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Phytochemical and Proximate Studies on Justicia secunda vahl (Blood root)

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Abstract

Morphologically, Justicia secunda vahl can be visually identified easily by possession of an erect plant that grows up to 90cm/3-4 ft, a perennial herb with an evergreen leave possessing a simple leaf, opposite, acuminate and acute at apex and base respectively and an entire margin with Glabrous surface across the stem, petiole and leaves. The leaves of Justicia secunda used in this work were washed without squeezing, pressed using carbon paper, milled and stored in an airtight labeled container. Standard methods were used for both phytochemical and proximate analysis. Qualitative analysis was carried out on the sample extract, the results showed the presence of Phenols, Alkaloids, Tannins, Saponins, Anthraquinone Glycosides. Quantitative analysis was also carried out using the sample extract and the results showed phenol (1.02 ± 0.78), Alkaloid (2.6 ± 0.86), Anthraquinone Glycosides (0.21 ± 0.27), Tanins (1.20 ± 0.58). The Proximate composition was Moisture content determination, Ash content determination, Carbonhydrate determination, Fat content, Crude Fiber determination, and Crude protein determination, Proximate analysis showed that there was significant difference in the leave. Table (4.5) showed that these constituents are of great nutritive and medicinal importance. Justicia secunda plants are readily available, rich in essential nutrients needed for growth and development.

Keywords: *Phytochemistry, nutrient, active ingredient, quantitative, qualitative*

INTRODUCTION

Justicia secunda is a flowering plants belonging to the family *Acanthaceae*. It has over 700 species. They are commonly found most parts of Africa and America. It hosts many insects such as butterfly. Available data confirmed that *J. secunda* currently domesticated in the sub-saharan Africa originated from a part of America. The name *"Justicia"* is in honour of the Scottish horticulturist James Justice (1698–1763) [1]. It is commonly known as St.john's bush but "blood leaf" or "blood root" in Barbados [2]. In Nigeria, the igbos call it "Obara Yom Yom" or" ogwu obara " meaning " blood multiplier" or " blood tonic".

Ethnobotanical Significance and Distribution of *Justicia secunda*

Justicia secunda, commonly known as "blood root" or "blood leaf," holds various local names reflecting its cultural and medicinal importance across Nigeria. Among the Yorùbá people, it is referred to as "Èwe Èjẹ" (blood leaf) or "Èwe Ajẹ́rì" (Jehovah Witness leaf), the latter name highlighting its traditional use as a natural alternative to blood transfusion—particularly valued by members of the Jehovah's Witness faith who may decline conventional transfusion procedures for religious reasons. In South-Eastern Nigeria, particularly among the Igbo-speaking communities, the plant is locally called "Obara Bundu," emphasizing its association with blood restoration. The Ogbia people of Otuoke-Otuaba in Bayelsa State, located in the Niger-Delta region, refer to it as "Asindiri" or "Ohowaazara." *Justicia secunda* thrives in humid environments, often found growing in moist soils near rivers, streams, and creeks. Its distribution spans tropical and pantropical regions of the world, where it is valued not only for its medicinal uses but also for its ecological adaptability.

Medicinal plants according to World Health Organization [3] is defined as herbal preparations made by introducing plants materials to extract, fractionation, purification, concentration or other biological or physical processes which maybe produced for herbal products or for immediate consumption[4]. Most drug are produced both in orthodox and traditional medicine using medicinal plants. The importance of medicinal plants in health care delivery system cannot be over-emphasized because over 50% of the world population use it for treatment and prevention of various diseases that affaect both children and adults. It is a known fact that orthodox drugs are expensive, not readily available and most have side effects in some remote places, hence the recent increase in the usage of medicinal plants in these areas. Socio-ethnic preference and indigence may likely be part of the reason for the recent shift. *Justicia secunda* leaf is used in the treatment of anemia in some parts of Africa especially Jehovah's Witness believers. The plant is referred to as blood booster. This is also confirms the scientific basis of the doctrine of signature; decoction from the leaf produce red colour. [5,6].

Ethno-medicinal studies on the plant proved that every part of the plant is useful especially in folk medicine. Athough the leaf and the roots are mostly used. The effectiveness of the extract in the treatment of ilments especially diabetes has been confirmed by various researchers. This was done by the leaf extract [7]. Its microbial activity on some bacteria has also been proven [8].

