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Phytochemical and Proximate Analysis of Wild Fruits and Vegetables from the Federal Capital Territory, Abuja

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Abstract
Over the ages, fruits and vegetables have always been an important part of both human and animal diets. Fruits and plants in general have several medicinal and therapeutic uses in addition to being a source of food to satisfy dietary needs. Little to no attention has been paid to the nutritional value of the many fruits and leafy vegetables that are growing unchecked in the Six Area Council of the Federal Capital Territory (FCT). Documenting the nutritional value of these wild fruits and vegetables would be helpful in the food-based strategy to eliminate micronutrient deficiencies. Therefore, the study's objective is to assess the ethnomedical applications, phytochemical components, and proximate analysis of lesser-known wild fruits and vegetables that are consumed in the FCT, Abuja. The result revealed that in wild vegetables, seven parameters were examined. While *Physalis angulata* had the lowest dry matter (50.28%) and carbohydrate (3.23%), *Portulaca oleracea* had the highest dry matter (95.27%) and carbohydrate (73.32%). *Vitex doniana* had the lowest protein (1.01%), while *Cyathea postiato* had the greatest crude protein (9.24%), fat (7.03%), and fibre (46.70%). Ash concentration was highest in *Celosia isertii* (16.67%), moisture content was highest in *Solanum dulcamara* (15.55%), and lowest in *Portulaca oleracea* (4.73%). Phytochemical screening of 17 wild vegetables revealed varying presence of alkaloids, carbohydrates, flavonoids, glycosides, phenols, saponins, steroids, tannins, and terpenoids, with some compounds absent in specific vegetables. In conclusion, vegetables that are high in protein, fibre, and carbohydrates are valuable for food security. They also have phytochemical components that may be used therapeutically to treat microbial infections, inflammation, and oxidative stress.

Keywords: Phytochemical Analysis, Proximate Analysis, Wild Fruits, Wild Vegetables, Nutritional Composition

Introduction

Fruits and vegetables have always played a significant role in the diets of both humans and animals throughout history. In addition to providing food to meet nutritional demands, fruits and plants in general can be used for some medical and therapeutic purposes. Fruits and vegetables are a vital component of the human diet since they are a significant source of vital nutrients. They comprise a variety of plant food groups with widely differing nutritional and energy contents. They provide vitamins, minerals, dietary fibre, and phytochemicals that act as anti-inflammatories, antioxidant, and phytoestrogens (Bvenura et al., 2017). Due to their health-promoting qualities, fruits and vegetables are always recommended. Diets high in fruits and vegetables have been linked to several health advantages, including a lower risk of chronic conditions like high blood pressure, heart disease, hypercholesterolaemia, respiratory disorders, and body weight management. One of the most significant sources of phytochemicals for the human diet is fruits and vegetables, which can be eaten raw or processed (Lawal *et al*., 2019). Approximately 20,000 of the 200,000 phytochemicals currently known have been found to come from fruits, vegetables, and grains (Achikanu et al., 2020). Antioxidant, antibacterial, antifungal, antiviral, cholesterol-lowering, antithrombotic, and anti-inflammatory qualities have all been found in phytochemicals (Lawal et al., 2019). Bananas (Musa sapientum) are one of the most popular fruits in tropical and subtropical regions of the world (Achikanu et al., 2020). The ripe banana is often eaten raw, though it can occasionally be a key component in fruit salads or desserts. Minerals, vitamins, carbohydrates, flavanoids, and phenolic substances are all abundant in it (Mandev et al., 2019). The nutritious makeup of the numerous leafy vegetables and fruits that are growing freely in the FCT's Six Area Council has received little to no attention. In the food-based strategy to eradicate micronutrient deficiencies, it would be beneficial to document the nutritional value of these wild fruits and vegetables.

