THE IMPACT OF SELECTED MODIFICATION TECHNIQUES ON THE PHYSICOCHEMICAL, RHEOLOGICAL AND THERMAL CHARACTERISTICS OF SOME IMPROVED NON-WAXY RICE FLOURS

Oral Defence by PhD Candidate Chijioke Anthony Nwankpa

Department of Bioresource Engineering

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Abstract

Non-waxy rice cultivars are important in global food security program. However, it is grossly underutilized in today's food market because of its unstable and unpredictable behavior when incorporated in most food systems. Physical modification of non-waxy rice flours can play a pivotal role in their adoption and utilization. The impact of physical modification techniques namely heat-moisture treatment (HMT), microwave, and ultrasound treatment was evaluated. The modified non-waxy rice flours were characterized using hydration studies, rheometer and differential scanning calorimeter (DSC). Different dispersions (4-8%) of the non-waxy rice flour exhibited pseudoplastic flow behaviour and were characterised by Power law model. Modification of non-waxy rice flours enhanced the amylose fraction of the rice cultivars, thereby significantly influencing the storage and loss modulus of the flour. Application of microwave and heat-moisture treatment was found to increase the peak gelatinization temperature (T_p) of the unmodified flours by 7.37%. On the other hand, ultrasound treatment reduced T_p of the unmodified non-waxy rice flours by 28.94%. Hydration analysis revealed that the selected modification treatments utilized in this study enhanced the oil and water absorption properties of the unmodified non-waxy rice flours. Coating chicken cuts with modified rice flours significantly influenced pore development during air frying of the coated products. Thus, this research provided new knowledge on the application of modified non-waxy rice flours in selected food systems such as in the production of flour-based

About the Candidate

Chijioke Anthony Nwankpa holds a B.Tech degree in Food Science and Nutrition from the Federal University of Technology, Minna and an M.Sc. degree in Food Science and Agricultural Chemistry from McGill University. His Ph.D. project, under the supervision of Professor Michael Ngadi, aimed at optimizing and evaluating the impact of eco-friendly physical modification techniques on flour quality and applicability.