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Qualitative and Quantitative Analysis of Phytochemicals, Mineral and Vitamin Compositions of Ethanol Extract of *Telfairia occidentalis* from Idah Metropolis, Nigeria

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Abstract

We analyzed the leaf extract of *Telfairia occidentalis* for its qualitative and quantitative phyochemicals properties. The mineral and vitamin compositions of the extract were also evaluated. Standard methods were employed to evaluate the qualitative and quantitative phytoconstituents present in the extract. The extract was characterized using Fourier Transform Infrared Spectroscopy (FT-IR) and X-ray Fluorescence Spectroscopy (XRF), and standard VitaFast microbiological microtiterplate test kit was used to assess the vitamins content in the extract. The qualitative and quantitative phytochemicals evaluation of the extract revealed highest content of flavonoids (14.0 %), followed by steroids (11.0 %), saponins (9.4 %), phenolics (8.0 %), terpenoids (6.6 %), carbohydrates (5.2 %), tannins (2.7 %), and alkaloids (2.6 %). Glycosides were not detected. The XRF analysis showed highest composition of potassium (27.95 %), followed by Calcium (21.04 %), Magnesium (9.68 %), Silicon (5. 07), Zinc (2.64 %), Iron (1.44 %), Cupper (1.07 %), Tin (0.98 %), Manganese (0.95 %), and the least was Phosphorus (0.32 %). The extract contained highest content of vitamin C (10.76 %), followed by niacin (0.5 %), riboflavin (0.45 %), biotin (0.36 %), pantothenic acid (0.29 %), cobalamine (0.21 %), thiamine (0.18 %), and pyridoxine (0.15 %). The outcomes of this study showed that the leaves of *Telfairia occidentalis* are potential candidates for use in nutrition and medicine.

Keywords: *Phytochemical screening, Minerals content, Vitamins composition, Telfairia occidentalis, Extract*

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1. Introduction

The significance of plants in traditional medicine and as raw materials in the manufacture of drugs by Pharmaceutical industries cannot be overemphasized. The widespread cases of chronic diseases like malaria, obesity, diabetes, malnutrition, heart disease, cancer among others today need an urgent attention from the scientific community (Vikas *et al.*, 2015; Diass *et al.*, 2023; Loukili *et al.*, 2024; Mishra *et al.*, 2025). The human body system relies heavily on bioactive phytochemicals for its nutritional and medicinal applications and this bring the need to screen plants continuously for their nutritional and medicinal applications (Riaz *et al.*, 2023; Ouahabi *et al.*, 2024; Khosroshahi *et al.*, 2025; Samuel *et al.*, 2025). These bioactive compounds which are derived mostly from plants act as a barrier to protect cells from the damage caused by free radicals in the body. They also play a major role in a variety of functioning of human body and the utilization of these conventional medicinal plants may result in the identification of novel, powerful bioactive compounds that can be used to treat a greater range of chronic diseases (Leitzmann, 2016; Chaachouay & Zidane, 2024; Elbouzidi *et al.*, 2024; Mrani *et al.*, 2024). In many places around the world including Nigeria vegetables make up the majority of the people's diet, which is closely related to ever growing public knowledge of the crucial roles they play in human health protection and development. Consuming diets high in vegetables has actually been associated with killing of cardiovascular diseases; however, eating diets poor in vegetables has been connected to 31 % of cases of ischemic heart disease and 11 % of cases of stroke (Ezekwe *et al.*, 2020). Vegetables boost immune system by supplying nutrients and antioxidants that fight inflammation and advance general health (Rafi and Rktaruzzaman, 2015; Haddou *et al.*, 2023; Taibi *et al.*, 2024). Since phytochemicals have been shown to provide health benefits, eating plant-based meals high in these compounds is generally advised (Kocyigit *et al*., 2018; Kadda *et al*., 20122; El Hassania *et al*., 2024). There are currently over 10,000 different kinds of phytochemicals known to exist, and the kind and structure of these compounds determine how they affect human body health (Park, 2023; Samuel *et al*., 2025).

Telfairia occidentalis is a tropical creeping vegetable vine that spread on the ground with large lobbed leaves and long twisting tendrils, it is highly valued commercially in the eastern region of Nigeria and is widely grown throughout Western Africa. It belongs to the family Oliffieace and the sub-family cucurbitaceae (Desire *et al*., 2022). It is called ubong, ugu, ewekoro and ekumarku Ejashains in Nigeria and Cameroon. It is a perennial; drought tolerant plant with young shoots and leaves that is used in cooking soups, yam and vegetables sauces, and for medicinal purposes (Orole *et al*., 2020). The shrub is a dioecious plant whose sex is not known until after flowering. The female plants has very broad leaves with big stem and usually is more succulent; producing fruits which contain seeds, while the male plants produces only flowers with smaller leaves and tiny stems. The female plants have significantly higher concentrations of protein and fat, while the male plants have higher fibre, ash other anti-nutritive contents (Orole *et al*., 2020). Its main uses are in the making of vegetable soup and herbal medications that make blood tonic for sick and weak people, as well as in the treatment of other illnesses (Agwu *et al.,* 2016). The leaf of *telfairia occidentalis* is high in minerals, vitamins and antioxidants. Also, lactones, cucubitacine, and sesquiterpene are found in the root. The leaves also contain vitamins and essential oils. To treat convulsions, the fresh leaves are cut, combined with coconut water, salted, and kept in a container as an ethno medical remedy. As an ordeal poison, the roots are employed as a rodenticide. Important legumes showed a favorable comparison in essential amino acid amounts. They are occasionally used to thicken soups (Okoye and Orakwue, 2019).

