Development and evaluation of a drinkable, peanut-based, therapeutic food

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Aim

To develop a low cost, drinkable, peanut-based, ready-to-use therapeutic food for malnourished children using plant sources.

Methodology

10 crops grown in Uganda entered into the Creative Formulation Concept 4-Least Cost Formulation System computer software.

Least cost formulations meeting the energy, protein and amino acid composition of F100 were formulated (Table 1).

Cooked ingredients were milled, water and 1% bromelain added, hydrolyzed at 40°C for 4 hours and sterilised in glass jars.

Proximate and biochemical analyses were carried out.

Results

Results were compared to F100, plumpy nut and values predicted by the software.

- All Energy values were significantly higher than predicted values and the F100 target. But lower than Plumpy nut.
- All Carbohydrate contents were significantly higher than those predicted yet lower than F100 values.
- Plumpy nut had a higher energy density than the 3 products which also had higher values than F100.
- Plumpy nut had a lower protein density (2.5g/100 kcal) than RUTFs (4.5-5.5g/100 Kcal).
- Fat density of plumpy nut was higher (6.5g/100Kcal) than that of the RUTFs (5.2-5.8g/100Kcal).

Product C met all requirements best, costing 1USD/kg.

Table 1: % composition of RUTF formulations.

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>Formulations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Peanuts</td>
<td>50</td>
</tr>
<tr>
<td>Beans</td>
<td>25.5</td>
</tr>
<tr>
<td>Sesame</td>
<td>10</td>
</tr>
<tr>
<td>Cowpeas</td>
<td></td>
</tr>
<tr>
<td>Amaranth grain</td>
<td>7</td>
</tr>
<tr>
<td>Sugar</td>
<td>7.5</td>
</tr>
<tr>
<td>Total cost $/tonne</td>
<td>1,012.19</td>
</tr>
</tbody>
</table>

Graph 2: Comparison of Protein content

- 70% of the starch was hydrolysed by the amaranth malt.
- Protein digestibility of the products was 41 to 53%.
- Protein hydrolysis by bromelain gave a 125-131 mg/ml reduction in BSA concentration (Buret Assay)

Graph 3: Comparison of Fat content

Graph 4: Comparison of Carbohydrate content

Conclusion

- Readily available and affordable plant foods are able to produce nutrient dense RUTF’s for use in developing countries.
- The nutritional value of the formulated RUTF’s will be improved by fortifying with a vitamin mineral pre-mix.
- Efficacy of the RUFT will be evaluated in an animal model.

Acknowledgements: This research is funded by Peanut Collaborative Research Support Program