

Preliminary Study on the Nutritional, Anti-Nutritional and Elemental Composition of Bishops Vegetable (*Jatrophanjorensis*) and Cashew Shoot (*Anarcadium Occidentale*) Leaves

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Abstract: Levels of some nutrients, anti-nutrients and mineral of Bishops vegetable (*Jatrophanjorensis*) and Cashew shoot (*Anarcadium occidentale*) leaves were determined using standard analytical methods. Crude protein, crude fat, crude fibre, ash, carbohydrates, moisture content and caloric values were ; 17.44 & 17.12%, 1.02 & 1.22%, 6.2 & 7.4%, 12.66 & 14.22%, 62.68 & 60.04%, 8.88 & 9.25%, 304.86 & 290.02 Kcal respectively. Vitamin C composition was found to be between 42.02 & 42.22 mg/100g. The elemental analysis of the leaves in mg/100g Dry Matter (DM) indicated that the leaves contained appreciable levels of Calcium (1.38, 2.02), Sodium (9.33, 8.45), Magnesium (33.30, 38.15), Iron (1.22, 1.88), Zinc (0.01, 0.03), Phosphorus (322.20, 332.02), Potassium (112.30, 101.22), and Copper (0.001, 0.001). The anti-nutrients composition for phytates, tannins and alkaloids were; 221.20, 384.22 mg/100g, 4.50, 5.45 mg/100g, 384.88, 301.02 mg/100g respectively. These results reveals that the leaves of Bishops vegetables and Cashew shoot contain appreciable amount of nutrients, minerals and vitamin C and could be a good source of these nutrients in human diets in promoting good health.

Keywords: Vegetables, Nutrients, Human diet, Health

1. INTRODUCTION

Vegetables are edible portions of plants usually used in soup making or serving as an integral part of the main course of meals. Vegetables are obtained within certain periods of the year in Nigeria depending on the moisture content of the vegetable and their nutritional composition. Vegetables serve as an indispensable constituent of the human diet. It supplies the body with nutrients and certain hormone precursors. They also contribute to appetite appeal through odour, flavour, aroma and texture [1]. Diets that are rich in fresh fruits and vegetables are known to be protective against chronic, degenerative diseases [2,3]. Despite the importance of vegetables in human diets, there exist some useful and inexpensive leafy vegetables whose nutritional potentials are yet to be adequately studied. Among these vegetables are the leaves of Bishops vegetable and Cashew shoot. Bishops vegetable (*Jatrophanjorensis*) is an exotic plant in Nigeria. It is native to America. Its leaves are variously divided or digitatively nerved, long petiolate leaf segments or pinately lobed [4]. The stem are hard, the leaves resembles that of cassava leaves and contains a whitish fluid that itches when it comes into contact with human skin. The vegetable is mostly common in the Western part of Nigeria where it is planted mostly as flower to beautify houses and used in soup making. *Jatrophanjorensis* plant belongs to the *Euphorbiaceae* family. It is a perennial herb, showing intermediary in phenotypic characters between *Jatrophacurcas* and *Jatrophagossypifolia* [5]. It can survive both dry and raining seasons, a characteristic that makes it very important and readily available. Phytochemical screening reveals the presence of carbohydrates, fats, saponins, steroids and alkaloids [4]. It is used ethno-medically for the treatment of hypertension, diabetes, anaemia and cardiovascular diseases [6,7]. Cashew

(*Anacardium occidentale L*) is an important cash crop which is mainly propagated by air layering, grafting and cuttings [8].

Cashew shoot are obtained from the tree which is native to Central and Southern Africa. Cashew nut is of considerable economic importance to countries in Tropical regions and India [9]. The tree is of medium size with large leaves which are simple, entirely pale green and relatively thick (when matured). The veins are prominently reticulated and the inflorescence is either axillary or terminal. The young tender leaves are used to prepare soup which is rich in juice while a decoction of the bark is a remedy for fever and dysentery and it is also locally used in the treatment of elephantiasis, toothaches and sore gums [10,11]. In most literatures, much attention is paid only to the medicinal importance of the leaves of these plants and not their nutritional significance. Therefore, this work is aimed at assessing the nutrients and anti-nutrients profiles of Bishops vegetable and Cashew shoot leaves with a view to ascertaining their suitability as edible vegetables and as valuable substitutes in food processing and formulation.

2. MATERIALS AND METHODS

The leaves of Bishops vegetable and Cashew shoot were collected from Ekiti State Ministry of Agriculture farm settlement, Erinfun, Ado-Ekiti, Nigeria. The leaves were carefully destalked, washed and oven-dried at 40⁰C in an oven for 48 hours. After drying, the leaves were ground into fine powder using mortar and pestle. The sample was passed through a 2mm sieve and packed in a labeled, air-tight container for analysis.

The proximate composition of the samples was carried out according to recommended standard methods described [12,13]. Elemental composition was determined using the Atomic Absorption spectrophotometer after the acid digestion of the samples [12]. Anti-nutrients, phytates, tannins, and alkaloids were determined using the standard methods [14].

The analyzed parameters were done in triplicates with the mean recorded as representative result.

