



The Inhibitory Effect of a Sodium Free Powder Preservative on the Growth of *Listeria Monocytogenes* and Lactic Acid Bacteria in Turkey Ham Applications

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Objectives

Organic acids are proven effective antimicrobials against *Listeria* and LAB. However, current organic acid based preservatives are liquid in most cases and powder forms contain sodium. This document evaluates the antimicrobial efficacy of an organic acid based powder without any sodium content.

Objective

The purpose of this research is to evaluate the effects of sodium free ProvianK powder and 60% potassium lactate and sodium diacetate (PL-SD) solution on *Listeria monocytogenes* and Lactic acid bacteria in cured and uncured turkey hams.

Materials and Methods

Manufacture of Turkey hams. Deli-style turkey formulations were prepared containing boneless, skinless turkey breasts, 2.0% starch, 1.8% salt, 1.0% dextrose, 1.0% carrageenan, 0.4% sodium tripolyphosphate, appropriate concentrations of antimicrobials and balance added water. Analyzed treatments: Control (no antimicrobials), 2.5% potassium lactate–sodium diacetate, 60% sol.(PL-SD), ProvianK (potassium acetate-potassium diacetate), 0.25, 0.5, and 0.75%. Finished product targets included 75% moisture, 1.9% salt and 6.2 to 6.4 pH. Cured products contained 156 ppm so-

dium nitrite and 547 sodium erythorbate. Turkey formulations in casings were cooked to 73.9°C (165°F), cooled overnight according to USDA Appendix B and aseptically sliced.

Inoculum: Surface was inoculated with approximately 3log CFU/g using a cocktail of various serotypes of *L. monocytogenes* or a cocktail of different species of LAB isolated from meat products. Inoculated slices were vacuum packaged in gas-impermeable bag. Packages were stored at 4 and 7°C.

Microbial analysis: Inoculated samples of each treatment ($n = 3$) were assayed by rinsing meat in Butterfield's phosphate buffer and hand massaging externally for 3 min. Rinsate was serially diluted and enumerated on appropriate media. *Listeria* populations were determined by surface plating on MOX agar (35°C, 48 h); LAB plate counts were determined by plating on APT agar with bromocresol purple (25°C, 48 h). Statistical significance was determined using ANOVA.

Results

Food Safety control in cured turkey and uncured turkey (*Listeria* inhibition). At 4°C all treatments show complete inhibition of *Listeria* for 12 wk. At 7°C 0.5% ProvianK shows comparable inhibition to with 2.5% PL/SD ($P < 0.05$). In uncured meat 0.25% ProvianK shows comparable performance to 2.5% PL/SD ($P < 0.05$).

Shelf life extension in uncured turkey (LAB inhibition), see Table 1.

Conclusion

This research shows a significant improvement of antimicrobial efficacy of a sodium free powder antimicrobial compared to current used sodium containing antimicrobials. This research provides meat industry with a powerful acetate based antimicrobial powder to replace current sodium containing preservatives.

Table 1. Time (d) to end of shelflife (6 logs LAB CFU/g)

Treatment	Time (days) to end of shelflife at 4°C	Time (days) to end of shelflife at 7°C
Control without preservatives	5.5	2.5
KL/SD 60% solution, 2.5%	7.5	4.5
Provia K 0.5%	9	5
Provia-K 1.5%	12	6.5