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COMPARATIVE SCIENTIFIC STUDIES OF NUTRITIONAL AND MEDICINAL PLANTS OF SOUTHEAST AND NORTH CENTRAL OF NIGERIA

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ABSTRACT

This study compared medicinal and nutritional plants in South East and North Central Nigeria between July and December 2023. The aim was to identify high-profile plants for national recognition and scientific recommendation. The study used survey and experimental methods, including phytochemical, mineral, and proximate analysis. Top medicinal plants identified include *Bryophyllum pinnatum*, *Piper guneense*, *Garcinia kola*, and *Vernonia amygdalina*. Top nutritional plants include *Vignia subterranean*, *Cajanus cajan*, *Treculia africana*, and *Colocasia esculenta.* The study found subtle differences in phytochemical, proximate, and mineral constituents between plants from the two regions, but these differences were not statistically significant. The study identified potential veritable sources of nutritional substances that can also help prevent diseases, including *Ipomoea batatas*, *Allium cepa,* and *Moringa oleifera*. Top nutritional plants from the study include *Treculia africana*, *Vigna subterranean*, and *Cajanus cajan.* Top medicinal plants include *Bryophyllum pinnatum*, *Vernonia amygdalina*, and *Garcinia kola*. The study recommends mass cultivation of these plants to benefit from their nutritional and medicinal properties, potentially reducing deficiency diseases, neglected tropical diseases, and age-related problems. By adopting and promoting these plants, individuals, schools, and governments can improve public health and well-being.

Keywords: Medicinal , Nutritional , Southeast, North Central, Nigeria.

INTRODUCTION

Right from the beginning of time since man came to being and given the responsibility of managing and exploring nature and its endowment, he has always made relentless efforts in order to provide for himself an affordable, comfortable , healthy and purposeful life. He does this by taking advantage of the knowledge, instinct and wisdom that the same nature has given to him over other animals (American Stroke Association, 2017). One aspects of man's life that has not only much value but also determines his productivity in all ramification, is the aspect of his health. This is because human health is not just the engine for the functionality of the total man but also, determines his viability, sustainability, efficacy and productivity in all respects. Therefore, one cannot over emphasize the need for not just curing man of the effects of life's threatening illnesses that have confronted and are confronting him over the years and today, but also must as well, formulate methods and skills to stop, eliminate and or prevent these threats from occurring in the first place (Nwankwo, *et al*, 2014).

The major ways used by man to do this are: his feeding habit, life style, approach to problems and choice of environment to live in (American Stroke Association, 2017).

Plants are a good source of medicines and play a vital role in ethnic and tribal communities' survival. Medicinal plants are used all over the world to treat different types of human and animal diseases. The therapeutic usage of indigenous plant products for ethnomedicinal and nutritional objectives has attracted scientists' curiosity, motivating them to look for bioactive compounds. Medicinal plants posses' essential food components such as carbohydrates, protein and fat. These components are important for human body's requirements and they are used in different physiological, metabolic and morphological activities. Chauhan, *et al*, 2021.

Natural plants derived products are used in medications, nutritional supplements and in different health care products. Plants play vital roles in the identification of new beneficial medicinal components, and their phytochemical constituents such as antioxidants, hypoglycemic and hypolipidemic constituents. Plants are

often an excellent source of medicine and many medicines are derived directly or indirectly from plant resources (Petrovska B.B. (2014), Dagli *et al*, 2015.

Throughout the world, medicine plants have been confirmed to contain essential bioactive compounds that can help to prevent different types of diseases such as cancer, heart diseases and diabetes. Medicinal plants serve a critical role in oral health diseases such as bleeding gums, mouth ulcers, dental carriers, gingivitis and halitosis since they have maximum efficiency or fewer side effects. Secondary metabolites are produced in different ways in different plant species (Pandey and Kumar *et al* (2021), Ferrentino *et al*, 2020). Micronutrients and mineral deficiencies in the diet may have long term negative effects on human health and lead to micronutrient deficiency diseases. Traditionally, all medicinal remedies were made from plants, whether in the form of a sample of plant parts or a more complex form such as crude extract combination. The primary advantage of using plant-derived drugs is that they are generally safer than synthetic substitutes, with significant therapeutic benefits and lower casts (Radha S.P., and Pundir A., 2019).

The aim of this research is to compare the scientific studies of Nutritional and Medicinal plants of South East and North Central of Nigeria.

MATERIALS AND METHODS

Description of the Study Area

The study was carried out for Anambra State (South East, Nigeria) and Benue State (North Central, Nigeria) between July and December, 2023. Anambra is characterized by forest (predominantly) and Savannah vegetation. Rainy season lasts between April to October, while Dry season lasts from November to March. Anambra state has the geographical co-ordinates (6^{o}.20'N and 7^{o}.00'E) of the Equator. It is bounded by Enugu State to the North, Imo State to the East, Delta state to the South and Kogi state to the West. It is characterized by major Rivers, lakes, timbers, palm, fruits, vegetable and domestical animals. Benue State is bounded by Enugu State on the East, Kogi state on the West, Nassarawa State on the North and Cross River State on the South. Benue State is mostly Savannah vegetation with very rich black organic soil. It has rivers, fruits, vegetables, tuber crops and domesticated animals. Geographical co-ordinates for Benue is (7^{o}.31'N and 8^{o}.34'E) of the Equator.

