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Nutritional Properties of Heat-Moisture Treated Maize Meal with Added Stearic Acid by Infrared Energy

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Abstract

Maize meal is considered as a high glycaemic index (GI) grain product. It is a staple and traditional food in Southern Africa. There is need to modify maize meal to increase resistant starch and other functional properties using high energy efficient, and green chemistry. This study investigated the potential of using infrared energy in the heat-moisture treatment (HMT) of maize meal with stearic acid to produce maize meal with nutritional and functional properties comparable to conventional HMT. Maize meal with stearic acid (1.5% w/w) was treated by HMT using infrared (IR) energy (at 110°C for 1, 2 & 3h) and conventional HMT (at 110°C for 16h). The pasting, thermal, structural and enzymatic digestibility properties of the treated maize meal were analysed using a rheometer, differential scanning calorimetry, X-ray diffraction scattering and in vitro starch digestibility assay respectively. Infrared HMT produced similar results compared to conventional HMT since both treatments reduced final viscosity, increased the amount of resistant starch thereby reducing the in vitro starch digestibility of maize meal with stearic acid. The estimated GI decreased from ~80 to ~69. These changes were attributed to increased formation of V-type polymorphs (Type II) and increased in relative crystallinity showed by differential scanning calorimetry and X-ray diffraction scattering, respectively. These results suggested that infrared HMT has the potential to replace conventional HMT in the development of lower GI, higher value-added functional starch foodstuffs.

Biography: Clarity Ropafadzo Mapengo

Clarity Ropafadzo Mapengo Is a postdoctoral research fellow in the Department of Consumer & Food Sciences at the University of Pretoria. She recently graduated with a PhD in Food Science from the University of Pretoria. Her research work is centered on utilising green chemistry & emerging technologies to manipulate the structure of food biopolymers and enhance the nutritional properties of food and food ingredients. She is interested in the application of chemistry and material science in the development of functional food & food ingredients from Indigenous Africa crops.