ORIGINAL RESEARCH PAPER

BIOCHEMICAL SCREENING OF FLUTED PUMPKIN LEAF

ABSTRACT

The well-known vegetable telfairia occidentalis, sometimes known as the fluted pumpkin leaf, is utilized throughout Nigeria. In Igbo, it is typically referred to as Ugu. The objective of this study was to ascertain the biochemical (phytochemical) makeup of Telfairia occidentalis, a popular vegetable in Nigeria. The study made use of fluted pumpkin leaf extract that was treated differently by soaking in ethanol and water. Alkaloids, flavonoids, glycosides, saponins, tannins, steroids, and phenol compounds were all present in the ethanolic extract at the conclusion of the research, but terpenoids were not, making seven out of the eight phytochemicals present. Alkaloids, flavonoids, steroids, glycosides, and phenol compounds were all present in the water extract, while saponin, tannin, and terpenoids were not. This made five out of the eight phytochemicals present. According to quantitative analysis, the flavonoid concentration in the fluted pumpkin leaf was the highest (11.83 mg/100 g), followed by steroid (11.67 mg/100 g), saponin (4.58 mg/100 g), alkaloid (3.63 mg/100 g), terpenoids (3.56 mg/100 g), and phenol (3.50 mg/100 g), while tannin had the lowest value (0.51 mg/100 g).

Keywords: BIOCHEMICAL ANALYSIS, FLUTED PUMPKIN.

INTRODUCTION

Just like many other polygenic features, environmental variables and variations affect the chemical components of plants. Through biochemical screening of the leaf, this study attempts to determine the qualitative and quantitative biochemical concentration of the fluted pumpkin leaf. Chemicals called biochemicals can be found in living things. It is known as a phytochemical in plants. Phytochemicals are substances derived from plants (Breslin, Andrew., 2017). Chemicals generated by plants through primary or secondary metabolism are known as phytochemicals (from the Greek word phyto, which means "plant") (Molyneux et al., 2007; Harborne et al., 1999). They often serve a role in plant development or defense against adversaries, diseases, or predators and have biological action in the plant host (Molyneux et al., 2007). Because there is currently insufficient evidence to support their potential health benefits, phytochemicals are often considered research substances rather than essential nutrients (Corvallis, Oregon, 2017). Major categories of phytochemicals under study include carotenoids and polyphenols, which include phenolic acids, flavonoids, and stilbenes/lignans (Heneman, Karrie and Zidenberg-Cherr, Sheri, 2008). Anthocyanins, flavones, flavanones, isoflavones, and flavanols are some of the categories of flavonoids that can be further subdivided based on similarities in their chemical structures (Heneman, Karrie and Zidenberg-Cherr, Sheri 2008). Additionally, catechins, epicatechins, and proanthocyanidins are subclasses of flavanols (Heneman, Karrie and Zidenberg-Cherr, Sheri., 2008). Over 25,000 different phytochemicals have been identified, and most of them are contained in the colorful sections of plants including fruits, vegetables, nuts, legumes, whole grains, etc.

Numerous advantages to health have been associated with fluted pumpkin leaves (Emebiri and Nwufo, 1990). This is the rationale for why so many people consume it. Pumpkin leaves are said to contain significant levels of important vitamins A and C. Vitamin C aids in wound healing and the formation of scar tissue, as well as promoting healthy bones, skin, and teeth, whereas vitamin A enhances vision and supports healthy skin and hair.Studies have revealed that pumpkin leaves contain a significant quantity of calcium, which is essential for strong bones and teeth, according to Badifu (1993). Calcium is essential for maintaining healthy bones, especially in women, and for preventing osteoporosis. Additionally, calcium may help lower the risk of cardiovascular failure, according to certain research. These iron-rich, fibrous leaves are a healthy and advantageous supplement to a person's diet. Iron helps the body transport oxygen from the lungs to other regions of the body as well as assist the muscles store and use oxygen. Pumpkin leaves can help naturally supply the iron that women, children, and others need to maintain healthy levels. The leaves are said to be high in protein as well, making them a great supplement to help the body get more of it each day. Given that fluted pumpkin leaves share these qualities, additional research is required to elucidate the contents of these leaves.