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To boost nutrient intake, people in the Federal Capital Territory can freely gather and consume a variety of lesser-known wild fruits and vegetables, many of which have nutritional values comparable to those of common or everyday fruits and vegetables. The scarcity and high cost of many domestic fruits and vegetables may be compensated for by some wild fruits and vegetables, which could bridge the gap in fruit and vegetable consumption in both urban and rural areas. Even though these fruits and vegetables are abundant in the wild, Abuja and Nigeria as a whole continue to struggle with nutritional deficiencies. Major health issues like poor health, blindness, stunted growth, mental retardation, and learning difficulties can arise from consuming insufficient amounts of these vital nutrients (Kiani et al., 2022). The phytochemical, elemental, proximate, anti-nutrient, and ethnobotanical uses of some wild fruits and vegetables must be identified and assessed. In Abuja and Nigeria, these wild fruits and vegetables could be used in a food-based and pharmaceutical strategy to combat health issues and nutritional deficiencies. Therefore, the study's objective is to assess the ethnomedical applications, phytochemical components, and proximate analysis of lesser-known wild fruits and vegetables that are consumed in the Federal Capital Territory (Abuja).

Materials and Methods

Chemicals and Equipment procurement

Samples were collected and stored in polyethylene bags to prevent contamination. Unwanted elements were removed by picking the leaves. Iodised water was used to wash the leaves and fruits, and too much water fell off. The fruits and vegetables were chopped into edible chunks and blended until they were smooth. Following homogenization, the samples were placed in an airtight container. The fruits and leaves were tagged as fresh, and every wild fruit and vegetable that was gathered was examined for different nutrients and anti-nutrients as soon as it was collected.

Study Area

The study was conducted in the rural communities of the six Area Councils of the FCT, namely Abuja Municipal, Abaji, Bwari, Gwagwalada, Kuje, and Kwali. The Federal Capital Territory (FCT) is in central Nigeria also known as the capital of Nigeria, lies between latitudes 80° 25' and 9° 25' North of the equator and longitude 6°45' and 7° 45' East of the Greenwich Meridian. It is bordered by four states; Kaduna in the North, Kogi in the South, Niger in the West and Nasarawa in the East. It covers a land mass of 8,000 square kilometres (km²), which is equivalent to 0.8% of Nigeria's land mass. Abuja master plan (2000).

Sampling Collection, and Identification

Two men and two women (indigenes) assisted the researcher to collect and identify some of the wild fruits and vegetables which are consumed in their locality. The wild fruits and vegetables were collected from forests in two different communities and were identified alongside their local names, each in the six area councils of the Federal Capital Territory, namely: Abuja Municipal, Abaji, Bwari, Gwagwalada, Kuje, and Kwali. Sampling of materials was run side by side with the laboratory work. Samples of these fruits and vegetables were taken to the Department of Biological Sciences, University of Abuja Herbarium for identification and sampling by a taxonomist. The samples identified were matched to a known taxon, using various methods, for characterisation and identification of their botanical names.

Preparation of Materials

Polyethylene bags were used for the collection and storage of samples to avoid contamination. The leaves were picked to remove unwanted materials. The vegetables and fruits were washed with iodised water and excessive water was blotted dry. The moisture content of the samples was determined by weighing two grams of each sample in different ranges of temperature between 100°C and 102°C (Dutta et al., 2023). The dried matter obtained was ground and stored at 5°C in air-tight containers before further analysis.

Determination of Parameters

The parameters analysed were proximate composition and phytochemical analysis (quantitative/qualitative). Seven proximate analyses were carried out, namely; ash content determination, carbohydrate determination, crude fibre determination, crude lipid determination, crude protein determination, dry matter determination, and moisture content determination. Nine Phytochemicals were screened, namely: alkaloids, carbohydrates, flavonoids, glycosides, phenols, saponins, steroids, tannins, and terpenoids.

Proximate Analysis

The proximate analysis (Moisture Content, Crude Fibre, Ash Content, Crude Lipid, Crude Protein, Carbohydrate and Dry matter) of all the samples were determined. The moisture and ash were determined using the weight difference method. Fibre content was estimated from the loss in weight of the crucible and its content on ignition.

