

Proximate And Phytochemical Composition Of *Vernonia Amygdalina* In Donga Metropolis, Taraba State, Nigeria

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Abstract- The proximate and phytochemical composition of *Vernonia amygdalina* samples X and Y taken from Donga metropolis and Donga non residential areas of Taraba State were investigated using standard methods. The proximate analysis gave the following results: moisture content 8.25% and 9.22%, crude protein 22.60% and 26.84%, fat 3.30% and 3.45%, crude fibre 12.93% and 12.41%, ash 12.11% and 7.50%, and carbohydrate 40.81% and 38.55%. Phytochemical concentrations are in the order: saponin > flavonoids > polyphenols. This study established that *Vernonia amygdalina* has nutrition and phytochemical properties; these bioactive compounds can be useful for therapeutic health benefits, sources of carbohydrate and fibre.

Index Terms- *Vernonia amygdalina*, phytochemicals, proximate analysis, bioactive

I. INTRODUCTION

Vernonia amygdalina, also known as bitter leaf, is a shrub, often vegetative planted and whose leaves are usually bitter. It is a prominent plant species found in tropical region of the world, where they are used partly as condiments and spices in human diet or as supplementary feeds to livestock (Alter and Adigun, 1995). It is scientifically classified as belonging to the kingdom *plantae*. It is an angiosperm, of order *Asterales* of the family *Asteraceae*, genus *vernonia*. The vegetable is consumed as cooked compliments to major staple foods such as plantain, maize, millet, cassava etc. Also, the leaves extracts, stems and bark can be used for culinary, medical and curative purposes. (Adanlwo and Dairo, 2006). The phytochemical effects of these substances in the plants inhibit or retards diseases that are caused by oxidative and inflammatory purposes. (Forombi and Owoeye, 2011)

The predominant *vernonia* specie found in Nigeria is the *Vernonia amygdalina*, it has structural adaptation tendency that enables it to survive in both areas of high rainfall and average rainfall, making it readily available in all season (Ayensus, 1978). For this singular reason, the need for investigation of the proximate and phytochemicals components of the vegetable is conceived. Hence, the need to encourage the consumption of

Vernonia amygdalina in Nigeria especially among rural dwellers can never be over emphasized. The results of the research are intended to educate the society, and to appreciate the benefits *Vernonia amygdalina* can provide to developing countries which Nigeria is not an exception.

II. MATERIALS AND METHODS

2.1 Study Setting and Design

Donga town consists of three wards which include Fada ward, Asibiti ward and Gyata Aure ward. These three wards are in Donga metropolis where the samples were collected.

2.2 Sample collection

A 20g sample of bitter leaf each were collected from Donga metropolis and marked as X, and Y in Donga nonresidential area where automobile repairs, painting and smelting activities are carried out daily. All samples were collected in Donga metropolis of Taraba State, Nigeria.

2.3 Sample preparation

The leaves of the bitter leaf vegetable were cut off from the stem and washed with distilled water, then dried at room temperature 37 °C for about three days. The dried sample was blended using a local mortar and pestle, sieved using 2 mm mesh sieve to obtain fine particles.

2.4 Proximate Analysis

The methods of the Association of Official Analytical Chemist were used for the determination of percent moisture content, crude protein, crude fat, crude fibre, ash and carbohydrate.

2.5 Phytochemical Tests

Phytochemical tests include tests for saponins, Flavonoids and Phenols.

2.6 Statistical analysis

Mean and standard deviation (SD) of data were calculated; spearman rank correlation coefficient was evaluated for samples in X and Y.

III. RESULTS

Proximate screening for samples X and Y in Donga metropolis are presented in Table 1, while Table 2 presents the phytochemicals screening for the samples X and Y.

Table 1: Proximate composition of the samples (%)

Proximate Composition	X	Y
Moisture	8.25±0.35	9.22±0.01
Crude Protein	22.60±0.26	26.84±0.01
Fat	3.30±0.15	3.45±0.01
Crude Fibre	12.93±0.30	12.41±0.01
Ash	12.11±0.43	7.50±0.01
Carbohydrate	40.81±0.00	38.55±0.02

± means the standard deviation for 3 replicate determination; % crude protein= $N \times 6.25$

Table 2: Phytochemicals screening of samples X and Y

Sample	Saponins	Flavonoid	Polyphenols
X	+++	++	+
Y	+++	+++	++

+: Present in small concentrations
 ++: Present in moderate concentrations
 +++: Present in large concentrations
 X= Samples in Donga metropolis
 Y= Samples in Donga non-residential area

IV. DISCUSSION

The results for proximate analysis of sample X and Y indicated that sample X had moisture content of 8.2467%, while that of sample Y was 9.2233%. The moisture contents of the two samples were low. The proportion of moisture in *Vernonia amygdalina* leaf concentrates showed that it has high moisture content and can be broken down easily within the body. Crude protein contents (22.5967%, 26.8433 %) are high. Proteins are powerful compounds that build and repair worn out body tissues and can provide essential amino acids necessary for the maintenance of body tissues. However, this research shows bitter leaf can be a good source of daily proteins. Fat for samples X and Y were 3.3033% and 3.4533%, which is the lowest in the proximate parameters results though these values were greater than those reported for *spinach* and *amaranthus hybrids* leaves with values ranged from 0.3% to 1.60% (Nwaogu *et al.*, 2000). Crude fibre content obtained from this research was 12.9333 and 12.4100 % in samples X and Y respectively hence, higher than the value (10.46) reported by Sodamade, (2011). Dietary fibre helps to reduce serum cholesterol level, risk of coronary heart disease, colon, breast cancer and hypertension (Gauong, 2003). Ash percent concentration in this work indicated that samples X and

Y had values of 12.1100 % and 7.5033% respectively. Carbohydrate contents of *Vernonia amygdalina* obtained were 40.8103 and 38.5550 % in samples X and Y respectively. Carbohydrate is an important source of energy and dietary fibre. It also contributes to the rigidity appearance and textural characteristics of many food substrates. The proximate analysis results for sample X and Y was subjected to Spearman rank correlation coefficient analysis showed strong correlation r_s (r_s 0.94) between the two samples X and Y, since the value of r_s is close to unity. The strong correlation between sample X and Y makes them easily influenced despite different samples locations. Table 2 showed phytochemical characteristics results for saponins, flavonoid and polyphenols in samples X and Y in order saponins > flavonoid > polyphenols with respect to their concentrations.

V. CONCLUSION

Vernonia amygdalina are good sources of carbohydrate, dietary fibre, moisture, crude protein, but poor in fat. phytochemical analysis shows the presence of phenols, saponin, flavonoids which are bioactive metabolites for healthy living and the leaf is safe for consumption.

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