



212/B

Development of high caloric nutritional porridge formula rich in pro-vitamin A and iron for primary school children

I G G Kasunamala,^{1*} Jagath Wansapala¹ and H M Theja Herath²

¹Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayewardenepura, Gangodawila, Nugegoda

²Food Technology Section Laboratory, Industrial Technology Institute, 363, Bauddhaloka Mawatha, Colombo 07

Malnutrition is a major problem among school children in Sri Lanka. This is mainly due to the consumption of ready to eat foods with low and imbalanced nutritional value. The aim of this study was to produce high caloric nutritional porridge rich in pro-vitamin A and iron, and to evaluate the nutritional quality of the developed porridge. Selection of raw materials was done by considering the availability, nutritional value and the organoleptic properties of the ingredients. After conducting the sensory evaluation in several formulations, the best formula which fulfills the main objective of the study, was selected for further study. This formula contains pachchaperumal, rathu heenati as two traditional rice varieties (*Oryza sativa*), medeeri (*Panicum miliaceum*), soybean seeds (*Glycine max*) and green gram seeds (*Vigna radiata*) as the grain mixture. Pumpkin (*Cucurbita maxima*), gotukola (*Centella asiatica*) and spinach (*Spinacia oleracea*) were selected as the vegetables due to their high β carotene and iron content. Common spices (pepper, mustard, curry leaves, coriander, fenugreek, cumin seeds, garlic, red onion, ginger, cinnamon, table salt) used to prepare porridge at household level were used as the spicy mixture. All the ingredients were separately washed, cleaned, dried ($mc < 10\%$) and ground to 0.5 mm particles. Vegetables were steam blanched for two minutes before dehydration and leafy vegetables were dipped in colour preserving solution (1% SMS, 1% $MgCO_3$ and 3% Citric acid solution at pH 3.0 – 3.5) for five minutes. Three formulae were made by mixing the ingredients according to the ratios, and using sensory evaluation the best formula was selected. Due to the moisture content and water activity difference of raw materials, two packages were introduced, as Met Pet/ LDPE aluminum foil for the spicy and vegetable pack and Pet/ LDPE transparent foil for the cereal pack. For the selected formula, proximate analysis (AOAC methods 2012), vitamin, mineral, microbiological analysis and storage studies were conducted. The final product was sensory approved with regard to all sensory attributes (taste, colour, texture, mouth feel, palatability and overall acceptability). The caloric value, protein, fat, dietary fiber, available carbohydrate and ash content of the selected product (per one serving: 200 mL) were 78.53 kcal, 3.17 g, 3.92 g, 1.94 g, 7.63 g, 1.94 g respectively. Further, the selected product contained 1.1 g, 16.4 mg, 6.4 mg, and 1.2 mg of Na, Ca, Fe and Zn respectively. It also contained 30.0 μ g, 8.6 mg and 0.4 mg of β carotene, vitamin B₃, and vitamin B₆ respectively. The moisture content (8.49%), water activity (4.98) and the microbial count were monitored and these parameters were within the recommended standard range during the two months of storage.

Keywords: High calorie, nutrition, porridge