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PROXIMATE AND MINERAL COMPOSITION OF FLOWER (SPATHE AND SPADIX) OF Colocasia esculenta var. antiquorum GROWN IN DSCHANG, CAMEROON

E. E. AGBOR, I. B. UMHO, E. H. ITAM and E. U. ENYONG
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ABSTRACT

Samples of flower spathe and flower spadix of Colocasia esculenta var. antiquorum obtained from Dschang, Cameroon, were analysed for proximate and mineral compositions. Flower spadix was found to contain higher percentage of crude protein (19.34%DM), crude lipid (8.02%DM) and crude fibre (30.35%DM) compared to flower spathe (16.65% DM protein, 5.93%DM lipid, and 12.01%DM crude fibre) which had higher crude ash content (11.65%DM). The major dietary fibre found in flower spadix was hemicellulose (34.9%DM) while cellulose (14.64%DM) formed the major dietary fibre in flower spathe. Mineral analyses showed that flower spathe and flower spadix had high levels of phosphorus, calcium, magnesium, iron and potassium but low levels of sodium. These materials form part of the daily dietaries of Dschang people of the Republic of Cameroon and from these investigations, they contribute significantly to the requirement of these people.

KEYWORDS: Colocasia esculenta, flower, composition.

INTRODUCTION

Colocasia esculenta (commonly known as taro), is a herbaceous plant which belongs to the genus Colocasia and the family Araceae (Onwueme, 1999; Wilfred, 1999). There are two varistal types, edoc type (or Japanese type or Colocasia esculenta var. antiquorum) and dasheen type (common taro or Colocasia esculenta var. esculenta) which are differentiated from each other by manner of corn development and chromosome number (Agbor - Egbe, 1991). Dasheen type (with 28 chromosomes) produces a large corn and few cornels while the edoc type (with 42 Chromosomes) produces a small to medium sized corn and numerous cornels.

Colocasia esculenta consists of a central corn from which cornels, roots and the shoot arise (Onwueme, 1999). The shoot consists of a large leaf lamina and an erect petiole. Flowering in Colocasia esculenta is only occasional. The flowers consist of a spathe (20 to 40cm long) enclosing a spadix (6-14cm long) which contains unisexual seeds (Wilfred, 1999).

Colocasia esculenta is an important staple food of developing countries in Africa, the West Indies, the Pacific region and Asia (Onwueme, 1999). The corn and cornels are a good source of carbohydrates, have traces of fat and rich in vitamins A and C (Onwueme, 1999; Florida, 2002). The leaf lamina of Colocasia esculenta contains about 23% protein on a dry weight basis and is a rich source of calcium, phosphorus, vitamin C, thiamin, riboflavin and niacin (Leaflet, 1992).

In Cameroon and Nigeria, the cornels, corns and the leaves are consumed as food sources. Some rural dwellers use the flower of Colocasia esculenta var. antiquorum as a thickener in soups and as vegetable. There is no information on the proximate and mineral contents of this plant part. It is in this light that the research is designed to determine the proximate and mineral composition of the flower (spathe and spadix).

MATERIAL AND METHODS

Samples of matured fresh flower spathe and flower spadix were harvested from Colocasia esculenta experimental farm within the University of Dschang, Dschang, Cameroon. These samples were authenticated by a taxonomist in the Department of Botany, University of Dschang, Cameroon. These samples were separately washed with clean water and dried using air drought oven maintained at 50°C. The dried sample was ground into powder using an electric blender (Moulinex). The two samples were analysed for crude ash, crude lipid, crude protein, crude fibre and mineral elements following the A. O. A. C. (1984) method. The method of Van Soest et al., (1991) was adopted for the analysis of neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL), hemi cellulose and cellulose contents.

RESULTS AND DISCUSSION

Table 1 shows the proximate composition while table 2 shows the mineral element content of flower spathe and flower spadix of Colocasia esculenta var. antiquorum.

Result showed higher values of crude protein and crude lipid in flower spadix than in flower spathe, though not statistically significant (P>0.05). The values of crude protein compared favourably with those recorded by Aliot and Adeogun (1995) for green leafy vegetables whose values ranged from 15.0 to 30.0% DM. Considering the daily dietary allowances for protein (23-36g for children and 44-55% for adults), specified by the National Research Council (1980), the flowers spathe and flower spadix can be used as supplements for protein in diets, though the amino acid composition was not analyzed.

