

## 2018 Reciprocal Meat Conference – Meat and Poultry Safety

## Meat and Muscle Biology™



## Inhibition of *Listeria Monocytogenes* and Spoilage Bacteria on Cured Ready-to-Eat Meats by Sodium-Free and Clean-Label Antimicrobial Ingredients

E. Heintz<sup>1\*</sup>, L. Vega<sup>2</sup>, and G. Jahr<sup>2</sup><sup>1</sup>Innovation, Niacet, Tiel, the Netherlands; <sup>2</sup>Innovation, Niacet, Niagara falls, NY, 14304

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

**Keywords:** food safety, *Listeria* control, natural preservation, shelflife extension, sodium reduction

Meat and Muscle Biology 2(2):137–138

doi:10.221751/rmc2018.122

### Objectives

To compare the inhibitory properties of a standard potassium acetate and diacetate blend (Provian K) and a natural fermented and neutralized dry vinegar product (Provian NDV) on the growth of both *Listeria monocytogenes* and lactic acid bacteria in cured RTE meats.

### Materials and Methods

Five treatments of cured deli-style ham (72 to 74% moisture,  $1.75 \pm 0.1\%$  salt, and pH 6.2 to 6.4, 156 mg/kg sodium nitrite and 547 mg/kg sodium erythorbate) were tested, including a control without antimicrobials and different concentrations of Provian K (0.5 and 0.75%) and Provian NDV (0.5%, 0.65%). Cooked products were surface-inoculated with  $3\text{-log}_{10}$  CFU/g of a cocktail of 5 strains of *Listeria monocytogenes* (including serotypes 4b, 1/2a and 1/2b) or a mixture of 2 lactic acid bacteria (LAB) strains including *Carnobacterium divergens* and *Leuconostoc mesenteroides*, both isolated from spoiled cooked meat products. Inoculated slices (100 g/package) were vacuum-packaged and stored at different temperatures for up to 4 and 8 wk, for LAB and *L. monocytogenes*, respectively. Triplicate samples per treatment were assayed by enumerating twice on modified Oxford Agar for *L. monocytogenes* and on Plate Count agar (30°C, 48 h) and APT agar with bromocresol purple (27°C, 48 h) for LAB. The study was conducted twice.

### Results

#### Results on *Listeria* inhibition

Control Ham supported  $> 1$  log increase of *L. monocytogenes* at 4 and 2 wk storage at 4°C and 7°C, respectively (Fig. 1). In contrast, hams supplemented with 0.5 or 0.75% Provian K or 0.65% 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% 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) supported growth ( $> 1$  log increase) at 8 wk. Similar trends were observed at 7°C.

#### Results on Lactic Acid Bacteria inhibition

The Control Ham supported the increase of Lactic acid bacteria to spoilage level ( $> 6$  Logs) at 3 and 2 wk storage at 4°C and 7°C, respectively. In contrast, hams supplemented with 0.5% Provian K or 0.8% Provian NDV showed complete inhibition of LAB for 4 wk. For complete inhibition at 7°C slight higher concentrations of 0.75% and 1% were needed of Provian K and Provian NDV, respectively.

## Conclusion

The results of this study show the inhibitive effect of a natural fermented vinegar product on the growth of *Listeria monocytogenes* and Lactic acid bacteria in a cured ready-to eat ham. To have a comparable efficacy

with neutralized natural vinegar as with a standard acetate-diacetate product, the dosage of the vinegar based product should be increased by approximately 10%. This can be explained by the lower amount of undissociated acid in the product.

