Salmonella and Shiga toxin *Escherichia coli* contamination during cattle slaughter in some South African Rural Abattoirs

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Foodborne and waterborne infections contribute significantly to morbidity and mortality of human beings worldwide, especially among vulnerable segments of the population. In addition, foodborne and waterborne infections negatively influence the socio-economic welfare of communities due to the burden that is posed on health-care systems and limited economic activity. Some *Salmonella* serovars and Shiga toxin *Escherichia coli* (STEC) are among the zoonotic pathogens that have been associated with symptoms of foodborne intoxications. The aim of this study was to determine the contamination of cattle carcasses during slaughter in rural abattoirs of South Africa. In addition, parallel studies involving analysis of cattle faeces (in communities that supply the rural abattoirs with slaughter animals) and water used during the slaughter process were analysed for the presence of *Salmonella* and STEC. The *Salmonella* isolates were subjected to antimicrobial resistance testing. Classical microbiological and molecular methods were used for *Salmonella* spp and STEC analysis of cattle faeces (n = 400), carcass samples (n = 100), hides (n = 67), and intestinal contents (n = 62), and water (n = 75). In addition, STEC virulence factors were evaluated using PCR reaction targeting *VT1*, *VT2*, intimin-encoding gene (*eae*), and *HlyA*. In general, 92 *Salmonella* spp were isolated representing an average of 35.37% (n = 81) from intestinal contents, hides and carcasses and 2.75% (n = 11) from cattle faeces. *Salmonella* Enteritidis occurred more frequently compared to other serovars. Variation was observed between the serovars that were observed on the carcass, hides and intestinal contents, which signals diverse sources of contamination other than those analysed. A large proportion of the 92 *Salmonella* spp was resistant to a minimum of one of the tested antimicrobials (n = 66; 71.7%). Most of these isolates were resistant to oxytetracycline (51.90%). Of the 229 samples from hides, carcasses and intestinal contents that were analysed, 45 (19.65%) tested positive for diverse STEC virulence factors, of which 21 (9.17%) were *E. coli* O157:H7. The proportion of STEC on hides, carcasses and intestinal contents were not significantly different. In conclusion, diverse combinations of *VT1*, *VT2*, *eae*, and *HlyA* were associated with STEC from hides, carcasses and intestinal contents among cattle slaughtered in rural abattoirs of South Africa. Cattle that are processed in some rural abattoirs in South Africa may be contaminated with different *Salmonella* serovars, which may be resistant to common antibiotics. This study highlighted the potential health risk of cattle slaughtered in rural abattoirs and emphasises the need for instituting Good Hygienic Practise during animal slaughter and prudent antimicrobial use during cattle production.

Keywords: *Salmonella*; Shiga toxin *Escherichia coli*; cattle slaughter

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