A Review of Ethnomedicinal Plant Resources in Southern Nigeria

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Research

Abstract

Background: The inadequate programs established to eradicate numerous health problems in Nigeria have led to little improvement in the health status, especially in southern Nigeria. Southern Nigeria has a high prevalence rate of malaria, typhoid, fevers, colds and chills, catarrh, flu, river blindness, respiratory disorders, eye problems and skin infections. The strain caused by the dire need to provide a financial health coverage for the family, a poorly developed health care systems and functional surveillance has led to the exploration of alternative medicine by the indigenes of southern Nigeria. This study aims at documenting information on the common plant resources employed in the ethnomedicinal practices of the indigenous people of the Southern Nigeria, and to explore ways of sensitizing genuine conservation efforts in the face of threat of genetic erosion posed to these resources due to anthropogenic activities.

Materials and methods: Onsite ethnomedicinal survey in the study area was carried out between September 2019 and November 2020 to document an indigenous medicinal plant traditional knowledge. Interviews were conducted with the aid of a local language interpreter. Data were obtained using 300 semi-structured questionnaires. Consultations were made on all available information about traditional medicinal plants and ethnomedicinal surveys in Southern Nigeria. Online electronic databases including Google scholar, Research Gate, SciFinder, ScienceDirect and Open Thesis were used to search for relevant literature. Ethnomedicinal data were analyzed using the Relative frequency of citation (RFC), Fidelity level (FL), Relative popularity level (RPL), Use value (UV) and Informant Consensus Factor (ICF).

Results: A total of 236 species belonging to 80 families were reported by this study. Fabaceae was the most represented family having thirty (30) plant species. The three (3) regions had varying frequencies of occurring plants species. South-Western Nigeria represented the region with the highest plant occurrence (47%) followed by South–...
South (31%). Leaves (42.32%) were the most common parts used in the preparation of herbal remedies. Decoctions (48.89%) were the most common method of plant preparation used in herbal remedies. Regional distribution and occurrence of ethnomedicinal plant resources of Southern Nigeria is reported here for the first time.

**Conclusion:** Medicinal plants play crucial role in the treatment of various ailments by the indigenous people in Southern Nigeria. This study highlights the level of species richness as well as biodiversity in the study area. Bioactivity and toxicity by *in vitro* and *in vivo* standard tests should be made on herbal drug extracts of the presented species for isolation and possible identification of potentially active compounds.

**Background**

Ethnomedicinal plants are components of effective source of both traditional and modern medicine. In recent times their potency has been proven and approximately 80% of the rural population depend on them as a source of health care (Akinyemi *et al.* 2018 and Abd El-Ghani 2016). Traditional medicine has always been popular among countries of the developing world and its use is becoming acceptable in the industrialized nations (Akinyemi *et al.* 2000).

As defined by WHO (1978), traditional medicine is the total of all knowledge and practical application, whether explicable or not used in diagnosis, prevention, and elimination of physical, mental or social imbalance, and relying exclusively on practice and experience and observations handed down from generation to generation, whether verbally or in writing.

Since ancient times people across the continents including Africa and most notably West Africa, have relied on plants as sources of remedies for the treatment of many diseases (Abd El-Ghani 2016). According to Hostellmann and Marston (2002), orthodox drugs are expensive in developing countries especially West Africa.

Plant genetic resources of Nigeria are a veritable source of therapeutics and pharmaceuticals though the plants are not adequately documented (Gbile & Adesina 1986). Ethnomedicinal practice have long been in existence in southern Nigeria but currently undergoing degradation because of pressure from practitioners of modern medical practice and the lack of proper scientific background in its method of administration. The worldwide renewed interest in traditional medicine is due to insufficient availability of orthodox medicine in poor countries, and the sustenance of healthcare has been achieved by these cultural alternatives (Okujagu 2005). Noteworthy is that despite the renewed interests in the use of ethnomedicinal plants, many of the plants may have gone into extinction long before they are documented (Eke 1999). Over-exploitation of wild population of Plant species, anthropogenic activities and lack of conservation programmes are the major problems encountered with sustainable management of these plant resources, especially in the Southern part of Nigeria (Warnbebe 1998).