Growth and habit

Vigor, germination, and seedling establishment are all impacted by seed size. From 63% for little seeds (less than 11 g) to 89% for larger seeds (22 g), the vitality varies. On normal soil, germination takes around 14 days, but in a sawdust medium, it takes just 7 days. For big seeds, the vine length is typically 31 cm one week following emergence, whereas little seeds develop into a similar vine length of 16 cm. Larger seeds exhibit higher uniformity in the seedling stand and better development potential in terms of the number of leaves and branches. Plants develop vegetatively in a sigmoidal pattern that peaks 6.5 months after planting, under regular and careful trimming of young edible leaves. About three months after sowing, male plants blossom, a month before female plants do. Beginning at the inflorescence's base, flowers begin to open. Around midday, when pollinating insects, primarily bees of the species Trigona, visit the blossoms, the aroma of the male

flowers becomes apparent. In the afternoon, the stigma of female flowers is receptive. Given that hand pollination produced a fruit set of 35% as opposed to 15% with open pollination, it appears to be beneficial for fruit set. A fast development of the ovary, which begins three days after pollination, is a sign that fruit has been set. After successful fruit set, fruit development is sigmoidal throughout an 8-week period and fast between 1.5 and 5.5 weeks afterwards. A week after fruit set, a white, waxy bloom forms on the fruit's surface and progressively gets stronger; towards maturity, it gets weaker. Sometimes the fruit that is developing inhibits the later-setting fruit. Only 1-4 of the approximately 18 solitary blooms produced by female plants grow into ripe fruits. Only 35% of a population's female plants produce fruit. The quantity of seeds per fruit varies greatly across and among plants, averaging 62 seeds per fruit but ranging from 6 to 196. The seeds' sizes, which range from 1 g to 68 g, are similarly uneven. Some seeds have several embryos. Because the seed is resistive by nature, storing it is challenging.Nine weeks following fruit set is the fruit's physiological peak. Female plants are more vigorous than male ones, thus vine size 64 days after planting may be utilized as a sex indication. However, it has not been effective to distinguish female plants from either seeds or immature seedlings.

Cultivation

However, it may be let to spread out flat across a field. *T. occidentalis* is commonly cultivated vertically on trestle-like structures (Okoli and Mgbeogu., 1983). The control of weeds is a benefit of growing gourds flat, especially when they are intercropped with a tall, upright plant like maize. When seeds are sown, the growth season begins in April or May (Emebiri and Nwufo, 1990). After a month, the first leaves and shoots may be taken, and after that, they can be gathered every 2-4 weeks (Okoli and Mgbeogu, 1983). Direct sowing of seeds usually occurs in groups of three to maximize yield in the event of unsuccessful germination (Okoli, and Mgbeogu, 1983). Normally, T.Fruit is harvested from October through December (Emebiri and Nwufo, 1990). The seeds are then gathered and dried, with some of them being used right once and the remaining being saved for the upcoming planting season. The fluted gourd may ratoon and subsequently produce several flushes of fruit over extended periods of time, despite being reliant on the kind of soil (Aiyelaagbe, I.O.O, and A.A Kintomo., 2002). In well-drained soils, it can ratoon with the greatest degree of success (Akoroda, 1990). The seeds are used to spread it. Its seed is protected from injury by a different, more substantial covering or hard shell. It endures dryness and can continue to exist in the root even after a long period of time. It is a creeping plant that thrives when bamboo anchored in place.

Uses

You may eat the fluted pumpkin leaf's leaves as veggies (Akoroda, 1990). It may be utilized for herbal medicine as well. The herbal medication made from T. occidentalis is used to treat rapid attacks of convulsion, malaria, and anemia. It also has a critical and preventive function in cardiovascular illnesses. Additionally, the edible seeds can be fermented and added to ogili or boiled and eaten whole (Badifu, 1993). Native American cultures

have long employed the fluted gourd as a blood tonic, perhaps because of its high protein content (Akoroda, 1990). High-protein breads may be made using the seeds' flour (Giami, 2003).

The kingdom of plants stands in for a country with unfulfilled potential.

Many plant species contain various chemical substances that are extremely advantageous to people and other living things. Determining the qualitative and quantitative biochemical makeup of the Fluted pumpkin leaf (Telfairia occidentalis), one of the plant species that is useful to humans, is therefore important.