Despite having a low amount of crude fiber, the leaves of *telfairia occidentalis* are high in folic acid, calcium, zinc, potassium, cobalt, copper, iron, and vitamins A, C, and K. They are also rich in proteins, oil, vitamins, and minerals. The young leaves can be cut and kept in a bottle with salt and coconut water added, and they can then be used to treat convulsions (Orole *et al*., 2020). The leaves also have nutritional and therapeutic benefits (Okpala, 2015). Additionally, the leaves can help treat heart disease, hypertension, diabetes, liver issues, elevated cholesterol, weakened immune systems, and meningitis in certain situations (Orole *et al*., 2020).

Plants need to be continuously screened for their biochemical and minerals content. Assessing the bioactive compounds, vitamins, and mineral compositions of *telfairia occidentalis* could reveal information on their nutritional profiles and their dietary contributions as well as its potential medicinal applications. Despite the fact that *telfairia occidentalis* has been studied, little of that research has concentrated on the biochemical and mineral content of the plant (Samuel *et al*., 2025). Therefore, this study was done to ascertain the qualitative and quantitative phytochemical screening, vitamin and mineral compositions of leaf extract from *telfairia occidentalis* sold in Idah, Kogi State, Nigeria.

2. Experimental work

2.1 Collection of Plant Material

The leaf sample of *Telfairia occidentalis* was bought from vegetables sellers by the gate of the Federal Polytechnic Idah, Kogi State, Nigeria. The sample was authenticated by the department of botany, Federal Polytechnic Idah and then cleaned and dried under shade for two weeks and crushed into powder with the help of mortar and pestle. The powdered sample was kept in a suitable container until use. All the chemicals, reagents, equipment, and other necessary materials used in this research were of analytical grade and were bought from a prestigious company.

2.2 Extraction of the Plant Material

Two hundred grams (200 g) of the powdered leaf sample of telfairia occidentalis was soaked in 600 ml (w/v) 95 % ethanol for two days with constant agitation. The mixture was filtered using Whatmann No. 1 filter paper. The filtrate was dried to get ethanol crude extract.

2.3 Fourier Transform Infrared Spectrophotometer (FT-IR)

The FT-IR spectra of the extract of *Telfairia occidentalis* were recorded using a Cary Agilent Technologies model 630 spectrophotometer within the 400–4000 cm^{-1} range using KBr pellets (Abdullahi *et al*., 2025).

2.4 Qualitative Phytochemicals Screenings

The ethanol extract of *Telfairia Occidentalis* was subjected to qualitative phytochemical screening using standard protocols as outlined by Ekwueme *et al*. (2015), Ushie *et al*. (2016), Santhi *et al.* (2015), Longbap*et al*. (2018), Danjuma *et al*. (2024), and Danjuma *et al*. (2025) with little modifications as follows:

2.4 1 Test of Alkaloids (Mayer's Test)

Two millilitres (2 ml) of concentrated hydrochloric acid (HCl) was added to two millilitres (2 ml) of the plant extract followed by an addition of a few drops of Mayer's reagent. Presence of alkaloids was indicated by the appearance of a green precipitate.

2.4.2 Test of Saponins (Foaming Test)

20 millilitres of deionised water were added to a 5.0 millilitre of the extract, followed by a strong agitation. The presence of saponins was confirmed by the appearance of persistent foaming

2.4.3 Test of Steroids

The extract was extracted with chloroform and filtered. The filtrate was then carefully combined with 2 ml of concentrated sulphuric acid forming a lower layer. An appearance of reddish brown colour indicates the presence of steroids.

2.4.4 Test of Carbohydrates (Molisch's Test)

About 0.1 g of the extract was mixed and heated with 2 ml of distilled water and filtered. A few drops of Molisch's reagent, a naphthol solution in ethanol, were added to the filtrate. A lower layer was subsequently created by carefully pouring concentrated sulphuric acid from a Pasteur pipette down the test tube's side. The presence of carbohydrates was indicated by a purple interfacial ring.

2.4.5 Test of phenolics

Ten millilitres (10 ml) of distilled water were mixed with 0.1 grams of the test extract. After about three minutes of moderate heating in a boiling water bath, the solution was filtered. Three test tubes were filled with a 2 ml sample of the filtrate. Distilled water was added to one test tube containing the filtrate in a 1:4 ratio. Phenols were confirmed by a blue coloration.

