Practical and Novel Sterilization Approach for the Pathogenic Staphylococcus aureus Bacteria.

ABSTRACT

Problem statement: Decontaminating meat surfaces has been the big concern of meat industry. Thus, various intervention strategies have been studied to reduce the level of bacteria on animals' carcass surfaces. Approach: Mixture of different concentrations 1, 1.5 and 2% of acetic, lactic, propionic and formic acids at 1:1 ratio were spray washed on inoculated meat to evaluate their efficacy in reducing numbers of Staphylococcus aureus on meat tissue at 4±1°C. The beef pieces were decontaminated with hot water and then inoculated with S. aureus which then were spray washed with treatments for 15 sec separately. Results: Spray wash combinations of acetic and formic, lactic and formic and propionic and formic acids reduced the number of S. aureus at a range of 1.18-1.43 log cfu mL-1 more than combinations of acetic and lactic, acetic and propionic and lactic and propionic acids on meat tissue. Increasing the concentration of used acids increased the lethality of treatments as lethal effect of 2% concentration >1.5% concentration >1%concentration. Conclusion: Lactic and formic acids Combination showed the strongest lethal effect on S. aureus among other treatments. Moreover, this study showed that the combination of lactic and formic acids treatment is a feasible, safe, and economical decontamination method which is highly recommended for use rather than other combinations or single organic acids.

Keyword: Beef; Staphylococcus aureus; Acetic acid; Lactic acid, Propionic acid and formic acid.