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Utilization of Psyllium Husk Powder as a Dietary Fiber Source for Improving the Quality of a Processed Turkey Product

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Objectives

The objectives of this study were to determine the effects of different dietary fiber levels (0, 1, 2, or 3 g per serving) of psyllium husk powder on the functional properties of a processed ground turkey product and determine consumer preferences for the processed ground turkey product containing the dietary fiber additive.

Materials and Methods

Each processed turkey product contained 10.9 kg ground turkey, 0.6% sodium alginate, 0.6% encapsulated lactic acid, 0.3% calcium carbonate, 5.0% distilled water, and 0, 1.6, 6.4, or 12.8% psyllium husk powder (PHP). The Genesis R&D Food Formulation and Labeling Software was used to determine the appropriate PHP percentages to create a 55 g serving size with 0, 1, 2, or 3 g of dietary fiber. Samples were prepared and stuffed into fibrous casings and cooked until an internal temperature of 74°C was obtained via smokehouse using a step cooking method. The entire experiment was repeated 3 times. During each trial, 4 samples per treatment were initially used for functionality testing, 2 samples per treatment were vacuum-sealed and stored at 4°C for 1 wk for a secondary texture profile analysis, and the remaining 4 samples per treatment were vacuum-sealed and stored at –10°C for sensory evaluation. Forty-nine panelists volnteered for the taste panel in which each panelist evaluated 12 samples on a 9-point hedonic scale regarding flavor, texture, and appearance, and were asked to answer one "purchasing" question. Data was analyzed using One-Way ANOVA through the general linear model of SAS (SAS Inst. Inc., Cary, NC). Means were seperated by least significant difference when $P < 0.05$ values were detected.

Results

The cook yield values concluded that the 6.4 and 12.8% PHP treatments had significantly ($P < 0.05$) higher percentages, 90.0 and 90.6%, respectively. There were no significant ($P > 0.05$) differences observed for the raw and cook pH, cooked water activity, and raw water holding capacity values. Within the raw samples, as the fiber percentage increased the moisture content significantly ($P < 0.05$) decreased. The 1.6 and 6.4% PHP cooked treatments showed the highest values ($P < 0.05$) for moisture content at 70.1 and 69.4%, respectively. The 12.8% PHP had the highest significant ($P < 0.05$) values for cooked water holding capacity, hardness, springiness, cohesiveness, gumminess, chewiness, and resilience when compared to the other 3 treatments. There was no significant ($P > 0.05$) interaction observed between the texture profile analysis on wk 0 and wk 1. As the fiber percentage increased, the consumers' degree of liking for flavor and appearance significantly ($P < 0.05$) decreased; however, no significant ($P > 0.05$) difference was observed for the texture category.

Conclusion

Overall, this study indicated that adding dietary fiber into a processed meat product can benefit functionality properties such as cook yield, moisture content, water holding capacity, and texture. Ultimately though, creating a product that contains an adequate amount of psyllium husk fiber for the health benefits can become challenging and negatively impact sensory evaluation. Potentially, further research can be done with this fiber at the same or lower levels to determine shelf-life, microbiological growth, and consumer acceptability if incorporated into a specific product category.