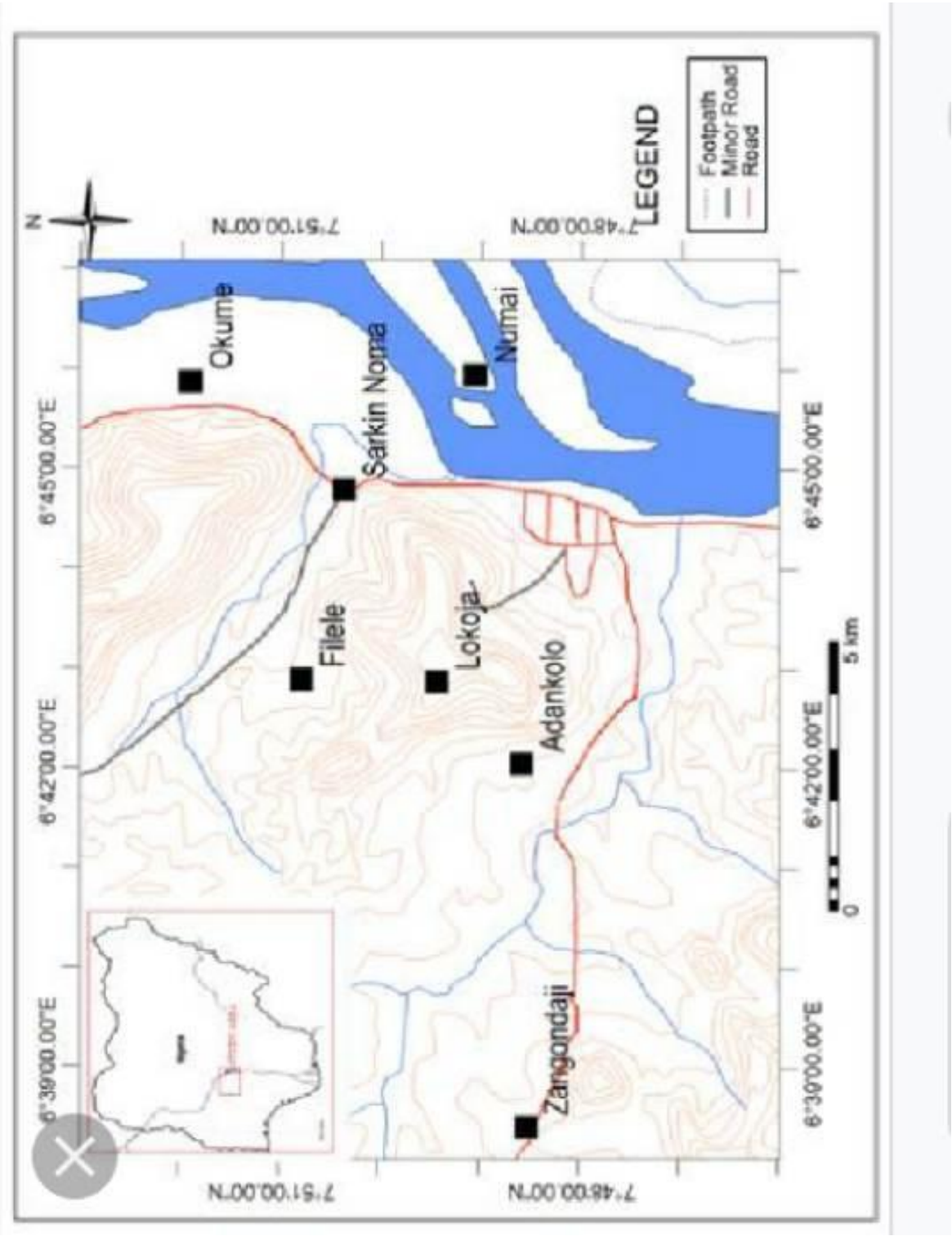

Fig. 3.1 Map of Benue State

Source: Google scholar

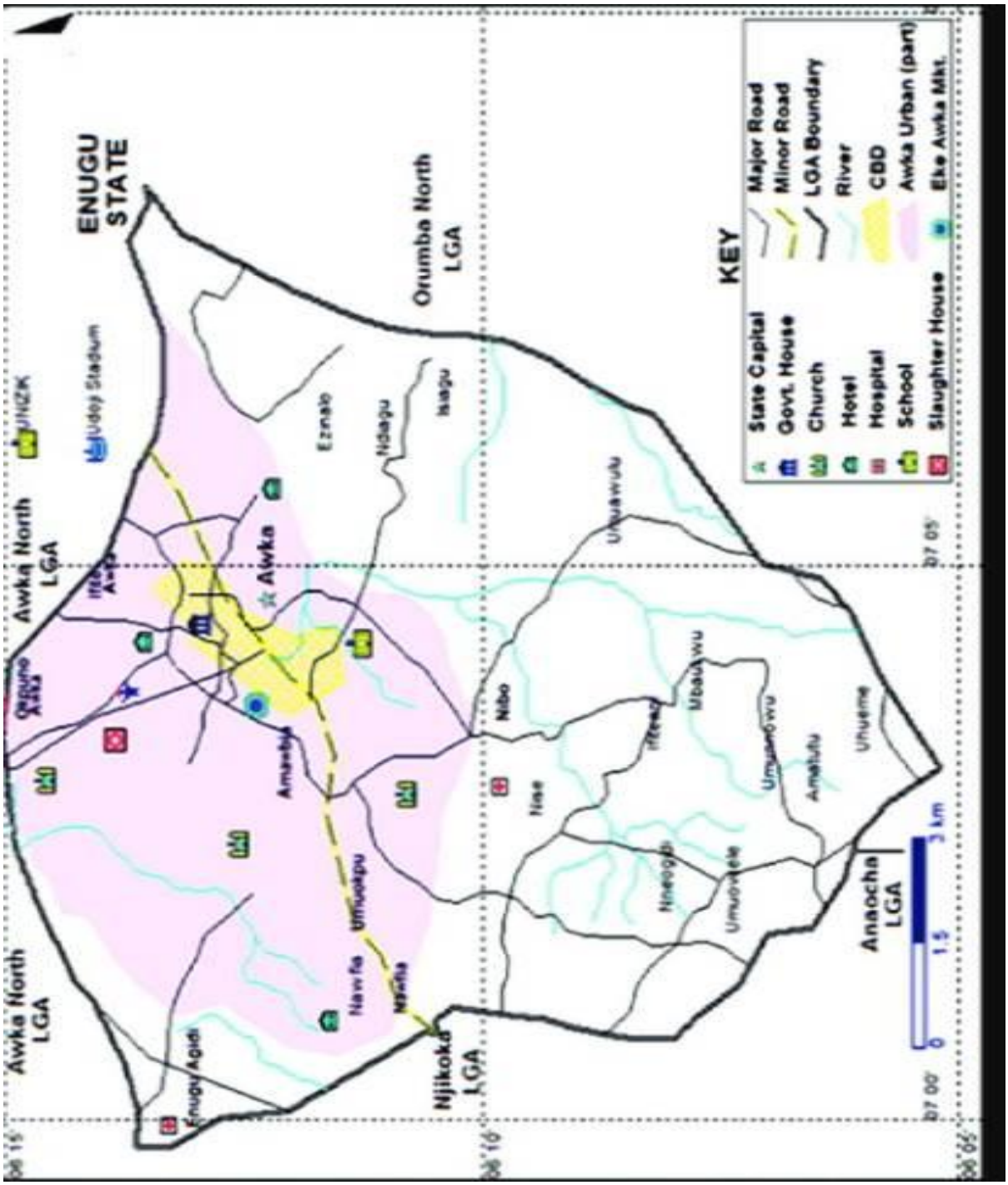

Fig. 3.2 Map of Anambra State

Source: Google scholar

Design of the study

The research design utilized in this work was experimental and descriptive survey design. Experimental design was employed in the phytochemical, proximate and mineral content analysis, while descriptive design made use of questionnaires for the collection of data from Igbo and Hausa populations based on their nutritional and medicinal foods, semi-structured questionnaires were used to obtain field data from students, parents, workers, traders and lecturers.

Analytical Method

The result obtained was presented in tables and charts and analyzed statically using T-test and Anova in SPSS 2.0 at 5% significance.

Study Population

Three hundred (300) questionnaires were distributed to Igbo and Hausa students, lectures ,traders and medical practitioners

$$\frac{235}{300} \times \frac{100}{1} = 78.3\%$$

Sample Techniques

Selection of respondents was randomized to ensure sound statistics and complete elimination of bias.

Reliability of Instrument

This was ascertained using the t-test method by the repetition of the same questions on the same group of respondents after an interval of two weeks.

Validity of Instruments

This was done by the Departmental team of lecturers (Botany option)

Sample Collection

The plant materials was collected from vegetative garden in Anambra (Akwa, Achina) Benue (Gboko) state. The plant parts were sundried, milled to fine powder and kept in an air tight container and the voucher specimen deposited for laboratory analysis at the Botany Department herbarium. The milled plant powder was weighed and used for the phytochemical analysis.

