



Listeria monocytogenes Control using Clean-Label Ingredients

E. Heintz^{1*}, K. Glass¹, and J. Lim¹

¹Food Microbiology, Food Research Institute, Madison, WI USA

*Corresponding author. Email: eelco.heintz@niacet.nl (E. Heintz)

Keywords: clean label, food safety, *Listeria* control, sodium reduction
Meat and Muscle Biology 3(2):129-130

Objectives

World's largest outbreak of listeriosis in South Africa last year, remind us that *Listeria monocytogenes* contamination and growth is still of major concern in refrigerated RTE meats. The same time customers demand for clean label food safety solutions. Provian NDV, a fermented vinegar based powder, was developed to provide a clean label solution that inhibits *Listeria monocytogenes* during long term refrigerated storage. This document describes the effect of chemical derived acetates and Provian NDV, a novel vinegar based product, on the inhibition of *Listeria monocytogenes* in a cooked meat application

Materials and Methods

Five treatments of cured deli-style ham were tested. The pork ham contained 72–74% (w/w) moisture, 1.75 ± 0.1% (w/w) salt, and pH 6.2–6.4, 156 mg/kg sodium nitrite and 547 mg/kg sodium erythorbate. The treatments included a control without antimicrobials and different concentrations of a chemically derived acetates (0.5% and 0.75%) and Provian® NDV (0.5%, 0.65%). Cooked products were surface-inoculated with 3-log₁₀ CFU/g of a cocktail of 5 strains of *Listeria monocytogenes* from the culture collection of Food research institute, Wisconsin University including serotypes 4b, 1/2a, and 1/2b. All strains were isolated from RTE- cooked meat products. Inoculated slices (100 g/package) were vacuum-packaged and stored at 4°C and 7°C for 8 to 12 wk. Per treatment triplicate samples were assayed by enumerating on modified Oxford Agar. One way ANOVA was used to analyze significance, $p < 0.05$. Except from the triplicate repeat, this study was conducted twice independently (trial 1, 5 treatments in triplicate and trial 2 including same treatments, also in triplicate.)

Results

Control Ham supported > 1 log increase of *Listeria monocytogenes* at 4- and 2-weeks storage at 4 and 7°C, respectively. In contrast, hams supplemented with 0.5 or 0.75% chemical acetates or 0.65% Provian® NDV inhibited the *Listeria* growth for 12 and 8 wk at 4 and 7°C, respectively. Inhibition of *Listeria* on ham supplemented with 0.5% Provian®NDV was further affected by pH and moisture. Ham supplemented with 0.5% Provian® NDV in the trial 1 (71.5% moisture, pH 6.2) delayed *Listeria* for 12 wk storage at 4°C, whereas individual samples of trial 1 (72.9% moisture, pH 6.3)

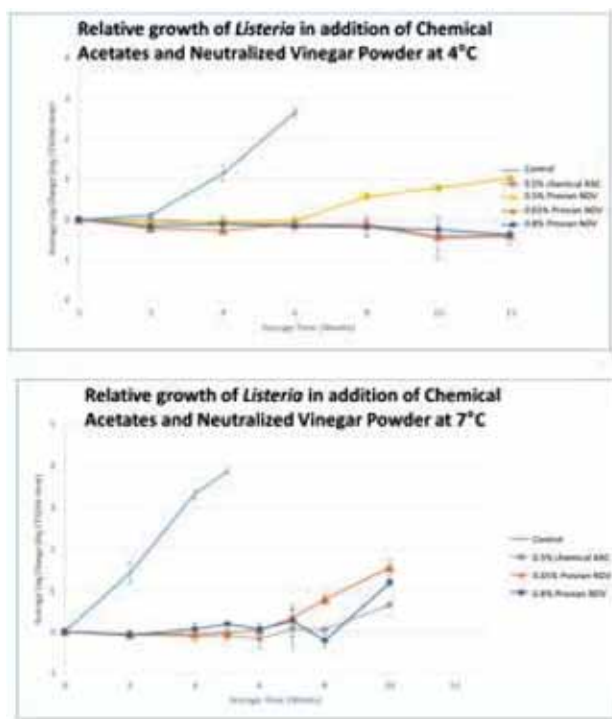


Figure 4.

supported growth (> 1 log increase) at 8 wk. Similar trends were observed at 7°C. The images below reflect the results of trial 1 only.

Conclusion

This study confirms the efficacy of acetates on the inhibition of *Listeria monocytogenes*. Next, this study

shows that a product based on natural fermented vinegar, Provian NDV, has a comparable growth inhibitive action in a cured ready-to eat ham. This illustrates that most relevant serotypes (4b, 1/2b and 1/2a) of *Listeria monocytogenes* can be controlled using an ingredient based on natural fermented vinegar.