2.4.6 Test of Flavonoids

A 2 ml of the extract was boiled in 10 ml ethyl acetate for three minutes, followed by filtration and cooling. Then 4 ml of the filtrate was agitated with 1ml of dilute ammonia solution. An intense yellow coloration indicates the presence of flavonoids.

2.4.7 Test of Tannins

One millilitre of the extract was mixed with water and heated on a water bath. The mixture was filtered and ferric chloride was added to the filtrate. Formation of a dark green colour indicated the presence of tannins.

2.4.8 Test of Flavonoids

A small portion of each extract was combined with two millilitres of chloroform and three millilitres of concentrated sulfuric acid. An appearance of reddish-brown coloration indicates the presence of terpenoids.

2.4.9 Glycosides

A ferric chloride solution was added to a small amount of the extract followed by immersing the mixture in boiling water for five minutes. The mixture was cooled and extracted with benzene. The benzene layer was subsequently separated from the mixture and ammonia solution was added to it. A formation of rose pinkcolour in the ammonia layer shows the presence of glycosides.

2.5 Quantitative Phytochemical Screening

Using conventional protocols as outlined by Malik *et al*., (2017), Milan and Bharat (2019), Ekwueme *et a*l. (2016), and Sabaragamuwa *et al*. (2023). The quantitative phytochemical screening was performed on the ethanol leaf extract of *Telfairia occidentalis* as follows:

2.5.1Total Alkaloids Content

Twenty (20) millilitres of ethanol and twenty percent (20 %) sulphuric acid (1:1 v/v) were used to macerate 1.0 g of the extract. A quantity 5 ml of 60 % sulphuric acid was mixed with 1 ml of the filtrate. Five minutes later, the mixture was combined with five millilitres of 0.5% formaldehyde in 60 % sulphuric acid and left to stand for three hours. At 565 nm, the absorbance was recorded.

2.5.2Total Steroids Content

Twenty (20) millilitres of ethanol were used to macerate 1 g of the extract, followed by filtration. Two (2) millilitres of chromagen solution were combined with the 2 ml of the filtrate and the mixture was allowed to stand for half an hour. At 550 nm, the absorbance was recorded.

2.5.3 Total Carbohydrates Content

About 50 millilitres of distilled water were used to extract 1 gram of the sample extract followed by filtration. After adding a saturated aqueous solution of picric acid to 1 millilitre of the filtrate, the absorbance at 580 nm was measured.

2.5.4 Total Phenolics Content

Twenty millilitres of 80 % ethanol were used to macerate 1 g of the extract which was subsequently filtered. A 0.5 ml of Folinciocalteus reagent was mixed with 5 ml of the filtrate, and the mixture was left to stand for 30 minutes. An absorbance at 650 nm was measured after adding 2 ml of 20 % sodium carbonate.

2.5.5Total Flavonoids Content

About 50 ml of methanol was used to macerate 1 g of the extract followed by filtration. A quantity 0.3 ml of 0.1N ferric chloride in 0.1N hydrochloric acid and 0.3 ml of 0.0008 M potassium ferricyanide were added to the 5 ml of the filtrate. The absorbance was measured at 720 nm.

2.5.6 Total Terpenoids

Ten (10) milliliters of petroleum ether were used to macerate the extract in a glass vials that had been previously weighed. The ether extract was separated and allowed to fully dry (wf). The yield (%) of the total terpenoids was calculated using the formula:

$$\text{Total Terpenoids} = \frac{W_i - W_f}{W_f} \text{ X } 100 \qquad (2)$$

Where: W_i is the weight of the ethanol extract, and W_f is the eight of petroleum ether extract

2.5. 7 Total Tannins

The standard used was tannic acid. This tannic acid was made by using a variety of solvents concentrations. One millilitre of sodium carbonate, Na_2CO_3, (7.5 %) was added after the ethanolic and acetone extract was combined with 0.1 millilitre of folin reagent in 1:1o ratio. After shaking the mixture at room temperature for 30 minutes, the absorbance at 700 nm was taken using a UV-visible spectrophotometer.

2.6 Elemental Compositions of the Extracts by X-Ray Fluorescence Spectroscopy

Utilizing the energy dispersed X-ray fluorescence spectrometer, the mineral elements were identified. Spectra were captured using high-resolution detectors after each sample was excited by an X-ray beam. The elemental concentrations were calculated in milligram per kilogram for a variety of mineral elements, including potassium (K), calcium (Ca), magnesium (Mg), iron (Fe), and copper (Cu) among others (Ehigie *et al*. 2025)

2.7 Assessment of Vitamin Content

In this study, we determined the levels of vitamins B1 (thiamine), B2 (riboflavin), B6 (pyridoxine), B3 (niacin), B5 (pantothenic acid), B12 (cyanocobalamin), folic acid, and B7 (biotin), by employing the Vita-Fast microbiological microtiterplate test kit. The extract was first diluted with the vitamins. Folic acid solution was then made by pipetting the diluted extract and the folic acid assay-medium into the wells of a microtiter plate coated with *Lactobacillus rhamnosus* (ATCC Nr. 7469). Folic acid was necessary for the development of *Lactobacillus rhamnosus*. When folic acid is added as a standard or as a component of the sample, the bacteria proliferated until the vitamin is ingested. Within the range of 44–48 hours, the solution was incubated at 37 °C in the dark. Turbidity was a measure of the degree of growth or metabolism in relation to the extracted folic acid, and it is compared to a standard curve. An ELISA reader was used to measure the wavelength between 610 and 630 nm (Yuan *et al.*, 2018).

