RESEARCH ABSTRACT

PORK SAFETY

Title: Effects of chilling methods for bacterial recovery and reducing bacteria on pork carcasses - **NPB # 00-015**

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Abstract

To date, very little information exists on recovery methods for freeze-injured cells and the effect of blast- or conventional-chilling for reducing specific pathogens associated with pork surfaces. To address these issues, two separate studies were conducted to determine 1) an effective recovery method for freeze-injured *Listeria monocytogenes*, *Salmonella* Typhimurium and *Campylobacter coli* associated with pork surfaces and to use this recovery method to 2) determine the effect of blast- versus conventional-chilling methods for reducing pathogens at two bacterial levels (high and low) associated with skin-on and skin-off pork surfaces. In the first study, cell suspensions of *L. monocytogenes, S.* Typhimurium or *C. coli* or cells associated with pork surfaces were subjected to a freeze-thaw cycle (-15ºC, 24 h; 4ºC, 4 h). Following treatments, freeze-injured cells were plated onto media incorporating the following recovery methods: overlay (OV); thin agar layer (TAL); or Lutri plate (LP) method. The recovery rates for the pathogens using the TAL, OV and LP methods following freeze treatments in cell suspensions or on pork surfaces were not statistically different ($P>0.05$) from recovery rates associated with nonselective media. The results also demonstrated that OV and TAL were reliable and consistent recovery methods for isolation of freeze-injured cells. The TAL method was not only easier to perform, but also allowed for improved isolation of single colonies for further biochemical and serological characterization.

In the second study, fecal slurries at inoculation levels of 3 and 5 $\log_{10}$ CFU/cm^2, with and without pathogens (*L. monocytogenes*, *S.* Typhimurium and *C. coli*), were inoculated onto skin-on and skin-off pork surfaces, and subjected to blast- and conventional-chilling using the TAL method developed in the first study. Results indicated there were no statistically significant ($P > 0.05$) differences between blast- or conventional-chilling in reducing APC, total coliforms, *E. coli*, *L. monocytogenes*, *S.* Typhimurium and *C. coli* at a low inoculation level. However, both blast- and conventional-chilling were more effective against bacterial populations when pork samples were inoculated with a high inoculation level (5 $\log_{10}$ CFU/cm^2). Specifically, *C. coli* associated with pork surfaces and subjected to blast-chilling was reduced to undetectable levels. Given the low levels of pathogens associated with fresh pork products, chilling regimens may provide pork processors with an added measure to improve the microbiological safety of their product.