Extraction of plants

Ethanol and water extract. The plant materials collected were air dried with ethanol and water.

Quantitative phytochemical screening

A small portion of the dry extract was subjected to the phytochemical test using Trease and Evans (2016) and herbarium (2016) methods to test for alkaloids, tannins, flavonoids, steroids, saponins, and cardiac glycoside.

Test for Alkaloids

Extract was dissolved in dilute Hcl (Hydrochloric acid) and filtered. Filterates were treated with Mayers reagent (potassium mercuric iodide). Formation of a yellow coloured precipitate indicates the presence of alkaloids

Test for Tannis

One gram of the extract was boiled and dissolved in 20ml of distilled water and filtered. Two to three drops of 10% of $FeCl_3$ (Ferric chloride) was added to 2ml of the filtrate. The production of a blackish – blue or blackish – green colouration was indicative of tannins.

Test for Flavonoids

Dilute ammonia (5ml) was added to a portion of an aqueous filterate of the extract. Then concentrated sulphuric acid (H_2SO_4) (Iml) was added. A yellow colouration indicated the presence of flavonoids

Test for Saponins

Five grams of extract, 5ml of distilled water was added in a test tube and the solution was shaken vigorously and observed for a stable persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation an emulsion which indicates the presence of saponins.

Test for steorids

Five grams of the extract was dissolved in 1ml of chloroform and 1ml acetic anhydride was added, followed by the addition of 2ml of concentrated H_2SO_4 . Steroids was indicated by formation of reddish violent colour or reddish brown colour.

Test for cardiac glycosides

Five grams of extract dissolved in 5ml water was added 2ml of glacial acetic acid solution containing one drop of ferric chloride solution, this was underlayed with 1ml of concentrated H_2SO_4. A brown ring at the interface indicated the presence of deoxysugar characteristics of cardenolides.

In acetic acid layer, a greenish ring may form just about the brown ring and gradually spread out; this shows that the presence of greenish ring indicates glycoside is present.

Quantitative Phytochemical Analysis

Depending on the above qualitative results, the quantitative assay is carried out for Alkaloids, Tannins, phenols, saponin, flavonoids and steroids.

Determination of Total Tannins content

The tannins were determined by slightly modified folin and ciocalteu method. 0.5ml of sample extract is added with 3.75ml of distilled water and added 0.25ml of folin phenol reagent, 0.5ml of 35 % sodium carbonate solution. The absorbance was measured at 725nm. Tannic acid dilutions (0 + 0.5mg/ml) were used as standard solutions. The results of tannins are expressed in terms of tannic acid in mg/ml of extract.

Determination of total phenol content

The phenols were determined by slightly modified folin and ciocalteu method. The 200µl of the sample extract, 800 µl of folin ciocalteu reagent mixture and 2ml of 7.5% sodium carbonate were added. The total content is diluted to 7 hrs incubation in dark. The absorbance was measured at 765nm. Galic acid dilutions were used as standard solutions. The results of phenols are expressed in terms of Gallic acid in mg/ml of extract.

Determination of Total Alkaloid Content
40ml of 10% acetic acid in ethanol was added to 1g of powdered sample, covered and allowed to stand for 4 hours. The filtrate was then concentrated on a water bath to get ¼th of its original volume. Concentrated ammonium hydroxide was added drop wise to the extract until the precipitation was

complete. The solution was allowed to settle and collected precipitate was washed with dilute ammonium hydroxide and then filtered. The residue was dried and weighed.

Determination of Total Flavonoid content

The total flavonoids content of samples was determined by following the Aluminum chloride method. Plant concentrate was mixed with distilled H_2O and $NaNO_2$ solution. After 6 minutes , $Alcl_3$ solution was added and enabled to stand for 6 minutes, NaOH solution was added to bring to the final volume and then the mixture was extensively mixed and enable to stand for another 15min. The total flavonoids were calculated using the standard curve, and expressed as routine equivalent in mg/g of extracts.

Proximate Analysis of Food

Moisture	65 - 78 %
Ash	2 – 5%
Fat	0.2 – 1.10%
Fibre	2- 5%
Carbohydrate	14 -23%
Potassium	390 – 460 mg/100g
Calcium	24-43 mg/100g
Protein	0.3 – 4.8%
Magnesium	79 -110 mg/100g
Energy	79- 91 k/cal

Determination of Proximate Composition

Total moisture content, crude protein, crude fat, crude fibre , total ash, total carbohydrate and gross energy values were determined by the following methods.

Determination of moisture content

Moisture content (%) was determine in an oven drying methods at 105 $\pm$ 5^{o}c according to the procedure described in Association of Official Analytical Chemists (2015). Five grams of each fresh sample was accurately weighed in triplicate and placed in a pre-weighed aluminum dish and dried in an oven t 105$\pm$5^{o}c till the constant weight of dry matter was obtained.

The moisture contents in the sample was determined as:

Moisture

$$\frac{\text{Weight of fresh sample} - \text{Weight of dried sample}}{\text{Weight of fresh sample}} \times 100$$

Determination of crude protein

The powdered extract samples were analyzed for crude protein content according to the Kjeldahl's method described in the Association of Official Analytical chemists, (2015).

Five grams of the sample was weighed in an ash less filter paper and put into 250ml digestion flask. Then 3g of a catalytic mixture, tablet (75g of $CuSO_4$ and 0.7g of K_2SO_4) and 15ml of 98% H_2SO_4 were added into a digestion flask.

The whole mixture was heated in a digestion chamber until transparent residue (clear light green) content was obtained.

The solution was titrated with 0.1mM Hcl to a brown colour. After titration the % of nitrogen was calculated as:

Nitrogen

$$\frac{(vs - VB) \times mMHcl \times 0.014008}{\text{Weight of sample}} \times 100$$

Then the percentage of crude protein in the sample who calculated from the % nitrogen as :

Crude protein = % N x F

Where F (Conversion factor) is equivalent to 6.25.

Determination of Crude Fibre

Six grams of powdered sample (E) was taken into 50ml tube and 2.5ml of alpha – amylase was added and incubated at room temperature for 10min. another mixture of composed 700mml. 70% acetic acid was added. Digestion was under taken by heating at 200^{o}c.

The residue and filter paper were burned first in Busen burner at 550^{o}c of Mt. the carbonaceous materials was cooled in a disicater and weighed to obtain M_2 and it was calculated as :

$$\text{Crude fiber} = \frac{(M_1 - M_f) - M_2}{E} \times 100$$

Determination of Crude Fat

The crude fat in the powdered samples was determined by automated Soxhlet extraction method.

After weighing the dried flask containing sand to constant weight, 15g of homogenized samples were measured by using filter paper of known ass and placed in extraction flask. The dried flasks were weighed and filled with 150ml of petroleum either.

Determination of Total Ash Content

A crucible was dried at 550^{o}c for 30 mins and cooled down in a desiccater for 1 hr. The crucible was measured (M_1) . Five gram of powdered sample was added in the dried crucible and was measured (M_2).