The biology of the plant Fluted pumpkin leaf (Telfairia occidentalis) is covered in this paper, along with a qualitative and quantitative biochemical investigation of its growth and habits, distribution, cultivation, and applications.

Description of the studied species

A tropical plant known as Telfairia occidentalis (Fluted pumpkin leaf) is produced as a leaf vegetable in West Africa. Fluted gourd, fluted pumpkin, ugu in Igbo, sokoyokoto in Yoruba, kabewa in Hausa, and Ikong-Ubong in Efik and Ibibio are some of the common names for the plant. T. occidentalis is a native of southern Nigeria and a member of the Cucurbitaceae family (Akoroda, 1990). The fluted gourd is widely grown in southeast Nigeria, but it also thrives in many other West African countries. It is typically used in soups and herbal remedies (Nwanna, et al., 2008). Although the fruit is inedible, the gourd's seeds are rich non protein and fat and can help maintain a diet that is balanced.

The plant is a dioecious perennial that tolerates dryness and is often cultivated trellised. The edible seeds can be fermented and added to ogili, or they can be cooked and eaten whole (Badifu, 1993). Native American cultures have long employed the fluted gourd as a blood tonic, perhaps because of its high protein content (Akoroda, 1990). High-protein breads may be made using the seeds' flour (Giami, 2003). The shoots and leaves can also be eaten as vegetables (Akoroda, 1990). The herbal medication made from T. occidentalis is used to treat rapid attacks of convulsion, malaria, and anemia. It also has a critical and preventive function in cardiovascular illnesses. The fluted gourd fruit is quite large; one study documented a range of 16–105 centimetres (6.3–41.3 in) in length, and an average of 9 cm in diameter(Okoli, and Mgbeogu, 1983). The same study found the seed count in larger gourds to reach upwards of 196 per fruit, typically measuring between 3.4 and 4.9 cm in length(Okoli and Mgbeogu, 1983). In both the pistillate and staminate varieties, T. occidentalis flowers grow in sets of five, with creamy-white and dark red petals, contrasting with the light green colour of the fruit when young, and yellow when ripe(Okoli and Mgbeogu, 1983). Dioecious flowering is most common in the fluted gourd, with very few documented cases of monoecious flowering.

Plate 1: *Telfairia occidentalis,* illustrated by

Joseph Dalton Hooker, 1877

2.2 Scientific classification of Fluted pumpkin leaf *(Telfairia Occidentalis)*

Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Rosids
Order:	Cucurbitales
Family:	Cucurbitaceae
Genus:	Telfairia
Species:	T. occidentalis
Binomial name:	*Telfairia occidentalis*

Distribution

In the forests of West and Central Africa, the fluted pumpkin is most common in Benin, Nigeria, and Cameroon. It is a widely consumed vegetable in Nigeria. It does not exist in the rest of East Africa and is uncommon in Uganda. It has been hypothesized that the Igbo people, who have grown this crop since antiquity, disseminated it from their homeland in south-east Nigeria. However, it is also conceivable that the fluted pumpkin's present habitat was formerly home to wild species that have been harvested to local extinction and replaced by cultivated varieties. (Akoroda,1990)

MATERIALS AND METHODS

Description of the studied area

Uli is a town of historic importance situated at the extreme southeast corner of Ihiala local government area of Anambra state in Nigeria. Its closest neighbouring towns are Amaofuo, Ihiala, Amorka, Ubulu, Ozara, Egbuoma and Ohakpu. Uli town extends westward to the confluence of the rivers of Atamiri and Enyinja, and across Usham Lake down to the lower Niger region. Anambra State University is located in Uli. The major markets in Uli is Nkwo Uli and Orie Ubahudara.

Plate2 : Uli Location in Nigeria map

Coordinates: 5°47′N 6°52′E

Country: Nigeria

State: Anambra State

LGA: Ihiala

Area: 99 sq mi (256 km2)

Materials

Equipment / apparatus

Beakers

Whatman Filter paper

Water bath.

