Shelf life of Improved FNRI-Developed Nutrient-Rich Complementary Blends and Snack Foods

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INTRODUCTION

» Malnutrition in children may have debilitating mental and physical consequences that are carried into adulthood. Infants and children need the right foods at the right time to grow, develop to their full potential, survive and be resilient in the face of crisis.

» The Food and Nutrition Research Institute have developed several complementary blends and snack foods utilizing different combinations of legumes and cereals focused on addressing the protein, energy and vitamin deficiency problems of children six months up to two years of age. However, there is a need to conduct a shelf life study of the improved products to determine product quality changes over time.

» Use of extrusion technology in food manufacturing has been an innovation used in processing many food products that require specific temperature and moisture content yet preserving its nutritional components.

OBJECTIVES

» To conduct shelf life study on the improved formulation and processing method of complementary blends and snack foods from blends of rice-legume-rootcrop/vegetable;

» To evaluate changes in product quality during storage; and,

» To estimate product cost.

MATERIALS AND METHODS

» Snack foods and instant baby food blend were developed using several combinations of rice, legume, root crops and/or vegetables

» The formulation and process was improved and standardized

» Over-all acceptability was determined using sensory evaluation

» The prototype products were packed in polyethylene (PE) and stored at ambient temperature (26-32°C) to simulate actual market conditions

» Conduct quality evaluation of prototype products during storage
The finished products were stored for 12 months simulating actual market conditions.

Sensory evaluation, physicochemical analysis, microbiological and nutrient analysis will be determined during storage.
**HIGHLIGHTS OF RESULTS**

**Prototype Products**

- Curls
- Crunchies
- Baby food

**Results of Nutrient Analyses**

<table>
<thead>
<tr>
<th>Nutrient analyses – per 100 grams</th>
<th>Rice-Cowpea-Squash</th>
<th>Rice-Mongo-Squash</th>
<th>Rice-Cowpea-Rice bran</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instant Baby Food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>408</td>
<td>520</td>
<td>488</td>
</tr>
<tr>
<td>Total Fat (g)</td>
<td>1.4</td>
<td>28.2</td>
<td>29.6</td>
</tr>
<tr>
<td>Saturated Fat (g)</td>
<td>1.4</td>
<td>23.3</td>
<td>23.4</td>
</tr>
<tr>
<td>Trans Fat (g)</td>
<td>&lt;0.01</td>
<td>&lt;0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Total Protein (g)</td>
<td>12.1</td>
<td>8.7</td>
<td>9.5</td>
</tr>
<tr>
<td>Total Carbohydrates (g)</td>
<td>79.2</td>
<td>57.8</td>
<td>64.2</td>
</tr>
<tr>
<td>Total Dietary Fiber (g)</td>
<td>3.2</td>
<td>3.9</td>
<td>5.3</td>
</tr>
<tr>
<td>Total Sugar</td>
<td>10.0</td>
<td>4</td>
<td>8.5</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>2</td>
<td>153</td>
<td>1</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>1.4</td>
<td>2.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Beta-Carotene, µg</td>
<td>107</td>
<td>79</td>
<td>-</td>
</tr>
</tbody>
</table>

**SHELF LIFE STUDY**

- **Quality Evaluation**
  - Increase in moisture content and water activity after four months of storage for all products.
  - In terms of appearance, the baby food was found to be “moderately acceptable” until the 8th month, an increase in acceptability on the 9th month but begun to slightly decline on the 10th month.
  - For the crunchies and curls, the loss of crispiness and rancid taste was the determinant factor affecting the acceptability of the improved/innovated snack foods packed in PE.
  - Results of microbial analysis showed that products are acceptable and safe (FDA BAM, 2001).
  - Accelerated shelf life study showed snack foods have a shelf life of 7 months when packed in PE and a shelf life of 10 months when packed in polyfoil while instant baby food have a shelf life of 12 months.
  - Based on price of ingredients and cost of production, the estimated product cost per 30 grams of the snack foods and instant baby food blend is from Php 6 to 10 pesos.

**CONCLUSION & RECOMMENDATION**

- **Snack foods were produced using hot extrusion (curls), cold extrusion (crunchies) and cereal puff machine (instant baby food) with high energy content (380–530 kcal and protein (8–12 grams).**
- **Improvement of the innovated snack foods and instant baby food using combination of rice, cowpea, mongo and squash were found to be acceptable.**
- **It is recommended that pilot scale production be conducted to determine actual product cost and use other packaging materials to improve shelf life. The innovated products can be offered to complementary food processing centers.”**