Then the sample was burnted with Busen burner until the steam off and in over at 550^{o}c for 5 hrs. Ash is an inorganic residue remaining after the materials has been completely burnt. The crucible ash was cooled and re-weighted (M_3).

$$\text{Ash} = \frac{M_3 - M_1}{M_2 - M_1} \times 100$$

Determination of Carbohydrate

Total carbohydrate content was calculated adding the total values of crude protein, crude fat, crude fiber and total ash contents of the sample and subtracting it from 100%.

Total Carbohydrate = 100

- (% Crude fiber

+ % Crude protein

+ % Crude fat + % Ash)

RESULTS

NATURAL FOODS OF SOUTH EAST AND NORTH CENTRAL

From Table 1, there are many families in nutritional plants of south east and north central geopolitical zones of Nigeria. The highest family is Fabaceae which have 9 plants. The plants are: *Pterocarpus soyauxil, Pterocarpus santalinoides, Vigna subterranean, Phaseolus*

vulgaris, Cajanu cajan, Pentaclethra macrophylla, Parkia biglobosa Ricinus communis and Glycine max. Family Cucurbitaceae have 4 plants, followed by family Solananaceae which have 3 plants. Family Poaceae, Annonaceae, Anarcadiaceae and Aracaceae have 2 plants each while other families have one plant.

Key

S.E	**South East**
N.C	**North Central**

Table 1: Nutritional plants of south east and north central

	S.E				**N.C**			
S/N	**Botanical Name**	**Family**	**Common Name**	**Local Name**	**Botanical Name**	**Family**	**Common Name**	**Local Name**
1	*Solanum lycopersicum*	Solanaceae	Tomato	Otuboala	*Pennisetum specie*	Poaceae	Fountain grass	-
2	*Solanum melogena*	Solanaceae	Egg plant	Anara	*Cyperus esculentus*	Cyperaceae	Tiger nut	Ayian
3	*Pterocarpus soyauxil*	Fabaceae	African padauk	Akwara	*Sorghum bicolor*	Poaceae Barnhort	Guinea corn	Joro
4	*Pterocarpus santalinoides*	Fabaceae	Mututi	Ntutukpa	*Hibiscus zooboadarifa*	Malvaceae	China Rose	Zobo
5	*Telfaira occidentalis*	Cucurbitaceae	Fluted pumpkin	Ugu	*Glycine max*	Fabaceae	Soya bean	Waken soya
6	*Vigna subterranea*	Fabaceae	Bambara nut	Okpa	*Oryza sativa*	Gramineae	Rice	Shinkafa
7	*Persea americana*	Annonaceae	Avocado	Ube-oyibo	*Annona muricata*	Annonaceae	Soursop	Tuwon biri
8	*Dioscorea dumetorum*	Dioscoreaceae	Bitter yam	Ona	*Ipomea batatas*	Convolvulaceae	Sweet potato	Kudaku
9	*Cucumeropsis mannii*	Cucubitaceae	Melon	Egusi	*Solanum lycopersicum*	Solanaceae	Tomato	Tumatar
10	*Anacardium occidentalis*	Anacardiceae	Cashew	Okpokpo	*Carica papaya*	Caricaceae	Paw- paw	Gwanda
11	*Phaseolus vulgaris*	Fabaceae	Beans	Agwa	*Citrullus lanatus*	Cucurbitaceae	Water melon	Kankana
12	*Cucurbita pepo*	Cucurbitaceae	Pumpkin	Anyu	*Cocos nucifera*	Aracaceae	Coconut	Kwa kwa dabiniya
13	*Musa species*	Musaceae	Banana	Unere	*Capsicum species*	Solanaceae	Red pepper	Tatashi
14	*Anona muricata*	Annonaceae	Sour sop	Ukwa oyibo	*Ananas comosus*	Bromeliaceae	Pineapple	Abacha
15	*Colocasia esculenta*	Aroidene	cocoyam	Ede	*Magnifera indica*	Anacardiaceae	Mango	Mangwaro
16	*Cajanus cajan*	Fabaceae	Pigeon pea	Agbugbu (fio fio)_	*Phoenix dactylofera*	Arecsceae	Date palm	Dabino
17	*Magnifera indica*	Anacardiaceae	Mango	Mangoro	*Dioscorea rotundata*	Dioscoreales	White yam	Doya
18	*Treculia africana*	Rosales	Bread fruit	Ukwa	*Zea mays*	Poaceae	Maize	Amiacha
19	*Pentaclethra mocrophylla*	Fabaceae	African oil bean	Ukpaka	*Terminelia catappa*	Combretaceae	Almond fruit	
20	*Parkia biglobosa*	Fabaceae	Locust beans	Ogiri igbo	*Persea americana*	Annonaceae	Avocado	Fiya
21	*Ricinus communis*	Fabaceae	Castor seed	Ogiri okpei	*Daucus carota*	Apiaceae	Carrot	Karaz

Table 2: Medicinal plants of south east and north central

From Table 2, there are many families of medicinal plants of south and north central geopolitical zones of Nigeria. The highest families are Annonaceae, Zingiberaceae and Malvaceae which have 3 plants each and there plants are: For Annonaceae: *Xylopia aethiopica, Dennetia tripetala and Monodora myristica.* For *Zingiberaceae: Zingiber officinale, curcuma longa and Aframomum melegueta and for Malvaceae: Adansonia digitata, Corchorus olitorus and Hibiscus zoobodarita.* Family *Asteraceae, Cucurbitaceae, Myrtaceae, Solanaceae and Arecaceae* have 2 plants each while other families have one plant.

key

S.E	**South East**
N.C	**North Central**

	S.E				**N.C**			
S/N	**Botanical Name**	**Family**	**Common Name**	**Local Name**	**Botanical Name**	**Family**	**Common Name**	**Local Name**
1	*Moringa oleifera*	moringaceae	Moringa	Odudu oyibo	*Moringa oleifera*	moringaceae	Moringa	Zogala/ barambo
2	*Bryophyllum pinnatum*	crassulaceae	Life plant	Oda-opue	*Azadirachta indica*	Meliaceae	Neem	Dogoyaro
3	*Garcinia kola*	clusiaceae	Bitter kola	Akinu	*Daucus carota*	Apiaceae	Carrot	Karaz
4	Venonia amygdalina	Asteraceae	Bitter leaf	Onugbo	Cucumis sativum	cucurbitaceae	cucumber	Kokwamba
5	*Azadirachta indica*	Meliaceae	Neem	Dogonyaro	*Cucurbita species*	Cucubitaceae	Pumpkin	Kabewa
6	*Morinda lucida*	Rubiaceae	Brimstone tree	Nfia	*Syzygiun aromaticum*	Myrtaceae	Clove	Kanumfari
7	*Piper guineense*	Piperaceae	African black pepper	Uziza	*Trigonella foenum-graecum*	Fabaceae	Fenugreek	Hulba
8	*Xylopia aethiopica*	Annonaceae	Negro pepper	Uda	*Allium sativum*	Amaryllidaceae	Garlic	Tafarnuwa
9	*Cymbopogon citratus*	Poaceae	Lemon grass	Achara ehi	*Adansonia digitata*	Malvaceae	Baobab	Kuka
10	*Chromolaena odoratum*	Asteraceae	-	Siam weed	*Corchous olitorus*	Malvaceae	Jute	Malafiya
11	*Ocimum gratissimum*	Lamiaceae	Scent leaf	Nchuanwu	*Zingiber officinale*	zingiberaceae	Ginger	Chita
12	*Amaranthus specie*	Amaranthaceae	Pig weed	Inine	*Curcuma longa*	Zingiberaceae	Turmeric	Kurkur
13	*Carca papaya*	Carieaceae	Paw-paw	okwuru bekee	*Allium cepa*	Amaryllidaceae	Onion	Albasa
14	*Dennetia tripetala*	Annocaceae	Pepper fruit	Nmimi	*Vitex doniana*	Myrtaceae	Black plum	Dinya
15	*Citrus species*	Rutaceae	Orange	oroma	*Cympogon citratus*	Poaceae	Lemon grass	Tsauri
16	*Capsicum species*	Solanaceae	Hot/chili pepper	Ose oyibo	*Carica papaya*	Caricaceae	Paw-paw	Gwanda
17	*Elaesisi guineensis*	Aracaceae	Oil palm	Akwu	*Cocos nucifera*	Aracaceae	Coconut	Kwa kwa Dabiniya
18	*Murraya koeningii*	Rutaceae	Curry leaf	Akwukwo nri	*Hibiscus zoobadarita*	Malvacceae	China rose	Zobo
19	*Aframomum melegueta*	Zingiberaceae	Alligator pepper	Ose Oji	*Capsicum species*	Solanaceae	Red/chili pepper	Tatashi
20	*Gongronema latifolium*	Apocynaceae	Bush buck	Utazi	*Cyperus esculentus*	Cyperaceae	Tiger nut	Ayain
21	*Monodora myristica*	Annonaceae	African nutmeg	Ehuru	*Withania somnifera*	Solanaceae	India winter cherry	Ashulagandha

