RESEARCH ABSTRACT

PORK SAFETY

Title: Prevalence and characterization of Salmonella from head meat and trim for ground at pork processing facilities; NPB Grant #14-203.

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Date Submitted: May 4, 2017

Scientific Abstract:
Pork head meat, cheek meat, lymph nodes, and other carcass by products may become contaminated with *Salmonella* in pork slaughter facilities. In a survey, a large pork processing plant in the United States was sampled bimonthly for 11 months from January to November of 2015 to determine the prevalence, seasonality, serotype diversity, and antimicrobial susceptibility of *Salmonella enterica* (SE) isolated from cheek meat and head trim of swine carcasses. Each cheek meat and head trim collection period (January, March, May, July, September, and November) consisted of 25 samples collected on a Monday a.m., 25 on Monday p.m., 25 on Tuesday a.m., and 25 on Tuesday p.m., for a total of 100 cheek meat and 100 head trim samples (total of 200 for each period, total of 1200 for 6 periods). Tissues were cultured for SE by described procedures using restrictive media and enrichment techniques. SE isolates were serotyped by the National Veterinary Services Laboratories, Ames, IA, USA.
For the six sample periods, the percentages of SE-positive sample totals were 63% for cheek meat and 66% for head trim. The following were the results of isolations from cheek meat and head trim: January 94%; March 80%; May 53.5%; July 58.5%; September 46.5%; and November 55%. Serotypes (25) included: Derby; Heidelberg; Senftenberg; Muenchen; Typhimurium var 5-; Brandenburg; 4,12:i-; Rough_O:gst; London; Infantis; Enteritidis; Westhampton; Alachua; Ohio; Bredeney; 4,[5],12:i-; Mbandaka; Rissen; Anatum; Typhimurium; Agona; Kentucky; Montevideo; 4,5,12:i:; and Worthington. We identified 218 isolates (99 [58.8%] cheek meat and 119 [66.8%] head trim) that were multidrug resistant (greater than 3 classes of antibiotics). Of the 45 serotype 4,[5],12:i:- *Salmonella* isolated, 26 of them exhibited the ACSSuT phenotype highlighted in the 2013 NARMS Integrated report as an increasing phenotype of concern. In addition, 97 isolates exhibited elevated ciprofloxacin MIC values (0.5 to 2 mg/L). The plasmid mediated quinolone resistance (PMQR) gene *qnrB* was found in 19 of 32 isolates sequenced. The finding of *Salmonella* isolates with elevated ciprofloxacin MIC values and PMQR genes, in addition to a multitude of other AMR genes, from pork at slaughter is concerning and warrants further investigation.
These data suggest that pork products from the head may have a relatively high carriage rate of SE which includes a diverse population of serotypes, a substantial number of isolates with elevated MDR, and based on our results, there appears to be an effect of season (increased in cooler months compared to warmer ones) on the prevalence of SE in head and cheek meat.