



A Clean-In-Place Type Sanitation Method Validation for a Benchtop Meat Grinder

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Objectives

This research is designed to validate a novel clean-in-place type antimicrobial ice-based meat grinder sanitation method.

Materials and Methods

Four different types of antimicrobial ice were prepared from peracetic acid (PAA, 350 mg/L) and combination PAA with 2% FreshFX® (PAAF), 2% Paradigm® (PAAP) and 2% lactic acid (PAAL). The grinders were inoculated by processing 400 g beef trim containing 400 µL of *E. coli* O157:H7 or *S. Typhimurium* DT 104 suspensions at 8.4 to 8.7 (high inoculation) and 5.3 to 5.5 (low inoculation) log CFU/mL. Each meat grinder was then treated by processing 1000 g of antimicrobial ice and 500 mL of corresponding antimicrobial solution. At the end of each treatment, 400 g un-inoculated beef was processed through the meat grinder, and the resulting ground beef was then analyzed for the presence of target pathogens by direct plating and after enrichment. Efficacies of antimicrobial ice-based treatments were compared with 1000 g deionized water ice + 500 mL deionized water (DI), and no treatment (NT) controls.

Results

All antimicrobial ice treatments were able to reduce cross-contamination to non-detectable levels from the meat grinders inoculated at the low levels of pathogens, but after enrichment, target pathogens were detected in all the samples. Recoveries from the meat grinder inoculated with high levels of pathogens ranged from 5.95 to 3.50 log CFU/g and 5.86 to 3.46 log CFU/g for *E. coli* O157:H7 and *S. Typhimurium* DT 104, respectively. All antimicrobial ice treatments were significantly ($p \leq 0.05$) more effective in reducing cross-contamination in comparison of NT and DI controls. The microbial reductions achieved by different antimicrobial ice treatments were not significantly ($p \leq 0.05$) different from each other.

Conclusion

The antimicrobial ice-based meat grinder sanitation technique could effectively reduce foodborne pathogens from meat grinders without needing meat grinder disassembly.