Key

S.E	**South East**
N.C	**North Central**

S/N

Table 3. Quantitative Phytochemical Composition of South East and North Central

		S.E				N.C			
1	Saponin	Bryphyllum pinnatum	0.531	Total	Mean	Azadirachta indica	4.557	Total	Mean 4.079
		Veronian amygdalina	2.339	2.818	1.439	Moringa oleifera	3.601	8.158	
2	Cardiac glycosides	Bryphyllum pinnatum	17.333	19.745	9.8725	Azadirachta indica	1.438	3.4048	1.7024
		Veronian amygdalina	2.412			Moringa oleifera	1.968		
3	Tannins	Bryphyllum pinnatum	11.149	21.026	10.513	Azadirachta indica	8.891	19.176	9.588
		Veronian amygdalina	9.877			Moringa oleifera	10.285		
4	Alkaloids	Bryphyllum pinnatum	3.137	11.977	5.9885	Azadirachta indica	1.153	2.295	1.1475
		Veronian amygdalina	8.840			Moringa oleifera	1.142		
5	Flavonoids	Bryphyllum pinnatum	3.477	5.816	2.908	Azadirachta indica	4.557	8.141	4.0705
		Veronian amygdalina	2.339			Moringa oleifera	3.584		
6	Phytate	Bryphyllum pinnatum	0.428	0.874	0.437	Azadirachta indica	0.478	0.823	0.4115
		Veronian amygdalina	0.446			Moringa oleifera	0.345		
7	Cyanogenic glycosides	Bryphyllum pinnatum	1.188	3.78	1.89	Azadirachta indica	1.89	4.05	2.025
		Veronian amygdalina	2.92			Moringa oleifera	2.16		
8	Oxalate	Bryphyllum pinnatum	0.366	0.876	0.438	Azadirachta indica	0.451	0.952	0.476
		Veronian amygdalina	0.510			Moringa oleifera	0.501		
9	Anthocyanin	Bryphyllum pinnatum	0.934	2.413	1.2065	Azadirachta indica	2.382	3.721	1.8105

		Veronian amygdalina	1.479			Moringa oleifera	1.239		
10	Steroid	Bryphyllum pinnatum	25.561	68.543	34.2715	Azadirachta indica	14.912	34.21	17.105
		Veronian amygdalina	42.982			Moringa oleifera	19.298		
11	Phenoil	Bryphyllum pinnatum	2.893	7.517	3.7585	Azadirachta indica	2.437	5.011	2.5055
		Veronian amygdalina	4.624			Moringa oleifera	2.574		
12	haemaglutin	Bryphyllum pinnatum	0.382	0.604	0.302	Azadirachta indica	0.420	0.899	0.4495
		Veronian amygdalina	0.222			Moringa oleifera	0.479		

Table 4 : Table of proximate analysis of the medicinal plants of South East

From Table 4, medicinal plants of south East Nigeria with highest …. concentration of Nutritional value are: xylopia aethiopica (19.699); Parkia biglobosa (19.156); Bryophyllum pinnatum (18.551) ; Colocasia esculentum (17.799) an Telfaira occidentalis (16.066). Those with the highest ash content include Dioscorea dumentorum (10.738); Monodora myristiea (9.302); Piper guineese (7.613) and Xylopia aethiopica (7.255). Those with the highest protein content include: Parkia biglobosa (28:35); Cajanus Cajans (25.2); Vigna subterranea (24.5); Ricinus communis (23.8) Xylopia aethiopica (20.3) and Monodora myristica (17.5).

S/N	Plants	Percentage Moisture	Percentage Ash	Percentage Fat & oil	Percentage fibre	Percentage Protein	Percentage carbohydrate	Total	Mean
1	*Telfaira occidentialis*	5.788	4.511	4.350	2.179	14.7	64.788	96.396	16.066
2	*Piper guineense*	11.893	7.631	4.559	5.849	13.3	51.881	95.113	15.852
3	*Cucurbita pepo*	12.650	5.385	0.398	2.887	7.35	56.343	85.013	14.169
4	*Bryophyllum pinnatum*	24.638	1.458	0.250	1.547	13.65	69.762	11.305	18.551
5	*Discorea dumetorum*	7.484	10.738	4.881	10.547	15.05	42.098	91.014	17.799
6	*Colocasia esculenta*	23.680	5.743	7.422	1.896	12.25	55.804	106.795	15.620
7	*Ricinus communis*	11.596	0.732	7.870	5.044	23.8	44.67	93.722	12.676
8	*Cajanus Cajan*	8.437	0.549	9.108	6.167	25.2	26.491	94.054	15.676
9	*Vigna subterranc ea*	11.650	3.529	2.146	9.702	24.5	42.527	114.938	10.156
10	*Parkia Biglobosa*	22.016	5.871	4.990	2.708	28.35	47.007	118.193	19.699
11	*Xylopia aethiopica*	19.608	7.255	10.742	13.281	20.3	29.722	79.739	13.290
12	*Monodora myristica*	7.078	9.302	7.179	8.958	17.5	582.096		
13	***Total***	166.518	62.794	63.895	70.981	215.95	48.508		