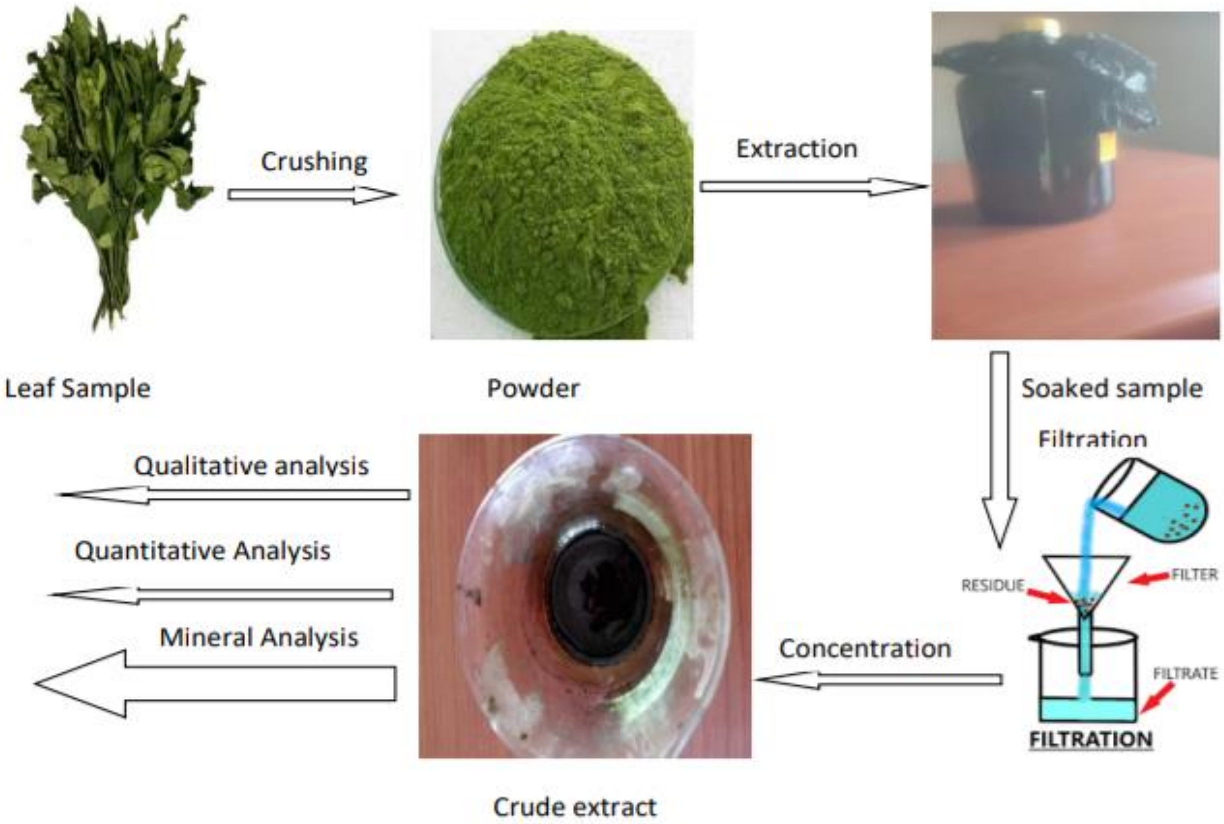

Figure 1. Methodology chart

3. Results and discussion

3.1 FTIR Analysis Spectra

The Fourier Transform Infrared Spectroscopic spectral data was presented in **Table 1** and **Figure 2**. The data showed that the identity of hydroxyl group (O-H) stretching of intermolecular bonded alcohol at 3439 cm-1. The double peak at 2925cm-1 and 2854cm-1 indicate the presence of C-H alkanes stretching. The peak of carbonyl (C=O) stretching of ester takes place at 1745cm-1. The peak at 1622cm-1 explains the occurrence of C=C stretching. The fingerprint region of the spectra accounts for the presence of methylene C-H bending, O-H bending of alcohol, and C-O stretching at 1462 cm-1, 1380cm-1 and 1164cm-1 respectively. The spectrum showed peaks absorption in the range between 4000-400 cm^{-1}. These ranges are the characteristics of particular molecular bonds; this makes the FTIR a powerful tool for quality control, pharmaceutical research, analysis for contaminates in various pharmaceutical and chemical industries. The vibration characteristics of chemical functional groups in a sample are determined by FTIR spectroscopy, a strong optical spectroscopy based on vibration measurement of an excited molecule by IR radiation at a certain wavelength range.