Electronic weighing balance

Crucible

Conical flask

Electric hot plate

Spectrophotometer

Pipette

Reagents

Petroleum ether

Acetic acid

Ethanol

Ammonium hydroxide

Aqueous methanol

Sodium hydroxide

Phenolphthalein

Phenol

Distilled water

Sample collection and preparation

The fresh fluted pumpkin leaves were collected from different locations within total market Ihiala in Anambra state Nigeria and the leaves were identified by my supervisor. The samples were dried in the shade at ambient temperate (28 – 30^{o}C), and was ground to powder.

200g of the flute pumpkin leave sample were weighed into labeled conical flasks. 500ml of the solvents (ethanol and distilled water) were poured into the conical flasks to extract the phytochemicals. After 24hrs, the mixtures were filtered using what man filter paper (No.1) into conical flasks. The filtrates were concentrated by placing the flasks into water bath at 100^{o}C.The resulting filtrate were cooled to room temperature,

Qualitative test were then carried out on the cool solution.

Method

Qualitative phytochemical

Test for tannins

a. Test with ferric chloride: 10 ml of extract was added to 5 ml of distilled water, along with a few drops (2–3) of ferric chloride. The mixture was then watched for any precipitate development and color changes. To establish the presence of tannins, the reaction mixture was examined for a brownish green or blue-black coloring**.**

b. Lead acetate test: 50 mg of the extract are dissolved in 3 ml of distilled water, which has 10% lead acetate solution. Phenolic chemicals are indicated by a large, white precipitate.

Detect saponins

(a) A foaming demonstration: 2.5 ml of filtrate were diluted to 10 ml with distilled water and forcefully agitated for 2 minutes. The creation of a froth that remained stable for a few minutes indicated the presence of saponin in the filtrate.

(b) A demonstration of the emulsifying properties of saponins was performed by adding two drops of olive oil to a solution made by diluting 2.5 ml of filtrate to 10 ml with distilled water (above). After vigorously shaking the mixture for a few minutes, a fairly stable emulsion was produced, indicating the presence of saponins.

Test for steroids

(a) The material was dissolved in 2 ml of chloroform, about 5 ml total. To create a layer, 0.2 ml of concentrated H2SO4 was carefully applied. The deoxy-sugar properties of cadenolides are visible at the layer interface as a reddish-brown color, which denotes the presence of steroids.

(b) (b) 5 ml of the sample's extract were combined with 2 ml of concentrated H_2SO_4 and 2 ml of acetic acid. In certain samples, the transition from violet to blue or green indicates the presence of steroids.

Test for alkaloids

a. The Mayer test Two drops of Mayer's reagent are applied along the test tube's sidewalls to a few ml of plant sample extract. Alkaloids are present when a white, creamy precipitate appears.

Wagner's test, b Along the sidewalls of the test tube, a few drops of Wagner's reagent are added to a few milliliters of plant extract. The test is considered positive when a reddish-brown precipitate forms.

the detection of cardiac glycosides

a) Two milliliters of glacial acetic acid containing one drop of ferric chloride solution were added to five milliliters of each extract. With 1 cc of concentrated sulfuric acid, this was underplayed. Cardenolides' deoxysugar properties were visible at the contact as a brown ring. Below the ring, a violet ring could show up, and in the acetic acid layer, a greenish ring might develop.

b) In separate test tubes, 1 ml of the filtrate was mixed with 10 ml of 50% H_2SO_4, heated for 15 minutes, and then Fehling's solution was added. The mixtures were then boiled. The presence of glycosides was detected by a brick-red precipitate (Sofowora, 1993).

Test for flavonoids

(a) A sample of the filtrate was mixed with 5 ml of diluted ammonia solution, and then concentrated H_2SO_4 was added. The presence of flavonoids was indicated by a yellow hue.

(b) To 1 ml of the cooled filtrate, a few drops of a 20% sodium hydroxide solution were added. When acid was added, the yellow color changed to a colorless solution, signifying the presence of flavonoids.

Phenolics

A 5ml extract was added to 10ml of distilled water for the ferric chloride test.

A solution of ferric chloride in 1 ml was then added. The development of brown or blue-black coloring suggested the presence of phenol.

Gelatin test,

b. 50 mg of the extract are diluted in 5 ml of distilled water before being mixed with 2 ml of a 1% solution of gelatin containing 10% NaCl. Phenolic chemicals are indicated by white precipitate.