Table 5: Proximate Analysis of the Medicinal Plants of North Central

From Table 5, medicinal plants of North Central Nigeria with the highest /richest concentration of Nutritional value are: S*orghum bicolor* (20.965); *Curcuma longa* (17.658); *Cyperus esculentus* (16.888),*Moringa oleifera* (16.667); *Azadiradita indica* (16.667); and *Carica papaya* (16.66(). Those with the highest Ash content include; *Moringa* (12:856); *Zingiber officinale* (12.500); *Azadiradita indica* (Audilita Nee) (20.090); *Pennisetum glaucum* (11:531). *Curcuma longa* (11.078); *Cyperus esculentus* (9.180), *Sorghum bicolor* (7.785) and *Digitaria exilis* (7.101). Those with the highest protein content include: *Sorghum bicolor* (13.3): *Digitaria exilis* (12:95), *Zingiber officinale* (11.2) ; *Moringa oleifera* (9.8); *Phoenix dactylifera* (9.8) and *Pennisetum glaucum* (8.05)

S/N	Plants	Percentage Moisture	Percentage Ash	Percentage Fat & oil	Percentage fibre	Percentage Protein	Percentage Carbohydrate	Total	Mean
1	Pennisetum glaucum	14.115	11.531	2.187	1.844	8.05	44.691	82.418	13.736
2	Zingiber officinale	1.563	12.500	4.297	2.780	11.2	54.734	87.074	14.512
3	Syzygium aromaticum	13.174	0.398	4.142	4.325	6.3	65.813	94.152	7.746
4	Sorghum bicolor	27.682	7.785	2.249	4.501	13.3	70.271	125.788	20.965
5	Cyperus esculentus	19.531	9.180	1.562	2.528	3.15	65.375	101.326	16.888
6	Phoerux dactylifera	3.159	3.653	9.872	7.371	9.8	57.414	91.269	15.212
7	Moringa oleifera	21.394	12.856	15.453	7.371	9.8	33.126	100	16.667
8	Azadirachta indica	24.540	12.090	9.144	8.683	6.65	38.895	100	16.667
9	Carica papaya	17.422	8.612	8.181	16.306	4.55	44.929	100	16.667
10	Digitaria exilis	23.828	7.101	8.190	0.781	12.95	41.281	94.131	15.689

11	Curcuma longa	10.579	11.078	2.295	7.520	6.3	68.177	105.949	17.658
12	Solanum tuberosum	12.729	3.300	0.890	7.685	6.3	57.648	88.552	14.759
	Total	189.716	100.084	68.462	71.695	98.35	642.352		
	mean	15.810	8.340	5.705	5.975	8.196	53.53		

Table 6: Mineral composition of the plants species from South East

From Table 6, the plants with the collective highest concentration of the assayed minerals (iron, magnesium, zinc, calcium and iodine) are as follows; *Monodora myristica* (4.4,) *Dioscorea dumentorum* (3.936); *Parkia biglobosa* (3.78)*Piper guineense* (3.773); *Colocasia esculenta* (3.675); *Bryophyllum pinnatum* (3.112); X*ylopia aethiopica* (3.109) and *Cucurbita pepo* (3.095). with the highest iron concentration are *monodora myristica*, *Dioscorea dumetorum , Bryophyllum pinnatum* and *Colocasia esculenta.* Plants with the highest magnesium concentration *Monodora myristica. Telfaira occidentalis*, *Parkia Biglobosa , Piper guineense, Cajanus cajans, Cucurbita pepo , Dioscorea dumetorum, Bryophyllum pinnatum* and *colocasia esculenta.* Plants with the highest concentration of zinc include; *Parkia biglobosa, Monodora myristica , Cajanus cajans, Telfairia occidentalis* and *Dioscorea dumetorum*. Plants with the highest calcium concentration are : *Dioscorea dumetorum , parkia biglobosa, Vigna subterranea , Xylopia aethiopica , Cajanus cajans* and *Piper guineense.* Plant with highest concentration of iodine include: M*onodora myristica, Bryophyllum pinnatum, Dioscorea dumetorum, Piper guineense* and *Parkia biglobosa.*

S/N	Plants	Percentage Iron	Percentage Magnesium	Percentage Zinc	Percentage Calcium	Percentage Iodine	Total	Mean
1	*Telfaria occidentalis*	1.141	5.131	0.298	3.047	3.066	12.683	2.537
2	*Piper guineense*	2.315	4.217	0.253	5.011	7.069	18.865	3.773
3	*Cucurbita peop*	2.140	4.129	0.092	4.047	5.065	15.473	3.095
4	*Bryophyllum pinnatum*	3.115	4.102	0.207	0.046	8.091	15.561	3.112
5	*Discorea dumetorum*	3.175	4.111	0.296	6.041	6.055	19.678	3.936
6	*Colocasia esculenta*	3.045	4.021	0.187	4.051	7.071	18.375	3.675
7	*Ricinus communis*	0.931	4.220	0.203	3.079	5.060	13.493	2.699
8	*Cajanus Cajan*	0.864	4.145	0.433	4.053	3.033	12.528	2.506
9	*Vigna subterranea*	0.712	3.138	0.263	5.051	2.069	11.233	2.247
10	*Parkia Biglobasa*	2.336	4.414	0.789	5.153	6.207	18.899	3.780
11	*Xyopia aethiopica*	1.107	3.103	0.237	5.041	6.057	15.545	3.109
12	*Monodora myristica*	3.393	5.660	0.609	4.327	8.180	22.079	4.416

Total	24.274	50.391	3.867	48.857	67.023
Mean	20.023	4.200	0.322	4.071	5.585

Table 7 mineral composition of plant species from North Central

From Table 7, the plants with the collective highest concentrations of the assayed minerals (Iron, magnesium, zinc, calcium and iodine) are as follows: *Azadiractita indica* (5.525); *Moringa oleifera* (4.681) *Carica papaya* (4.400) S*yzygium aromaticum* (3.889); C*urcuma longa* (3.794) *Digitaria exilis* (3.866); *Cyperus esculentus* (3.540); *Zingiber officinale* (3.5); *Sorghum aromaticum* (3.358) and *Phoenix dactylifera* (3.348).

S/N	Plants	Percentage Iron	Percentage Magnesium	Percentage Zinc	Percentage Calcium	Percentage Iodine	Total mean	Mean
1	*Pennisetum glaucum*	2.131	3.057	0.603	4.064	5.089	14.944	2.989
2	*Zingiber officinale*	3.113	4.041	0.269	4.031	6.046	17.5	3.5
3	*Syzygium aromaticum*	3.032	4.071	0.236	5.047	7.066	19.443	3.889
4	*Sorghum bicolor*	3.184	3.146	0.363	3.023	7.073	16.789	3.358
5	*Cyperus esculentus*	2.132	5.193	0.330	4.039	6.097	17.701	3.540
6	*Phoenix dactylifera*	4.179	4.138	0.330	3.022	5.073	16.742	3.348
7	*Moringa oleifera*	4.167	5.782	0.178	5.998	7.278	23.403	4.681
8	*Azadirachta indica*	5.787	7.267	0.467	7.227	6.877	27.625	5.525
9	*Carica papaya*	4.278	6.178	0.367	5.178	5.998	21.999	4.400
10*	*Digitaria exils*	3.015	4.023	0.181	6.047	6.066	19.332	3.866
11	*Curcuma longa*	2.120	5.217	0.529	6.031	5.071	18.968	3.794
12	*Solanum tuberosum*	1.133	3.111	0.185	6.050	4.055	14.534	2.907
Total		38.262	55.224	4.038	59.757	71.789		
Mean		3.189	4.602	0.337	4.980	5.982		

DISCUSSION

Nigeria is a great country highly endowed by God Almighty in all areas of human Nutritional, Health and resources. Different parts of the country by reasons of their climate, soil, geology, vegetation structure, topography and anthropogenic influence boast of a wide array of foods. Nutritional and medicinal plants that are unique in satisfying the medicinal and culinary needs of these particular regions based on the *peculizoities* and *dissyncracies* of the peoples that inhabit these regions. Bearing in mind what the Igbo adage says that " the firewood unique to a place is more than enough to prepare their needs. The role objective of this scientific research is to identify the top Nutritional and medicinal plants of the South East and North Central of Nigeria and pool them together towards getting a wholistic pool of plant encapsulated goodness. If these plants had hold away in their regions over the years, a synthesis of them all may be a panacea for not just our reginal deficiencies but for more Nationalistic and international nutritional needs.

