Quality Evaluation of Ebiripo using Cocoyam/Soybean/Soy residue Blends

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Abstract

An attempt was made to evaluate the nutritional status of ehiripo using cocoyam/soy flour/soy residue blends. Ehiripo fortified with 40% soy flour was significantly higher in protein (28%) and fat (8.4%) than the other ehiripo samples. Unfortified ehiripo was the highest in ash (7.33%) and total carbohydrate (28.77%). Ehiripo fortified with 10% soy flour was significantly higher in K (1.53%) and Ca (0.62%).

Generally, unfortified ehiripo was higher in general acceptability and ehiripo fortified with soy flour was better accepted than ehiripo fortified with soy residue.

Keywords: Ehiripo, Fortified, soy flour, soy residue.

Introduction

In developing countries like Nigeria, the consumption of starch based foods from tubers and cereals is very common amongst the people. Ehiripo is a local dish of the Ijebu tribe in South Western Nigeria. It is popular among the young and old in this area. It is made by grating cocoyam and mixing with water to form a paste. Salt is also added for taste. It is then wrapped in leaves and allowed to steam until it is ready for consumption. Ehiripo is usually eaten with palm oil or any type of soup.

Cocoyam is very poor in protein but high in carbohydrate and cocoyam has been implicated in fortification process. (Lesile, 1967 Onwueme, 1978 Oyenuga, 1968 and Ogundeyo, 1982).

Soybean, common and readily affordable is rich in protein, oil and essential nutrients (Omueti et al. 1994, Oyenuga 1968 and Rackis et al. 1961 and Weingartner 1989). The high protein content of soybean can be used to duce the problem of malnutrition in Nigeria. (Omueti et al. 1994).

Ehiripo is solely made from cocoyam which is known to be poor in protein and other nutrients. This product can then be regarded as being poor nutritionally. Therefore there is need to improve the nutritional status of the food by way of fortification.

The combination of cocoyam and soybean in the processing of ehiripo will bring about a nutrient complementarity. Thus the objective of this research work is to evaluate the chemical and consumer preference of Ehiripo fortified with soybean flour and residue.

Materials and Methods

Raw materials

Soybean and cocoyam were purchased from Apata, a local market in the city of Ibadan, and Ehiripo processing was done at crop utilization unit of the Institute of Agricultural Research and Training Moor Plantation, Ibadan.

Processing of Ehiripo

Cocoyam tuber was peeled, washed and grated. Water was added to form a paste of soft consistency and salt was added to taste. The paste was then wrapped in leaves and steamed until cooked.

Preparation of soy flour and residue

Soybean flour was prepared by picking whole soybean grains boiled for about 25 mins, hand peeled to remove the peels and sundried for 2 days, and ground into flour. Soy residue was prepared by picking soybean grain, steeped for 6 hours, hand peeled, wet milled and sieved with cheesecloth to remove the milk. The soy residue was also sundried and packed.

Preparation of soy flour and soy residue ehiripo

Dry soy flour and residue were added to cocoyam paste independently at 10%, 20%, and 40% levels and mixed with water to obtain a soft and smooth consistency. Salt was added for taste. They were wrapped in leaves and steamed for 45 minutes.

Chemical analysis

Chemical composition was done by A.O.A.C. (1990).

Sensory evaluation

Samples were given to panelists in tasting booths in such a way that there would not be any interference in their evaluation. Water was also provided for them to rinse their mouths. Ten panelists were used and analysis was on a nine-point hedonic scale basis (1 = extreme dislike and 9 = extreme likeness) (Larmond, 1937)
Table 1. Nutrient composition of ebinipo samples

