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Development of ready to use supplementary food (powder) to address chronic malnutrition under the age group of 6 – 59 month children

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The low energy and nutrient content of supplementary foods in developing countries has been associated with linear growth faltering (stunting), increased morbidity and delayed motor milestone acquisition. As chronic malnutrition is evidently prevailing, it should be urgently combated through proper nutrient supplementation. The aim of this present study was to produce and evaluate the nutritional quality of a ready to use supplementary food from rice (*Oryza sativa*), chick peas (*Cicer arietinum* L), soy beans (*Glycine max*), moringa leaves (*Moringa oleifera*), mung beans (*Vigna radiate* L.), peanut *(Arachi shypogeae* L), sugar, vegetable fat, milk powder and a vitamin mineral premix to address chronic malnutrition. The ingredients were obtained from the local market and Nutrition Division of the Medical Research Institute, Sri Lanka. Rice, chick peas, mung and soy beans were soaked, oven dried, milled and sieved into flour. Peanuts were roasted, milled and sieved into flour. Fresh tender leaves of moringa were pre-treated with 0.5% SMS, blanched at 90 ^{o}C for 10 min, dried at 60 ^{o}C for 24 hr, milled and sieved to obtain flour. The ingredients were mixed in different ratios to obtain eight recipes which complied with the basic nutritional needs of malnourished children. A sensory analysis was carried out to select the best formula out of these eight samples. Significant differences ($P < 0.05$) were reported for the sensory parameters of overall acceptability, colour, taste, and odour for sample no. 681, which was selected as the most preferred sample. The nutritional composition and functional properties of the final product were analyzed and the most suitable packaging material was determined using standard methods. The caloric value, protein content, total fat content and crude fiber content of the final product (per 100 g) were 453.96 ± 2.12%, 18.419 ± 0.08%, 19.396 ± 0.31%, 3.517 ± 0.98%, respectively. About 0.4% of n-3 and 8.0% of n-6 polyunsaturated fatty acids (PUFAs) were present in the final product with a preferable n-6/n-3 ratio. The final product contained 821.1 g, 202.11 mg, 241.1 mg, 35.60 mg, and 24.7 mg of K, Mg, Ca, Fe and Zn respectively. The swelling capacity, water absorption capacity and bulk density of the final product were 0.87 ± 0.03, 0.67 ± 0.03 $cm^3\ g^{-1}$, and 0.71 ± 0.01 g cm^{-3} respectively. The 12 MetPet/45 LDPE material was selected as the most suitable packaging material after conducting a three-month storage study. The peroxide value of the product was lower than 10 meq/kg after three months of storage. Moisture content of the final product after three months was within the recommended range. Microbiological analysis during the three-month storage period revealed that yeast and mould count (< 10^2 cfu/g), total plate count (< 10^4 cfu/g), and presumptive coliform count (< 10^2 cfu/g) of the product did not exceed the acceptable levels indicating that the product is microbiologically safe after three months of storage.

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