The plant has low glucose deficiency and anti-biabetic effects[9]. This proved by an empirical study conducted with model organisms, while the antioxidant, anti-inflammatory and antinociceptive activities have also been reported [10]. The reactive substances in this plant are responsible for most of these activities.

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Phytochemicals also referred to as phytoconstituents are bioactive compounds that play significant role in disease prevention and control. This is an essential feature of the plant-derived chemicals. Primarily, these chemicals are produced for the protection of plants but findings from researchers proved that they also protect man against diseases. Over one thousand phytochemicals in plants have been studied and documented. Common examples of phytochemicals are alkaloids, terpeniods, steroids, flavonoids, tannins and phenolic compounds [11], phytochemicals, also called secondary metabolites are usually abundant in various parts of therapeutic plants including *J. secunda,* they have protective mechanism and defend plants from various stress[12]. In Nigeria, *Justicia secunda* Vahl is commonly cultivated around homesteads, where it often serves dual purposes as both a living fence and a medicinal herb. The plant is valued for its ease of propagation; it can be readily grown from stem cuttings by simply inserting the stem 1–2 inches into moist soil. One of its most notable features is the purplish-reddish sap, often referred to as "blood juice," which is extracted from the leaves either by soaking in water or by boiling. This extract is typically consumed as a herbal tea believed to have blood-enhancing properties.

In various regions of the country, the fresh leaves of *J. secunda* are also consumed raw or used in combination with other medicinal plants such as "nchuanwu" (scent leaf, *Ocimum gratissimum*) and *Moringa oleifera* as culinary ingredients to enhance the nutritional and medicinal value of local dishes like yam porridge and stews. Despite its widespread application in Nigerian folkloric medicine, scientific validation remains limited, with relatively few pharmacological studies conducted to date on this potentially valuable species [13].

This study is aimed at identifying the phytochemicals and Proximate components of *Justicia secunda* vahl which will be useful in providing information that could lead to further utilization of the plant either for medicinal purposes or other uses in the future and to establish the importance of *Justicia secunda* vahl plant.

MATERIALS AND METHODS

Collection and Identification of Plant Sample

Fresh leaves of *Justicia secunda* were collected on November 8th, 2022, from Obeagu Village, Agulu, located in Anaocha Local Government Area of Anambra State, Nigeria. The plant specimen was subsequently identified and authenticated by a taxonomist in the Department of Botany, Faculty of Biosciences, Nnamdi Azikiwe University, Awka. A voucher specimen was deposited in the department's herbarium with the reference number NAUH-203[B].

Preparation of plant sample for phytochemical extraction

Each leaf was spread on the laboratory bench and carefully inspected for the presence of variegated or extraneous materials such as dirt and insect larvae. Healthy leaves were sorted and washed under running water without squeezing to remove debris and dust particles. The plant sample was dried at a temperature of 23°C for five days and ground into powder with the use of electric blender. Fifteen grams (15g) of the sample was weighed into Soxhlet extractor and extracted for 30 minute with solvent (ethanol). The extract was transferred into a 250 ml conical flask and ready for phytochemical and proximate analysis.

Procedure for Phytochemical Screening

Both qualitative and quantitative analyses were conducted to determine the presence and concentration of various phytochemicals in the leaves.

Qualitative Analysis

Various phytonutrients which include alkaloids, flavonoids, cardiac glycoside, tannins, anthraquinone glycosides, saponins, steroids, and terpenes were tested ti ascertain their availability. This was carried out by the methods of modern techniques of plant analysis[14].

Quantitative Determination of the Phytochemical Constituents of the Sample

Determination of tannin

The method described by Amadi et al. [15] and Ejikeme et al. [16] was adopted for the analysis of tannin content. Approximately 50 g of sodium tungstate (Na_2WO_4) was dissolved in 37 cm^3 of distilled water to prepare the Folin-Denis reagent. To this, 10 g of phosphomolybdic acid ($H_3PMo_{12}O_{40}$) and 25 cm^3 of phosphoric acid (H_3PO_4) were added. The mixture was refluxed for 2 hours, cooled, and diluted to 500 cm^3 with distilled water.