Quantitative phytochemicals

Steroids

20 ml of ethanol were macerated with one gram (1 g) of the extract. To 2 ml of the filtrate, two milliters (2 ml) of chromagen solution were added, and the mixture was let to stand for 30 minutes. At 550 nm, absorbance was measured. The concentration of steroid in the extract was extrapolated from the standard curve after a standard was created using the same process at various concentrations of steroid hormone and a standard curve of absorbance vs. concentration was constructed.

Alkaloid determination

20ml of 20% acetic acid in ethanol will be added to 5g of the sample, which will then be weighed into a 250ml beaker. The beaker will then be covered and let to stand for 4 hours at room temperature. The filtrate will be filtered through filter paper and heated to a fourth of its initial volume. Until the precipitate is fully formed, 5ml of concentrated ammonium hydroxide will be added drop by drop. Use the pre-weighed filter paper to filter after that. The dried alkaloid is what is left on the filter paper after it has been dried in an oven at 80oC. The amount of alkaloid will be computed and presented as a percentage of the sample's weight. The formula will then be applied to the calculation.

% weight of alkaloid =

$$\frac{\text{(Weight of filter paper with residue) – (Weight of filter paper)}}{\text{Weight of the sample analyzed}} \times 100$$

Tannin determination by Titration

(Weight of filter paper with residue) - (Weight of filter paper) x 100 = % weight of alkaloid Weight of the examined sample

Tannin measurement using titration

100mls of petroleum ether or n-hexane will be put to a conical flask containing 20g of sample, which will then be covered for 24 hours. After filtering, the sample will stand for 15 minutes to enable the solvent to evaporate. After that, it will be extracted once more by soaking in 100 cc of 1% acetic acid for 4 hours. After filtering the sample, the filtrate will be obtained.

To precipitate the alkaloids, 25 ml of ammonium hydroxide will be added to the filtrate. A portion of the ammonium hydroxide left in solution will be removed from the alkaloid by heating it on an electric hot plate. The remaining volume will be calculated, and 5ml of it will be taken, along with 20ml of ethanol. Until a pink end point is achieved, it will be titrated with 0.IM NaOH using 1ml of phenolphthalyne as an indicator. Calculating the amount of tannin in percentage (C1V1 = C2V2) molarity

Data

Tannic acid concentration, C1, is

C2 = Base Concentration

V1 = Tannic acid volume

V2 = Base Volume

Therefore C1 = C2V2 Tannic acid percentage V1 = C1 x 100 Sample weight used for analysis

Determination of Saponins

A thimble will be used to weigh 20 grams of the ground material before transferring it to the soxhlet extractor chamber with a condenser and flask. Methanol, 250 ml, will be added to the flask. Continued extraction for one hour, The flask will be heated on a heating mantle in order to completely extract the saponin. The saponin and a little amount of methanol will remain in the flask after the thimble and its contents have been removed and the methanol has been collected. The remaining methanol will then be evaporated in an oven at a temperature of 70°C while the object is held in a

slanting posture. The mass of saponin removed will be determined by comparing the weights of the flask and its contents to the contents of the flask alone.

Determination of Flavonoids

10g of the plant sample will be put in a beaker with 100ml of 80% aqueous methanol at room temperature and allow to stand for 2hrs. The whole solution will be filtered through what man filter paper. The filtrate will be later transferred into a crucible and evaporated into dryness over a water bath and weighed to a constant weight .

Calculation:

$$\% \text{ Flavonoids} = \frac{(\text{Weight of crucible + residue}) - (\text{Weight of crucible}) \times 100}{\text{Weight of sample analyzed}}$$

Cyanogenic glycosides determination

A 250ml round-bottomed flask weighed one (1)g of dry ground material. Add 200ml of diluted water and let stand for two hours (in autolysis to occur fully) 20ml of 2.5ml was distilled into a 250ml flask, and between 150 and 170ml of distillate were recovered. Tannic acid was added to 100ml of the distillate containing cyanogenic glycosides as an anti-foaming agent. 8ml of NHO-6 A. On a black backdrop, 2ml of 15% potassium were added, and the mixture was then titrated with 0.02N silver nitrate ($AgNO_3$) solution using a microburette. Cyogenic glycosides mg/100g = Titre value x 1.08 (g) x extract volume (m) x 100 Aliquot volume (ml) x sample weight (g)

Phenol

Weighted out, the extract (1 g) was diluted in 20 cc of 80% ethanol, then filtered. Folin-reagent Ciocalteu's was applied to 5 ml of the filtrate, and then 3 minutes of standing time was given. 2 cc of

20% sodium carbonate was then added after that (Na2CO3). The mixture's absorbance was measured at 650 nm. At various gallic acid concentrations, a standard was created using the same process. The concentration of phenol was calculated using a standard curve that showed absorbance against concentration.