3. RESULTS AND DISCUSSION

Table 1. Proximate Composition and Caloric Value of Bishops Vegetable and Cashew Shoot Leaves (% Dry Matter)

PARAMETER	BISHOPS VEGETABLE	CASHEW SHOOT
Moisture content	8.88 ±0.20	9.25 ±0.02
Ash content	12.66 ±0.10	14.22 ±0.11
Crude fat	1.02 ±0.00	1.22 ±0.04
Crude protein	17.44 ±0.06	17.12 ±0.05
Crude fiber	6.20 ±0.12	7.40 ±0.16
Carbohydrates	62.68 ±0.23	60.04 ±0.27
Caloric value	304.86(Kcal)	290.02(Kcal)

Table 2. Anti-nutrients composition of Bishops vegetable and Cashew shoot leaves (mg/100g)

ANTI-NUTRIENTS	BISHOPS VEGETABLE	CASHEW SHOOT
Tannins	4.50 ±0.05	5.45 ±0.03
Phytates	221.70 ±0.09	384.22 ±0.13
Alkaloids	384.88 ±0.06	301.02 ±0.08

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Table 3. Elemental and Vitamin C composition of Bishop's vegetable and Cashew shoot leaves (mg/100g).

MINERAL ELEMENT	BISHOPS VEGETABLE	CASHEW SHOOT
Calcium	1.38 ±0.01	2.02 ±0.04
Sodium	9.33 ±0.05	8.45 ±0.00
Magnesium	33.30 ±0.25	38.15 ±0.06
Iron	1.22 ±0.00	1.88 ±0.05
Zinc	0.01 ±0.01	0.03 ±0.00
Potassium	110.30 ±0.20	101.2 ±0.00
Phosphorus	322.20 ±0.10	332.02 ±0.04
Copper	0.001 ±0.00	0.001 ±0.00
Vitamin C	42.02 ±0.10	42.22 ±0.07

Table 1 presents the proximate composition and caloric value of bishops vegetable and cashew shoot leaves. Both samples had low fat content (1.02, 1.22%) compared to *Ipomoea batatas* (4.90%), *Talignum triangulare* (5.9%) and *Amaranthus hybridus* (14.80%) as previously reported [15]. Dietary fat increases the palatability of foods by absorbing and retaining flavours. A diet providing 1-2% calorific energy as fat is said to be sufficient for human beings as excess fat intake has been implicated in atherosclerosis, cancer and ageing [10,14].

Crude protein content for both samples were 17.44% and 17.12%. These values are higher than that reported for *Heinsiacrinita* (14.70%) [16], but lower than the one reported for *Amaranthus caudatus* (20.59%), *Piper guinenses*(29.59%) and *Talignum triangulare* (31.00%) [15]. However, the availability of protein and some minerals in foods is inhibited by the presence of high tannin content in foods [17]. The Ash content for both samples were 12.66% and 14.22%, lower than that reported for *Talignum triangulare*(20.50%) and higher than *Occimum graticimum* and *Hibiscus esculentus*(8.00%). High ash content in foods is a reflection of the mineral contents in the food material [14,18].

Both samples have high crude fiber content (6.20, 7.40%). Non-starchy vegetables are the richest sources of dietary fiber and are employed in the treatment of such diseases as obesity, diabetes etc [19,20,21].

Table 2 shows the anti-nutrients composition of both samples. Tannins, Phytates and Alkaloids were high: 4.50 and 5.45 mg/100g, 221.20 and 384.22 mg/100g, 384.88 and 301.02 mg/100g respectively. Tannin in foods is known to inhibit the availability of protein and some minerals in the foods, however, the presence of tannins is essential for the treatment and prevention of diarrhea, dysentery and leucorrhoea while phytates are known to prevent the absorption of Ca²⁺ in man, all phytates that escapes hydrolysis renders an equivalent amount of Ca²⁺ unavailable [16,17]. The high anti-nutrients composition is a potential health risk as they are potent human poison. However, researches have shown that proper cooking before consumption significantly reduces the levels of these anti-nutrients in leaves or vegetables [22].

The mineral composition of the leaves in Table 3 reveals a considerably high amount of Phosphorus (322.20, 332.02mg/100g), Magnesium (33.30, 38.15mg/100g), Potassium (110.30, 101.22mg/100g) and Sodium (9.33, 8.45mg/100g). Calcium content is however low (1.38, 2.02mg/100g) compared to that reported for *Ipomoea batatas* (28.44mg/100g) (Antia et al, 2006). Vitamin C content is high 42.02, 42.22mg/100g, which is more than the daily recommended dietary requirement for adults (30mg/100g/day) [23].

4. CONCLUSION

From the data obtained from analysis, the leaves of Bishops vegetable and Cashew shoot contains a considerable amount of nutrients and caloric value (energy), but high levels of phytates, tannins and alkaloids (which can be reduced through proper cooking). Since they contain substantial amounts of nutrients, and also for their medicinal uses, it can be concluded that the inclusion of the leaves of bishop's vegetable and cashew shoot in the human diet can contribute significantly to the nutrients requirements of man.

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