Two grams (2 g) of the powdered sample were placed in a conical flask, and 50 ml of distilled water was added. The mixture was gently boiled for 1 hour on an electric hot plate, and the resulting solution was filtered using Whatman No. 42 filter paper (125 mm) into a 100 cm^3 volumetric flask. To the aliquot, 5 ml of Folin-Denis reagent and 10 ml of saturated sodium carbonate (Na_2CO_3) solution were added for color development. The solution was thoroughly agitated and allowed to stand for 30 minutes in a water bath maintained at 25 °C.

The absorbance was then measured at 700 nm using a Spectrum Lab 23A spectrophotometer. Tannin concentration was determined by comparing the absorbance with a standard curve prepared using tannic acid. The following formula was used to calculate the tannin content in the sample:

$$\text{Tannin (\%)} = \frac{\text{C x Extract Volume x 100}}{\text{Aliquot volume x weight of sample}}$$

C = absorbance of tannic acid

Determination of Total Terpenoid Content

The method described by Anukwuorji et al. [17] was adopted for the determination of terpenoid content. Approximately 1 g of the powdered sample was weighed into a clean conical flask and soaked in ethanol for 24 hours at room temperature. After maceration, the mixture was filtered, and the resulting filtrate was extracted with petroleum ether using a separating funnel. The petroleum ether extract, which contains the terpenoids, was collected and considered as a measure of the total terpenoid content in the sample.

Total terpenoid content = Final weight of the sample - Initial weight of the extract)

Determination of Alkaloids

The quantitative determination of alkaloid content was carried out following the method described by Harborne [14]. Three grams (3 g) of the powdered sample was placed in a 150 mL conical flask, and 20 mL of 10% acetic acid in ethanol was added. The mixture was allowed to stand for 4 hours with occasional shaking. The extract was then concentrated on a water bath to reduce the volume to one-quarter of the original.

Subsequently, 15 drops of concentrated ammonium hydroxide (NH_4OH) were added to the concentrated extract to induce complete precipitation. The mixture was allowed to settle for 3 hours to ensure complete sedimentation of the precipitate. The resulting precipitate was washed with 20 mL of 0.1 M NH_4OH, then filtered using Whatman filter paper while discarding the supernatant.

The residue (alkaloid precipitate) was dried to a constant weight and then weighed. The alkaloid content was expressed as a percentage using the following formula:

$$\text{Alkaloid (\%)} = \frac{\text{Weight of alkaloid}}{\text{Weight of sample}} \times 100$$

Determination of flavonoid

The method described by Ejikeme et al. [16] was employed for the quantitative determination of flavonoids. Three grams (3 g) of the powdered sample was placed in a 250 cm^3 beaker, and 50 mL of 80% aqueous methanol was added. The beaker was covered and allowed to stand for 24 hours at room temperature to facilitate extraction. After the initial extraction, the supernatant was discarded, and the residue was re-extracted three times using the same volume of methanol.

The combined extracts were filtered using Whatman No. 42 filter paper (125 mm). The filtrate was transferred into a crucible and evaporated to dryness over a water bath. The dried residue was then cooled in a desiccator and weighed repeatedly until a constant weight was achieved. The final weight was recorded and used to calculate the flavonoid content in the sample.

The percentage of flavonoid was calculated as;

$$\text{Flavonoid (\%)} = \frac{\text{Weight of flavonoid}}{\text{Weight of sample}} \times 100$$

Determination of Saponin

The quantitative determination of saponins was carried out following the methods of Ejikeme et al. [16] and Obadoni and Ochuko [18]. Five grams (5 g) of the powdered sample was placed in a 250 mL conical flask, and 100 mL of 20% aqueous ethanol was added. The mixture was heated over a water bath at 55 °C for four hours with continuous stirring. After filtration, the residue was re-extracted with another 100 mL of 20% aqueous ethanol and again heated for four hours under the same conditions.The combined extracts were concentrated to 40 mL over a water bath maintained at 90 °C. The concentrate was transferred into a 250 mL separatory funnel, and 20 mL of diethyl ether was added. The mixture was vigorously shaken, and the aqueous layer was recovered while the ether layer was discarded. This purification step was repeated twice.

Subsequently, 60 mL of n-butanol was added to the aqueous extract, followed by two successive extractions with 10 mL of 5% sodium chloride solution. The sodium chloride layer was discarded, and the remaining solution was heated in a water bath for 30 minutes. It was then transferred into a pre-weighed crucible and dried in a hot-air oven to a constant weight.