3.5 **Statistical Analysis:**

The statistical analysis was based on the method of statistical analysis system (SAS). Data generated were subjected to two way analysis of variance(ANOVA) using multiple least test and Fisher's least significant difference(FLSD) at 5% probability to separate the treatment.

RESULT

4.1 Qualitative Phytochemical screening of Fluted pumpkin leaf extracts

Table 1: QUALITATIVE PHYTOCHEMICAL OF FLUTED PUMPKIN LEAF

Parameters	ETHANOL	WATER
SAPONIN	+++	-
FLAVONOID	+++	+
ALKALOID	+++	+
TANNIN	+++	–
STEROIDS	+++	++
TERPENIODS	-	-
GLYCOSIDES	++	+
PHENOL	+++	++

Key

+++ = Present in high concentration
= Present in moderate concentration
+ = Slightly or sparingly present
- = Absent.

The result of the qualitative phytochemical screening of different extracts of Fluted pumpkin leaf are shown in table 1. The phytochemical studies of the ethanolic extract revealed the presence of seven (7) out of the eight (8) phytochemicals determined with presence of alkaloids, flavonoid, glycosides, saponins, tannins, steroids and phenol compounds while terpenoids, is absent. The water extract showed the presence of five (5) out of the eight (8) phytochemicals determined with presence of alkaloids, flavonoid, steroid, glycosides, and phenol compounds while saponin, tannin and terpenoids. The table above shows the level of concentration of the various phytochemicals analysed from the fluted pumpkin extract under qualitative analysis. From the ethanol extract saponin shows to be highly concentrated, while from the result of the water extract it shows to be absent. Flavonoid also

shows to be highly concentrated from the ethanol extract while from the water extract it is slightly present. Alkaloid is also highly concentrated from the result of the ethanol extract while from the water extract it is slightly present. Tannin from the table above has high concentration from the ethanol extract while the water extract shows it's absence. Steroids is highly concentrated from the result of the ethanol extract while the water extract shows that it is moderately concentrated. Terpenoids is absent in both extract. Glycosides is moderately concentrated from the result of the ethanol extract while the result of the water extract shows that it is slightly or sparingly concentrated. Phenols is highly concentrated from the result of the ethanol extract while the result of the water extract shows that it is moderately concentrated.

4.2 Quantitative Phytochemical screening of Fluted pumpkin

TABLE 2: QUANTITATIVE PHYTOCHEMICAL OF FLUTED PUMPKIN LEAF SAMPLES

PHYTOCHEMICALS	MEAN VALUE(mg/100g)	Std. Deviation
ALKALOID	3.6333	$\pm$ 0.56862^{b}
TANNIN	0.5167	$\pm$ 0.09452^{c}
SAPONIN	4.5833	$\pm$ 0.38188^{b}
FLAVONOID	11.8333	$\pm$ 0.28868^{a}
TERPENOIDS	3.5600	$\pm$ 0.38223^{b}
STEROID	11.6667	$\pm$ 0.57735^{a}
PHENOL	3.500	$\pm$ 0.38223^{b}

***Values are mean scores ± Standard deviation of three (3) replicates**

***Data in the same column bearing different superscript differ significantly ($p < 0.05$).**

The result for the quantitative phytochemical compositions of fluted pumpkin leaf is shown in table 2 above. The result showed flavonoid with the highest concentration (11.83mg/100g), followed by steroid (11.67mg/100g), saponin (4.58mg/100g), alkaloid (3.63mg/100g), terpenoids (3.56mg/100g), phenol (3.50mg/100g) while tannin have the lowest value (0.51mg/100g).

