



EVALUATION OF PHYTOCHEMICALS AND VITAMINS CONSTITUENTS OF *Corchorus aestuans* L.

¹Alaye S. A., ^{2*}Adeagbo A.A., ¹Ampitan T.A., ¹Meduna P.N., ¹Adeniji O.A., ³Odeyemi S.A. and ¹Irunokhai E.A.

¹Federal College of Wildlife Management New Bussa, Niger State, Nigeria.

²Department of Forest Production and Products, University of Ibadan.

³Humid Forest Research Station, Umuahia, Abia State

*Corresponding Author : aydeagbo@yahoo.com

ABSTRACT

This study evaluates the phytochemicals and vitamins constituents of Corchorus aestuans. The plant extracts were prepared by cold maceration using methanol as a solvent. Phytochemical screening was carried out using preliminary phytochemical tests and the vitamins was determined according to procedure outlined by Official Methods of Analysis of the Association of Official Analytical Chemistry. Data obtained were subjected to descriptive statistics. The qualitative phytochemical screening showed the presence of tannin, phenolic, saponin, alkaloid, flavonoid, trypsin, glycoside and carbohydrates while steroids, cardiac glycosides and triterpene are not presence. The quantitative phytochemical constituents of leaves of Corchorus aestuans indicated that alkaloid and flavonoid recorded the highest mean value of 2.973 and 0.131 mg/kg each, followed by carbohydrates with 0.99 mg/kg while phenolic was the least with a mean of 0.01 mg/kg. Vitamins composition of the leaves of Corchorus aestuans showed that vitamin C recorded the highest value of 8.82 mg/100g, followed by Vitamin E and Vitamin A (5.68 and 2.246 mg/100g) while Vitamin D (0.27mg/100g) is the least. The study concludes that leaves of Corchorus aestuans can serve as a good source of vitamins and used as herbs. Therefore, the study recommends that further study on pharmacological uses of C. aestuans should be carried out and include in the human diet to solve the problem of malnutrition.

Keywords: Phytochemical, Vitamin, *Corchorus aestuans*, Pharmacological, Malnutrition

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INTRODUCTION

Vegetables serve as a cheap source of vitamins, minerals and plant proteins in human diet (Yalemtsehay and Fisseha, 2016). Vegetable cultivation is one of the major branches of Agriculture which has many economic values in Nigeria. Several vegetables are cultivated in Nigeria for their nutritional and medicinal values (Kadiri and Olawoye, 2015). However, despite their economic importance, majority of these consumed veggies are on the list of underutilized

plant species for research in Nigeria (Ajewole, 1999). Vegetables are valuable in maintaining alkaline reserve of the body. They are crucial principally for their high carbohydrate, vitamin and mineral contents. Roots, stems, leaves, fruits or seed of vegetables may be edible (Gimplinger et al., 2007). Leafy vegetables are food sources in the diet of the average Nigeria with their level of consumption; because of the appreciable amounts of nutritive minerals they provide. Most developing countries depend on starch-based

food as the main staple food for the supply of both energy and protein Kadiri and Olawoye, (2015) reported that over dependence on starch-based food in developing countries has leads to protein deficiency which prevails among the populace as recognized by Food and Agricultural Organization. In Nigeria, as in most other tropical countries of Africa where the daily diet is dominated by starchy staple foods, vegetables are the cheapest and most readily available sources of important proteins, vitamins minerals and essential amino acids (Thompson and Kelly, 1990).

Corchorus aestuans belong to family Tiliaceae and can grow up to 50-100cm tall. The stem is erect and pubescent (i.e. hairy). The leaves are ovate 8mm in diameter. The fruits are capsules up to 4cm long, narrowly winged, hairless and it fruits from February to May (Mbay *et al.*, 2011; Ganapaty and Ramadevi, 2012; Al-Snafi, 2016). *Corchorus aestuans* is an annual herb occurring throughout the warmer parts of the tropic as weed in the microclimate areas of river banks where Sandy soil is available and also in shade conditions undisturbed areas. *Corchorus aestuans* are reported for the treatment of Gonorrhoea and used as tonic (Mbay *et al.*, 2011) and also exhibit various pharmacological activities such as stomachic, anti-inflammatory and pneumonia.

