PROXIMATE AND MICRONUTRIENT COMPOSITIONS OF TWO LOCAL SEASONINGS-FERMENTED SOYA BEAN AND SORREL SEEDS

CHADI, M. AND ABDULLAHI, A.
Department of Science Laboratory Technology, Federal Polytechnic, Bauchi

ABSTRACT

The proximate and micronutrient compositions of two local seasonings, namely fermented soya bean and sorrel seeds were determined by various analytical methods which include titrimetric method, standard fluorimetry and atomic absorption spectrophotometry (AAS). The results showed that fermented soya bean and fermented sorrel seed respectively have the following proximate compositions in percentages: Moisture 9.2±1.2 and 10.3±0.5; ash 3.2±1.5 and 5.2±0.7 and crude fat 22.1±1.1 and 26.2±1.0; crude fibre 1.3±0.5 and 4.5±1.0; crude protein 37.6±1.3 and 31.5±1.2 carbohydrate 26.7±1.0 and 22.4±1.0. The micronutrient contents were retinol 0.64 and 0.24 1µ/g; thiamine 2.00 and 1.36 g/100g; riboflavin 1175.20 and 561.56 mg/100g; ascorbic acid 0.06 and 0.06 mg/100g calcium 155.50 and 97.30 mg/100g; potassium 30.21 and 24.60 mg/100g; magnesium 266.3 and 77.11 mg/100g; copper 1.34 and 1.05 mg/100g; manganese 1.17 and 0.92 mg/100g; iron 21.00 and 18.10 mg/100g; phosphorus 49.59 and 37.89 mg/100g and sodium 54.40 mg/100g. These condiments are rich source of proteins, lipids as well as vitamins and minerals.

KEYWORDS: - proximate; micronutrient; seasonings; condiments and minerals.

INTRODUCTION

Seasoning or condiments are substances that enhance the flavor of foods by imparting aroma or improving the taste such as sweetness (Carol & Rinzler, 1990). They have the subtle flavors that intrigue the palate and stimulate appetite.

Some seasonings are very pungent, bitingly hot, racy and strong-smelling, while others are succulent with almost no pungency. They are known to contain some nutritional, chemical and medical benefits (Pruthi, 1980).

For the food industry, monosodium glutamate (MSG; C5H8NNaO4.H2O) is intimately linked to the world of tastes and flavors. It is the sodium salt of glutamic acid and amino acid. It is a white crystal that is readily soluble in water. MSG intensifies and enhance flavor but does not contribute a flavor of its own (Ensor, 1989).

Locally, many fermented products are used by different communities as condiments in the preparation of soups and stews, among the most popular are fermented locust bean, fermented soya bean and fermented sorrel seeds. These are produced on a traditional small scale household basis under highly variable condition (Odunfa, 1984).

Soya bean (Ghyanix max) belongs to the legume family and is an important protein source for millions of people. Soya bean protein has high biological value and contains all the essential amino acids. When the seed are used as condiment, it is referred to as ‘daddawan wake’ in Hausa. The characteristic odour and flavour of the soya bean condiment enhances the tastes of traditional soups and sauces (Simmon, 1996).

Sorrel (Hibiscus sabdariffa) is abundantly grown in the northern region of Nigeria. Its popularity has made different racial groups to identify it with different names such as “Yakuwa in Hausa, and Isape in Yoruba. It is an erect branched woody annual plant up to 1.5m in height. The stem is red and branched. The fruits have-oval capsules up to 3cm in length containing 15-25 dark brown seeds. Sorrel has a variety of uses; the young shoots and leaves are used as cooked vegetable dish; the calyces are dried and used for preparation of beverages (zobo); the stem can be used as fibre and the seed are used as source of edible oil and as seasoning. When the seeds are used as condiment the product is called ‘daddawar batso’ in...
Hausa. It is prepared in the form of a paste which has an ammoniacal strong odour that imparts taste and aroma to food (Tindell, 1986).

The proximate compositions as well as the micronutrient contents of these local condiments were determined by different analytical methods.

MATERIALS AND METHODS

Sample collection and preparation
The samples (fermented: soya bean and sorrel seed) were purchased in Wunti Market in Bauchi metropolis. They were dried and ground to fine powder and packaged in moisture-proof, air tight polythene bags and kept for the analysis.

Proximate Analysis
The moisture, ash, ether extract, crude fibre, crude protein (Nx6.25) and carbohydrate (by difference) were determined in accordance with AOAC (1995) methods. All proximate analysis of the samples were carried out in triplicate and reported in percentages. All chemicals were of Analar grade.

Mineral Analysis
The standard method according to Whiteside and Midnel (1983) was adopted. The samples were ashed at 500°C in a muffle furnace to a constant weight. The ash was dissolved in a volumetric flask using distilled deionized water with a few drops of concentrated hydrochloric acid. The metals were determined by atomic absorption spectrophotometer (Perkin-Elmer 5000, Norwalk C. USA).

Vitamin Analysis
The standard methods according Morris (1999) were adopted. The samples were extracted using appropriate solvents.

