

Effect of Microwave Heat Pre-Treatment on Cooking Time, Pasting, Thermal and Sensory Properties of Sorghum Grains

A Venter, Riette De Kock, Mieke Schmidt, Naushad Emmambux

University of Pretoria, Pretoria, South Africa

Abstract

Introduction: Whole sorghum grain can be cooked and eaten as 'sorghum rice'. Whole grain is rich in dietary fibre and consumption of whole grain is recommended. However, the cooking time of sorghum grain is long. Heat treatment may reduce cooking time by disrupting grain structure.

Materials and methods: Sorghum (whole and decorticated at 5%) were soaked for 24 hours, then heat treatment using infrared and microwave. Grains were dried in a convection oven before being tested for their cooking time, and other batches underwent pasting, thermal, microscopy and sensory analysis.

Results and discussion: Heat treatments resulted in a significant reduction in the cooking time of the sorghum grains. The microwave treatment reduced the cooking time of the whole and decorticated sorghum from 80 to 20 and 15 minutes, respectively. Flour peak viscosities were significantly ($p \leq 0.05$) reduced for all treatments. Heat treatment significantly ($p \leq 0.05$) reduced the thermal [starch gelatinisation] enthalpy of sorghum. Light microscopy also showed that heat treatment caused starch pre-gelatinization, possibly protein denaturation, and the formation of starch-protein aggregates to reduce pasting viscosity. Descriptive sensory analysis revealed that decortication decreased the flavour intensity, produced a softer product and decreased the number of residual particles left in the mouth after chewing. Microwave treatment had minimal effects on the sensory properties, except for changing the colour of the product slightly.

Conclusion: Heat pre-treatment of sorghum grains caused a significant reduction in cooking time and slight decortication can promote better sensory properties for consumer acceptability.

PRESENTER BIOGRAPHY: PETER MUKWEVHO

Peter is a lecturer in the Department of Consumer and Food Sciences at the University of Pretoria. He teaches modules including product development, quality management systems, meat science, and dairy technology. He is also enrolled for a PhD in Food Science at the University of Pretoria. His research interests are meat science and protein from novel sources. Professional organization membership: SAFFoST, SASDT, IFT and AMSA