

Development and Characterisation of Gluten-free *Magwinya* Using Sorghum (*Sorghum bicolor*) Flour

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Abstract

Magwinya is usually produced using cake or bread wheat flour because of the naturally useful proteins (glutenin and gliadin) found in wheat. In this study, we developed and characterised gluten-free *magwinya* using sorghum flour, xanthan and guar gum. The analysis of weight, diameter, crust, and crumb colour properties (L^* , a^* , b^* , ΔE , H° and C), moisture, fat, ash, fibre, and hardness were compared and evaluated with the control samples (100% wheat flour and 100% sorghum flour). The sorghum: xanthan (SX) ratios were 99.5: 0.5, 99.0: 1.0 and 98.5: 1.5; and sorghum guar gum (SGG) ratios were (98.5: 1.0, 98.0:2.0 and 97.5: 2.5). SGG samples showed a significant decrease ($p < 0.05$) in the fat content of *magwinya*, with the lowest content being 8.48% at SGG2.5. Hardness of *magwinya* was significantly lower in SGG samples due to its high moisture content. Ash and fibre content also remained significantly high in SGG samples. SGG1.5 had the highest fibre and ash content of 3.64% and 2.59% respectively. A significant decrease in hardness in SX samples as the xanthan gum level decreased ranged from 4253.91 g to 3280.86 g. A level increase in the SGG levels increased the volume (63.33 - 66.67 cm³). Colour analysis showed a significant increase in the L^* (Lightness) of the crumb (46.28 – 49.12) as compared to the crust (26.96 – 30.11) in the SX and SGG samples. Redness (12.28 – 13.77) increased with levels and yellowness (11.86-14.02) decreased with levels in SX and SGG crust. This study showed that guar gum was the better binder for developing sorghum *magwinya*. Guar gum, derived from the seed endosperm of a guar plant, is highly nutritious for health cautious people, thus bringing variety to celiac patients with the gluten-free *magwinya*.