Dietary fibre (especially hemicellulose and cellulose), reduces glucose and cholesterol absorption, reduces the risk of coronary heart disease, provides relief from constipation and contribute to bowel health by reducing the intestinal transit time (Mridula, 2002). The result of this study

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Table 1: PROXIMATE COMPOSITION OF FLOWER SPATHE AND FLOWER SPADIX OF COLOCASIA ESCULENTA VAR. ANTIQUORUM

<table>
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</thead>
<tbody>
<tr>
<td>Flower</td>
<td>5.930 ± 0.150</td>
<td>16.63 ± 0.02</td>
<td>11.65 ± 0.20</td>
<td>12.01 ± 0.03</td>
<td>20.58 ± 0.41</td>
<td>17.43 ± 0.25</td>
<td>2.79 ± 0.21</td>
<td>3.15 ± 0.12</td>
<td>14.84 ± 0.02</td>
</tr>
<tr>
<td>Spadix</td>
<td>6.02 ± 0.01</td>
<td>18.34 ± 0.03</td>
<td>7.34 ± 0.10</td>
<td>30.35 ± 0.03</td>
<td>52.02 ± 0.01</td>
<td>17.12 ± 0.11</td>
<td>6.78 ± 0.20</td>
<td>34.93 ± 0.22</td>
<td>10.34 ± 0.15</td>
</tr>
</tbody>
</table>

+ SD of 3 determinants  
NDF: Neutral detergent fibre  
ADF: Acid detergent fibre  
ADL: Acid detergent Lignin  
DM: Dry matter

Table 2: MINERAL ELEMENT CONTENT OF FLOWER SPATHE AN FLOWER SPADIX

<table>
<thead>
<tr>
<th>Sample</th>
<th>P (mg/kg DM) ± 0.01</th>
<th>Ca (mg/kg DM) ± 0.22</th>
<th>Mg (mg/kg DM) ± 0.30</th>
<th>Cu (mg/kg DM) ± 0.02</th>
<th>Zn (mg/kg DM) ± 0.002</th>
<th>Mn (mg/kg DM) ± 0.01</th>
<th>K (mg/kg DM) ± 0.001</th>
<th>Na (mg/kg DM) ± 0.001</th>
<th>Fe (mg/kg DM) ± 0.001</th>
<th>N (mg/kg DM) ± 0.001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower</td>
<td>2.94 ± 0.001</td>
<td>13.29 ± 0.22</td>
<td>7.40 ± 0.30</td>
<td>0.38 ± 0.02</td>
<td>0.65 ± 0.002</td>
<td>0.39 ± 0.001</td>
<td>0.97 ± 0.001</td>
<td>1.74 ± 0.001</td>
<td>7.69 ± 0.002</td>
<td>2.66 ± 0.002</td>
</tr>
<tr>
<td>Spadix</td>
<td>1.57 ± 0.03</td>
<td>5.95 ± 0.23</td>
<td>7.50 ± 0.20</td>
<td>0.39 ± 0.01</td>
<td>1.08 ± 0.02</td>
<td>0.812 ± 0.001</td>
<td>7.45 ± 0.001</td>
<td>0.347 ± 0.002</td>
<td>4.24 ± 0.01</td>
<td>2.94 ± 0.03</td>
</tr>
</tbody>
</table>

+ SD of 3 determinants  
* Significantly different from flower spadix (Student t-test)

revealed that flower spadix contained significantly (P<0.05) higher amounts of crude fibre (predominantly hemicellulose) when compared with flower spathes. However, the values of crude fibre obtained for flower spadix and flower spathes favourably compared with those indicated by Tunç (1998) for green leafy vegetables whose values ranged from 0.2 to 33.0% DM. Hence, diets, supplemented with flower spathes and flower spadix of Colocasia esculenta var. antiquorum could be beneficial to patients with coronary heart disease, diabetes mellitus, obesity or bowel disorder.

Mineral composition of green leafy vegetables is influenced by many factors especially soil fertility or type and quality of fertilizer used (Schmidt, 1971; Wastingh, 1991; Almeida and Rosa, 1996). The results showed that the flower spathes and flower spadix of Colocasia esculenta var. antiquorum are rich in phosphorus, calcium, magnesium, iron and potassium in soil. This agrees with the findings on Nigerian green leafy vegetables which indicated that green leafy vegetable contained appreciable amounts of minerals but poor in sodium (Ifon and Bassir, 1979; Fauoya, 1983; Aletor and Adeogun, 1995). Hence, the high mineral content of flower spathes and flower spadix, make them suitable mineral supplements in food.

CONCLUSION

The flower spathes and flower spadix of Colocasia esculent var. antiquorum are very nutritious. The consumption of this plant part (flower) should be encouraged as these materials could meaningfully contribute to the daily nutrient needs.

REFERENCES


