Antimicrobial Susceptibility and Internalization of Salmonella Typhimurium in Vacuum-Tumbled Marinated Beef Products

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Abstract

As the incidence of multi-drug resistance (MDR) Salmonella enterica serotype Typhimurium is increasing, data regarding the antimicrobial interventions and pathogen internalization in marinated meat products is important. This study evaluated the antimicrobial intervention and internalization of Salmonella Typhimurium in marinated beef sirloin steaks. Beef bottom sirloin flaps (IMPS #185A; USDA Select) inoculated (10⁸ log₁₀ CFUml⁻¹) with Salmonella Typhimurium were sprayed (lactic acid (4%) and buffered vinegar (2%)) prior to vacuum-tumbled marination (0.35% sodium chloride and 0.45% sodium tripolyphosphate) for 30 min. Pathogen presence after antimicrobial spray, vacuum-tumbled marination, and translocation was determined by direct plating on Xylose Lysine Deoxycholate (XLD) agar with tryptic soy agar (TSA) overlay. The data imply varied internalization and antimicrobial susceptibility pattern of Salmonella Typhimurium in marinated meat. Lactic acid (4%) spray (P <0.0001) and buffered vinegar (2%; P <0.0001) reduced surface populations of Salmonella Typhimurium on inoculated beef sirloin flaps prior to vacuum-marination. However, lactic acid treated sirloin flaps had greater reductions (~ 2 log₁₀ CFUcm⁻²) than buffered vinegar when compared with control prior to vacuum-marination. However, the translocation of Salmonella Typhimurium following vacuum-marination was not influenced (P <0.333) by the application of a surface organic acid spray prior to marination.

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