

2018 Reciprocal Meat Conference – Meat and Poultry Processing, Ingredient Technology and Packaging

Meat and Muscle Biology™



The Effect of Breadfruit (*Artocarpus Altilis*) Flour on Textural Properties of Comminuted Beef Compared with Other Flour Sources

S. Huang and B. M. Bohrer*

Food Science, University of Guelph, Guelph, Ontario, Canada

*Corresponding author. Email: bbohrer@uoguelph.ca (B. M. Bohrer)

Keywords: breadfruit flour, comminuted beef, ingredient technology
Meat and Muscle Biology 2(2):73

doi:10.221751/rmc2018.063

Objectives

Breadfruit flour as an ingredient in processed meat products has not previously been investigated. The objectives of this study were to investigate the effect of breadfruit (*Artocarpus altilis*) flour on textural properties of comminuted beef when compared with other flour sources.

Materials and Methods

All flour sources were obtained commercially and were unmodified. Flour sources included breadfruit, corn, soy, tapioca, and wheat. Beef samples originating from one master 15 kg batch of ground beef were comminuted to include 500 g lean beef, 200 g water, and 17.5 g salt. Comminuted beef samples were then prepared with breadfruit flour and other flour sources at varying inclusion levels (0, 1, 2, 3, 4, and 5%). Cooking loss was determined after comminuted beef samples were prepared and cooked to 72°C in a circulating water bath. Texture profile analysis (TPA) was determined using a texture analyzer (TA.XT Plus; Stable Micro Systems Ltd.) with a 30 kg load cell. The prepared and cooked samples were cut into 15 mm diameter and 10 mm thick samples and were compressed twice to 75% of their original height at a cross-head speed of 1.5 mm/s. Data were collected on the following TPA parameters- hardness, adhesiveness, springiness, cohesiveness, gumminess, chewiness, and resilience. The entire experiment (preparation of comminuted beef with flour at differing inclusion levels) was conducted in its entirety 3 times for each treatment. Statistical analyses were conducted using the MIXED procedure of SAS (SAS Inst. Inc., Cary, NC) with fixed effects of flour source, inclusion level, and their interaction. LS means were separated using the PDIF option with a Tukey's adjustment. The LS means were further separated using polynomial estimate statements to ana-

lyze linear and quadratic effects for inclusion level of each flour source.

Results

Flour source, flour inclusion level, and their interaction significantly affected cooking loss ($P < 0.05$). Cooking loss of comminuted beef prepared with breadfruit flour and the other flour sources decreased at differing rates as the inclusion level increased (*Linear* $P < 0.05$). The interaction of flour source and flour inclusion level affected a number of texture profile parameters, namely hardness ($P = 0.05$) and cohesiveness ($P < 0.01$). Hardness was at similar values and decreased as inclusion level increased (0 to 5%) for comminuted beef prepared with breadfruit and soy flour; while hardness was at greater values and remained constant or increased as inclusion level increased (0 to 5%) for comminuted beef prepared with corn, wheat, and tapioca flour. Cohesiveness decreased in value as inclusion level increased (0 to 5%) for breadfruit and soy flour; while cohesiveness remained constant or increased as inclusion level increased (0 to 5%) for comminuted beef prepared with corn, wheat, and tapioca flour. Overall, there were significant linear relationships ($P < 0.05$) as the inclusion of breadfruit flour was increased (0 to 5%) for cooking loss, hardness, cohesiveness, gumminess, chewiness, and resilience.

Conclusion

The results indicate that breadfruit is a promising ingredient in comminuted beef products. Greater research is warranted to further examine the effect of breadfruit starch on rheological characteristics and microstructure of emulsified beef products; as well as, determine the most appropriate inclusion level of optimal product formation.