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Carbohydrate was determined by different methods when the sum of the percentages of moisture, ash, crude protein, ether extract and crude fibre was subtracted from 100. Two grams of each sample was weighed into a crucible, and the sample containing the crucible was placed in a hot air oven at 105 ± 2 °C till constant weight was obtained. The crucible was cooled in a desiccator, and finally, the weight of the sample was taken to determine the loss in weight due to the removal of moisture. Percentage moisture = 100 (loss in weight after drying)/ Total weight sample taken. Involving digestion, distillation and finally titration of the samples. A robust, simple and reproducible method for available carbohydrate analysis across various matrices, published recently. Carbohydrate was determined by the difference method; all the proximate values were reported in percentage (AOAC, 2020)

Phytochemical Analysis

Phytochemical screening is the identification of different classes of phyto-constituents present in various parts of a plant. Phytochemical screening of the extract revealed the presence of alkaloids, saponins, phenolics, tannins, flavonoids, terpernoids, steroids.

Results

Result of the Percentage Value of Proximate Composition of Wild Vegetables

Proximate composition analysis determines the group of closely related compounds in substances such as plants. The proximate composition of this research includes: moisture, ash, crude fibre, crude lipid, crude protein, carbohydrate and dry matter content.

Seven (7) parameters have been measured based on percentage value. Dry matter in *Portulaca oleracea*(L) having the highest percentage value of 95.27; while the lowest Dry matter recorded in *Physalis angulate*(Linn) 50.28; *Portulaca oleracea*(L) had the highest Carbohydrate percentage 73.32 and *Portulaca oleracea*(L) lowest Carbohydrate percentage of 3.236; *Cyathea postiato*(J.E Smith) had the highest Crude protein percentage of 9.245 and *Vitex doniana*(Sweet) lowest percentage of 1.017; *Cyathea postiato*(J.E Smith) had the highest Crude lipid percentage of 7.033 and *Portulaca oleracea*(L) the lowest of 1.040; *Cyathea postiato*(J.E Smith) had the highest Crude fibre of 46.70 and *Portulaca oleracea*(L) the lowest of 10.30; *Celosia Isertii*(C.C.Towns) had the highest Ash Content of 16.67 and *Cyathea postiato*(J.E Smith) the lowest of 0.140; *Solanum dulcamara*(Linn) had the highest Moisture content of 15.55 and *Portulaca oleracea*(L) the lowest of 4.731.

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Table 1: The Percentage Value of Proximate Composition (Nutrients) of Wild Vegetables eaten in FCT, Abuja

BOTANICAL NAME	% MC	% AC	% CF	% CL	% CP	% CHO	% DM
DC	5. 91±0.42	3.71±2.07*	30.19±1.87*	4.98±1.82	2.21±3.17	52.98±1.56*	94.09±3.95*
AS	7.46±3.88	15.66±1.83*	31.20±3.65*	2.32±1.93	3.69±1.33	9.65±1.56	92.54±3.23*
AV	15.32±1.13	11.14±4.81*	38.82±1.70*	3.95±4.89	4.16±0.31	35.01±4.50*	93.08±4.34
ASE	6.71±6.37	7.58±3.32*	26.42±4.09*	3.64±4.28	3.32±4.21	52.32±6.63*	93.31±3.34*
BP	15.20±5.02*	10.33±4.09*	16.45±3.20*	5.55±2.26	2.95±3.59	53.69±3.67*	89.20±4.09*
BD	6.06±3.76*	15.02±5.70	36.16±7.18*	1.95±3.43	4.62±1.51	36.18±3.83	93.94±3.57
CP	13.09±1.37*	12.70±5.82*	26.62±8.78*	3.31±8.27	4.34±1.21	39.94±3.92*	86.91±3.02*
CI	12.89±0.25*	16.67±0.72*	13.86±0.51*	2.57±0.96	2.03±1.95	51.97±0.91*	87.11±0.72*
CG	6.78±0.88*	12.95±1.23*	33.40±1.13*	4.00±0.41	4.43±0.74	38.42±1.34*	93.22±1.13*
CPO	12.23±0.06*	0.14±0.14	46.70±0.12*	7.03±0.25	9.24±0.07	24.65±0.11	87.77±0.12*
CPR	7.15±0.11*	13.54±0.55*	37.67±0.12*	3.84±0.25	2.58±0.07	35.20±0.04*	92.84±0.08*
CPOP	5.26±0.42*	7.71±1.87*	17.76±1.82*	3.71±2.07	1.57±1.56	63.98±3.17*	94.73±0.08*
DO	5.95±1.87*	4.59±0.42	31.43±0.96*	4.79±1.95	3.14±1.95	50.10±1.87*	94.05±3.95*
PA	10.99±1.87	10.92±4.09*	19.97±1.95*	4.60±2.07	3.23±1.87	3.23±4.09	50.28±2.35*
POL	4.73±1.56*	2.74±0.51	10.30±1.56*	1.04±1.35	7.85±2.35	73.32±3.95*	95.27±1.13*
SDU	15.55±0.46*	14.16±1.96	37.91±1.56*	3.38±0.96	2.40±1.13	26.59±1.56*	84.45±1.23*
VDO	6.40±0.87	7.39±0.72	46.61±0.25*	5.08±0.96	1.01±3.95	33.49±0.91*	93.59±0.88*