Results and Discussion

Result
The results of the proximate and micronutrient analysis are presented in Tables 1 and 2 respectively.

Table 1: proximate compositions of some local seasonings

<table>
<thead>
<tr>
<th>Parameter (Parameter)</th>
<th>Fermented Soya bean</th>
<th>Fermented Sorrel seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture (%)</td>
<td>9.2±1.2</td>
<td>10.3± 0.5</td>
</tr>
<tr>
<td>Ash</td>
<td>3.2±1.5</td>
<td>5.2±0.7</td>
</tr>
<tr>
<td>Crude fat</td>
<td>22.1±1.1</td>
<td>26.2±1.0</td>
</tr>
<tr>
<td>Crude fibre</td>
<td>1.3±0.5</td>
<td>4.5± 1.0</td>
</tr>
<tr>
<td>Crude protein</td>
<td>37.6±1.3</td>
<td>31.5±1.2</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>26.7± 1.0</td>
<td>22.4±1.0</td>
</tr>
</tbody>
</table>

Table 2: Micronutrient composition of some local seasonings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fermented Soya bean</th>
<th>Fermented Sorrel seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retinol (1µ/g)</td>
<td>0.64</td>
<td>0.24</td>
</tr>
<tr>
<td>Thiamine (g/100g)</td>
<td>2.00</td>
<td>1.36</td>
</tr>
<tr>
<td>Riboflavin(g/100g)</td>
<td>561.56</td>
<td>ND</td>
</tr>
<tr>
<td>Ascorbic acid</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Calcium (Ca)</td>
<td>155.50</td>
<td>97.30</td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>30.21</td>
<td>24.60</td>
</tr>
<tr>
<td>Magnesium (Mg)</td>
<td>266.3</td>
<td>77.11</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>1.34</td>
<td>1.05</td>
</tr>
<tr>
<td>Manganese (Mn)</td>
<td>1.17</td>
<td>0.92</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>21.00</td>
<td>18</td>
</tr>
<tr>
<td>Phosphorus (P)</td>
<td>49.59</td>
<td>37.89</td>
</tr>
</tbody>
</table>
Sodium (Na) “59.00 54.40

Discussion

The proximate chemical composition and micronutrients content of the selected condiments are shown in table 1 and 2 respectively. Both the seasonings are rich proteins, carbohydrate and lipid sources. Protein is a vital requirement for any balanced diet which promotes growth in the young and for the maintenance and repair of damaged and worn-out tissues as well as for reproduction and lactation (Chaney, 2011). Therefore, these condiments, even though used in small quantity (they are self-limiting) can augment and enrich the diet in addition to the enhancement of flavour.

Appreciable amounts of lipids and carbohydrate, both of which are energy yielding nutrient are also contributed by the seasoning as can be seen in table 1. The fairly high level of ash and crude fibre in fermented sorrel seed is a result of it’s method of preparation. Unlike in the preparation of fermented soya beans, sorrel seed is not dehulled before the fermentation and hence the high crude fibre content. All the condiments have high moisture contents which can encourage the growth of spoilage organisms such as bacteria and fungi, if not properly stored.

Small quantities of vitamins, retinol (vitamin A), thiamin, riboflavin and ascorbic acid are also available in the two preparations. Vitamin A is a fat-soluble vitamin that is required for the maintenance good eye sight and for resistance against infection (Sopranoul et al, 2004). Thiamin and riboflavin both members of the B complex group of vitamins are energy releasing water-soluble vitamins (Chaney, 2011). Ascorbic acid (Vitamin C) functions in reduction and hydroxylation reaction in the body. It is required as a component in the formation collagen and in the maintenance of the integrity of connective tissue and for wound healing. Vitamin deficiency results in capillary fragility (Bleeding gum) and delayed wound-healing and condition is called scarvey (Fleck, 1976).

The macrominerals (calcium, phosphorus, potassium, magnesium and sodium) requirement in the diet can also be contributed by these seasoning. Calcium phosphorus and magnesium in conjunction with vitamins D, A and C are involved in bone formation and maintenance (Bsoul and Terezhalmy, 2004). Sodium and potassium regulate fluid volume in the body.

Copper, Manganese and Iron are required in minute quantities (microminerals) in the diet. Copper and manganese are important cofactors. Iron is a component of haemoglobin and myoglobin which are essential for oxygen transport. Iron deficiency results in microcytic hypochromic anaemia and decreased immunocompetence (Andrews and Schmidt, 2007).

Conclusion and Recommendation

Fermented soya bean and sorrel seed contain significant amounts of nutrients and they can be used to enrich the diet in addition to flavor enhancement. Though their odour may be objectionable to some people, such odour can be reduced or eliminated if they are used together with spices such as ginger, curry powder etc. it is therefore recommended that the populace be enlightened about their nutritional benefit and safety as against the over use of synthetic flavouring agnets such as monosodium glutamate, which has been implicated in producing transients symptoms like numbness, palpitation and deterioration of mental alertness in children below the age of 5 (Vasudevan and Sreekuman, 2007)

REFERENCES