

Gluten-free Noodles from Cassava-Bambara groundnut Composite Flour: Physicochemical Properties and Consumer Acceptability

Rosemond Godbless Dadzie¹, Jerry Ampofo-Asiama², Nazir Kizzie-Hayford², Gifty Serwaa Otoo³, Isaaca Adade¹, Sandra Voryehor⁴, Jesse Baidoo⁴, Emmanuel Azeedan Ayoobe²

¹Department of Agricultural Engineering, School of Agriculture, University of Cape Coast

²Department of Biochemistry, School of Biological Sciences, University of Cape Coast

³Department of Food Science and Postharvest Technology, School of Applied Sciences and Technology, Cape Coast Technical University

⁴Fountain Foods Limited, Ghana

Abstract

The aim of this study was to develop gluten-free noodles with enhanced nutritional quality using cassava and Bambara groundnut flours as alternative ingredients. A combined mixture-process design was applied to investigate the effects of two mixture components (cassava and Bambara groundnut flours) and two process factors (whole egg and xanthan gum) on the quality attributes of noodles. The responses (protein content, ash content, L*-values, Hue, chroma, browning index, weight gain, and cooking loss) were modelled by mixture-process equations. The results indicated that the protein, ash, and weight gain of the noodles increased with an increase of both cassava and Bambara groundnut flours. The noodles were optimised based on the desirability function and three optimal formulations were selected for sensory evaluation. The formulation with the highest desirability index (0.82) consisted of 70.4 % cassava flour, 29.57 % Bambara groundnut flour, 40 % whole egg, and 0.49 % xanthan gum. However, the sensory panel preferred the formulation without Bambara groundnut flour (100% cassava flour, 36.92% whole egg, and 0.23% xanthan gum), although the addition of Bambara groundnut flour enhanced protein, ash, fat and fibre contents, weight gain, phytochemical composition, hardness, chewiness and gumminess of the noodles, while reducing cooking loss.

Keywords: Cassava flour, Bambara groundnut, Nutritional composition, Cooking loss