Acanthospermum hispidium - **DC**, Amaranthus spinosus – **AS,** Amaranthus viridis- **AV**, Annona senegalensis - **ASE**, Biden pilosa- **BP**, Boerhavia diffusa- **BD**, Calotropis procera- **CP**, Celosia Isertii- **CI**, Cleome Gyandra- **CG**, Cyathea postiato – **CPO**, Cyathula prostrata - **CPR**, Cissus populnea - **CPOP**, Daniellia oliveri -**DO**, Physalis angulate- **PA**, Portulaca oleracea- **POL**, Solanum dulcamara- **SDU**, Vitex doniana- **VDO**

Key: *- p≤0.05, MC = Moisture Content (%), AC = Ash Content (%), CF = Crude Fibre (%), Crude Lipid (%), CP = Crude Protein (%), CHO = Carbohydrate (%), DM = Dry Matter (%)

Phytochemical constituents of wild vegetables and fruits

Preliminary phytochemical screening reveals the presence of alkaloids tested from present moderately to present very strongly in all the seventeen wild vegetables; Carbohydrate present in 16 of the wild vegetables and absent in 1 *Annona Senegalensis*(Persoon); Flavonoids present in 15 of the wild vegetables and absent in *Biden pilosa*(Linn) and *Daniellia Oliveri*(Rolfe); Glycosides present in 16 of the wild vegetables and absent in *Celosia Isertii*(C.C.Towns); Phenols present in 16 of the wild vegetables and absent in *Cyathula prostrata* (L.)Blume; Saponins present in 11 of the wild vegetables and absent in *Amaranthus viridis*(Linn), *Boerhavia diffusa*(L), *Calotropis procera*(Ait.) R. Br. *Cleome Gyandra*(Linn), *Daniellia Oliveri*(Rolfe), *Vitex doniana*(Sweet); Steroids present in 12 of the wild vegetables and absent in 5 namely *Amaranthus spinosus*(Linn), *Annona Senegalensis*(Persoon), *Cyathea postiato*(J.E Smith), *Portulaca oleracea*(L), *Vitex doniana*(Sweet); Tannins present in 15 of the wild vegetables and absent in 2 namely *Annona Senegalensis*(Persoon), *Cyathula prostrata* (L.)Blume; Terpenoids present in 14 of the wild vegetables and absent in 3, namely *Acanthospermum hispidium*(DC), *Cissus populnea* (Guill. & Perr), *Vitex doniana*(Sweet).

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The significance of phytochemicals in vegetables or plants helps to protect the immune system from viruses, bacteria fungi and parasites. High phytochemicals or phytonutrients in vegetables is known to slow the growth of many cancers.