The saponin content was calculated as a percentage using the following formula:

$$\text{Saponin (\%)} = \frac{\text{Weight of Saponin x 100}}{\text{Weight of sample}}$$

Determination of Cardiac Glycoside.

The methodology described by Amadi et al. [15] and Ejikeme et al. [16] was used to determine the quantity of cardiac glycosides. Two grams (2 g) of the sample were weighed into a 250 mL round-bottom flask, and 60 mL of distilled water was added. The mixture was allowed to stand for 2 hours to allow autolysis to occur.

Subsequently, the mixture was subjected to full distillation in a 250 mL conical flask containing 20 mL of 3% sodium hydroxide (NaOH). To the distillate, an antifoaming agent (tannic acid) was added, along with 8 mL of 6M ammonium hydroxide (NH_4OH) and 2 mL of 5% potassium iodide (KI) solution. The contents were thoroughly mixed and titrated with 0.02 M silver nitrate ($AgNO_3$) solution using a micro burette, against a black background.

The endpoint was indicated by the appearance of turbidity, signifying the presence of cardiac glycosides. The quantity of cardiac glycoside was calculated using the following formula:

$$\text{Cardiac glycoside (\%)} = \frac{\text{Titer value x 1.08 x extract volume}}{\text{Aliquot volume x sample weight}}$$

Determination of phenols

Two grams (2 g) of the sample were defatted in 100 mL of petroleum ether using a Soxhlet extractor for 2 hours. Following this, the defatted sample was boiled for 15 minutes with 50 mL of ether to extract phenolic components.

To the resulting extract, 10 mL of distilled water, 2 mL of 0.1 N ammonium hydroxide solution (NH_4OH), and 5 mL of concentrated amyl alcohol were added. The mixture was left to react for 30 minutes to allow for color development. The optical density (OD) of the solution was measured at 505 nm.

A standard phenolic acid solution was prepared by dissolving 0.20 g of phenolic acid in distilled water and diluting it to a final volume of 200 mL, resulting in a concentration of 1 mg/mL (1 mg/cm^3). This solution was used to generate a phenol standard curve.

Various concentrations of the phenolic acid solution (0.2–1.0 mg/cm^3) were pipetted into five different test tubes. To each tube, 2 cm of ammonium hydroxide (NH_4OH), 5 mL of amyl alcohol, and 10 mL of water were added. The total volume in each test tube was adjusted to 100 mL, and the tubes were allowed to react for 30 minutes to develop color. The optical density of each standard solution was then measured at 505 nm.

Determination of Anthraquinones Glycoside

Fifty grams (50 g) of the sample were soaked in 50 mL of distilled water for 16 hours. The resulting suspension was heated in a water bath at 70°C for 1 hour. After cooling, 50 mL of 50% methanol (MeOH) was added to the suspension, and the mixture was filtered. The clear filtrate was collected for analysis.

The absorbance of the clear solution was measured using a spectrophotometer at a wavelength of 450 nm. The results were compared with a standard solution containing 1 mg/100 mL of alizarin and 1 mg/100 mL of purpurin, both having an absorption maximum at 450 nm (as reported by [source]) to determine the concentration of these compounds in the sample.

Determination of Steroids: The method described by Okeke and Elekwa20 was followed for the determination of sterols. Five grams (5 g) of the sample were dispersed in 100 mL of freshly distilled water and homogenized using a laboratory blender. The resulting homogenates were filtered, and the filtrate was eluted with normal ammonium hydroxide solution to achieve a pH of 9.

Two milliliters (2 mL) of the eluate were placed in test tubes and mixed with 2 mL of chloroform. To this mixture, 3 mL of ice-cold acetic anhydride was added, followed by the cautious addition of 2 drops of concentrated sulfuric acid (H_2SO_4).

A standard sterol solution was prepared and treated in the same manner. The absorbance of both the standard and prepared samples was measured using a spectrophotometer at 420 nm, and the readings were recorded accordingly.

Proximate Determination

The following materials were used in the proximate analysis: Test tube, Test tube rack Soxhlet extractor, Conical Flask**,** Pipette**,** Blender **,** Heating mantle, Fume cupboard, weighing balance, silica dish, funnel, filter paper, oven, petri dish, thimble, retort stand and muffle furnace.

