

First name: Ayca

Middle name:

Last name: Gedikoglu

Adviser first: Andrew

Adviser last: Clarke

Co-adviser first:

Co-adviser last:

Grad Term: FS 2008

Department: Food Science

Degree: MS

Title: Effect of Antimicrobial Agents on Physical, Chemical and Microbiological

Characteristics of Ready-to-Eat Bologna

Abstract:

Safety and quality of meat products can be improved by using different meat processing techniques. One of those is addition of antimicrobial agents into the formulation or using them as dipping solutions. Addition to cooking, curing, packaging, and cold storage antimicrobial agents provide extra hurdle to prevent pathogen growth, improve shelf life and preserve quality of ready-to-eat meat products. In this study, organic acids' salts were used as antimicrobial agents. These were buffered liquid form of l-lactate combined with sodium diacetate (Optiform SD 4), granule form of sodium citrate (Ional) and sodium citrate combined with sodium diacetate as in granule (Ional LC). These ingredients are generally recognized as safe (GRAS), which means that they don't have toxic and carcinogenic properties. Furthermore, they have been used in food industry for many years as humectant, controlling pH, synergistic antioxidant, tenderizer or carcass decontaminant. In many studies the effect of these antimicrobial agents on foodborne pathogens have been investigated. However, there are few studies researched on the effect of these antimicrobial agents on quality of meat products. Therefore, the objective of this study was to evaluate the effect of Ional (1.5%, 2.5%, 3.5%), Ional LC (1.5%, 2.5%, 3.5%) and Optiform SD4 (2.5%) compared to a control on selected physical, chemical and microbiological characteristics of ready-to-eat vacuum-packaged bologna slices stored less than 4⁰C for up to 112 days of retail display. Water activity (a_w), expressible moisture (WHC), pH, fat and moisture content, cooking yield, texture profile analysis, puncture test, Hunter color values, total aerobic plate count (PCA), yeast

and mold count (YM), and lactobacilli count (MRS) were evaluated. WHC, pH and texture profile parameters were significantly different ($P < 0.05$) between treatments. Bologna formulated with Optiform SD4 (2.5%) had the highest springiness and hardness values after control and it had highest puncture value. Water activity was not significantly different ($P > 0.05$) between treatments. Furthermore, day of display had no significant affect on a_w . L value was significantly different for treatments, but Hunter a and b values were not. Product with Optiform SD4 (2.5%) had the highest cooking yield. MRS, PCA and YM values were not significantly affected by treatments ($P > 0.05$), however length of storage had a significant affect on the log increase. Ional (2.5%) had the lowest increase for MRS counts, while PCA count was lowest for treatments with Ional (3.5%). Presence of antimicrobial agents had no significant affect on decreasing yeast and mold growth. Treatments with Ional (2.5%) and Optiform SD4 (2.5%) were most effective for preserving quality of the bolognas. Overall results showed that the increasing level of antimicrobial agent had a negative affect on the quality characteristics of the ready-to-eat bolognas. Further studies are needed to evaluate the affect of antimicrobial agents on sensory analysis. Also, consumer taste panel needs to be conducted to determine the acceptability of the products formulated with these antimicrobial agents.