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Effects of Ground Cardamom on the Functional Properties of Restructured Ground Turkey

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Objectives

The objectives of this study were to determine the effects of 0, 1.0, 1.5, and 2.0% ground cardamom in a restructured turkey product. The aim was to determine if this ingredient affected the function of an alginate binding system regarding cook yield, pH, texture, water activity, moisture percentage, and water holding capacity.

Materials and Methods

Each treatment contained 1 pound (454 g) raw turkey, 0.6% sodium alginate, 0.6% encapsulated lactic acid, 0.3% calcium carbonate, and 5.0% distilled water. Samples were prepared and stuffed into polypropylene centrifuge tubes within 20 min at 23°C and given at least 12 h to set in a 4°C refrigerator. Samples were then cooked to an internal temperature of 72°C via water bath and the experiment was replicated 3 times. The binding strength of each treatment was determined using a Stevens-LFRA Texture Analyzer fitted with a spherical probe to penetrate 1-cm discs of product. One-way ANOVA was used to analyze the data with $P < 0.05$ as the significance level and a Tukey multiple range test was used to separate means.

Results

The addition of ground cardamom within the binding system did affect pH, water holding capacity, and

cooking yield of each treatment. As ground cardamom increased, the pH decreased from 6.35 to 6.10 and the cook yield increased by 4% ($P < 0.05$). The 2.0% ground cardamom sample had the highest cooking yield (72.7%) and lowest pH value (6.10). A decreased value in pH across all ground cardamom samples correlated to a decreased value in water holding capacity. This may be explained by competitive interactions between the ground cardamom and the calcium alginate binding system. The cardamom fiber absorbed water adequately to increase cook yield, but did not possess the same water holding capacity as turkey meat bound by calcium alginate. Water activity and moisture percentage appeared to have minimal differences ($P > 0.05$) of up to 0.003 units and up to 2.8%, respectively, across all 4 treatments. It was observed that 2.0% ground cardamom (166 g) had significantly higher ($P < 0.05$) binding strength than the 1.0% ground cardamom (146 g) treatment.

Conclusion

Overall, this study indicated that adding a fiber-rich spice source enhanced the cooking yield of the product while minimally influencing other characteristics. However, no sensory evaluation was performed to determine whether the differences were desirable. Further research can be performed with sensory evaluation to determine if ground cardamom at different levels affects the appearance, flavor, and overall acceptability of a restructured turkey product.