The reagents used include: Concentrated sulphuric acid, Dilute hydrochloric acid, distilled water, Ethanol, Acetic anhydride, Ferric Chloride, Petroleum ether, sodium hydroxide, boric acid, methylene indicator, sodium sulfate, kjeldahl catalyst, copper sulphate, selenium speck, crucible, acetone, phenolphthalein, indicator, ammonia, molybidic acid.

Moisture Content Determination

The gravimetric method described by Bradley21 was employed to determine the moisture content. A five-gram (5 g) weight of the sample was dispensed into a previously weighed moisture can. The sample was then dried in an oven at 95-100°C under a pressure of 100 mmHg for an initial 30 minutes. After this period, the sample was cooled and reweighed.

Drying continued in the oven, and the drying, cooling, and weighing process was repeated at intervals until a constant weight was achieved. The weight difference between the initial and final weights allowed the determination of the moisture lost, which was then expressed as a percentage of the original sample weight.

The moisture content was calculated using the following formula:

$$\text{Moisture (\%)} = \frac{W_2 - W_3 \times 100}{W_2 - W_1}$$

Where

W_1 = initial weight of the empty crucible

W_2 = weight of empty crucible + sample

W_3 = final weight of empty crucible + sample after drying to constant weight.

Ash Content Determination

The furnace incineration gravimetric method described by Bradley22 was used to determine the ash content. A measured weight (5 g) of each sample was placed in a previously weighed porcelain crucible. The sample in the crucible was then placed in a muffle furnace at 550°C for 2 hours, allowing the sample to burn completely until it became white ash.

After the burning process, the crucible was carefully removed from the furnace (taking care to avoid blowing away the ash with air), cooled in a desiccator, and then reweighed. The difference in weight, which corresponds to the ash content, was calculated and expressed as a percentage of the original sample weight.

The ash content was calculated using the following formula:

$$\text{Ash (\%)} = \frac{W2 - W1 \times 100}{W}$$

Where;

W = weight of sample

W1 = weight of empty crucible

W2 = weight of crucible + ash

Determination of Crude Fiber

The crude fiber content was determined using the Wende method described by James23. A 5 g sample of each was first defatted by petroleum ether. The defatted samples were then boiled in 200 mL of a 1.25% H_2SO_4 solution under reflux for 30 minutes. After the boiling, the samples were washed with hot water.

The washed samples were carefully transferred back to the flask, and 200 mL of a 1.25% NaOH solution was added. The samples were boiled for another 30 minutes and again washed with hot water. After washing, the samples were carefully transferred into a weighed porcelain crucible and dried in an oven at 105°C for an hour. Once dried, the crucible was cooled in a desiccator and reweighed.

The weight loss after incineration was used to calculate the crude fiber content, expressed as a percentage of the sample weight.

The crude fiber content was calculated using the following formula:

$$\text{Crude fibre (\%)} = \frac{W2 - W}{W1} \times 100$$

Where;

W1 = weight of sample

W2 = weight of crucible + sample after drying

W3 = weight of crucible + sample ash.

Determination of Fat Content

The fat content was determined using the continuous solvent extraction method with a Soxhlet extractor, as described by James23. A 2 g sample was wrapped with a weighed porous paper (Whatman filter paper No. 40). The wrapped samples were placed into the Soxhlet reflux flask, which was then mounted onto a weighed oil extraction flask containing 300 mL of petroleum ether (40-60°C boiling points). The upper end of the reflux flask was connected to a condenser.

The solvent in the extraction flask was heated using an electrothermal heater. The vaporized solvent condensed into the reflux flask, completely covering the wrapped samples. The samples remained in contact with the solvent until the flask filled up and siphoned over, carrying the extracted oil (fat) down to the boiling flask. This cycle of vaporization, condensation, extraction, and reflux was repeated continuously for about 4 hours.

After the extraction, the defatted samples were carefully removed from the flask using forceps. The solvent was recovered, leaving the oil extract in the flask. The defatted wrapped samples were then dried in an oven at 100°C for 1 hour, cooled in a desiccator, and weighed.

The experiment was replicated multiple times to obtain an average. The fat content was calculated based on the weight difference, using the following formula:

$$\text{Fat (\%)} = \frac{W2 - W3 \times 100}{W2 - W1}$$

Where;

W1 = weight of empty filter paper

W2 = weight of paper + sample before defatting

W3 = weight of paper + sample after defatting and drying.

