

Title Effects of phosphate type, antimicrobials and processing methods on the quality, shelf-life and sensory characteristics of enhanced catfish fillets

Author Kin Sovann, Schilling M. Wes, Silva Juan L., Smith Brian and Nannapaneni Ramakrishna

Citation Thesis, Doctor of Philosophy (Food Science, Nutrition, and Health Promotion), Mississippi State University. 2011

Keywords catfish fillet; sodium tripolyphosphate; agglomerated phosphates; vacuum tumbling; injection; potassium lactate; potassium acetate; liquid smoke; wood smoke

Abstract

Catfish fillets that were enhanced with salt and various phosphate treatments through vacuum tumbling or multi-needle injection were evaluated for yield, protein exudate (only tumbling), surface color, pH, cooking loss, tenderness, purge loss and shelf-life. An agglomerated sodium phosphate blend (AGSP) was the optimum treatment for both vacuum tumbling and multi-needle injection and was further utilized in conjunction with potassium lactate (PL) and/or potassium acetate (PA) through vacuum tumbling to determine their effect on the quality, shelf-life and sensory characteristics of enhanced catfish fillets. In addition, the combination of AGSP and PA+PL that maximized shelf-life was further utilized in conjunction with liquid or wood smoking to evaluate the quality and inhibition of *L. monocytogenes* growth in ready-to-eat (RTE) smoked catfish fillets. All phosphate treatments increased ($P<0.05$) tenderness, but AGSP that contained mono-, tri-, and polyphosphates increased ($P<0.05$) pH and yield and decreased ($P<0.05$) yellowness in both tumbling and injection systems when compared to the control treatment. In addition, AGSP decreased ($P<0.05$) protein exudate when fillets were tumbled and increased ($P<0.05$) solution pick-up when injected. Psychrotrophic plate counts (PPC) for all phosphate treatments were similar to the control at each storage time and reached 7 log CFU/g by day 7 of storage; however, when AGSP was used in conjunction with PA+PL, PPC and sensory spoilage scores of raw catfish fillets were lower ($P<0.05$) than the control at each storage time. Marinating with a combination of 0.25% PA and 0.58% PL increased shelf-life ($P<0.05$) to between 10 and 14 days when compared to the control which had a shelf-life between 7 and 10 days. In addition, consumers preferred ($P<0.05$) fried catfish fillets that were treated with AGSP with and without PA+PL when compared to non-marinated controls with respect to appearance, flavor and overall acceptability.

In conclusion, AGSP optimized yield and improved the quality of refrigerated catfish fillets, and extended shelf-life three days over other treatments when combined with PA+PL. This combined treatment also enhanced sensory properties of fried catfish fillets and had a synergistic effect with wood smoke constituents that inhibited the growth of *L. monocytogenes* on RTE smoked catfish fillets.