Table 1: FTIR spectra of ethanol extract of *Telfairia occidentalis*

Type of Chemical bond	Absorption Frequency(cm-1)	Type of vibration/Stretching
Hydroxyl (OH) group	3439.95	OH stretching, H-bonded
C-H Alkanes	2925.65	Alkanes C-H stretching
C-H Alkanes	2854.65	Alkanes C-H stretching
Carbonyl (C=O) group	1745.66	Carbonyl C=O ester stretching
Aromatic C=Cgroup	1622.82	Aromatic C=C stretching
Methylene group	1462.74	Methylene C-H bending
OH group (alcohol)	1380.75	Alcoholic OH stretching
C-O Carboxylic Acid	1164.62	C-O ester stretching

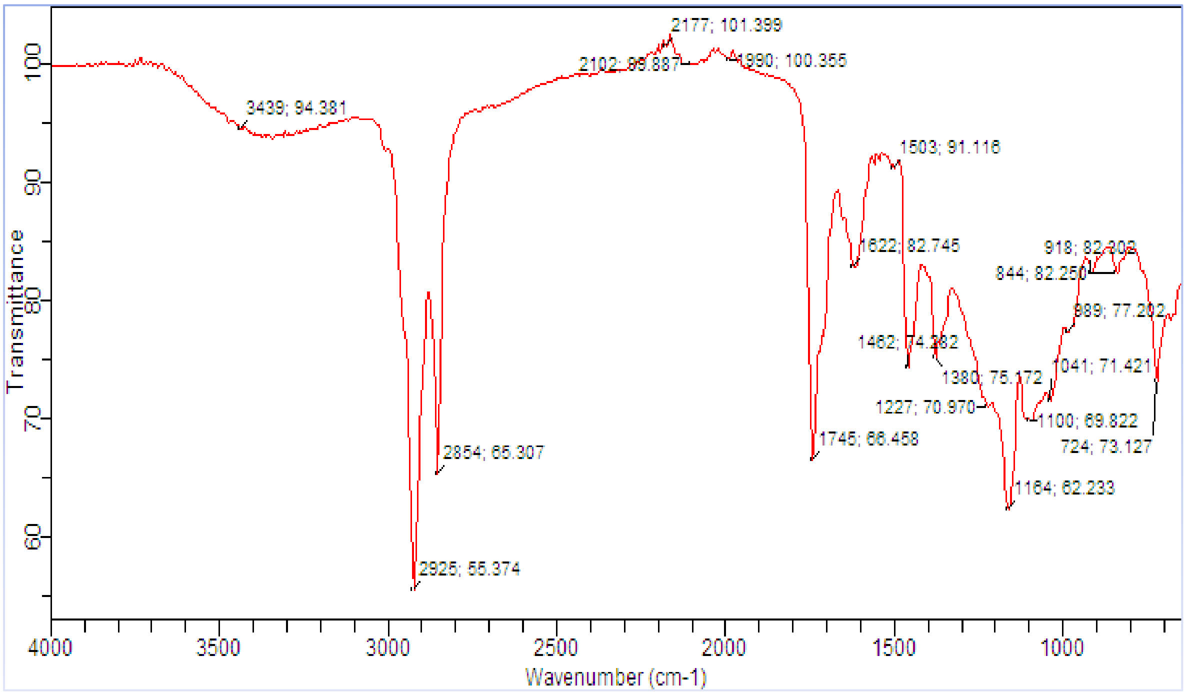

Figure 2: FTIR Spectra of the ethanol extract

It is a quick and non-invasive analytical technique. It is appropriate for analyzing pharmacological forms that are solid, liquid, or biotechnology, however. FTIR has emerged as a useful analytical approach for food-related structural or functional studies as a quick, affordable, and sensitive physicochemical fingerprinting technique. All kinds of organic and many types of inorganic materials can be identified using FTIR, as can the molecular composition of surface species, molecular orientation in polymers and solutions, species quantification in challenging mixtures, and the identification of structural and geometric isomers. The FTIR is important in identifying and quantifying active elements. It is also highly useful in the analysis of food, medicine, counterfeit medications, and biomedical products (Bhokare *et al.*, 2022).

3.2 Qualitative Phytochemical Screening

Table 2: Qualitative phytochemical screening of ethanol extract of *Telfairia occidentalis*

S/N	Phytochemicals	Test	Result
1	Alkaloids	Mayer's reagent	+
2	Flavonoids	Alkaline reagent test	+
3	Terpenoids	Salkowski test	+
4	Steroids	Extract + acetic anhydride + H2SO4	+
5	Saponins	Foam test	+
6	Tannins	Ferric chloride test	+
7	Phenolics	Ferric chloride test	+
8	Carbohydrates	Molisch's Test	+
9	Glycosides	Extract + H2O +NaOH	-

