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Effects of Oven, Infrared, Microwave, and Freeze-Drying Drying Methods on Physicochemical Properties and B-Carotene Content of Orange Fleshed Sweet Potato Flour

Daddy Kgonothi, Nwabisa Mehlomakulu, Mohammad Naushad Emmambux

University of Pretoria, Pretoria, South Africa

Abstract

Recent research has shown that vitamin A deficiency is prevalent in sub-Saharan African countries. To address this issue, orange fleshed sweet potato (OFSP) has been used due to its high content of β-carotene, also known as pro-vitamin A Fresh OFSP has a limited life span, therefore drying and milling to flour is an alternative method to increase shelf life for over one year. β-carotene is heat sensitive; therefore, its quantity is reduced during oven drying. Alternative methods to preserve the β-carotene are required. OFSP was dried by oven, microwave, infrared and freeze drying. Functional properties of OFSP flour (pasting, swelling, solubility index, rehydration, bulking density, rheology and total solids and thermal properties) were analyzed as well as the β-carotene content. The results showed that OFSP flour dried by microwave and infrared, had better retention of β-carotene, as well as improved functional properties as compared to oven dried flour. The combination of electromagnetic and radiation from microwave and infrared had the fastest drying rate. Microwaves produce high frequency electromagnetic waves which have deep penetration and translate to electromagnetic energy which causes volumetric heating of the water molecules to the surface of the food material. Infrared has high surface heating and penetration to the food material; this results in shorter drying time of the food material. Microwave and infrared can be used to dry food material without completely gelatinizing the starch molecule, hence the improved functional properties.

Biography: Daddy Kgonothi

Daddy is currently doing his Masters in Food Sciences at the University of Pretoria. Daddy has completed his undergrad studies under Food Sciences at the same institution. Daddy is originally from Limpopo Province in South Africa, in the rural areas of Marble Hall where he completed his primary and secondary education. Daddy grew a passion for food science once he started learning about it during his undergrads, more especially with the issues of food insecurities facing our country and continent. Daddy's goal and aim is to play a vital role as a citizen of the world in addressing the food insecurity and malnutrition challenges.