



PROTEIN, ENERGY, AND ANTIOXIDANT-DENSE FLAKED BREAKFAST CEREAL BY RESPONSE SURFACE OPTIMISATION OF COMPOSITE FLOUR COMPONENTS (YELLOW MAIZE, SOYBEAN, AND MANGO PEEL)

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ABSTRACT

Breakfast flakes are a popular choice among consumers for a quick and nutritious meal. However, to enhance their nutritional value, supplementation with nutrient-dense ingredients is essential. In this study, soybean and mango peel were utilized to develop protein, energy, and antioxidant-rich flakes through an optimized formulation process. A three-component constrained optimal mixture experimental design was employed, utilizing yellow maize (0-100%), soybean (0-50%), and mango peel flour (0-50 %) blends. Standard procedures were employed to analyze the proximate composition, antioxidant properties, and colour of the flake samples. Sensory analysis using a 9-point hedonic scale was performed by thirty panellists to evaluate the flakes. Statistical significance was determined at $\alpha \leq 0.05$, and optimization was achieved by maximizing protein, energy, and antioxidant properties. The moisture content of the flake samples ranged from (7.03-9.78 %), protein (8.05-35.37 %), fat (3.13-13.74 %), ash (2.72-5.88 %), crude fibre (1.75-5.55 %), and carbohydrate (39.41-70.94 %). The energy value ranged from 341.95 to 422.71 kCal. Mango peel flour increment significantly influenced the antioxidant properties of the flakes, while changes in protein, fat, and energy were dependent on the quantity of soybean flour. The inclusion of up to 33.33% mango peel flour did not significantly alter the sensory ratings compared to the control sample (100% maize flour). The optimized composite formulation for nutrient-dense flakes consisted of 50 % yellow maize, 28.45 % soybean, and 21.45 % mango peel. Enriching flakes with soybean and mango peel flour significantly improved their protein, energy, and antioxidant properties, making them a healthier choice for consumers of all ages.