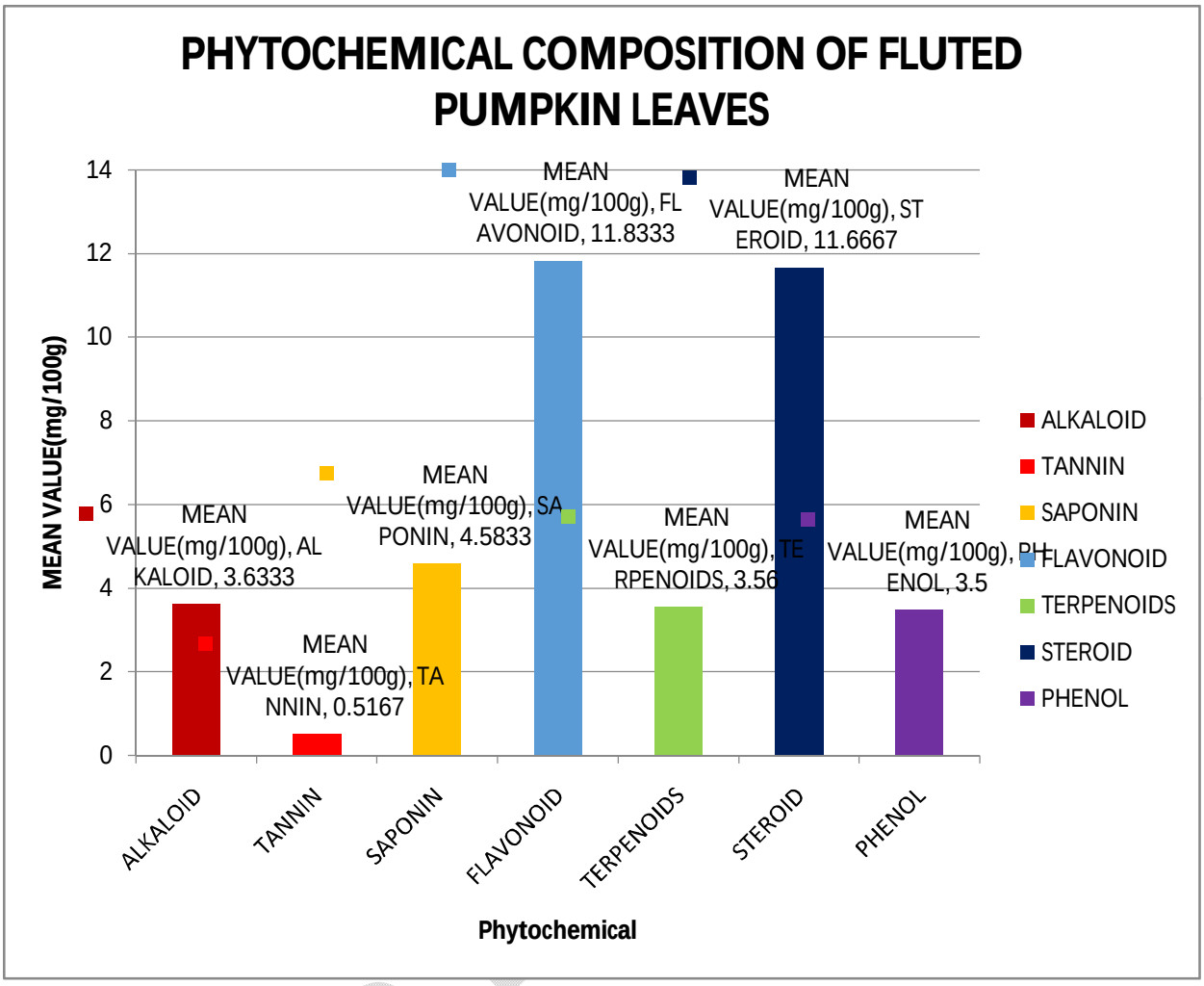

FIG 1: Bar chart for quantitative phytochemical of fluted pumpkin leaf

The histogram above expresses the result of the quantitative analysis of fluted pumpkin leaf. It shows flavonoid to have the highest concentration (11.83mg/100g), followed by steroid (11.67mg/100g), saponin (4.58mg/100g), alkaloid (3.63mg/100g), terpenoids (3.56mg/100g), phenol (3.50mg/100g) while tannin have the lowest value (0.51mg/100g).