Key: Positive (+) indicates presence, and negative (–) indicates absences

Qualitative phytochemical screening was studied using standard procedure, and the result showed that saponins, steroids, carbohydrates, terpenoids, phenolics, flavonoids, tannins, and alkaloids were all present in the ethanol leaf extract of *Telfairia occidentalis* (**Table 2**). Glycosides were not found in this study. This finding is in consistence with the work of Okoye and Orakwue (2019) who also detected alkaloids, tannins, saponins, steroids, and flavonoids in the leaf of *telfairia Occidentalis*, but they didn't test the presence or absence of carbohydrates. Ojimofor *et al.* (2022) also reported alkaloids, flavonoids, glycosides, saponins, tannins, steroids, and phenol compounds from *telfairiaoccidentslis*. Findings have shown that flavonoids may decrease inflammation, slow the growth of tumors, and increase the body's production of detoxification enzymes. It was also reported that tannin could draw xenobiotic chemicals from animal blood because they are high molecular weight molecules that attract lower molecular weight foreign substances (Arowosegbe *et al.*, 2015). It is also believed that alkaloids are the most potent phytochemicals due to their antispasmodic, antibacterial, healing, and antimalarial qualities (Corvallis, 2017).

3.3 Quantitative Phytochemical Analysis

Table 3 and **Figure 3** explain the quantitative composition of *telfairiaoccidentalis* leaf. It shows flavonoid had the highest concentration (14.0 %), followed by steroids (11.0 %), saponins (9.4 %), phenolics (8.0 %), terpenoids (6.6 %), carbohydrates (5.2 %), tannins (2.7 %), and alkaloids (2.6 %). Findings have shown that quality and quantity of phytochemicals derived from plants are influenced by environmental factors and other ecological variations such as rainfall and temperature among others. Temperature fluctuations, for example, can change how plants function physiologically, which can impact how many phytochemicals and elemental compositions are produced. Same plants grown in different regions may contain different minerals and phytochemicals content (Ejimofor *et al.*, 2022).

Table 3: Quantitative phytochemical screening

S/N	Phytochemicals	Quantity (%)
1	Alkaloids	2.6
2	Flavonoids	14.0
3	Terpenoids	6.6
4	Steroids	11.0
5	Tannins	2.7
6	Carbohydrates	5.2
7	Phenolics	8.0
8	Saponins	9.4

