GLOBAL JOURNAL OF PURE AND APPLIED SCIENCES VOL. 11, NO. 4, SEPTEMBER 2005: 491 - 493
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PROXIMATE AND MINERAL COMPOSITION OF FLOWER (SPATHE AND SPADIX) OF *Colocasia esculenta var. antiquorum* GROWN IN DSCHANG, CAMEROON

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(Received 11 February, 2005; Revision accepted 18 May, 2005)

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 (18.34%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 varietal types, eddoe 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 corm development and chromosome number (Agbor - Egbe, 1991). Dasheen type (with 28 chromosomes) produces a large corm and few cormels while the eddoe type (with 42 Chromosomes) produces a small to medium - sized corm and numerous cormels.

Colocasia esculenta consists of a central corm from which cormels, 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 corm and cormels are a good source of carbohydrate, have traces of fat and rich in vitamins A and C (Onwwueme, 1999; Floridata, 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 corms, cormels 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 Aletor 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 44-56 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 hemi -cellulose 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*

Sample	Crude lipid (%DM)	Crude protein (%DM)	Crude ash (%DM)	Crude fibre (%DM)	NDF (%DM)	ADF (%DM)	ADL (%DM)	Hemi-cellulose (%DM)	Cellulose (%DM)
Flower Spathe	5.930 ± 0.150	16.63 ± 0.02	11.65 ± 0.20	12.01 ± 0.03	20.58 ± 0.41	17.43 ± 0.25	2.79 ± 0.21	3.15 ± 0.12	14.64 ± 0.02
Flower Spadix	8.02 ± 0.01	18.34 ± 0.03	7.34 ± 0.10	30.35 ± 0.10	52.02 ± 0.01	17.12 ±0.11	6.78 ± 0.20	34.9 ± 0.22	10.34 ± 0.15

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

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

Sample	P (mg/kg DM)	Ca (mg/kg DM)	Mg (mg/kg DM)	Cu (mg/kg DM)	Zn (mg/kg DM)	Mn (mg/kg DM)	K (mg/kg DM)	Na (mg/kg DM)	Fe (mg/kg DM)	N (mg/kg DM)
Flower spathe	224.0 ± 0.01	133.29 ± 0.22	71.40 ± 0.30	0.38 ± 0.02	0.650 ± 0.002	0.395 ± 0.01	67.99 ± 0.015	1.746 ± 0.001	7.69 ± 0.02	2.66 ± 0.02
Flower spadix	*157.58 ± 0.03	*98.50 ± 0.23	71.50 ± 0.20	0.39 ± 0.01	1.083 ±0.02	0.612 ± 0.01	76.31 ± 0.10	0.347 ± 0.002	4.24 ± 0.01	2.94 ± 0.03

± SD of 3 determinants.
* Significantly different from flower spathe (Student t-test)

revealed that flower spadix contained significantly ($P<0.05$) higher amounts of crude fibre (predominantly hemi cellulose) when compared with flower spathe . However, the values of crude fibre obtained for flower spadix and flower .spathe favourably compared with those indicated by Tunde (1998) for green leafy vegetables whose values ranged from 0.2 to 33.0% DM. Hence, diets, supplemented with flower spathe 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; Worthington,1991; Almeida and Rosa,1996). The results showed that the flower spathe and flower spadix of *Colocasia esculenta var antiquorum* are rich in phosphorus, calcium, magnesium, iron and potassium but poor in sodium. This agrees with the findings on Nigerian green leafy vegetable which indicated that green leafy vegetable contained appreciable amounts of minerals but poor in sodium (Ifon and Bassir, 1979; Faboya, 1983; Aletor and Adeogun, 1995). Hence, the high mineral content of flower spathe and flower spadix, make them suitable mineral supplements in food.

CONCLUSION

The flower spathe 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.

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