Discussion

According to this study, fluted pumpkin leaves contain a variety of significant phytochemicals. This is consistent with Verla *et al*(2014)'s study on the phytochemical examination of fluted pumpkin leaves, which found that the leaves of *T. occidentalis* include alkaloids, flavonoids, phenols, saponins, and tannin. This research supports prior results by Arowosegbe et al. (2015) that pumpkin leaves contain phenol, flavonoids, glycosides, alkaloids, and saponin. The same research was done by Hussaine et al. (2012) on the phytochemical analysis of fluted pumpkin leaves, and they noted that the majority of the phytochemicals present there—such as alkaloids, saponins, flavonoids, and glycosides—are secondary metabolites produced as a byproduct of the plant's metabolic processes. Literature research has revealed evidence that flavonoids may reduce inflammation, slow the development of tumors, and increase the body's production of detoxification enzymes. According to Manian et al., the tannin in pumpkins has the ability to draw xenobiotic chemicals from animal blood because they are high molecular weight molecules that attract lesser weight foreign substances. Alkaloids, according to Ayoola and Adeyeye (2010), are the most potent phytochemical because they have antispasmodic, antibacterial, healing, and antimalarial properties. This is supported by research by Okwu and Okwu (2004), Stray (1998), Trease and Evans, and Okwu and Okwu (2004). (1985). Cardiac glycosides are triterpenoids that have the ability to control cardiac contraction without raising the heart's oxygen demand. Adeyeye A and Ayoola PB (2010). An essential secondary metabolite with antioxidant effects, phenol is found in both sexes of plants. By scavenging free radicals created during regular catabolic and anabolic cellular processes, antioxidants have a protective impact. By bonding free radicals and deactivating the radicals, they prevent oxidative damage. Tannins are recognized to be helpful in the treatment of inflamed or ulcerated tissues and have outstanding action in cancer prevention, according to Ruch et al. (1989) and Motar et al. (1985). As a result, tannins found in T. occidentalis may be a source of bioactive compounds useful in the treatment and prevention of cancer. Flavonoids have been shown to have anti-inflammatory, anti-tumor, anti-viral, and anti-platelet properties (Corkan et al., 1998; Pourmorad et al., 2006). The same research was done by Salah et al. in 1995, Del-Rio et al. in 1997, and Okwu in 2004. They found that flavonoids, which contain hydroxyl groups, are what most plants use to scavenge free radicals. Alkaloids are substances that plants can use to ward off pests and predators. This most likely gives this agents' group their

antimicrobialactivity. Alkaloids have been proven to have a microbiocidal impact, and their main anti-diarrheal and anti-hypertensive actions are likely caused by their effects on the small intestine. In their study of the phytochemical makeup of plants, Just et al. (1998) revealed that alkaloids are effective against both HIV infection and intestinal infection linked to AIDS. Additionally, it was discovered that the plant extract included saponins, which are known to have an anti-inflammatory impact. Through an intra-lumenal physiochemical interaction, saponins are well-known bioactive compounds that can decrease the absorption of cholesterol and glucose in the stomach (Price et al., 1987). According to Francis et al. (2002), saponins, a family of natural chemicals, are likewise engaged in complexing with cholesterol to generate pores in cell membrane bilayers. As a result, they can be utilized as cholesterol-lowering or anti-cholesterol agents. These phenolic chemicals are found in this plant, which adds to its antioxidative characteristics and its efficacy as a herbal remedy. Phenols may be important in the production of some antimicrobial compounds, such as dettol and cresol, according to Shahidi and Wanasundra's 1992 study of some significant phytochemicals in leafy vegetables, including pumpkin leaves. They claimed that phenols function as free radical chain reaction stoppers, serving as antioxidants in the process. Additionally, they claimed that phenols may be able to prevent the oxidative stress syndrome, which is a contributing factor in a number of illnesses and cardiovascular conditions.

Conclusion

Based on the findings of this study, it can be concluded that biochemical screening of fluted pumpkin leaf has confirmed the presence of some phytochemicals and has justified their concentration via qualitative and quantitative analysis of the leaf extracts.

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