It has been observed that ethnomedicinal practitioners tend to hold in secret the identity of plants used for different ailment for fear of lack of future patronage should the sufferer learn to cure himself. To mystify their trade, cultivation of the plants is not encouraged, thus all the collections are virtually from the wild. With the passing away of most of these practitioners along with their wealth of knowledge, a huge loss is made in the body of knowledge dealing with the plants that heal. Often, the discerning ones try to relate this important information to a few close relatives where any interest is shown. This mode of transmission is, however, grossly inadequate in that it lacks continuity (Obute and Osuji 2002).

Health information system (HIS) is a structured repository of data, information, or knowledge that provides support in health care delivery or to promote health development. Health care provision in Nigeria is a function of the three tiers of Government, Federal, State and Local Governments (Adeyemo 2005, Omoruan *et al.* 2009, NHIS 1999). The primary health care system in southern Nigeria is managed by Local Government and supported by the southern States Ministry of Health and private medical practitioners (Olanrewaju & Akanni 2010, Adeyemo 2005). There are some challenges related to the Health Information System (Onwujekwe *et al.* 2010, Uzochukwu *et al.* 2015) and this makes the Federal Government unable to take lead roles in directing stakeholders in the health sector and this has resulted to increased levels of fragmentation (Adeyemo 2005).

Population health is determined by environmental, behavioral, genetic, demographic, social, and economic factors. Medical intelligence and surveillance are important components in the health care system and help to control disease outbreak, bio-attack etc. The role of automated based medical intelligence and surveillance systems alongside traditional manual pattern of document retrieval is widespread in Europe and the West. In contrast, the
Nigerian health care system is still poorly developed, and lacks adequate and functional surveillance systems (Menizibeyya 2011). Presently, the strain caused by the dire need to provide a financial health coverage for the family, a poorly developed health care system and functional surveillance has led to the exploration of alternative medicine by the indigenes of southern Nigeria (Olanrewaju & Akanni 2010).

The inadequate programs designed to address the numerous health problems in Nigeria have led to little improvement in the health status, especially in southern Nigeria (Kajang & Keswet 2016). From causes such as poor nutrition, poor health facilities, availability of trained medical personnel etc. to mode of living, ways of life and occupational hazards involved in occupations like fishing, wine tapping farming. Environmental factors such as those living in the riverine areas and absence of municipal sewage systems has increased the level of waterborne diseases, and as a result has caused major increase in the health challenges of persons living in these regions.

Southern Nigeria has a high prevalence rate of malaria, as studies have shown that the highest prevalence rates are found in the Niger Delta States, and areas surrounding the confluence of the rivers Niger and Benue. All Nigerians are at risk of malaria and the problem is compounded by the increasing resistance of malaria and the cost of effective drugs (Jimoh et al 2007, Okonko et al 2009, Nnadozie 2015, Ezenduka et al 2017). Other ailments prevalent in the region include typhoid (Ojo et al 2009, Clark et al 2010), fevers, colds and chills, catarrh, flu, river blindness (Murray et al 2013), respiratory disorders, eye problems, worm infection (Gillespie 2018), stomach infections (Bryce, et al 2005, Ryan 2016) and skin infections.

The need to review ethnomedicinal plants in Southern Nigeria and their various uses cannot be overemphasized for a number of reasons which includes, a growing number of household resort to alternative medicine for health provisions, widespread use of plants in folk medicine, need to conserve traditional medicinal plants and proper documentation of knowledge about them in order to curtail their imminent loss or erosion. This study aims at documenting information on the common plant resources employed in the ethnomedicinal practices of the indigenous people of the Southern Nigeria, and to explore ways of sensitizing genuine conservation efforts in the face of the genetic erosion threat posed to these resources due to anthropogenic activities.

Materials and Methods

Demographic Data of Southern Nigeria

The study was carried out in Southern Nigeria (Fig. 1) which is made up of three (3) regions (geopolitical zones) namely: the south–east region (S.E) comprising of Anambra state, Imo state, Abia state, Enugu state, Ebonyi state, south–south region (S.S) comprising of Delta state, Edo state, Bayelsa state, Rivers state, Cross rivers state and Akwa-ibom state, and south–west region (S.W) comprising of Lagos state, Ondo state, Ogun state, Ekiti state, Oyo state and Osun state (Fig. 1). These regions are characterized by high rainfall and high humidity for most of the year with an average annual rainfall of 250 cm near the coastal areas and 150 cm in the northern parts of the region. These regions consisted of different ethnic groups of which six (6) were predominant namely, Yoruba (Y.), Igbo (I.), Edo (E.), Bini (B.), Urhobo (U.), Efik (E.), Ikwerre (I.K.), Ibibio (Ib.), Ekpere (Ek.), Kalabari (K.), Ogoni (O.), Oboso-Mbube (O-M.) and Ijaw (Ij.).