Major nutritional plants of South East and North Central according to our Questionnaire findings include: *Ecalis guineensis, Treculia afrinwa, Oryza sativa, sorghum species*, *Vigna subterranean, solanum lycopersion, Ipomoea tatatas, Pentoclethra macrophyla,Cariza papaya, Cueurbita species, Pennisetum species, Corchorus olitorius, Dioscorea species, Mangifera indica cucurma longa, colycine max, vigna unguizulata, zea mays, Cajanus cajans, Annona muricata, Anacardium occidentalis, Amaranthus species, saccharum officinarum, citralley lanatus, Arachis hypogea, musa species, colocasia species, cyperus esculentum, cocos rucifera, solanum aethiopizum, Dactyliferum palmivora, Adansonia digitata, Trigonella trenum – graecum, Allium species, cucumeropsis mannii, solanum melongena, parkia biglobosa , sphaenostylis species, chrysophylum albidum* etc. According to Ratimatollah and Mohbobeh (2015), Plants are significant for providing energy and nutritional requirements to human beings. Then carbohydrates, proteins and fats are the nutrients found in plants, as well as minerals, play a vital role in creating a healthier organ control system in human beings. Medicinal plants possess essential food components such as carbohydrate, protein and fat. These components are important for the human body requirements and they are used in different physiological, metabolic, morphological

activities (Redha Chauhen P. Far. S., *et al.* 2021).

Top medicinal plants of South East and North Central according to our questionnaire findings include: *Moringa oleifera, morinda Lucidum, Bryophyllum pinnatum. Xylopia aethiopica, Gacinia kola, aradiracha indica, Vernonia amygdalina , piper guineense, monodora myritica, Gongronema latifolium, Carica papaya, folanum melongena, spigelia anthelmica senna species, citrus species, Euphorbia species, Dennettis, tripetata, Atramomum melegueta chromolaena adorata, cymtopozon citratus; and Azadirachta indica, Daucus Carrota, Allium sativum, Allium cepa, cucurma longa, solanum lycopersirom, Solanum aethiopica, syzygium aromatizum, Gacinia kola, Adansonia digitata, Trigonella Foenum graceum, Zingiber offizinarum, moringa oleifera, cucumis sativum, saccharum offizinarum, Colocasia species, Corchorus oliforius, vigna species, Dachyliferum palmivora, cocos nucifera, Annona murizata* respectively. According to Chauhan and Puri (2021), plants are good sources of medicine and play a vital role in ethnic and tribal communities for survival. Medicinal plants are used all over the world to treat different types of human and animal disease. In recent years, there has been a significant increase in interest in botanical sources of natural pharmaceuticals, cosmetics, nutritional supplements, herbal teams and health promoting items (Rajurkar, et al 2021). Throughout the world, medicinal plants have been confirmed to contain essential bioactive compounds that can help prevent different types of diseases such as cancer, heart disease and diabetes.Secondary metabolite are produced in different plant organs in different plant species (pandey, *et al*, 2021), Ferrantino *et al* ,(2020). comparative phytochemical analysis (using ANOVA and correlation Analysis) between medicinal plant of south East and North Central region of Nigeria showed statistical significance ($p>0.5$) as a result of high disparity in saponin, cardiac glycosides, and steroid concentrations of two unique medicinal plants of South East Nigeria (*B. Pinnatum and* V. *amygdalina*)Tables. Despite these differences in phytochemical records of the two regions, only T-test failed to show significance.

The proximate analysis is a chemical method of accessing and expressing the nutritional value of food, which reports the moisture, ash (mineral) crude fibre, crude fat, and crude protein present in a food as a percentage of dry weight (Bardley, 1998). A higher degree of food spoilage is mainly explained by a higher moisture content of the leaves. The ash content in a food material determines the

consistency of the material identifying it as carbon-free and showing the organic, inorganic and impurity content found in the sample. The soluble and insoluble minerals in the sample are predicted by the total ash content (Ilodibia *et al* 2016). The proximate analysis gives the overall nutritional composition of the sample in question. South East Nutritional plants with the highest and lowest average indices of proximate analysis are *Bryophyllum pinnatum*……. (with …18.551……..) and …*Cajanus cajan*…….. (with…12.65918……) respectively. North central nutritional plants with the highest and lowest and average indices of proximate analysis are …*Digitaria exilis*…… (with …3.866……..) and …*Pennisetum glaucum*…….. (with …2.989…….)

Moisture protein, carbohydrate, fats and oils, mineral and vitamins which are the major indices of the proximate (composition) Analysis can be found in large concentrations in diverse fruits and vegetables. Fruits and vegetables are vital for healthy diets, with broad concensus that a diverse diet containing a range of plant foods (and their associated nutrients, phytonutrients and fibre) phytonutrients and fibre) is needed for health and well being (FAD, 2020). Studies have suggested intake ranges of 300- 600g per day (200- 600g) of vegetable mental goals (willet *et al*, 2019). The world Health Organization (WHO 2015), recommends adults to eat at least, 400g of fruits and vegetables per day, with national food – based dietary guide lines translating these into recommendations to eat multiple portions of a variety of fruits and vegetables each day for health (Herforth *et al*. 2019). Despite this clear message, intake of fruits and vegetables remains low for a majority of the global population (Afshin *et al*.,2017), Kalmpourtridou *et al*. 2020). Low fruit and vegetable consumption is among the top – 5 risk factors for poor health with over 2 million deaths and 65million disability – adjusted life years (DAL, attributed to low intake of fruits globally and particularly in low middle income countries (Afshin *et al,* 2017). Despite the subtle differences in the proximate composition of Nutritional plants of South East and North Central comparative assays T- test, ANOVA and correlation (Analysis) did not show statistical significance ($p>0.5$) and differences (concentration). (Table 4.6).

