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Use of Vinegar and Jasmine Tea Extract to Control Foodborne Pathogens and Spoilage Micro-Organisms in Fresh Chicken Sausage

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Objectives

Consumer demand for natural preservatives is on rise. Verdad Avanta F100 is a natural vinegar blended with jasmine tea extract (VJTE) and has excellent antimicrobial and antioxidant properties. *Salmonella* can be a serious problem in fresh poultry products such as fresh chicken sausage. Under abusive temperature storage conditions, *Salmonella* can grow in poultry products. Aerobic plate counts (APC), Psychrotrophic, *Enterobacteriacae* and Lactic acid bacteria (LAB) counts are reported to determine the shelf life of the fresh chicken sausage. This study evaluates the impact of vinegar and jasmine tea extract on the shelf life of fresh ground chicken sausage.

The objective is to validate the efficacy of vinegar and jasmine tea extract for *Salmonella* control and shelf-life extension of fresh ground chicken sausage.

Materials and Methods

Fresh bone-in, skin-on chicken thighs were deboned and ground to 4 mm and mixed with additional ingredients (water, salt, garlic powder, black pepper, onion powder, mustard powder) for control, and 2 levels of VJTE (0.70% and 1.00%). A 5 strain cocktail of *Salmonella* spp. was used in this study; including: *Salmonella* enterica; subsp. enterica; serovar Enteritidis, *Salmonella* enterica; subsp. Enterica; serovar Enteritidis, *Salmonella* enterica; subsp. Enterica; serovar Typhimurium, *Salmonella* enterica; subsp. Enterica; serovar Typhimurium and *Salmonella* enterica; subsp. Enterica; serovar Heidelberg. For inoculated chicken samples approximately 1,000 g of mixed sausage was placed in a plastic bag along with 1 mL of 4.5 log CFU/mL of *Salmonella* cocktail and mixed together to achieve a final count of 2.5 log CFU/g of *Salmonella* in the sausage. Inoculated samples were stored at 4 and 15.4°C for 27 and 13 d, respectively. Non inoculated samples were stored at 4°C for 27 d. pH, moisture, water activity were measured for all treatments. The plating for each microflora was done independently- in duplicate and at approximately 0, 7, 11, 20, and 27 d for the non-inoculated samples and at approximately 0, 5, 8, 13 d for the *Salmonella* inoculated samples.

Results

Salmonella has been shown not to grow under refrigerated temperatures and our results show no growth for any samples over 13 d during refrigerated storage. *Salmonella* growth indicates that even under temperature abused conditions (15.4°C) vinegar and jasmine tea extract were able to limit the growth of *Salmonella* for 13 d whereas the control reached 6.54 log CFU/g in 5 d. APC growth kinetics indicate vinegar and jasmine tea extract extended the shelf life of chicken sausage for the full 27 d whereas the control showed 7.00 log CFU/g increase at 11 d. *Enterobacteriaceae* growth data indicates that use of vinegar and jasmine tea extract inhibited the outgrowth over the shelf life to the initial level, while the control treatment had 7.08 log CFU/g increase in 14 d.

Conclusion

This research validates the antimicrobial efficacy of Vinegar and jasmine tea extract (VJTE) in chicken sausage to control the growth of *Salmonella* under abused temperature conditions and to extend the shelf-life of fresh chicken sausage and provides the meat industry with a highly effective natural antimicrobial to assure the food safety as well the shelf life of the product.