Data collection and ethical procedures

The informants were briefed on the objectives of the study and informed consent was obtained from each informant. Onsite ethnomedicinal survey in the study area was carried out between September 2019 and November 2020 to document an indigenous medicinal plant traditional knowledge. Interviews were conducted with the aid of a local language interpreter where necessary. Information such as local names, therapeutic use, plant part used, mode of preparation and regional distribution pattern were obtained through the use of semi-structured questionnaires (Huntington 2000). One hundred questionnaires were administered to the informants in each of the three geopolitical zones which make up Southern Nigeria and this summed up to a total of 300 questionnaires administered for the study. Consultations were made on all available information about traditional medicinal plants and ethnomedicinal surveys in Southern Nigeria. A total of 200 male and female informants from all age-groups were randomly selected for the interview, males comprised 48% and females 52% of which, 80 were traditional herb sellers, 65 community elders and 55 were herbal practitioners (Tables 1 & 2). Sixty informants from the total number of informants were interviewed with the aid of a local language interpreter.
Figure 1. Location of the study area.

Table 1. Demographic data of informant on ethnomedicinal Plant species and their therapeutic application

| Respondents   | Herbal vendors | Herbal practitioners | Community elders | Total interviewed persons |
|---------------|----------------|----------------------|------------------|--------------------------|
| Male (<40)    | 10             | 6                    | -                | 16                       |
| Male (>40)    | 25             | 28                   | 27               | 80                       |
| Female (<40)  | 12             | 8                    | -                | 20                       |
| Female (>40)  | 33             | 13                   | 38               | 84                       |
| Total interviews | 80         | 55                   | 65               | 200                      |
| Percentage (%) men | 44          | 62                   | 42               | 48                       |
| Percentage (%) women | 56         | 38                   | 58               | 52                       |

Table 2. Data on the trade practice of respondents

| Respondent | Herbal sellers | Herbal practitioners | Community elders | Total interviewed persons |
|------------|----------------|----------------------|------------------|--------------------------|
| <40        | 22             | 14                   | -                | 36                       |
| >40        | 58             | 41                   | 65               | 164                      |
| Total interviews | 80         | 55                   | 65               | 200                      |
| % <40      | 27             | 25                   | -                | 18                       |
| >40        | 73             | 75                   | 100              | 82                       |

Authentication and validation of species

Medicinal plants reported in the survey were collected, identified using Trees of Nigeria (Keay 1989), flora of Nigeria and West Africa (Hutchinson & Dalziel 1954, 1958, 1968). The identified plants were pressed and deposited at the Bioresources Development Centre, Ubulu-Uku Herbarium (BDU), Delta state. Taxonomic names of plant species were validated from online databases like: The Plant List (http://www.theplantlist.org/), International Legume Database and Information Service (http://www.ildis.org/) and encyclopedia of life (https://eol.org/). Data obtained were collected and tabulated to ascribe botanical names, common names, vernacular names, families of the various plant species as well as their uses.
Online electronic databases including Google scholar, Research Gate, SciFinder, ScienceDirect, IJURB8 and Open Thesis were used to search for relevant literature on previous studies. The key words employed in the electronic search criteria were “Ethnomedicinal surveys”, locations of the surveys South-South, South-East and South-West Nigeria. The following key words were used alongside ethnomedicinal practices, health information systems, medical intelligence, and surveillance.

**Data analysis**
Data obtained from the study were cleaned prior processing and were analyzed using Statistical Package for Social Science (SPSS) version 23 and Microsoft Office Excel 2016. Socio-demographic data of the respondents were analyzed using a simple descriptive statistical method and reported in a summary of frequency and percentages. On the other hand, ethnomedicinal data were analyzed using the Relative citation frequency (RFC), Fidelity level (FL), Relative popularity level (RPL), Use value (UV) and Informant Consensus Factor (ICF).

