *Salmonella*. The presence and adaptability of *Salmonella* within the poultry food chain remains a concern and requires investigation. This research project focused on investigating the occurrence of *Salmonella* at various stages in the poultry slaughtering process to gain an understanding of the occurrence throughout production, and where necessary intervention is required.

A total of 399 samples were taken at a South African poultry facility during the slaughtering process: namely bleeding, plucking, evisceration, chlorine application, ozone application, chilling, and processing. Samples were taken during four trials throughout 2022 and included neck skin samples, environmental swabs, cloacal vent swabs, and water samples, and were tested using the Food and Drug Administration's BAM method for the detection of *Salmonella*. Presumptive positive samples were confirmed using the VITEK® 2 Compact system. Confirmed positive samples from each stage of the second trial were selected for antibiotic susceptibility testing using the VITEK® 2 Compact System.

A total of 208 *Salmonella* isolates were detected, with 27, 100, 60, and 21 positives from the first, second, third, and fourth trials respectively. During the sampling trials, isolates were obtained from all stages of slaughtering. A total of 32 isolates from the second trial were selected for antibiotic susceptibility testing and all isolates showed resistance to cefuroxime, cefoxitin, cefuroxime axetil, amikacin, and gentamicin. A total of eight isolates from the ozone application, chlorine application, evisceration, pluckers, and bleeding showed multi-drug resistance.

The detection of *Salmonella* after the intervention stages and throughout the poultry slaughtering process highlights the food safety risk due to possible cross-contamination from processing or product handling. This study also indicates that there is resistance to antibiotics, a recurring concern due to the use of antibiotics for clinical and farming purposes. Further investigation into the influence of various stages of slaughter on the survival and resistance of the organism will equip the South African industry with more knowledge and provide insight into control methods that can be used to prevent its occurrence.