RESEARCH ABSTRACT

INTERNATIONAL TRADE

Title: Effect of lactic acid and commercial chilling processes on the survival of *Salmonella*, *Campylobacter coli* and *Yersinia* spp. in pork variety meats - **NPB #08-171**

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Scientific Abstract:

Current industry chilling practices with and without the application of 2% L-lactic acid were compared for their effectiveness at reducing levels of *Salmonella*, *Yersinia enterocolitica*, *Campylobacter coli*, and common indicator organisms used in industry (aerobic plate count APC, *Escherichia coli*, and coliforms) on pork variety meats. Pork livers, hearts, intestines, and stomachs were either inoculated individually with 1 of the 3 pathogens or not inoculated and subjected to 1 of 5 treatments: 1 (water wash + lactic acid spray + freeze), 2 (freeze), 3 (water wash + lactic acid spray + chill + freeze), 4 (chill + freeze), and 5 (water wash + freeze). Samples were analyzed between treatment steps and after 2 months, 4 months, and 6 months of frozen storage. Results of effects of the steps within treatments showed that reductions in levels of pathogens after the water wash and lactic acid spray were significantly different ($P<0.05$) across variety meats. Treatment of variety meats with water wash and lactic acid before chilling resulted in ≥ 0.5 log CFU/sample ($P<0.05$) reductions when compared to chilling alone. Regardless of treatments, reductions in levels of *Salmonella* and *Y. enterocolitica* of 0.6-1.3 log CFU/sample were observed after freezing (0°C) overnight. Freezing reduced *C. coli* by ≥ 2.2 log CFU/sample regardless of previous treatment.

Throughout 6 months of frozen storage, reductions were observed in levels of all microorganisms equal to or greater than 1.3 log CFU/sample. The greatest reductions were observed on samples treated with lactic acid (Treatments 1 and 3) (1.3-5.0 log CFU/sample) while the smallest reductions were reported for samples without any spray treatment (Treatments 2 and 4) (0.7-4.5 log CFU/sample). Large reductions were observed in levels of *C. coli* (2.9-5.0 log CFU/sample) for all treatments. The results of this study suggest that, while the application of a water wash followed by freezing reduced levels of pathogens by approximately 1 log CFU/sample, the application of lactic acid before chilling and freezing variety meats results in significantly larger ($P<0.05$) reductions in microorganisms. Results also show that the indicator organisms, aerobic plate counts, *E. coli*, and coliforms, follow similar trends in reductions during treatment and survival during storage to the pathogen inoculum.