<table>
<thead>
<tr>
<th></th>
<th>Crude protein (%)</th>
<th>Fat (%)</th>
<th>Moisture (%)</th>
<th>Ash (%)</th>
<th>Fe (%)</th>
<th>K (%)</th>
<th>Ca (%)</th>
<th>Total Carbohydrate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebinipo</td>
<td>11.37&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.95&lt;sup&gt;b&lt;/sup&gt;</td>
<td>9.15&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.23&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.02&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.47&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.61&lt;sup&gt;b&lt;/sup&gt;</td>
<td>28.77&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>10% soyleaf-ebinipo</td>
<td>16.64&lt;sup&gt;c&lt;/sup&gt;</td>
<td>7.01&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>7.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.82&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.53&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.62&lt;sup&gt;d&lt;/sup&gt;</td>
<td>19.66&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>20% soyleaf-ebinipo</td>
<td>24.52&lt;sup&gt;c&lt;/sup&gt;</td>
<td>7.92&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>5.91&lt;sup&gt;d&lt;/sup&gt;</td>
<td>6.5&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.86&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.61&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16.41&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>40% soyleaf-ebinipo</td>
<td>28&lt;sup&gt;c&lt;/sup&gt;</td>
<td>8.4&lt;sup&gt;c&lt;/sup&gt;</td>
<td>5.57&lt;sup&gt;d&lt;/sup&gt;</td>
<td>7.11&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.21&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.55&lt;sup&gt;d&lt;/sup&gt;</td>
<td>13.98&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>10% soyresidue-ebinipo</td>
<td>14.01&lt;sup&gt;c&lt;/sup&gt;</td>
<td>5.64&lt;sup&gt;c&lt;/sup&gt;</td>
<td>6.5&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.62&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.032&lt;sup&gt;bc&lt;/sup&gt;</td>
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<tr>
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<td>6.26&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3.98&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.04&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.27&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.56&lt;sup&gt;d&lt;/sup&gt;</td>
<td>14.55&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Means in the same column followed by the same letter are not significantly different at p<0.05.

Table 2. Sensory evaluation of ebinipo samples

<table>
<thead>
<tr>
<th></th>
<th>Colour</th>
<th>Taste</th>
<th>Texture</th>
<th>Flavour</th>
<th>General acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebinipo</td>
<td>7.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>10% soyleaf-ebinipo</td>
<td>6.6&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>5.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.9&lt;sup&gt;ab&lt;/sup&gt;</td>
</tr>
<tr>
<td>20% soyleaf-ebinipo</td>
<td>6.0&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>5.2&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>5.9&lt;sup&gt;c&lt;/sup&gt;</td>
<td>6.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.9&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>40% soyleaf-ebinipo</td>
<td>5.1&lt;sup&gt;cd&lt;/sup&gt;</td>
<td>3.7&lt;sup&gt;cd&lt;/sup&gt;</td>
<td>4.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.6&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>10% soyresidue-ebinipo</td>
<td>4.1&lt;sup&gt;cd&lt;/sup&gt;</td>
<td>3.4&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.6&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>3.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.2&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td>40% soyresidue-ebinipo</td>
<td>3.2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2.7&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.6&lt;sup&gt;cd&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Means in the same column followed by the same letter are not significantly different at p<0.05.

Statistical Analysis

Data was subjected to analysis of variance and the means were separated by (Duncan 1955).

Results and discussion

It was observed from table 1 that 40% soyleaf-ebinipo was significantly higher than the other samples in protein (28%) and fat (8.4%) at p<0.05. These differences could be due to increased presence of soyleaf in the ebinipo product.

Moisture (9.15%) and ash (7.23%) contents of ebinipo was significantly higher than other samples at p<0.05. Cocoyam used in the preparation of ebinipo is known to be high in minerals. Also 10% soyleaf-ebinipo was significantly different from other samples in K (1.53%) and Ca (0.62%). This indicates that 10% soyleaf-ebinipo is rich in K and Ca. Ebinipo fortified with soy residue at 20% was also significantly higher in Fe (0.04%) than other samples. The total carbohydrate of ebinipo was also significantly high (28.77%) as compared to other samples. Cocoyam used in the preparation of this product could be responsible for this, as it is high in carbohydrate (Oyenuga, 1968).

Sensory evaluation of ebinipo samples

From table 2, it was observed that ebinipo was significantly higher in colour when compared with other samples. However, Ebinipo fortified with soy residue at 40% level was scored very low. This could be due to increased presence of soy-residue in the product. Ebinipo was also significantly higher in taste as compared with other samples. With regard to texture and flavour, ebinipo, 10% soyleaf-ebinipo and 20% soyleaf-ebinipo were not significantly different from each other at p<0.05, but significantly higher than other samples.

With reference to general acceptability, it was observed that Ebinipo was significantly greater than other samples. Higher scores were also given at 10% soyleaf-ebinipo and 20% soyleaf-ebinipo. Ebinipo fortified with soy residue at 10%, 20% and 40% levels attracted lower scores. The presence of soy residue could be responsible for this result.

In conclusion, we found that Ebinipo and other soyleaf-ebinipo samples were better accepted than soyresidue-ebinipo samples.

References

AOAC 1990 Association of Official Analytical


