

Characterization of the Nutritional Properties of Sorghum Composite Flours Using Different Food to Food Fortification Approaches

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Abstract

Intervention using blended composite flours can reduce malnutrition in sub Saharan Africa. Prevalence of protein-energy malnutrition among the vulnerable children has necessitated research on cost effective food product development like food to food fortification of common staples like sorghum. An investigation was carried out on the nutritional properties of selected sorghum composite flours for the production of porridge for both home and industrial applications. In this study, composite flours were made from sorghum, maize, grain amaranth, baobab and butternut at different rations. Standard methods were used in determining the chemical characteristics of the composite flours. Composite flour formulations were based on Concept4creative software. Results on proximate composition indicated a significant ($p < 0.05$) difference in moisture content of the control composite (V5) and the other composite flours with the moisture content ranging from 9.1% to 12.1% in V5 and V3 respectively. Carbohydrates were the most abundant nutrient in the composite flours 66.0 to 72.7% in V1 and V5 respectively, followed by fat 5.5% (AV3) to 9.2% (AV1), protein 5.1 (AV2) to 8.6% (AV4), crude fibre 1.5 (V2) to 4.3% (V5), and ash 1.4 (AV1) to 2.8% (AV4). The total energy ranged between 359.25 kcal (V4) to 379.94 kcal (V1) however, these values were not significantly different ($p > 0.05$). Zinc, calcium and magnesium concentration were significantly different ($p < 0.05$) between the sorghum-maize-grain amaranth-baobab-butternut, on one hand and sorghum-cassava-chickpea-OFSP-baobab composite flours on the other. The concentrations of phosphorus and Iron were not significantly different ($p > 0.05$). Correlation analysis revealed significant negative correlation between crude protein and fiber (-0.512 , $p \leq 0.001$) and crude protein and iron (-0.386 , $p \leq 0.047$), whereas crude protein and magnesium had a significant positive correlation (0.455 , $p \leq 0.017$). The results indicate that both categories of flour composites have the potential to improve nutritional status of consumers. Thus, consumption of V1 and V4 composite flours with a protein content of 8.1% and 8.6% maybe encouraged for children aged 6 -59 months who need products with good nutritional composition for proper growth and development.

Key words: Wholemeal cereal, Composite flours, Nutritional quality, Food to food fortification