Table 2: The phytochemical constituents of wild vegetables and fruits eaten in FCT, Abuja

Botanical Name (Vegetable)	Alkaloids	Carbohydrates	Flavonoids	Glycosides	Phenols	Saponins	Steroids	Tannins	Terpenoids
Acanthospermum hispidium (DC)	+++	+	+	+++	+	+	+	+	-
Amaranthus spinosus (Linn)	+	+	+	+	+	++	-	++	+
Amaranthus viridis (Linn)	++	++	+	+	+	-	+	++	+
Annona Senegalensis (Persoon)	++	-	+	++	+	+	-	-	+
Biden pilosa (Linn)	+++	++	-	+	+	+	++	+	+
Boerhavia diffusa (L)	++	++	+	+	+	-	+	+	+++
Calotropis procera (Ait.) R. Br	++	+	+	++	+	-	+	+	+
Celosia Iserlii (C.C.Towns)	++	+	+	-	+	++	+	+++	+
Cleome Gyandra (Linn)	++	+	+	+	+	-	+	++	+
Cyathea posliato (J.E Smith)	++	+	+	+	+	+	-	+	+
Cyathula prostrata (L.) Blume	+++	+	+	+	-	+	+	-	+
Cissus populnea (Guill. & Perr)	+++	++	+	+	+	++	+	+	-
Daniellia Oliveri (Rolfe)	++	+	-	+	+	-	+	+	+
Physalis angulate (Linn)	+++	++	+	++	+	+++	+	+	+
Portulaca oleracea (L)	+++	-	+	+	+	+	-	+	++
Solanum dulcamara (Linn)	+++	++	+	+	+	+	++	++	+
Vitex doniana (Sweet)	+++	+	+	++	+	-	-	+++	-

Note: +: Present moderately; + +: Present strongly; + + +: Present very strongly; -: Signifies absence

Value represents mean (±) standard deviation (S.D) of 3 determinants

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Ethnobotanical usage of some wild vegetables and fruits

Table 3: The ethnobotanical usage of some wild vegetables and fruits eaten in FCT, Abuja

S/N	FAMILY	BOTANICAL NAME	HABIT	INDIGENOUS NAME	OTHER ETHNO-BOTANICAL USAGE
1	Amaranthaceae	*Amaranthus spinosus* (Linn)	Annual to subshrub, monoecious and or dioecious, occasionally spiny, hairs simple(branched)	Dagunro/ Efo tete (Yoruba) Ińińe-ógwú (Igbo)	Medicinal: atherosclerosis, stomach ulcers, tuberculosis, antiseptic, antifungal, anti-inflammatory preparation, antidote to snake poison, gonorrhea, haemorrhoids, diabetes, female fertility, galactagogue, treatment of menorrhagia Diuretic properties; alleviates urinary tract infections, decoction or infusion of the leaves is used to promote urine production Culinary uses: consumed as leafy greens, soups, curries, and fresh in salads Red dye can be extracted from the leaves and used for the colouring of fabrics and textiles. Animal Fodder for livestock due to its high nutritional value
2	Amaranthaceae	*Amaranthus viridis* (Linn)	Annual to subshrub, monoecious and or dioecious, occasionally spiny, hairs simple(branched), Erect or diffuse, annual, unarmed herbs, simple or branched, 20-80 cm tall	Malan kotshi (Hausa) Tete-abalaye (Yoruba) Atitee (Igbo)	Medicinal; astringent, diaphoretic, diuretic, emollient, febrifuge, galatogogue, eczema, burns, wounds, boils, earache, haemorroids bronchitis, sudorific, antidote to snake bite, menorrhagia, internal bleeding, diarrhea, stomach disorder, ulcerated mouths, nosebleeds, pain, asthma, diabetes, dysentery, urinary disorder, liver disorder, eyes disorder, venereal diseases, hemorrhoid, blood tonic. Antioxidant, antimicrobial, hepatoprotective, anti-nociceptive, anti-inflammatory, hypolipidemic, antihyperglycemic, anthelmintic, antiphytopathogenic and antidiabetic. Culinary uses: consumed as leafy greens in various cuisines, soups, curries and salads. Animal Fodder for livestock due to its high nutritional value
3	Amaranthaceae	*Celosia Isertii* (C.C.Towns)	Annual to subshrub, monoecious and/or dioecious, occasionally spiny hairs, simple(branched) leaf blade, simple	Nannaho (Hausa) Ajifowo/ Sokoyokoto (Yoruba) Eli-emi onu (Igbo)	Medicinal uses: wound healing, anti-microbial, anti-inflammatory leaf medicine, arthritis, rheumatism Respiratory conditions; alleviates respiratory conditions such as coughs, bronchitis, and asthma General food sauces, condiments, spices, flavourings