Phytochemical constituents are responsible for medicinal activity of the plant's species and the chemical features of these constituents differ considerably among different species. Several authors have reported on the compositional evaluation and functional properties of various types of edible wild plants in use in developing countries. However, much still needs to be done on the phytochemicals and vitamins composition of *Corchorus aestuans* which this study intends to bridge the gaps.

MATERIALS AND METHODS

Collection of *Corchorus aestuans* Leaf

Healthy plants of *Corchorus aestuans* was collected from Federal College of Wildlife Management Estate New Bussa, Niger State. The plant was identified and registered in the herbarium of Forestry Research Institute of

Nigeria (FRIN), Ibadan. The plant was washed thoroughly under running tap water to remove dust and other unwanted particles. The leaves were air dried under shade at room temperature.

Plants Extraction

The dried leaves were crushed to powder with pestle and mortar and five hundred grams of the powder was cold macerated in 1000 ml of 70 % methanol. The methanol extracts were periodically shaken for 48hours and filter. The procedure was repeated three times to exhaustively extract the constituents of the plant materials. The filtrate was kept and two-third of the initial solvent was added to the content of funnel, shaken and allowed to stand for another 24hours, after then it was filtered. The filtrate was pooled together and then solvent was remove in vacuum using rotary evaporator to obtained crude methanol extract and kept for the investigation.

Phytochemicals Screening and Chemical Analysis

Phytochemical screening of the crude plant extract was carried out employing standard procedures and tests described by Trease and Evans, (1983) while the chemical analysis was determined according to procedure outlined by A.O.A.C (2005).

Data Analysis

Data obtained was analysed using SPSS (Version 20.0) statistical package. Data were subjected to descriptive statistics in form of tables.

RESULTS

The qualitative phytochemical constituents of *Corchorus aestuans* leaves are revealed in table 1, in which tannin, phenolic, saponin, alkaloid, flavonoid, trypsin, glycoside and carbohydrates are detected while steroids, cardiac glycosides and triterpene are not detected. Table 2 indicated the quantitative phytochemical constituents of leaves of *Corchorus aestuans*, Alkaloid and flavonoid recorded the highest mean value of 2.973 and 0.131 mg/kg each, followed by carbohydrates with 0.99 mg/kg while phenolic was the least with a mean of 0.01 mg/kg. Vitamins composition of the leaves of *Corchorus aestuans* showed that vitamin C recorded the highest value of 8.82 mg/100g, followed by

Vitamin E and Vitamin A (5.68 and 2.246 mg/100g) while Vitamin D (0.27mg/100g) is the least (Table 3).

Table 1: Qualitative Phytochemical Constituents of the Leaves of *Corchorus aestuans*

Phytochemicals Constituents	Replicate		
	1	2	3
Tannin	+	+	+
Phenolic	+	+	+
Saponin			
Alkaloid	+	+	+
Flavonoid			
Trypsin	+	+	+
Glycoside			
Carbohydrates	+	+	+
Steroids	-	-	-
Cardiac Glycosides	-	-	-
Triterpene	-	-	-

Key: + = Presence - =Absence

Table 2: Quantitative Phytochemical Constituents of the Leaves of *Corchorus aestuans*

Phytochemicals Constituents	Replicates			
	1	2	3	Mean
Tannin	0.02	0.02	0.01	0.016
Phenolic	0.008	0.010	0.012	0.01
Saponin	0.248	0.252	0.254	0.251
Alkaloid	2.973	2.973	2.974	2.973
Flavonoid	0.130	0.132	0.130	0.131
Trypsin	0.005	0.006	0.006	0.006
Glycoside	0.003	0.004	0.003	0.003
Carbohydrates	1.02	0.98	0.98	0.99