**Relative frequency of citation (RFC)**
Calculations were made for the local importance of each plant species based on the relative frequency of citation (Tardio et al. 2006). The RFC was calculated as follows: number of who mentioned the use of the species (FC) divided by the total number of respondents (N).

\[ RFC = \frac{FC}{N} \]

**Informant consensus factor (ICF)**
Informant consensus factor was calculated in accordance with Herinch et al. (1998) for each category of ailment to authenticate the level of agreement by the informants on the reported cures for a group of ailments.

\[ ICF = \frac{N_{ir} - N_t}{N_{ir} - 1} \]

Where \( N_{ir} \) = number of use citations in each category
\( N_t \) = number of species used

**Fidelity Level**
Fidelity Level was calculated in accordance with Alexiades and Sheldon (1996) for the most frequently reported diseases as

\[ FL (\%) = \frac{N_p}{N} \]

Where \( N_p \) = number of informants that claim a plant use to treat a particular disease
\( N \) = number of informants that use the plant as medicine in the treatment of any disease

**Relative Popularity Level**
Relative popularity level was calculated using the formula below in accordance with Ali-Shtayeh et al. (2000).

\[ RPL = \frac{\text{Number of diseases treated by a specific plant species}}{\text{Total number of informants for any disease}} \]

**Use value**
Use value for each species was calculated in accordance with Savkin et al. (2013) as

\[ \text{Use value (UV)} = \sum \omega_i / N \]

Where \( \omega_i \) = number of uses recorded for each species
\( N \) = number of diseases treated by the species

**Results**
A total of 236 species were reported by this study and this is shown in Table 3. Study quality inconsistencies were recorded in line with local and common names, completeness of herbal drug recipe, plant parts used, ailments treated and route of herbal drug preparation. Two hundred informants provided information on herbal remedies used in 22 ethnomedicinal therapeutic applications (Table 5). The use of single plant species (5%) as well as multiple uses of plant species (95%) in the treatment of various ailments is reported. This study revealed important information gaps that should be addressed as well as the need for standardization of ethnomedicinal practices and studies in Southern Nigeria.
**Frequency of family occurrence**
A total of eighty (80) families were reported in this study. The results obtained from this study revealed, the family of Fabaceae had the highest frequency of occurrence having thirty (30) plant species, followed by Asteraceae with fourteen (14) species, Euphorbiaceae having thirteen (13) species, Rutaceae having nine (9) species, Curcurbitaceae (8), Annonaceae, Combretaceae, Rubiaceae and Verbenaceae having (6) species each, as well as Apocynaceae, Lamiaceae, Meliaceae and Sterculiaceae having five (5) species each (Table 3, Fig. 2).

![Bar chart showing frequency of family occurrence](image)

**Families**

![Figure 2. Top sixteen representative families of medicinal plants in Southern Nigeria.](image)

**Frequency of plants regional occurrence**
In the study area (Southern Nigeria), the three (3) regions had varying frequencies of occurring plants species. South-Western Nigeria represented the region with the highest plant occurrence (47%) followed by South-South (31%) and South-East (22%) (Fig. 3).

**Frequency of plants parts used**
In the study area, the leaves (42.32%) were the most common parts used in the preparation of herbal remedies followed by the stem/stem bark (20.63%), roots (14%), seeds (6.87%), fruits (7.93%), whole plant (3.9%), sap (1.32%), rhizome (0.52%), corms, flowers, oils, pulp, and gum exudates each having 0.26% (Fig. 4).

**Frequency of plant preparation**
In the study area (Fig. 5), decoction (48.89%) was the most common method of plant preparation used in herbal remedies followed by infusions (15.29%), poultices (11.33%), juice extracts (8.78%), mastication (5%), tinctures (4.53%), macerations (2.54%), baths and remedies (1.98%), aromatherapy and powdered each having 1.41%, compresses and syrups each having (0.84%).

![Pie chart showing frequency of plant preparation](image)