On mineral composition of nutritional/medicinal plant of South East Nigeria, plants with the highest and lowest average composition respectively were *Monodora myristica* (with 4.416) and *Vigna subterranum* (with 2.24). Plants of North

Central Nigeria with highest and lowest average mineral composition indices were *Arachinida indica* (with 5.525) and Solanum tuberosum……(with 2.90) respectively. Nutritional foods of South East Nigeria rich in minerals include : African oil been seed (Ukpaka). They are excellent sources of proteins, vitamins, calcium, energy, amino acid, phosphorous , magnesium, iron, and copper. It is also high in phytonutrients such as flavonoids , tannins, glycosides, alkaloids, sterols and saponins. Another nutritionally formidable plant of South East Nigeria is Bambara Nut (Okpa- *Vigna subterranea)*. It is rich in complex carbohydrates , proteins, fats and oils, vitamins and minerals particularly calcium- which help to build and maintain strong bones and muscles in the body, and potassium which prevents deficiencies, signs and symptoms of diseases, such as weakness and fatigue. Foods of North Central Nigeria rich in minerals include; *Dacty loferum Palmivora* species, *Adansonia digitata, Annona muricata, sorghum* and *Pennisetum* species with *ania somnifera, Vitex doniana, Plukenetia conophora, carica papaya*, *Arachis hypogea , cucurma longa,,* tiger nut et cetra. For instance. *A. digitata* leaves are sources of phosphorus calcium, iron, sodium, magnesium. Comparative mineral assay of South East and North Central nutritional plants using T-test ANOVA and proximate analysis did not show statistical significance($p>0.5$) despite the fact that there were subtle differences in individual nutrients compositions.

Recommendations (South East and North Central)

- For vegetable – *Cochonus oliotorius, Talinum, frutizosum, Amaranthus species, Abelmositas species, Conophonum, Daucus carota, Capsinum species, Allium sepa*, *Allium staivum, Solanum melongena*, *Solanum lyopersiron, Telfairia occidentalis, Celosia argentea, Vernonia amygdalina, Ociumum gratissiumum.*
- For fruits - *Terminalia catappa, Cyperus, Asculentus, Dactyletenus balsaminifera, Vitex doniana, Magnifera indica, Citrus species, Anacadium occidentalis, Carica papaya, Cocos nucifera, Elaesis guineensis Psidium guayava, Persea , Persea americana, Musa species, Cucumis sativum, Colocynthis citrullus, Anana comosus*.
- For medicinal – *Allium cepa, Moringa oleifera , Azadirachta indica, Cucuma*

longa, Solanum, lycopersiun, Carica papaya, Solanum melongena, Elasis geneensis, Capsicum species, Garcinia cola, Vernonia amygdalina, Ocimum gratissimum.

- For food – *Sorghum species, Pennisetum species, Dactyliferum talsaminfera, Saccharum officinarum, Ipomoea batatas, Vigna unguiculate , Vigna subterranea, Oryiza sativa , Zea mays, Glycine max, Manihot esculentum, Dioscorea species, Elacis guineensis, Musa species, Arachis hypogea.*

- we have to a reasonable extent attempted a documentation of the nutritional and medicinal plants of South East and North Central Nigeria – The onus is now on individuals, schools, parastatals, health institution, universities and regional government to adopt this plants make out ands and plant them in mass so that their own people will benefit maximumly (enjoy) from all that Nigeria has to offer in term of plant resources to avoid the tales of woe of the past in terms of deficiency diseases, neglected tropical diseases, pregnancy , and age related problems. Therefore top nutritional plants from this work include: *Treculia african , Vigna subterranea, Cajanus cajan; Pennisetum glaucum, Glycine max , Cyperus esculentus.* Top Medicinal Plants from this work also include: *Bryophyllum pinnatum, Venonia amygdalina, Garcinia kola, Zingiber officinale, Allium sativa, Cucurma longa.*

CONCLUSION

Veritable medicinal and nutritional plants of the South East and North Central geopolitical zones of Nigeria as enumerated by this study included but are not limited to: *M. oleifera, A. indica, G. max, I batatus, A cepa, A.sativum, C. papaya , B. Pinnatum, S. Melongena, S. Lyeopersicom, D. Carota, A. hypogza, C. Esulentum, P. macrophylla, D. palmivora, B. oleracea, o. gratissimum, (Bectooth), X. Sativum, T. africana, M. india, Dioscorea species, V. amygdalina Pterocorpus species, et cetara. Adansonia, M. Oleifera, H. Sbdariffa, V.amygdalina, T. Occidentalis, A. Cruentus.* We have to a reasonable extent attempted a documentation of the nutritional and medicinal plants of South East and North Central Nigeria – The onus is now on individuals, schools, parastatals, health

institution, universities and regional government to adopt this plants make out ands and plant them in mass so that their own people will benefit maximumly (enjoy) from all that Nigeria has to offer in term of plant resources to avoid the tales of woe of the past in terms of deficiency diseases, neglected tropical diseases, pregnancy, and age related problems

REFERENCES

Aberoumand A. Protein , fat, calories, Minerals, Phytic acid and Phenolic in some plant Foods Based Diet. *J. Process. Technol.* 2015; **2**. doi:10.4172/2157-7110.1000114.

Akoroda, M.O. (1990). Ethanobotany of *Telfaira occidentalis*(curcurbitacae) among Igbo's of Nigeria. *Economic* Botany **44**, Pp. 29-39 Published by Springer.

America Stroke Association (A.S.A) Together to end stroke, stroke Association. Org/ Warning signs. (2017).

AOAC (2015). *Official Method of Analysis,* 18th edition. Association of Official Analytical Chemists; Washinton D.C., USA ,

Azman Halimi, Razlini, Barkla, Brownyn J; Mayes, Sean, King, Graham J., 2019)

Chauhan N.S*., et al.*Medicinal and Aromatic. Plants of Himachal Pradesh. Indus Publishing; New Delhi, India: 2021.

Esau, (2017), *"Ocimum gratissiumum" Plants of the tropical Africa India, Brazil, etc.*

Harbourne J.B (2016). *Phytochemical methods: A guide to modern techniques of plant Analysis.* Chapman and Hall, London.

Lost crops of Africa. **II**: vegetables. Washington. DC: The National Academics Press, 2016. **53**),

Masaki, H. (2010). Role of Antioxidants in the skin: Anti-Aging Effects *Journal of Dematological Science Japan.* **58(2):** 85-90.

Nwankwo, Chibuzo, S., Ebenezer, Ike A., Ahamefula, J, *et al.*(2014). The nutritional and anti- nutritional values of two culinary herbs – uziza leaf, *piper guineense* and scent leaf *ocimum gratissimum* popularly used in Nigeria, International Journal of

Scientific and Engineering Research **5** (12).

Nwanna, Esther Emem, *et al* (2018). *"Antioxidant and Hepato* protective properties of *Telfaira occidentalis* leaf.

Peter Crosta (2015). Cancer; facts, causes, symptoms and Research, Medical News Today Knowledge Centre home.

Radha S.P., Pundir A., Survey of ethnomedicinal plants used by migratory shephered in Shimla district of Himachal Pradesh. *Plant Arch.* 2019; **19**: 477 - 482

The plants data base (Plants . usda.gov.) Greensboro, North Carolina, 2015.

Wadood A., Ghufran M., Jamal S.B., Naeem M., Khan A., *et al.* (2013). Phytochemical Analysis of Medicinal Plants Occurring in Local Area of Mardan, Biochemistry and Analytical Biochemistry, Abdul Wali Khan University Mardan, Mardan, Pakistan.

Wardlaw G. Smith A. (2012). *Contemporary Nutrition, A functional Approach (3rd ed.).* Mc. Graw- Hiller Science/Engineering/Math, Amaz