Crude Protein Determination

The protein content of the samples was determined using the Kjeldahl method (James23), which involves measuring the total nitrogen content and converting it to protein using a factor of

6.25. To begin, 0.5 g of the sample was digested with 10 mL of concentrated sulfuric acid in the presence of a selenium catalyst tablet. The mixture was heated in a fume cupboard until it became clear, indicating complete digestion. After digestion, the mixture was transferred to a 100 mL volumetric flask and diluted with distilled water. A 10 mL aliquot of the diluted digest was then mixed with an equal volume of 45% sodium hydroxide (NaOH) and placed in a Kjeldahl distillation unit. The distillate was collected in 10 mL of 4% boric acid containing a mixed indicator. The distillate (50 mL) was titrated with 0.02N hydrochloric acid (H_2SO_4) solution. A reagent blank was processed in the same manner. The nitrogen and protein contents were then calculated based on the following formula:

$$\text{Nitrogen (\%)} = \frac{T \times 0.02N \times 14}{W \times 1000}$$

Where;
W = weight of sample analyzed
N = Normality of titrant (0.02N)
T= Titre value
14= Molar mass of Nitrogen
The percentage of protein was calculated as % protein = %nitrogen × 6.25.

Determination of Carbohydrate Content

The carbohydrate content of the test samples was estimated using the arithmetic difference method. Carbohydrates were calculated as the nitrogen-free extract (NFE), using the formula:
% CHO (Nitrogen-Free Extract) = 100 - [%a + %b + %c + %d]
Where **a, b, c, and d** represent the percentages of moisture, protein, fat, and ash in the sample, respectively.
Where,
a= protein
b= fat
c= Ash
d= fiber.

RESULTS

Table 4.3 shows the qualitative analysis of phytochemicals screening present in the ethanol extract of *Justicia secunda* vahl leaves showing the presence of phenol, Alkaloids, Anthraquinone Glycosides, Tannins, and Saponins while Cardiac Glycosides, Steroids and Terpenes are absent.
Table 4.4 shows the Quantitative analysis of Justicia secunda vahl leaves. The different Concentrations and average means are recorded except for Saponins, Cardic Glycosides, Steroids and Terpenes which are absent.

Table 4.3: Preliminary Phytochemical Screening of Justicia secunda vahl

Phenol	Alkaloid	Anthraquinone Glycosides	Tannin	Saponin	Cardic Glycoside	Steroid	Terpene
+	+	+	+	+	-	-	-

Where;
(+) = Present
(-) = Absent

Table 4.4: Quantitative Analysis of Justicia secunda vahl Leaves

Parameters	Phenol (%)	Alkaloid (%)	Anthraquinone glycosides (%)	Tannin (%)
A	2.00	3.80	0.60	2.00
B	1.00	2.20	0.20	1.00
C	0.06	1.80	0.01	0.60
Mean	1.02	2.6	0.21	1.20
S. D	± 0.79	± 0.86	± 0.27	± 0.58

Data are means of triplicate determinations + standard error (means + S.E)

Table 4.5: proximate analysis of justicia secunda vahl leaves

Parameters	Moisture (%)	Fat (%)	Ash (%)	Crude fiber (%)	Protein (%)	Carbohydrate	Hydrogen cyanide
A	10.37	0.90	43.80	33.05	0.09	12.71	0.01
B	9.13	0.85	41.01	28.52	0.07	14.00	0.02
C	10.05	0.70	38.01	32.71	0.06	10.51	0.01
Mean	9.85	0.82	40.94	31.43	0.07	12.41	0.01
S. D	± 0.53	± 0.09	± 2.36	± 2.06	± 0.01	± 1.44	± 0.005

Data are means of triplicate determinations ± standard error (means ± S.E)
(X^2 = 1.500, P<0.05)