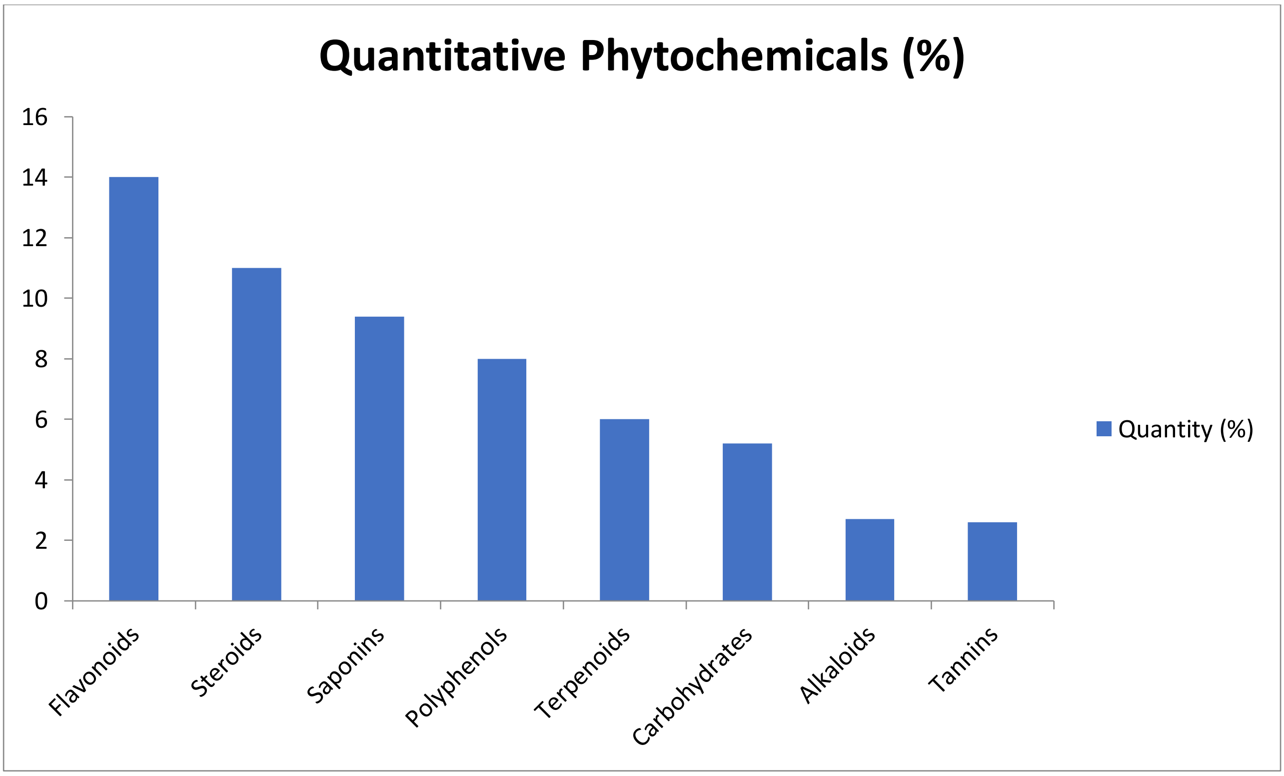

Figure 3: Quantitative phytochemical screening

3.4 Minerals Analysis

Mineral composition of *telfairia ocidentalis* was studied by utilizing the energy dispersed X-ray fluorescence spectrometer. Spectra were captured using high-resolution detectors after each sample was excited by an X-ray beam. The mineral content in this study (**Table 4 and Figure 4**) reveals the presence of sodium, magnesium, manganese, zinc, phosphorus, iron, and potassium among others. The composition shows that potassium had the highest concentration (27.95 %), followed by calcium (21.04 %), magnesium (9.68 %) silicon (5. 07 %), zinc (2.64 %), iron (1.44 %), cupper (1.07 %), Tin (0.98 %), manganese (0.95 %), and Phosphorus (0.32 %). Comparatively, Usunobun *et al*., (2014) and Abdussamad *et al*., (2016) also reported the presence of sodium, magnesium, calcium, and zinc among others.

Table 4: Mineral compositions of ethanol extract of *T. occidentalis*

S/N	Minerals	Quantity (%)
1	Zinc	2.64
2	Potassium	27.95
3	Silicon	5.07
4	Calcium	21.04
5	Iron	1.44
6	Tin	0.98
7	Magnesium	9.68
8	Phosphorus	0.32
9	Manganese	0.95
10	Cupper	1.07

Studies have shown that human health requires adequate consumption of calcium, magnesium, and trace elements such as copper (Cu) and zinc (Zn) (Sousa *et al*., 2019). In addition to supporting fundamental physiological processes, these components provide information about disease states when examined in diagnostic contexts. Because they interfere with Fe regulating mechanisms when they are present in the body, some of these non-essential elements can be extremely harmful to health. Environmental pollutants or occupational exposure can introduce these substances into the body, as can factors impacted by lifestyle choices like smoking and eating habits (Rawee *et al*., 2019). Potassium, magnesium, calcium, and other vital minerals are among the many nutrients found in fresh green vegetables, along with protein and dietary fibre. These minerals are essential for sustaining muscle function, fostering bone health, and preserving electrolyte balance (Govindaraj *et al*., 2017). They also have a major impact on lowering the risk of heart attacks and preventing vitamin deficiencies (Igboecheonwu *et al*., 2023).