**Figure 3. Frequency of plants regional occurrence.**
| Table 3. Ethnomedicinal Plants in Southern Nigeria |
|-----------------------------------------------|
| Family | Local name | Common name | Therapeutic usage | Parts used | Method of preparation | Relative frequency of citation (RFC) | Relative popularity level | Use value | Regional distribution pattern | References |
|--------|------------|-------------|-------------------|-----------|----------------------|--------------------------------------|-------------------------------|-----------|-----------------------------|------------|
| Abrus precatorius L. | Fabaceae | Anyannun (K.), Ojulu-oologbo (Y.) | Crab's eye, Bead tree | Leaves | Decoction | 0.26 | 73 | 0.2 | s.s, s.w | Iyama & Idu 2015 |
| Acacia nilotica (L.) | Fabaceae | Booni (H.) | Acacia, Egyptian mimosa | Seeds | Decoction | 0.19 | 75 | 0.05 | s.e, s.s, s.w | Iyama & Idu 2015 |
| Acacia senegal (L.) | Fabaceae | Dakwara (H.) | Acacia, Gum Arabic | Stembark | Decoction | 0.1 | 60 | 0.05 | s.e, s.s, s.w | Iyama & Idu 2015 |
| Acalypha tinnifolia (Schum & Thonn) | Euphorbiaceae | Abalebajji (K.) | Copper leaves | Leaves, twig | Juice, decoction | 0.11 | 68 | 0.2 | s.w | Ajibesin et al 2008 & 2012 |
| Acanthopanax hispidum D.C. | Asteraceae | Daugurru (Y.), Gorogoro (U.) | Stembark | Leaves | Decoction | 0.04 | 50 | 0.05 | s.s, s.w | Iyama & Idu 2015 |
| Acanthus montanus (Nees) | Asteraceae | Inyinyogwu (I.), Oga (K.) | False thistle | Leaves, roots | Decoction, tincture, poultice | 0.22 | 70 | 0.3 | s.e, s.s, s.w | Alade et al 2018, Akwai et al 2017 |
| Achyranthes aspera L. | Amaranthaceae | Aboro, Abora (Y.) | Prickly craft flower | Leaves | Stembark | 0.06 | 75 | 0.05 | s.w | Iyama & Idu 2015 |
| Adansonia digitata L. | Bombacaceae | Ose (Y.) | Baobab tree | Leaves, stems, seeds, latex, pulp | Decoction, tincture, poultice | 0.19 | 71 | 0.3 | s.s, s.w | Akwai et al 2017, Iyama & Idu 2015, Lawal et al 2016 |
| Adenopus breviflorus Benth. | Cucurbitaceae | Ukuoro (EK.) | Convulsion, laxative | Leaves, fruits | Decoction, infusion | 0.09 | 77 | 0.1 | s.s, s.e | Ajibesin et al 2008 & 2012 |
| Adenostemma maunubanum DC. | Asteraceae | Ofonu (IK.) | Malarias, measles | Leaves | Infusion | 0.05 | 60 | 0.1 | s.s, s.w | Ajibesin et al 2008 & 2012 |
| Afromomum melegueta roscoe K. Schum | Zingiberaceae | Ose-aju (I.), Erhe (U.), Atare (Y.) | Alligator pepper, grains of paradise, guinea grains | Leaves, seeds, stems, bark | Decoction, aromatherapy, mastication, maceration in Mimorvalica chaunara and Sorghum arundinaceum | 0.23 | 78 | 0.7 | s.e, s.s, s.w | Iyama & Idu 2015, Alade et al 2018 |
| Ageratum conyzoides L. | Asteraceae | Usaniyu, ursanjele (I.), Ogba-Okulup (K.), Ako-yunyyn (Y.) | Goat weed | Leaves | Infusion, juice extract | 0.19 | 84 | 0.2 | s.e, s.s, s.w | Iyama & Idu 2015 |
Alchornea cordifolia (Schum & Thonn.) Müll. Arg.  
Euphorbiaceae  
Ubebe (I.), Epai (IK.), Epa, Eisin (Y.)  
Christmas bush  
Eye problem, as a detox bitter, wound, Toothache, hemorrhoid, ringworm, rheumatism, gonorrhea, urethral disease, dysentery  
Leaves, stem bark, root epidemis  
Decoction, juice, pastes, maceration  
0.23  
76  
0.5  
0.21  
s.e, s.s, s.w  
Aiwaodo et al. 2012, Akwaji et al. 2017

Allamanda blanchetii B. & H. Oliv.  
Clusiaceae  
Egba (I.), Orogboerin (Y.)  
Christmas bush  
Malaria, tooth ache  
Leaves  
Decoction  
0.07  
85  
0.1  
0.14  
s.e, s.w  
Akwaji et al. 2017, Iyama & Idu 2015

Allium cepa L.  
BDU 90  
Liliaceae  
Alubosa (Y.), Uta (E.)  
Onions  
Malaria, convulsions  
Leaves  
Decoction  
0.13  
50  
0.15  
0.11  
s.s, s.w  
Iyama & Idu 2015

