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ABSTRACT

Antimicrobial resistance of *Escherichia coli* isolates from broiler chickens and clinical specimens from Jamaica

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In this study, 34 *E. coli* isolates from chicken litter of healthy broiler were analyzed to determine their susceptibilities to antimicrobial agents used in the Jamaican poultry industry. The susceptibilities of avian *E. coli* were also compared to 48 clinical *E. coli* isolates using a similar antimicrobial panel. Eighty two *E. coli* were isolated from broiler chicken litter and clinical specimen and analyzed by agar disk diffusion to determine their susceptibility patterns to 10 antimicrobial agents.

It was determined that avian *E. coli* expressed resistance to 3 or more antimicrobials at a frequency of 76.4% with the highest rate of resistance shown to kanamycin (~91%) followed by nalidixic acid (85.3%), tetracycline (82.4%) and ampicillin (20.6%). Among *E. coli* from clinical sources, resistance to 3 or more antimicrobials was expressed at a frequency of 45.8% with the highest rate of resistance shown to kanamycin (~91.4%) followed by tetracycline (60%), ampicillin (48.6%) and nalidixic acid (14.3%).

To determine the possible mechanism(s) of tetracycline resistance among avian and clinical *E. coli* isolates degenerate primers specific for ribosomal protection proteins (RPP) and *tetB* and *tetD* efflux genes were used. PCR products were amplified from plasmid DNA only when primers for the efflux mechanism of tetracycline resistance were used. This would suggest that tetracycline resistance among avian and clinical isolates is likely to be regulated by plasmid-borne Tet^R determinants that confer resistance by the efflux mechanism.

Plasmids of tetracycline resistant *E. coli* were characterized using random fragment length polymorphism with primers which resulted in diversity between avian and human *E. coli* isolates. However, with degenerate primers for tetracycline resistant genes by the efflux mechanism, similar amplification products were observed in both avian and human *E. coli* isolates, which might suggest the possibility that both avian and human *E. coli* isolates in this study harbour a similar plasmid that confers tetracycline resistance to *tet B* and *tet D*.

The presence of multiple antibiotic resistant *E. coli* among healthy broiler chickens in Jamaica may potentially be due to the transfer of resistant genes among bacteria within different environments, trace amounts of antibiotics in chicken feed and/ or the potential cross resistance between antibiotics used in animal husbandry and human medicine.