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			alternate or opposite margins, entire or serrate, veins pinnate		Cultural uses: ornamental purposes, gardens and landscaping for decorative purposes
4	Amaranthaceae	*Cyathula prostrata* (L.)Blume	Perennial, prostate herbs	Dakandafi (Hausa) Sawere pepe (Yoruba) Agbirigba (Igbo)	Medicinal: treatment of rheumatic fever, dysentery, cough, scabies, wounds, eye problems, ear drops to treat otitis, skin sores, shingles and burns, stop bleeding from piles, Anti-inflammatory, analgesic, anti-oxidant. Food: leaves cooked and eaten as vegetables, macerated leaves used as soap
5	Amplidaceae (Vitaceae)	*Cissus populnea* (Guill. & Perr)	Species of shrub in the family of climbers, liane to 4.5m, with old stems mostly hollow up to 7.5cm. Diameter and yielding a copious, clear watery sap when cut	Dafaaraa or Latutuwa (Hausa) Ajaara or Orogbolo (Yoruba) Okoho (Igbo)	Treatment of sore breast, indigestion, venereal diseases, intestinal parasites, oedema, eye problems resulting from an attack of a black cobra, cathartic aphrodisiac, antidote to arrow wounds, management of infertility in males, treatment of respiratory issues, ulcers, mouth sores, and inflamed gums
6	Annonaceae	*Annona Senegalensis* (L)	Deciduous Shrub	Shap-shap (Yoruba)	Food, medicinal diseases, and dysentery. Female infertility, anti-cancer, diabetes, anti-snake venom
7	Apocynaceae	*Calotropis procera* (Ait.) R.Br	A large shrub, much-branched, contains milky latex	Tumfafiya (Hausa) Ewe Bomubomu (Yoruba)	Food, fodder, Firewood, Medicinal; diarrhoea, cough, asthma, paralysis, anorexia, intestinal worms, bronchitis, dyspepsia, intermittent fevers, inflammations, swellings, tumours, sinus fistula and skin diseases
8	Asteraceae	*Acanthospermum hispidum* (DC)	A small hispid herb, up to 75cm	Dagunro-gogoro/ Egun arugbo (Yoruba)	Medicinal (yellow fever, tuberculosis, cough, migraine, haemorrhoids, malaria).
9	Asteraceae	*Bidens pilosa* (Linn)	Annual, glabrous or soft hairy	Ewe abere, abere oloko (Yoruba)	Medicinal epilepsy and haemorrhoids
10	Cleomaceae	*Cleome Gyandra* (Linn)	Annual, erect, branched, hairy herb with having tap root system	Gasaya (Hausa) Epuya (Yoruba)	Cosmetics and body cream
11	Cyatheaceae	*Cyathea postiato/ Prosea* (J.E. Smith)	Erect, petioles to 20cm long, dull dark brown to blackish matte, sparsely	Ma daddafin kusu (Hausa) Sawenpepe (Yoruba)	Treatment of intestinal worms, stomach aches, cholera, bowel problems, toothache, cramps, diarrhoea and vomiting and headaches

