

## Incorporation of a Buffered Vinegar Solution to Control Growth of *Listeria monocytogenes* and Lactic Acid Bacteria in Hot Dogs

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Controlling the presence and growth of *Listeria monocytogenes* in ready-to-eat meat products continues to challenge meat processors and federal regulatory agencies. Several anti-listerial interventions, such as post-processing chemical treatments, modified atmosphere packaging, and high-pressure-processing, have been employed. However, processors may seek less expensive, clean-label, natural antimicrobial alternatives. In this study, buffered vinegar (BV) was incorporated into hot dogs and evaluated for the ability to inhibit the growth of lactic acid bacteria (LAB) and *L. monocytogenes* during long-term refrigerated storage. Hot dogs were formulated with 0%, 1.5%, or 2.0% BV, cooked (70°F), and chilled to 4°C according to USDA-FSIS guidelines. In the laboratory, a portion of the hot dogs were inoculated experimentally with a four-strain cocktail of *L. monocytogenes*, vacuum packaged, and stored at 4°C for up to 98 days. At various time points (0, 1, 2, 7, 14, 28, 61, 98 days), inoculated and uninoculated hotdogs formulated with various concentrations of BV were processed and enumerated for *L. monocytogenes* and LAB populations. Results indicated that populations of *L. monocytogenes* increased ( $<1.0 \log_{10}$  CFU/g) on hot dogs treated with 1.5% and 2.0% BV, while populations of control samples (0% BV), increased  $>3.0 \log_{10}$  CFU/g, a significantly greater concentration ( $p<0.05$ ). Growth of LAB was not observed until day 7 on treated hot dogs (0%, 1.5% BV) and not until day 14 for treatments with 2.0% BV; however LAB populations were significantly greater ( $p<0.05$ ) by day 98, increasing to 6.38, 5.71, and  $4.91 \log_{10}$  CFU/g for 0%, 1.5%, 2.0% BV treatments, respectively. These results demonstrate that the incorporation of 1.5% and 2.0% BV into hot dogs suppressed the growth of *L. monocytogenes* and slowed LAB growth during long-term refrigerated storage, thereby providing an added measure of safety and shelf stability to these products.