DISCUSSION

Proximate and Phytochemical studies were carried out on the leaves of *Justicia secunda* vahl belonging to the family *Acanthaceae*. A review of literature confirmed that phytochemicals are produced by plants to protect themselves. However, recent studies confirmed that they help in disease protection and control in man. It was also reported that over 1000 phytochemicals are available in plants to protect them from natural enemies [11].
From the phytochemical screening, Harborne [14] observed that saponin is characterized by their ability to form stable froth (foam). Nutritionally, Saponins are considered to be anti-nutrients due to the ability to elucidate effects when consumed[24] and due to their ability to haemolyse red blood cells in cold-blooded animals.
Notwithstanding, Saponins have some health benefits in that they are reported to lower cholesterol levels and prevent coronary heart disease and inflammation. Also the ability to retain a stable froth is a characteristics that can be employed in the production of foods that need large foam volumes such as ice cream.
The Tannin concentration in the *Justicia secunda* vahl leaves was (1.20 ± 0.58 %). Tannin are used as classifying agents (hops) in beer production. Stevens and Page[25] reported success in the use of plant as an alternative to hops in the production of tela bear in Ethiopia. This supports the potential of the plant for utilization at industry level. Phenol are strong antiseptic and disinfectant with established anti-microbial activity. The Phenol content of the leaves of *Justicia secunda* vahl was found to be an average of (1.02 ± 0.79).

This agrees with the findings of Anyanwu and Okoye[26]. The presence of this strong antibacterial component of the plant maybe the reason behind its wide application in traditional African medicine[26]. The results of the phytochemical and proximate analysis carried out showed the presence of some plant chemicals and nutrients. The leaves of *Justicia secunda* Vahl showed the least phytochemical composition in Anthraquinone Glycosides (0.21 ± 0.27) % while the highest is Alkaloids (2.6 ± 0.86) %. Tannin (1.29 ± 0.58) are present in the phytochemical analysis, Tannins are organic substance of diverse composition with pronounced stringent properties that hasten the healing of Wounds and inflamed mucous membrane. Reed[27] stated that the toxicity of Tannins depends largely on the interference which in turn is dependent on certain features which include but not limited to such as kind of alimentary canal, dietary habits, physique and toxin removal process.

The Proximate composition of the leaves of *Justicia secunda* vahl showed the least content is protein (0.07 ± 0.01) % and fat (0.82 + 0.09) where as Crude Fiber (31.43 ± 2.06) %, Carbohydrates (12.41 ± 1.44), Ash (40.14 ± 2.36), Moisture content (9.85 ± 0.53) and moisture contents are generally high and this is in range with the report on the chemical composition and nutritive value of vagetables. Table (4.5) shows that the plants are of high nutritive value especially as it contains high fibre and Carbohydrate which are both necessary for digestion and energy respectively. Fibre may also help to increase bulk and reduce food transit time in the alimentary canal and the incidence of constipation and other related disease.

Generally, findings in this research shows the presence of many phytochemical responsible for the efficiency of plants uses in medicine. Anyanwu and Okoye [26] established a relationship between secondary metabolites in plants and their therapeutic properties. It was observed that the high Alkaloid content of *Justicia secunda* vahl explains the success needed in their use as antimalarial remedies. In traditional healing practice, the leaves are used for the treatment of wounds and various diseases that affects the abdomen. The extracted medicinal compounds from the leaves of *J. secunda* is taken in some parts of Africa particularly in Nigeria for the purpose of boosting the amount of blood in the body. Available literature shows that the leaves have possess antisickling and antimicrobial activities[28]. Onoja et al.[10] in his findings reported that *J. secunda* leaves have the potential to increase the bodys immune response to injury, infection or damage.

The effectiveness of the extract in the treatment of some life threatening ilments such as diabetes has been confirmed by various researchers. This wass ascertained by the use of its leaf extract[7]. Its microbial activity on some bacteria has also been confirmed and reported[8].

CONCLUSION

The phytochemical and proximate analysis of ***Justicia secunda*** Vahl depicts that they contain many nutrients and can be said to be of high nutritional value, especially in terms of phytochemical and Proximate contents of which have documented health benefits. ***Justicia secunda*** Vahl can easily be identified by possession of an erect herb (90 cm) with an evergreen leaves possessing simple leaf, opposite, acuminate, and acute apex and base and an entire margin. Glabrous surface across the stem, petiole and leave. The leaf decotion is known to produce a purplish blood-red colouration. Thus, extraction can be made from the leaf or root.

They can grow in homestead or garden. The raw leaves can be chewed or used together with other medicinal herbs like scent leaf (*ocimum gratissimum*) and moringa (*Moringa oleifera*) as culinary vegetables to garnish yam porridge and stew, this attributed to the absence of toxicity and cytotoxicity most especially in the level of hydrogen cyanide. Hence, *Justicia secunda* Vahl is said to be safe for human consumption and should be made known to the masses by propagating it and by the next 10 years to come it would be readably available.

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