

Effects of Microbiological and Physicochemical Processes on the Quality of Complementary Foods Based on Maize (*Zea mays*) Fortification with Bambara Groundnut (*Vigna subterranea*)

Authors : T. I. Mbata, M. J. Ikenebomeh

Abstract : Background: The study was aim at formulating a complementary foods based on maize and bambara groundnut with a view of reducing malnutrition in low income families. Protein-energy malnutrition is a major health challenge attributed to the inappropriate complementary feeding practices, low nutritional quality of traditional complementary foods and high cost of quality protein-based complementary foods. Methods: The blends 70% maize, 30% bambara groundnut were evaluated for proximate analyses, minerals, amino acids profile, and antinutritional factors, using proprietary formula ('Nutrend') as standard. Antinutritional factors, amino acids, microbiological properties and sensory attributes were determined using standard methods. Results; For Protein, the results were 15.0% for roasted bambara groundnut maize germinated flour (RBMGF), 13.80% for cooked bambara groundnut maize germinated flour (CBMGF), 15.18% for soaked bambara groundnut maize germinated flour (SBMGF); values for maize flour and nutrend had 10.4% and 23.21% respectively. With respect to energy value, RBMGF, CBMGF, SBMGF, maize flour and nutrend had 494.9, 327.58, 356.49, 366.8 and 467.2 kcal respectively. The percentages of total essential amino acids in the composition of the blends were 36.9%, 40.7% and 38.9% for CBMGF, SBMGF and RBMGF, respectively, non-essential amino acids contents were 63.1%, 59.3% and 61.1% for CBMGF, SBMGF and RBMGF respectively. The mineral content, that is, calcium, potassium, magnesium and sodium, of formulated samples were higher than those obtained for maize flour and Nutrend. The antinutrient composition of RBMGF and CBMGF were lower than of SBMGF. The rats fed with the control diet exhibited better growth performance such as feed intake (1527 g) and body weight gain (93.8 g). For the microbial status, microflora gradually changed from gram negative enteric bacteria, molds, lactic acid bacteria and yeast to be dominated by gram positive lactic acid bacteria (LAB) and yeasts. Yeasts and LAB growth counts in the complementary food varied between 4.44 and 7.36 log cfu/ml. LAB number increased from 5.40 to 7.36 log cfu/ml during fermentation. Yeasts increased from 4.44 to 5.60 log cfu/ml. Organoleptic evaluation revealed that the foods were well accepted. Conclusion: Based on the findings the application of bambara groundnut fortification to traditional foods can promote the nutritional quality of African maize - based traditional foods with acceptable rheological and cooking qualities.

Keywords : bambara groundnut, maize, fortification, complementary food

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