No.53

PREFERENCE TESTING OF NOVEL FORTIFIED BLENDED FOODS WITH INFANTS AND YOUNG CHILDREN IN TANZANIA

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INTRODUCTION

- Fortified blended foods (FBFs), including Corn Soy Blend Plus (CSB+), are widely used as supplementary foods in many developing countries around the world, but they have been criticized for their limited ability in treating young children with malnutrition.
- The Food Aid Quality Review (FQAR) recommended improving the formulation of existing FBFs in various ways such as increasing energy density and increasing acceptability to aid in consumption.
- The Micronutrient Fortified Food Aid Pilot Project was launched at Kansas State University to develop new cereal-based FBFs based on FQAR requirements and meet the goal of food security.
- USDA required the new FBFs be high in nutrition, but it is important to assure that they are acceptable or preferred to current product by target populations: infants and young children, 6 months to 5 years.

OBJECTIVES

- To determine children's preference of porridges prepared from new FBFs compared to the current FBF used in most food aid programs.
- To evaluate sensory characteristics of porridge prepared from each FBF using descriptive sensory analysis in order to explore reasons for children's preferences.

MATERIAL AND METHODS

Samples

Novel extruded FBFs

- **CSB14** - Corn Soy Blend 14
- **SSB** - White Sorghum$_{Fontanelle\ 4525}$ Soy Blend
- **SCB1** - White Sorghum$_{Fontanelle\ 4525}$ Cowpea Blend
- **SCB2** - White Sorghum$_{738Y}$ Cowpea Blend
- **SCB3** - Red Sorghum$_{217X\ Burgundy}$ Cowpea Blend

Current non-extruded FBF

- **CSB+** - Corn Soy Blend Plus

Table 1 Composition of novel extruded and current non-extruded FBFs.

Ingredient (%)	Novel Extruded FBFs	Current Non-Extruded FBF
Extrudates	63.30	-
Corn (White or Yellow)	-	78.5
Whole soy bean	-	20.0
Sugar	15.00	-
Whey Protein Concentrate (WPC80)	9.50	-
Vegetable Oil	9.00	-
Vitamins and Mineral Premix	3.20	-
Vitamin/Mineral	-	0.2
Tri-Calcium Phosphate	-	1.2
Potassium Chloride	-	0.2



CSB+ **CSB14** **SSB** **SCB1** **SCB2** **SCB3**

- All FBFs in this study were prepared into porridge which is the most common dish made from cereal-based products and eaten by young children, especially in developing countries.

Descriptive sensory analysis

- Descriptive sensory analysis was conducted at the Sensory Analysis Center, Manhattan, Kansas USA.
- Highly trained panelists evaluated sensory characteristics of porridge made from each product: Appearance, Texture, Aroma, Flavor.
- Porridge was evaluated at 45°C which is typical consumption temperature by infants.

Paired preference test

- Five paired preference tests between CSB+ and each novel FBF was conducted in Mwanza region, Tanzania.
  I. CSB+ vs CSB14
  II. CSB+ vs SSB
  III. CSB+ vs SCB1
  IV. CSB+ vs SCB2
  V. CSB+ vs SCB3
- Approximately 600 children (6-59 months) for each pair. (total 3,000 children)
- Each child was asked to taste 2 products (porridge prepared from CSB+ and one novel FBF)

(coded, of course) 

- After they finished tasting 2 products, enumerators asked children which sample they preferred.
  - *In case of infants, mothers were asked to interpret their child preference based on their body movement or facial expression.*



(a) (b) (b)

Figure 1 – Paired preference test conducted in Mwanza region, Tanzania. (a) – Enumerators prepared porridge for the test; (b) and (c) – Paired preference test with young children in two health facilities.

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RESULTS

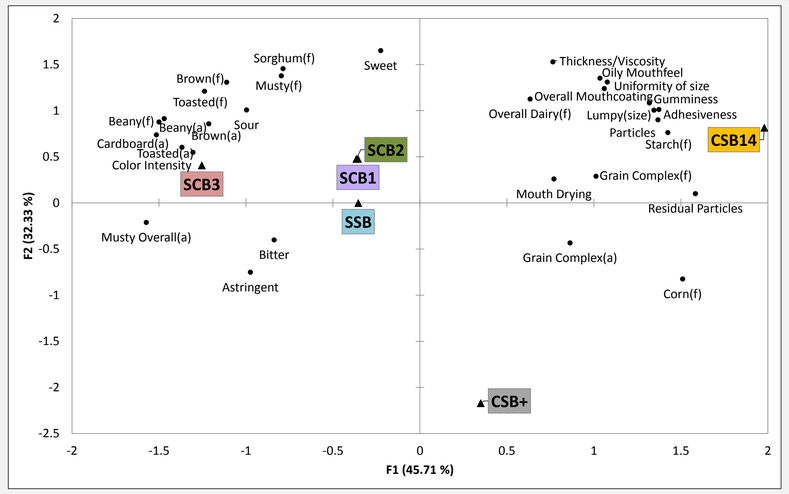

Figure 2 – Principal Component Analysis (PCA) representing sensory characteristics of porridges prepared from 6 FBFs. (a) – Aroma attributes; (f) – Flavor attributes.

- Porridges prepared from novel extruded FBFs had more complex sensory characteristics than CSB+.
- All porridges from novel FBFs had higher sweetness compared to CSB+, which could increase the products' acceptability, and might increase food consumption among undernourished children.
- Porridges from sorghum-based products including SSB, SCB1, SBC2, and SCB3 were mainly characterized by beany and toasted cereal characteristics.

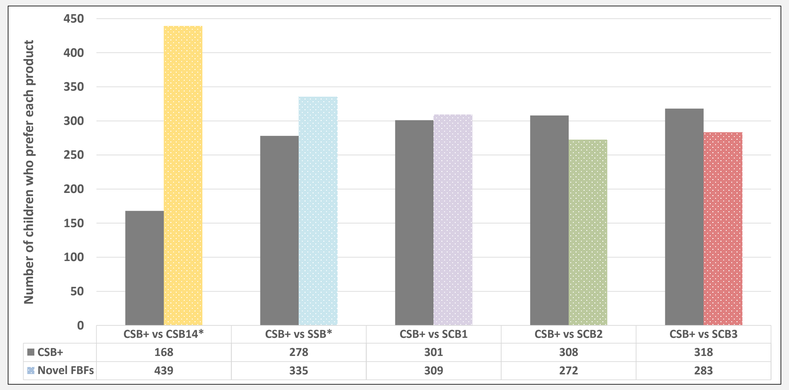

Figure 3 – Paired preference tests;
*Children had a preference for one sample over the other ($p \leq 0.05$).

- Children (6-59 months) preferred porridges prepared from CSB14 and SSB over CSB+ probably due to higher sweetness in the preferred products.
- Children did not show preferences between porridges from extruded sorghum cowpea blends (SCB1, SCB2, SCB3) compared to CSB+, probably because even though those products had higher sweetness they also had a beany flavor from cowpea that children were not familiar with.

CONCLUSIONS

- Novel, higher nutrient extruded FBFs can be used successfully as a supplementary food with higher or comparable preference to the CSB+ product currently used in food aid programs.
- Future studies on preference testing should include longer term testing to determine if continual exposure to these products results in changes to children's preferences over time or if actual consumption patterns are modified during extended use.