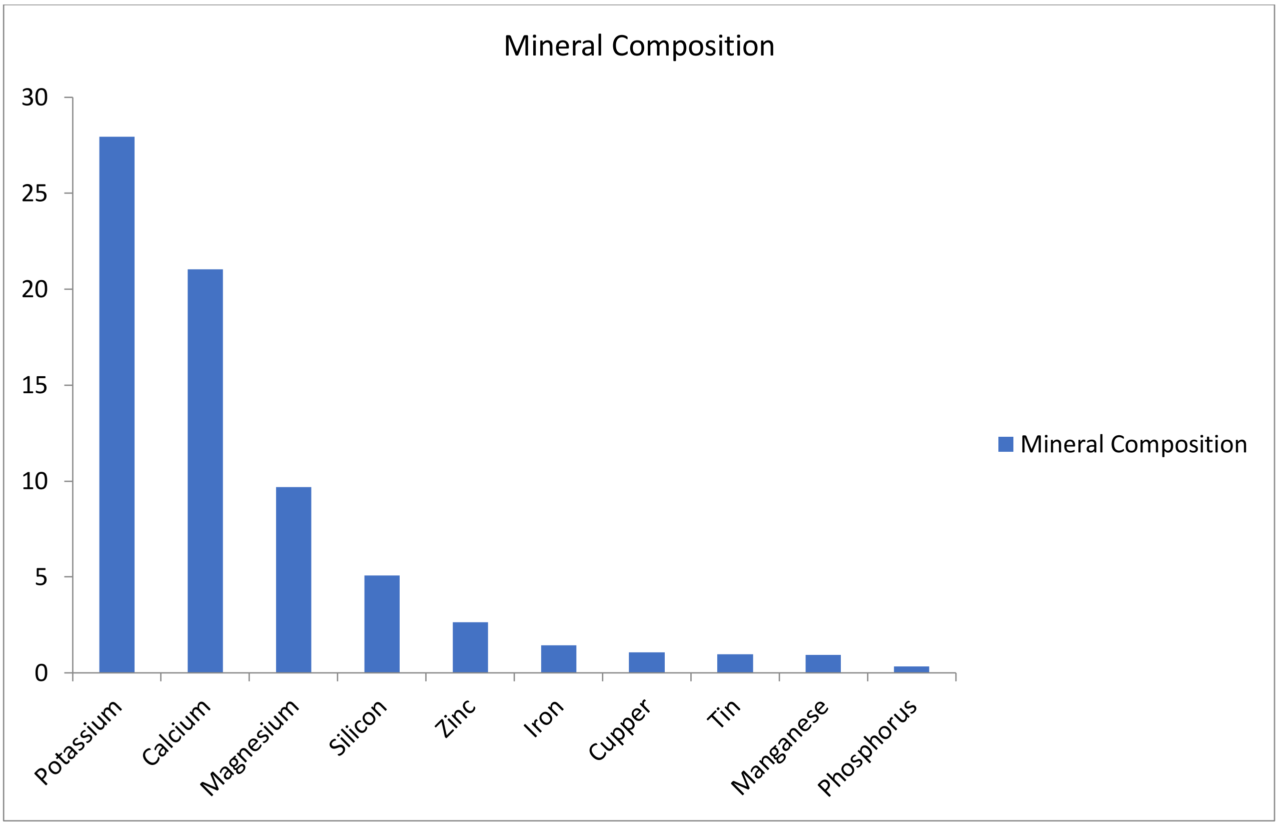

Figure 4: Minerals compositions of ethanol extract of *T. occidentalis*

3.5 Vitamins Composition

Table 5 recorded the vitamins composition in the ethanol extract from *T. occidentalis*, and the results showed that vitamin C recorded the highest quantity (10.76 %), and this was followed by Vitamin B3 (0.5 %), vitamin B2 (0.45 %), vitamin B7 (0.36 %), vitamin B5 (0.29 %), vitamin B12 (0.21 %), vitamin B1 (0.18 %), and the least was Vitamin B6 (0.15 %). The vitamin is obtained from consumed food substances as the body cells and organs cannot produce it. Vitamin is important in the formation of strong bones and teeth, acts as a non-enzymatic antioxidant with potential to mop and scavenge free radicals in the body. Orole *et al*., (2020) believed the vitamin has the capacity to regenerate other small molecule antioxidants such as α-tocopherol, urate from their respective radical species. Riboflavin (vitamin B2) is an important vitamin needed for freeing locked-up energy in food substances and other metabolism of nutrients. Riboflavin is found as flavin mononucleotide and flavin adeninenucleotide which are electron transporters within cells. Some Vitamins are important for the normal functioning of rhodopsin which enhances good eyesight, while some like thiamine (vitamin B1) aid glucose metabolisms. Vitamin B3 was reported to have reduced blood lipids level and provide nicotinamide in the body for normal metabolism (Orole *et al.,* 2020).

Table 5: Vitamins Compositions of ethanol extract from *Telfairia occidentalis*

Vitamins	**Quantity (mg/100g)**
Vitamin C	10.76
Riboflavin (B2)	0.45
Cobalamine (B12)	0.21
Thiamine (B1)	0.18
Niacin (B3)	0.5
Pyridoxine (B6)	0.15
pantothenic acid (B5)	0.29
Biotin (B7)	0.36

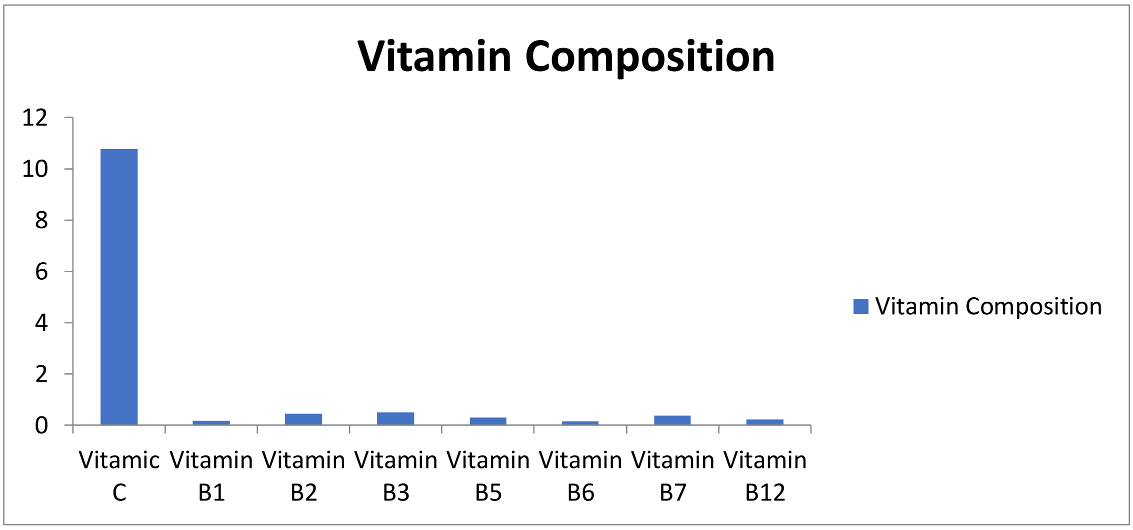

Figure 5: Vitamins content

Conclusion

The findings of this research have shown that Telfairia occidentalis leaves are excellent source of phytochemicals, minerals, and vitamins. The minerals found in this plant could provide required nutritional supplements and diets for people suffering from hypertension as it was proven that food rich in minerals could provide adequate protection against hypertension. The outcomes of this study showed that the leaves of Telfairia occidentalis are potential candidates for use in nutrition and medicine

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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