Allium sativum L.  
BDU 35  
Amaryllidaceae  
Ayuu (Y.), Ayo (U.), Uta (E.)  
Garlic, Haemorrhage Plant  
Highblood pressure, malaria, fever, indigestion and as a tonic  
Leaves, stem bark  
Decoction, mastication  
0.17  
88  
0.25  
0.14  
s.s, s.w  
Alade et al. 2018

Aloe vera (L.) Burm. f.  
BDU 16  
Liliaceae  
Barbados Aloe  
Malaria, hair growth, wounds, skin infections, dysmenorrhea  
Leaves  
Decoction  
0.07  
71  
0.3  
0.29  
s.e, s.s, s.w  
Alade & Ajibesin 2017, Iyama & Idu 2015

Alstonia boonei DeWild  
BDU 44  
Apocynaceae  
Egbu (I.), Ulodiri (EK.), Ahun (Y.)  
Tonic, malaria, asthma, cough, rheumatism, gonorrhea, vermiﬁuge, bladder disease  
Leaves, stem bark, roots  
Decoction, topical applications, poultice  
0.22  
90  
0.4  
0.18  
s.e, s.w  
Aiwaodo et al. 2012, Akwaji et al. 2017

Anacardium occidentale L. BDU 88  
Anacardiaceae  
Kanshu (I.), Kasu (Y.), Kasiu (IK.)  
Cashew  
Fever, malaria, tooth aches, diarrhea, kidney problem, whooping cough  
Leaves, stem bark  
Decoction, poultice, tincture  
0.19  
84  
0.4  
0.18  
s.e, s.s, s.w  
Akwaji et al. 2017, Iyama & Idu 2015, Lawal et al. 2010

Ananas comosus (L). Merr.  
BDU 162  
Bromeliaceae  
Ope-Oyibo (U.), Ediebo (EK.)  
Pineapple  
Fever, malaria, hepatitis, typhoid, menstrual disorder, waist pain, purgative, expectorant, emmenagogue  
Fruits  
Decoction  
0.15  
80  
0.5  
0.3  
s.s  
Aiwaodo et al. 2012, Iyama & Idu 2015

Anethum graveolens L.  
BDU 111  
Apiaceae  
Udumie (K.)  
Dill weed  
Laxative, improved lactation  
Seeds  
Decoction, infusion with honey  
0.07  
85  
0.1  
0.14  
s.s  
Ajibesin et al. 2008 & 2012

Anogeissus leiocarpus (D.C). Guill. & Perr.  
BDU 64  
Combretaceae  
Egba-anyn (Y.)  
Axle wood  
Malaria  
Roots  
Decoction  
0.05  
60  
0.05  
0.1  
s.w  
Iyama & Idu 2015

Annona muricata L.  
BDU 120  
Annonaceae  
Nangi (K.), Abo (Y.)  
Sour sop  
Malaria, diarrhea, dysentery, debility, hypertension, heart failure, yellow fever  
Leaves  
Decoction  
0.11  
86  
0.4  
0.32  
s.s, s.w  
Lawal et al. 2010

