Nutritional Evaluation of Medicinal *Cnidoscolus aconitifolius* (*Chaya*) leaves Used in Nigeria

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Evaluation of the nutritional content of edible plants is currently essential for safety. This work assessed the proximate and mineral composition of the leaves of *Chaya* plant (*Cnidoscolus aconitifolius*) commonly known as '*hospital is too far*' and consumed in Niger Delta, Nigeria for medicinal and nutritional purposes. The study showed that the dried leaves of the plant contain 47.03 ±1.02% of nitrogen free extract; 33.04± 3.14% of crude fibre; 7.03±0.23% of crude fat; 4.03±0.67% of crude protein, while moisture and ash made up 6.10±1.10% and 3.04±0.32%, respectively. A gram of the dried leaves yielded (in mg) 10±1.2, 20±1.6, 0.01±0.1, 100±5.3, 85±4.32, 18±2.1 and 50±2.3 of Iron, Phosphorus, Sodium, Potassium, Magnesium, Manganese and Calcium, respectively. The energy yield was 258±4.5kcal/100 mg. These results suggested the comparative richness of the leaves in fibre, high nitrogen free extract (carbohydrate) and essential minerals to prevent nutritional and electrolyte deficiency disorders among the consumers.

Key words: *Cnidoscolus aconitifolius, Nutritional Evaluation, Electrolyte, Niger Delta*

INTRODUCTION

World Health Organization (WHO) had specified the need to know the composition of biologically active botanical substances considered for usage for nutritional and medicinal purposes. As such scientific evidence will ensure the use of safe, effective and quality products and practices.[1]For this reason, it is pertinent to evaluate the nutritive and electrolyte values of *Cnidoscolus aconitifolius* (CA) consumed in Niger Delta, Nigeria whose phytomedicinal constituents had been characterized [2,3].

Cnidoscolus aconitifolius (CA), locally known in Niger Delta as '*hospital is too far'* or *'ogwu obala'* belongs to the family of *Euphorbiaceae*. It is an evergreen, drought deciduous shrubs up to 6 m in height with alternate palmate lobed leaves, milky sap and small flowers on dichotomously branched cymes. [2, 3]It is commonly found in the tropic and sub tropical regions worldwide, including Africa, South of Sahara, North and South America, India, etc. It is commonly eaten as vegetable in soup. In fact, levels of leaf nutrients are two to threefold greater than any other land-based

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leafy green vegetable [4,5,6,7].

CA leaves have a possible antidiabetic effect; [8, 9] antibacterial activities; [7, 10] and it also ameliorates anaemia and osmotic fragility induced by protein energy malnutrition [11].

Traditionally, leaves of plants have been identified for their nutritional / and medicinal values. [11-14]In this study, the nutritional and mineral constituents of CA will be assessed to assist in determining its safety.

MATERIALS AND METHODS

Collection and Identification of Plant Material

Fresh sample of *Cnidoscolus aconitifolius* (CA) was collect from private residences in Port Harcourt, Rivers state Nigeria in 2012. The botanical identification and authentification was confirmed at the Department of Pharmacognosy and Natural Medicine, University of Uyo, Akwa Ibom State, Nigeria.

Preparation of Plant extracts

The fresh leaves of CA were air dried and ground to powdered form by using an electric grinding machine in preparation for its proximate composition and mineral analysis to evaluate its nutritive and electrolyte values.

Proximate composition: The proximate compositions (crude protein, lipid, moisture content, crude fibre, ash content and carbohydrate), mineral elements (phosphorus, calcium, iron, magnesium, manganese, sodium, potassium, zinc and lead) were determined according to the standard methods as recommended by the Association of Official Analytical Chemists in the Department of Pharmacognosy and Natural Medicine University of Uyo, Akwa Ibom State, Nigeria. [15, 16]

RESULTS AND DISCUSSION

Organic constituents: The nutritive and electrolyte values of locally available CA in Port Harcourt were evaluated using standard procedures [15, 16] and the results were shown in Tables 1 and 2.

Table 1 showed that proximate analysis of CA which is locally nicknamed '*hospital is too far'* shows the percent composition of moisture, ash, crude protein, crude fat, crude fibre and nitrogen free extract i.e. carbohydrate. It also estimated the energy released by 100mg of the extract.

Table 1: Proximate Composition of *Cnidoscolus aconitifolius* leaves

S/N	Composition	Percent composition (%)
1	Moisture	6.10±1.10
2	Ash	3.04±0.32
3	Crude Protein	4.03±0.67
4	Crude Fat	7.03±0.23
5	Crude Fibre	33.04± 3.14
6	Nitrogen Free Extract (carbohydrate)	47.03 ±1.02
7	Energy	258±4.5 kilo Calorie/100mg

The data obtained showed that CA has high carbohydrate and fibre content. Like most leaves, it is low in fat and protein contents as compared to carbohydrate content. The results suggest that the leaves contain basic micronutrients needed for the daily requirements of the body functions as in the supply of the daily protein which is essential for the synthesis of body tissues and regulatory substances such as enzymes and hormones; as well as a dietary supplement for the daily requirement of the body. The low fat content may imply that it is without any risk of obesity [17] and the low moisture content probably may not encourage microbial growth and enzyme activities. [18] The ash content is in agreement with the previous result. [19]

Table 2 showed the mineral composition of the dried leaves in milligram per gram. These include iron, phosphorus, sodium, potassium, magnesium, manganese and calcium. They are essential components of body fluid electrolytes involved in vital metabolic

processes. Their dietary deficiencies or overloads may therefore cause clinical disorders. [20-27] Consequently, each mineral has a Recommended Daily Allowance (RDA) and dietary intake as the best physiologic source.

Table 2: Mineral Composition of *Cnidoscolus aconitifolius* leaves

S/N	Composition	mg / g of dried leaves
1	Iron (Fe)	10±1.2
2	Phosphorus (P)	20±1.6
3	Sodium (Na)	0.01±0.1
4	Potassium (K)	100±5.3
5	Magnesium (Mg)	85±4.32
6	Manganese (Mn)	18±2.1
7	Calcium (Ca)	50±2.3

For instance, RDA of iron for men is 10 milligrams or less and 15-18 milligrams for women and the average child while pregnant and nursing women need about 50–60 mg per day. [20] The result implied that consumption of one gram of the CA leaves will supply about 10mg of iron. Consequently, daily consumption of the leaves of CA will minimize iron deficiency anaemia, among other nutritional and electrolyte deficiency disorders in Niger Delta.

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