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A Dual Food-to-Food Fortification with *Moringa oleifera* Leaf Powder and *Adansonia digitata* Fruit Pulp

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Abstract

Malnutrition is one of the most serious problems throughout the world and children are especially vulnerable because of their rapid growth occurring while subject to inadequate dietary patterns. A cost-effective and sustainable alternative is food-to-food fortification by opposition to classical food fortification using chemical ingredients. In such a context, nutrient rich local food resources such as *moringa* leaf powder and baobab fruit pulp are good food fortificant candidates. This research aimed at (i) designing fermented sorghum ogi porridge dual fortified with *moringa* leaf powder and baobab fruit pulp and (ii) assessing iron, calcium and zinc bioaccessibility (IVS) to alleviate micronutrients deficiencies among under five years old children. In this way, fortification rate was defined by integrating traditional practices and literature data related to the amount of fortificant consumed daily by the under five years old children. The *in vitro* solubility (IVS) of the minerals were used as estimate of their digestibility and was assessed by simulating gastro-intestinal digestion. Acceptability test was performed using the facial expression of children and the perception of mothers. The results indicate that fortification increases significantly ($p < 0.05$) calcium content from 43.6 ± 1.9 mg/100 g dry weight to 3454.5 ± 86.4 mg/100 g dry weight, iron content from 7.3 ± 0.2 mg/100 g dry weight to 88.4 ± 1.2 mg/100 g dry weight and zinc content from 88.2 ± 3.8 mg/100 g dry weight to 202.4 ± 3.1 mg/100 g dry weight. In Vitro Solubility (IVS) of zinc significantly increases ($p < 0.05$) after fortification from $0.5 \pm 0.1\,\%$ to $2.1 \pm 0.1\,\%$. The acceptability test indicates that sorghum porridge dual fortified with *moringa* leaf powder and baobab fruit pulp (fortification rate, 17.0 %, dry weight) was the most preferred by children and their mothers. Finally, we suggest that dual food-to-food fortification using *moringa* leaf powder and baobab fruit pulp for porridges be promoted to fight against micronutrients deficiencies especially zinc deficiencies.

Keywords: Food to food fortification, *in vitro* digestibility, micronutrients deficiency

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