Table 3: Vitamins Composition of the leaves of *Corchorus aestuans*

Replicate	Vitamins A(mg/100g)	Vitamin B1(mg/100g)	Vitamin B3(mg/100g)	Vitamin B6(mg/100g)	Vitamin C(mg/100g)	Vitamin E(mg/100g)	Vitamin K(mg/100g)	Vitamin D(mg/100g)	Vitamin B2(mg/100g)
1	2.240	0.120	1.010	0.89	8.75	5.62	1.24	0.26	0.075
2	2.250	0.122	1.011	0.81	8.89	5.73	1.25	0.28	0.088
3	2.250	0.122	1.013	0.85	8.81	5.68	1.25	0.25	0.082
Mean	2.246	0.121	1.011	0.85	8.82	5.68	1.25	0.26	0.082

DISCUSSION

Phytochemical screening has been reported to be germane in the evaluation of plants chemical constituents and also for the search of bioactive ingredients that could be useful in the formulation of drugs (Onihunwa et al., 2020). Phytochemical constituents of the leaves of *Corchorus aestuans*

revealed the presence of tannin, phenolic, saponin, alkaloid, flavonoid, trypsin, glycoside and carbohydrates with alkaloid and flavonoid present in considering quantity. The presence of these bio-active constituents in the leaf of *C. aestuans* clearly indicates the phyto-therapeutic potentials of this plant. The plant (*Corchorus*

aestuans) is an immense store of pharmacological active compounds which exist as secondary phyto- constituents. The study is in line with Archana *et al.*, (2011) which attributed the beneficial effects of the plant typically result from the combinations of secondary products present in it. In the roles of secondary products as defense chemicals, many phyto-constituents remain a mixture of chemicals, having additive or synergetic effects at multiple target sites. These phyto constituents not only ensure effectiveness against a wide range of pathogens, but also decrease the chances of these micro-organisms to develop resistance or immune evasion mechanism. Flavonoids are a group of polyphenols compounds found in fruits and vegetables and in many plant parts have multiple biological activities (Steffan *et al.*, 2005; Cushnie and Lamb, 2005) Ao (2008) reported that Flavonoids has vasodilators, anticarcinogenic, anti-inflammatory and antibacterial activities while Cowan (1999) reported the anti-allergic, antiviral, estrogenic and immune system stimulating effects of flavonoids. Alkaloids are reported as a plant bases that exhibit certain physiological properties when used in herbal medicine (Cowan, 1999). Most of them have anti-malarial, antifungal and antimicrobial activities.

The result of vitamin analysis showed that the *C. aestuans* contains considerable amount of anti-oxidants trio of Vitamins A, C and E which help to prevent degenerative diseases such as cancer. This was in line with what was earlier reported by Al-Snafi, (2016) that *Corchorus aestuans* plant

was found to have anticancer activity against epidermal carcinoma of nasopharynx in tissue culture. Previous research findings indicated that edible species of *Corchorus* are very good source of proteins, vitamins (A, C, E) and they are also rich in mineral nutrients like calcium and iron (Steyn *et al.*, 2001; Dansi *et al.*, 2008). The A, C, E Vitamins also help in maintaining skin by increasing collagen production. Vitamin A is a powerful anti- oxidant that plays key roles in the body's immune system. It is also essential for growth, healthy skin and hair. Vitamin C is one of the most potent anti- oxidant Vitamins. It is essential for growth, healthy body tissue, wound repair and effective immune system. It is also ensuring the normal functioning of the body. Vitamin E is important in cell maintenance and also essential for healthy heart, blood and circulation. It is one of the body's main anti-oxidant.

CONCLUSION AND RECOMMENDATIONS

This study has confirmed the presence of tannin, phenolic, saponin, alkaloid, flavonoid, trypsin, glycoside and carbohydrates in *Corchorus aestuans* leaf while steroids, cardiac glycosides and triterpene are absent. Also, the leaf is highly rich in anti- oxidants (Vitamins A, C and E). It can then be concluded that the leaves can serve as a good source of vitamins and used as herbs. Therefore, the study recommends that further study on pharmacological uses of *C. aestuans* should be carried out and include in the human diet to solve the problem of malnutrition.

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