



## Effect of Cultured Cane Sugar and Vinegar in Comparison to Vinegar Powder on *Listeria monocytogenes* Inhibition in Natural Cured Deli Turkey Breast

P. Sijtsema<sup>1</sup>, S. Kumar<sup>2</sup>, G. McCoy<sup>2\*</sup>, and T. Rourke<sup>2</sup>

<sup>1</sup>Corbion Purac America, Lenexa, Netherlands; <sup>2</sup>Corbion Purac America, Lenexa, KS, 66215, USA

\*Corresponding author. Email: garrett.mccoy@corbion.com (G. McCoy)

**Keywords:** antimicrobial intervention, cooked processed meat, natural preservation, shelf life extension, turkey

Meat and Muscle Biology 2(2):152–153

doi:10.221751/rmc2018.134

### Objectives

The objective of this study was to assess the antimicrobial efficacy of Verdad Opti. Powder N70 cultured cane sugar and vinegar powder (CSV-P) versus vinegar powder solution (DV) on the inhibition of *L. monocytogenes* growth potential in natural cured ready to eat (RTE) Turkey breast formulation for 150 d of storage at 40°F.

### Materials and Methods

Ground turkey breast, water, sea salt, cane sugar, fermented celery juice powder and different levels of natural interventions, were mixed, vacuum tumbled, placed in a cooking bag and mold, and cooked in a steam cabinet to an internal temperature of 162°F. Table 1 outlines the treatment structure, water activity, pH, and moisture for the treatments as well as the *L. monocytogenes* outgrowth data.

Each of treatment was independently inoculated with a 5 strain cocktail of *L. monocytogenes*, vacuum packaged, and incubated at 40°F. The inoculated samples were enumerated for *L. monocytogenes* (in duplicate set), at 12 regular intervals for 150 d of incubation, using selective Palcam media. Water activity, pH, and moisture were analyzed for all the treatments.

### Results

The water activity values were relatively lower for CSV-P treatments in comparison to using dried vinegar treatments. The shelf life determined by the outgrowth of lactic acid bacteria is significantly influenced by water activity. Lower water activity values correspond to lower growth rate of lactic acid bacteria strains, thereby preventing spoilage.

The use of treatments 0.7% DV, 0.9% DV, 1.8% CSV-P, and 1.8% CSV-P showed higher inhibitory control of the outgrowth of *L. monocytogenes* compared to the control treatment. The 1 and 2 log<sub>10</sub> CFU/g outgrowth for *L. monocytogenes* were reached in 10 and 12 d for control treatment, respectively. The 1 and 2 log<sub>10</sub> CFU/g outgrowth of *L. monocytogenes* was reached at 30 and 40 d for 0.7% DV and 35 and 60 d for 0.9% DV, respectively. The addition of 1.8% CSV-P resulted in reducing the outgrowth of *L. monocytogenes*, and the counts reached 1 and 2 log<sub>10</sub> CFU/g outgrowth at 90 and 105 d, respectively. The strongest delay in growth was observed in the 1.8% CSV-P treatment, with the *L. monocytogenes* counts were controlled below 2 log<sub>10</sub> CFU/g outgrowth until 140 d.

**Table 1: Water activity, pH, moisture, and *Listeria monocytogenes* outgrowth kinetics details for different antimicrobial treatments**

Treatment Details	a <sub>w</sub>	pH	Moisture (%)	Time for 1 log <sub>10</sub> CFU/g outgrowth of <i>L. monocytogenes</i> (days)	Time for 2 log <sub>10</sub> CFU/g outgrowth of <i>L. monocytogenes</i> (days)
Control	0.980	6.35	76	10	12
0.7% DV	0.977	6.20	75	30	40
0.9% DV	0.976	6.20	75	35	60
1.5% CSV-P	0.972	6.25	74	90	105
1.8% CSV-P	0.970	6.20	74	125	140

## Conclusion

This research substantiates the antimicrobial efficacy of Verdad Opti. Powder N70 cultured cane sugar and vinegar powder in RTE turkey breast to control *L. monocytogenes* outgrowth and provides the industry with an effective, natural, and clean label ingredient solution to improve food safety and extend shelf life in sensitive meat formulations.