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Prevalence and Antimicrobial Susceptibility of *E. coli* and *Salmonella* Spp. in Market Show Cattle and Swine

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Objectives

The objective of this study was to determine the prevalence and antimicrobial susceptibility of generic *Escherichia coli* and *Salmonella* spp. in feces of market show steers and hogs from a state wide livestock show.

Materials and Methods

Fecal samples were collected from market steers ($n = 84$) and hogs ($n = 84$) at a statewide livestock show, stored at 4°C and processed within 36 h of collection. Fecal samples were processed using 3M *E. coli*/Coliform Count Plates for enumeration and isolated onto MacConkey Agar for susceptibility testing. *Salmonella* prevalence was determined using selective enrichment in Rappaport Vassiliadis and Tetrathionate broths and selective plating on XLT4 agar. *Salmonella* spp. isolates, which were confirmed positive via latex agglutination, were utilized for antimicrobial susceptibility testing. Antimicrobial susceptibility testing was conducted with a microbroth dilution method using Sensititre plates from Trek Diagnostic. Isolates were tested against 14 antimicrobial agents important to both human and animal health, including: Cefoxitin, Azithromycin, Chloramphenicol, Tetracycline, Ceftriaxone, Amoxicillin/Clavulanic Acid, Ciprofloxacin, Gentamicin, Nalidixic Acid, Ceftiofur, Sulfisoxazole, Trimethoprim/Sulfamethoxazole, Ampicillin, and Streptomycin. Resistance breakpoints used were published in the NARMS 2014 Human Isolates Surveillance Report. Data was analyzed using procedures of SAS (Version 9.1.3; SAS Inst. Inc., Cary, NC).

Results

As *E. coli* can serve as a vehicle for resistance genetics, fecal samples were analyzed for its presence and

antibiotic resistance. *E. coli* populations were higher in hogs with 6.12 log₁₀ CFU/g of feces compared to steer samples at 5.57 log₁₀ CFU/g ($P < 0.05$). Of the 662 *E. coli* isolates, 98.18% (324 of 330 tested) of hog isolates and 63.25% (210 of 332 tested) of steer isolates exhibited resistance to at least 1 antimicrobial. Within isolates from hogs, the most common resistance was to Tetracycline, Sulfisoxazole, and Streptomycin with 96.67, 69.70, and 53.64% of isolates exhibiting resistance to the respective antimicrobial. *Escherichia coli* isolates from steers exhibited the most common resistance to Tetracycline, Streptomycin, and Sulfisoxazole with 55.12, 32.53, and 28.61% of isolates exhibiting resistance, respectively.

Salmonella was more prevalent in hog samples than steer samples ($P < 0.05$) with 19.05% of hogs (16 of 84) and 3.61% steers (3 of 83) testing positive. Of the 18 *Salmonella* isolates from hog samples, 83.33% exhibited resistance to at least 1 antimicrobial. Isolates from market hogs exhibited the most common resistance to Tetracycline, Streptomycin, and Sulfisoxazole with 77.78, 44.44 and 44.44% of isolates resistant to the respective antimicrobial. Conversely, none of the *Salmonella* isolates from steers exhibited clinical resistance to any of the antimicrobials.

Conclusion

Little research has been done on the antimicrobial susceptibility of bacteria in show animals. Results from this study indicate that market show hogs had higher levels the bacteria of interest and isolates from hogs were consistently more resistant to the tested antimicrobial agents when compared to steers. While making up a small percentage of the overall industry, show animals that are designated “market livestock” will eventually be introduced to the human food supply and play a role in its safety.