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## Meat and Muscle Biology™



## Variation of Antimicrobial Resistance Patterns of *Salmonella* Isolated From Honduran Meat and Poultry Products

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### Objectives

To compare and characterize the antimicrobial resistance and multidrug resistance patterns of *Salmonella* isolates obtained from Honduras based on the source of isolation.

### Materials and Methods

A total of 134 *Salmonella* isolates from Honduras were subjected to phenotypical antimicrobial resistance analysis for 14 antibiotics from 9 different antibiotic classes. The isolates were collected from different sources, including beef cattle during harvesting ( $n = 78$ ), poultry ( $n = 26$ ) and retail beef ( $n = 30$ ). Antimicrobial resistance (AMR) analysis was conducted following the National Antimicrobial Resistance Monitoring System (NARMS) protocol. Minimum inhibitory concentrations (MIC) were obtained using the Sensititre OptiRead system and Sensititre software SWIN (V3.3). Results were categorized as susceptible, intermediate or resistant according to the revised Clinical and Laboratory Standards Institute (CLSI) breakpoints.

### Results

A total of 22% (30/134) of the isolates were multidrug-resistant (MDR), which indicates resistance to at least 3 or more classes of antibiotics. Antibiotic resistance patterns of all *Salmonella* isolates were analyzed detect-

ing difference among antibiotics ( $p < 0.05$ ). The results indicate that *Salmonella* had higher resistance ( $p < 0.05$ ) to cefoxitin antibiotic with 25% (34/134), followed by amoxicillin-clavulanic acid at 23% (31/134), ampicillin, gentamicin and streptomycin with 19% (25/134), and ciprofloxacin with 16% (21/134). Moreover, *Salmonella* showed 13% (18/134) resistance to trimethoprim-sulfamethoxazole, 12% (16/134) to nalidixic acid, 10% (14/134) to tetracycline, and 8% (11/134) to azithromycin. Furthermore, resistance of 4% (6/134) was found for ceftiofur, ceftriaxone, and chloramphenicol. In contrast, all *Salmonella* isolates exhibited susceptibility to the sulfisoxazole antibiotic. MDR patterns were found to be significantly different ( $p < 0.05$ ) among isolate source. *Salmonella* isolates from retail beef trim had the highest multidrug resistance patterns ( $p < 0.05$ ) with 57% (17/30), followed by beef cattle during harvesting 15% (12/78) and poultry sources with 4% (1/26).

### Conclusion

High levels of MDR were found in retail meat products originated from Honduras, suggesting a risk and public health concern to consumers. Resistant pathogens and resistance genes could potentially be transmitted from the final products to humans and bacteria using several transmission routes. Cross contamination in wet markets could result in transfer and spreading of MDR *Salmonella* among consumers. The reduction of antibiotic use in the Honduran animal industry may reduce and limit *Salmonella* antibiotic resistance patterns in animal products.