Antheecista djalonensis A. Chev.  
BDU 148  
Loganiaceae  
Sapo (Y.)  
Cabbage tree  
Malaria, anti diuretic, purgative, jaundice  
Stem bark  
Decoction  
0.22  
90  
0.2  
0.09  
s.w  
Iyama & Idu 2015, Lawal et al. 2010
| Common Name                      | Family       | Indigenous Name(s) | Part Used                  | Application (Mode of Administration) | *C. res. (%)* | *C. cont. (%)* | *C. tot. (%)* | Reference(s)                        |
|---------------------------------|--------------|--------------------|----------------------------|------------------------------------|---------------|---------------|---------------|-------------------------------------|
| **Anthonotha macrophylla P.**    | Fabaceae     | Ububa-ikpa (I), Abata (Y.) | Leaves, stem bark, roots, gum exudates | Decoction, infusion, poultices | 0.06         | 75            | 0.4           | Iwuala et al. 2017, Lawal et al. 2010 |
| **Artemisia dracunculus L.**     | Asteraceae   | Nsdegbuawom (O-M) | Leaves | Decoction, infusion, poultices | 0.09         | 50            | 0.4           | Iwuala et al. 2018, Arivaodo et al. 2012 |
| **Aporosa africana (Pers.) C.D Adams** | Asteraceae   | Oranjuila (K), ifakop (O-M) | Leaves | Juice extract | 0.15         | 90            | 0.15          | Iwuala et al. 2008 & 2012 |
| **Acalypha indica Juss.**        | Malvaceae    | Dongoyaro, Eke-oyibo (Y.) | Leaves, twig | Decoction, infusion | 0.26         | 90            | 0.15          | Iwuala et al. 2015, Lawal et al. 2010 |
| **Basella alba**                | Solanaceae   | Abaju-Okporo (I.) | Bamboo | Decoction, tincture, poultice | 0.09         | 50            | 0.2           | Iwuala et al. 2018, Arivaodo et al. 2012 |
| **Baphia nitida Lodd.**          | Fabaceae     | Abode (K), Ibi (K), Osin (Y.) | Leaves, twig, stem bark, roots | Mastication, poultice | 0.13         | 92            | 0.1           | Iwuala et al. 2008 & 2012 |
| **Baphia pubescens HOOK. F**     | Fabaceae     | Aweew, Urohun, Maajigi (Y.) | Leaves, stem bark, roots | Decoction, infusion | 0.03         | 50            | 0.5           | Iwuala et al. 2010 |
| **Basella alba**                | Solanaceae   | Amunututu (Y.), Gbologi (K.) | Whole plant | Infusion | 0.07         | 71            | 0.15          | Iwuala et al. 2010 & 2012 |
| **Bixa orellana L.**            | Bixaceae     | Ufie, Uhie (I), Aje (Y.) | Leaves, fruits, seeds | Decoction | 0.06         | 75            | 0.4           | Iwuala et al. 2010 |
| **Brachystegia auricoma Harms.** | Fabaceae     | Aku, Akolodu (Y.), Okwesi (I.), Apaapun (O-U), Oduluka (I.B.) | Seeds | Powdered | 0.17         | 88            | 0.05          | Iwuala et al. 2010 |
| **Brassica nigra (L.)**          | Brassicaceae | Ogwuujie (K.) | Black mustard | Hypertension, rheumatism, headaches | 0.11         | 86            | 0.15          | Iwuala et al. 2008 & 2012 |
| **Brassica oleracea L.**         | Brassicaceae | Ogbeagui (K.) | Wild celery | Leaves | 0.06         | 75            | 0.15          | Iwuala et al. 2008 & 2012 |
| **Cannabis sativa L.**           | Cannabaceae  | Ayoju (Y.) | Fungal infections, malaria | Leaves, young twigs | 0.03         | 50            | 0.1           | Iwuala et al. 2010 |
| **Calendula officinalis L.**     | Asteraceae   | Nosi (K), | Heart of Jesus | Skin diseases, wound | Cori | 0.06         | 50            | 0.1           | Iwuala et al. 2008 & 2012 |
| **Canavalia ensiformis (L.) DC.** | Fabaceae     | Pigei (Y.) | Jack bean | Antacidic, antiseptic | 0.06         | 50            | 0.1           | Iwuala et al. 2010 |
| **Canna indica**                 | Cannaceae    | Idio (Y.) | Local birth control, Malaria | Leaves | 0.03         | 50            | 0.1           | Iwuala et al. 2010 |
