Objectives

The objective of this study was to evaluate the antimicrobial efficacy of Verdad Opti. Powder N60 cultured sugar and vinegar (CSV-P) versus vinegar powder solution (DV) in ham formulation. The efficacy was evaluated on L. monocytogenes growth inhibition in different product treatments incubated at 40°F for 140 d.

Materials and Methods

Pork semimembranosus was injected at 33% pump level of brine solution containing water, sea salt, cane sugar, sodium nitrite, and varying levels of antimicrobial interventions. Each treatment was macerated independently, tumbled, stuffed, and cooked in a steam cabinet to an internal temperature of 162°F. Table 1 outlines the treatment structure, proximate values for the treatments and the L. monocytogenes outgrowth data.

Each of these treatments were independently inoculated with a 5 strain cocktail of L. monocytogenes, vacuum packaged, and incubated at 40°F. The treatments were sampled in duplicate at regular time intervals, enumerated for L. monocytogenes using selective Palcam media. Water activity, pH, and moisture content analysis was performed for all the treatments.

Results

The water activity values for CSV-P treatments were generally lower than control treatment and dried vinegar treatments (Table 1). The lactic acid bacteria outgrowth is significantly influenced by water activity values and lower a_w values correspond to lower growth rate of lactic acid bacteria strains, thereby preventing early spoilage by providing an additional preservation hurdle. The pH values show similar results for different antimicrobial treatments indicating no major impact on ionic strength of the formulations.

The use of 0.5% DV, 0.7% DV, 1.5% CSV-P and 1.8% CSV-P enhanced control in outgrowth of L. monocytogenes compared to the control treatment. The 1 and 2 log_10 CFU/g outgrowth for L. monocytogenes was reached in 7 and 12 d for control treatment, respectively. Addition of 0.5% DV treatment reduced the L. monocytogenes outgrowth to less than 2 log_10 CFU/g until 50 d. Increasing the DV concentration to 0.7% further reduced the L. monocytogenes outgrowth to less than 2 log_10 CFU/g until 125 d. For the other 2 treatments (1.5% and 1.8% CSV-P), an inhibition ( < 1 log outgrowth) of L. monocytogenes was observed during 140 d of incubation, respectively.
Conclusion

This research verifies the antimicrobial efficacy of Verdad Opti. Powder N60 cultured cane sugar and vinegar powder in ham to control *L. monocytogenes* outgrowth and provides the industry with an effective, natural, and clean label ingredient solution to enhance the food safety and shelf life in sensitive meat formulations.