

ORIGINAL RESEARCH

Development and Evaluation of Physicochemical Sensory and Microbial Stability of Ready-To-Use Composite Porridge Flour

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Abstract

Protein-energy malnutrition remains a significant health concern among children African countries. African communities rely on a thin porridge 'uji' made solely from cereals for complementary food and this is due to their easy accessibility. These cereals lack essential nutrients and their high fiber content promotes early satiety, limiting adequate dietary intake. Research has classified proteins from cereals to have Protein Digestibility Corrected Amino Acids of 0.20-0.87, which is linked to high incidences of kwashiorkor and stunting among young children. A ready-to-use composite porridge flour was developed using pumpkin pulp flour, arrowroot flour, and sesame seed flour in four ratios: T1 (30:50:20), T2 (20:60:20), T3 (40:40:20), and T4 (50:30:20), respectively, and processed using extrusion cooking to assess its suitability as a complementary food. Analysis was done on proximate composition using standard AOAC methods. Water absorption capacity, oil absorption capacity, and bulk density were determined using approved procedures. pH was analyzed using a pH meter and color using L*a*b* colorimeter. Beta-carotene content was measured using a UV-Vis spectrophotometer, total phenolics using the Folin-Ciocalteu reagent, and mineral content by atomic absorption spectroscopy. The flour samples were stored for a period of 30 days at 40°C temperature and 70% humidity in accelerated storage. Stability analysis was done on yeast and mould using enumeration method. Moisture content ranged between 7.75% and 11.73%, with the control sample exhibiting the highest level. Significant differences were observed in the crude ash, crude fat, crude protein, carbohydrate content, beta-carotene, and total phenolic content among the treatments. WAC, OAC, bulk density and mineral content varied significantly across all samples except for iron which showed no significant difference. Panellists preferred addition of equal amounts of pumpkin pulp flour and arrowroot flour in the development of the porridge flour. Samples T1, T2, T3 and T4 had no yeast and mould detected while T0 had several CFU of yeast and moulds. In conclusion, incorporating arrowroot and pumpkin pulp flour improved the nutritional and functional properties of the composite porridge flour, making it a suitable option for use as a complementary food for young children.

Keywords: Ready to Use, Composite Flour, Pumpkin Flour, Arrowroot Flour, Sesame Seeds Flour