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			muricate, scurf absent, with elliptic brown pnuemathodes		
12	Fabaceae	*Daniellia Oliveri* (Rolfe)	Tree, slow slow-growing deciduous tree with a flat top	Maje/ Kadaura (Hausa) Iya (Yoruba) Ozabwa (Igbo)	Treatment of diseases (inflammation, schizophrenia, epilepsy
13	Lamiaceae	*Vitex doniana* (Sweet)	Deciduous tree	Dinya (Hausa) Oori nla (Yoruba) Ucha koro (Igbo)	Food, medicine, Diarrhoea, dysentery, improves fertility, rheumatic pains, haemorrhoids, ulcer, dermatosis eye treatment, gastroenteritis, liver disease, hypertension, magic potion (luck, intelligence, fighting evil spirit), fuel, building, beekeeping, art (making ink)
14	Nyctaginaceae	*Boerhavia diffusa* (L)	Annual, perennial herb, subshrub, glabrous or hairy	Kudujin fadama /Harshen saaniiyaa (Hausa) Etiponla (Yoruba) Azeigwe (Igbo)	Treatment of infertility and menstrual pain, mild laxative and febrifuge for children
15	Portulacaceae	*Portulaca oleracea* (L)	Annual herb, prostrate succulent plant. The main stem is divided into many secondary stems spread on the ground or sometimes erect. They are smooth and fleshy.	Babbajibji (Hausa) Esan omode/ Papasan (Yoruba)	Febrifuge, antiseptic, vermifuge, diuretic, antiseptic, anti-spasmodic and pharmacological activities.
16	Solanaceae	*Physalis angulate* (Linn)	Grows as a glabrous annual to 1m in height. The leaves are arranged alternately, to 12cm in length, ovate to lanceolate, with an acute/acuminate leaf apex and toothed, undulate leaf margin. The vegetation can be reddish in colour.	Matsamama/ Doomashin mazaa (Hausa) Koroopo (Yoruba)	Medicinal (Fever, malaria, female infertility

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17	Solanaceae	*Solanum dulcamara* (Linn)	Bittersweet nightshade vine or sprawling, mounding shrub. Its lower stems are woody while the upper stems are herbaceous, deeply lobed at the base or simple, ovate to oval leaves without lobes.	Inuwar dare, daci mai dadi (Hausa) Kikoro dun ogbin (Yoruba) Osisi uto ilu (Igbo)	Extremely poisonous plant, dangerous to ingest, it can, in excess, paralyse the nervous system, slow circulation, lower temperature, as well as cause vertigo, delirium and convulsions, treatment of warts, tumours, eruptions and other skin diseases. However, also used for cough, diarrhoea, eye infection and joint aches. It is a mild narcotic.

Source: Field Research by Researcher

Discussion

The nutritional content and possible health advantages of wild vegetables are revealed by their proximate composition study. The findings indicate a significant variance in water content, with the dry matter content (DM) ranging from 50.28% in *Physalis angulata* to 95.27% in *Portulaca oleracea*. Reduced moisture content is associated with higher dry matter content, which can improve nutrient density and shelf life (Adewusi et al., 2020). One important factor influencing post-harvest storage and microbial stability is moisture content (MC). *Solanum dulcamara* had the highest MC (15.55%), which made it more perishable than *Portulaca oleracea*, which had the lowest MC (4.73%) and a wide range of nutrient deposits. *Physalis angulata* had the lowest value (3.23%), while *Portulaca oleracea* had the greatest (73.32%) in terms of the Carbohydrate content (CHO). Vegetables with high carbohydrate content are a source of energy and help increase dietary fibre consumption, which is critical for gut health (Odukoya *et al.*, 2019). According to earlier research, fibre-rich vegetables can help prevent constipation and maintain the balance of the gut microbiota. *Cyathea postiato* had the highest amount of crude fibre (CF), which improves digestive processes, at 46.70%, while *Portulaca oleracea* had the lowest at 10.30% (Ene-Obong et al., 2018). *Cyathea postiato* had the highest crude protein (CP) level (9.24%), whereas *Vitex doniana* had the lowest (1.01%). These vegetables are essential for protein supplementation since protein is essential for enzymatic processes and tissue repair, particularly in low-income populations where animal protein intake is restricted (Oni et al., 2021). Additionally, *Cyathea postiato* had the highest crude lipid (CL) content (7.03%), while Portulaca oleracea had the lowest (1.04%), indicating differences in the amount of important fatty acids. Energy storage and vitamin absorption are influenced by lipids (Ajayi et al., 2022).

