

## Evaluation of nutritional and rheological properties of biscuits produced using a blend of wheat and plantain flours

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### Abstract

Biscuits are nutritional products that contribute valuable quantities of proteins, calories, fibre, iron, calcium and vitamins to our daily nutritional requirements. Nowadays, plantain flours are used for the production of bakery products which would help to lessen our total dependence on imported wheat flour. Therefore, the present study was conducted to assess the feasibility of replacing wheat flour with plantain flour (cv. *Giant Cavendish*) in biscuit manufacture. The wheat flour was substituted by plantain flour at levels of 0, 20, 40, 60, 80 and 100% (w/w) for biscuit production. Nutritional composition, dough rheology and sensory attributes of the biscuits were evaluated.

The protein contents of wheat and plantain flours were 11.86% and 3.72%, respectively. Fibre and ash contents increased significantly ( $P < 0.05$ ) while the protein content decreased with increasing levels of plantain flour in the composite biscuits. The fibre content ranged from 1.03 to 3.21% in the formulated biscuits. The protein, fat, carbohydrate and ash contents of the 40% plantain flour fortified biscuit were 9.64, 21.6, 66.9 and 2.74%, respectively. Biscuits manufactured with 100% wheat flour contained 16.27, 2.45, 94.58, 1.30, 153.56 and 1.21 mg/100g for calcium, sodium, potassium, iron, phosphorus and copper, respectively. Meanwhile, at level of 40% of replacement, they increased to 29.87, 3.81, 130.2, 3.02, 195.7, and 2.36, respectively. The break strength and spread value of wheat-plantain composite biscuits decreased with increasing dilution of wheat with plantain flour without changes in the thickness. At 40 and 80% plantain flour substitution level, the break strengths and spread values were 1.69 kg and 55-68 mm and 1.45 kg and 52.45 mm, respectively. The mean scores for colour, texture, flavour and overall acceptability were generally high for all biscuits samples containing up to 40% plantain flour. Therefore, organoleptically acceptable biscuits could be produced from wheat-plantain composite flours using up to 60:40 ratios of wheat: plantain flour as maximum acceptable levels of substitution. This will reduce the over-dependence of wheat flour for biscuit manufacture and also diversify the use of plantain flour.

**Keywords:** Biscuit, nutritional quality, plantain, rheological properties, wheat flour.