Celosia isertii had the highest ash content (AC), a measure of the overall mineral composition, at 16.67%, while *Cyathea postiato* had the lowest (0.14%). According to Ekpo and Udoh (2020), a high ash content indicates a strong supply of vital minerals, including calcium, magnesium, and potassium, which are needed for bone health and enzymatic activities. Alkaloids, flavonoids, glycosides, saponins, phenols, tannins, steroids, and terpenoids were among the bioactive substances identified by the phytochemical screening. According to Akinmoladun et al. (2019), alkaloids, which are well-known for their antibacterial and analgesic qualities, were abundant in all wild vegetables. Fifteen out of the seventeen wild plants, except *Biden pilosa* and *Daniellia oliveri*, contained flavonoids, which have anti-inflammatory and antioxidant qualities. Flavonoids lend credence to these veggies' ability to fight oxidative stress and lower the likelihood of developing chronic illnesses (Igwe et al., 2021). *Celosia isertii* lacked glycosides, which are known to have cardioprotective qualities, and *Cyathula prostrata* lacked phenols, which are involved in free radical scavenging activity (Ogundele et al., 2019). Six species, such as *Boerhavia diffusa* and *Amaranthus viridis*, lacked saponins, which have immune-stimulating and hypocholesterolemia properties. *Portulaca oleracea* and *Vitex doniana* were among the five vegetables that lacked steroids, which are involved in the manufacture of hormones.

Fifteen (15) of the vegetables contained tannins, which are known to have antibacterial and antidiarrheal properties. *Annona senegalensis* and *Cyathula prostrata* did not contain tannins. 14 plants were found to contain terpenoids, which have anti-carcinogenic qualities, while *Acanthospermum hispidium*, *Cissus populnea*, and *Vitex*

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doniana did not. These results are consistent with earlier research showing the preventive function of phytochemicals in preventing illness (Ukwubile et al., 2020).

In both traditional medicine and nutrition, wild foods are important. Their cultural, culinary, and medical significance has been emphasised by studies. *Amaranthus spinosus*, for example, has been shown to have antibacterial, antifungal, and anti-inflammatory qualities (Umar et al., 2020). As evidence of its possible pharmacological significance, *Amaranthus viridis* is also utilised to treat diabetes, wounds, and dermatitis (Sahoo et al., 2015). Because flavonoids and saponins have been connected to antibacterial and immune-boosting properties, the phytochemical content of these plants supports their therapeutic uses, from chronic disease prevention to targeted treatments for conditions like cancer and neurodegenerative diseases (Pandey et al., 2009). Among the culinary uses of wild vegetables are in salads, curries, and soups. A popular leafy green that is often utilised as an ornamental plant, *Celosia isertii* is well-known for its antimicrobial and wound-healing qualities. Some species, like *Cissus populnea*, are prized for their aphrodisiac qualities and are traditionally used to treat infertility in addition to their culinary purposes. Additionally, *Vitex doniana* is utilised for its anti-hypertensive, anti-inflammatory, and analgesic qualities, while *Cyathula prostrata* is used to treat rheumatic fever, skin infections, and eye issues (Zhicheng et al., 2024). These applications are consistent with other studies showing the wide range of therapeutic benefits of wild plants (Ukwubile et al., 2020).

Conclusion

This study emphasises the phytochemical and nutritional diversity of wild vegetables, underscoring their potential use in the creation of functional foods and dietary supplements. Vegetables that are high in protein, fibre, and carbohydrates are valuable for food security. They also have phytochemical components that may be used therapeutically to treat microbial infections, inflammation, and oxidative stress. Future research ought to concentrate on bioavailability and how processing techniques affect the retention of nutrients. Promoting the utilisation of wild fruits and vegetables is essential for sustainable nutrition and public health, particularly in regions like Nigeria's Federal Capital Territory.

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