| Cannabis sativa L. | Cannabinaceae | Igbo | Indian hemp plant | Pain, stunted hair growth | Leaves, stem | Aromatherapy, poultice | 0.15 | 0.90 | 0.1 | 0.06 | s.e, s.w | Alade & Ajibesin 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carica papaya L. | Caricaceae | Okpurukwakwe (I.), Eto-Obyo (U.) | Papaya, pawpaw | Kidney detox, malaria, fever, diabetes, cancer, eczema, after-shave bumps, waist pain, syphilis, nematode infestations | Leaves, fruit (ripe and unripe), seeds | Decoction, infusion, macerations in Ocimum gratissimum, Garcinia kola seed | 0.23 | 0.76 | 0.6 | 0.24 | s.e, s.s | Alade & Ajibesin 2017 |
| Carpolobia lutea G. Don | Polygonaceae | Agba, Angelagala (I.), Otunsun (Y.), Ikpafum (IB.) | Cattle stick | Stomach problem, malaria, snake bites, leprosy, fever, ulcer, dermal infection, genital diseases, sterility, diarrhoea, headaches, wounds, rhumatism fever, pain, insanity, aphrodisiac | Leaves, rootbark, roots | Decoction | 0.03 | 0.50 | 0.8 | 2.66 | s.e, s.s, s.w | Lawal et al. 2010 |
| Cassia fistula L. | Fabaceae | Kassio | Golden shower tree | Purgative, astringent, vermifuge | Fruit | Decoction, tincture | 0.13 | 0.50 | 0.15 | 0.11 | s.e, s.s, s.w | Lawal et al. 2010, Soladoye et al. 2014 |
| Cassia fistula L. | Fabaceae | Nkwu (IK.) | South sea Islanders | Lactation suppressant, vermifuge, jaundice, infertility | Leaves, stem, whole plant | Decoction, infusion, juice extract | 0.05 | 0.60 | 0.2 | 0.4 | s.s, s.e | Ajibesin et al. 2008 & 2012 |
| Cecropia peltata (L.) Gaertn. | Bombacaceae | Akpu-ogwu, Araba (I.) | White silk cotton tree | Leprosy, tooth ache, mouth problems, conjunctivitis, eye wounds, fever | Leaves, stembark, root | Decoction, baths, compresses | 0.07 | 0.85 | 0.4 | 0.5 | s.w | Lawal et al. 2010 |
| Chenopodium ambrosioides L. | Chenopodiaceae | Arunpale (Y.) | Sweet pigweed | Anti-hypertensive, gonorrhea, syphilis, lacticave, febrifuge, cough, tuberculosis | Whole plant | Infusion, maceration | 0.1 | 0.60 | 0.4 | 0.4 | s.w | Lawal et al. 2010, Alade & Ajibesin 2017 |
| Chromolaena odorata (L.) R. M. King & Robinson | Asteraceae | Nsiegbeuwom (JK.), Obiorakara (I.), Ulikuro (O.) | Siam weed, Avelowo weed | Stomach upsets, wounds, tooth aches, malaria, Typhoid, antimicrobial, headache, dysentery, hemorrhoids | Leaves, leaf sap | Decoction, maceration, poultice, compress | 0.17 | 0.88 | 0.5 | 0.26 | s.e, s.s | Alade & Ajibesin 2017 |
| Chrysophyllum cainito L. | Sapotaceae | Udala (I.), Agbakumo, elbo (Y.) | African star apple | Diabetes, larynx inflammation, pneumonia, angina, diarrhoea, dysentery, haemorrhage, gonorrhoea, catarh of the bladder | Fruit, stembark | Decoction, infusion, maceration | 0.13 | 0.96 | 0.5 | 0.34 | s.e, s.w | Lawal et al. 2010 |
| Citrullus colocynthis (L.) Schrad | Cucurbitaceae | Egusi | Bitter apple | Syphilis, stomachache, laxative, skin disease | Leaves, fruits, seed shell | Decoction, powder mixed with palm oil | 0.19 | 0.84 | 0.2 | 0.11 | s.e, s.s, s.w | Ajibesin et al. 2008 & 2012, Soladoye et al. 2014 |
| Common Name | Family | Scientific Name | Part(s) Used | Uses | Citronellal (s) | s.t. | s.s | s.w | Authors |
|-------------|--------|-----------------|--------------|------|----------------|------|-----|-----|---------|
| Citrus aurantiifolia (Christm.) Swing. | Rutaceae | *Citrus aurantiifolia* L. | Leaves | Insect bites, sore eyes, dysentery, ophthalmia, Malaria, teething, Malaria | 0.25 | 58 | 0 | 0.9 | Alade & Ajibesin 2015, Lawal & Idu 2015, Iyama & Idu 2015 |
| Citrus aurantium L. | Rutaceae | *Citrus aurantium* L. | Leaves | Insect bites, sore eyes, dysentery, skin infections, Malaria, head ache, tooth ache, fever | 0.07 | 71 | 0.05 | 0.07 | Iyama & Idu 2015 |
| Citrus limon (L.) Burm. F. | Rutaceae | *Citrus limon* L. | Stembark | Insect bites, sore eyes, dysentery, Malaria, fungal infection | 0.26 | 25 | 0.05 | 0.21 | Alade & Ajibesin 2017, Ariwaado et al. 2012, Iyama & Idu 2015 |
| Citrus medica L. | Rutaceae | *Citrus medica* | Fruits | Insect bites, sore eyes, Malaria, teething, Malaria, fungal infection | 0.11 | 77 | 0.25 | 0.19 | Iwadiso et al. 2012 |
| Clausena anisata (Willd.) Hook-f.ex. Benth. | Rutaceae | *Clausena anisata* (Willd.) Hook-f | Leaves | Insect bites, sore eyes, dysentery, Malaria, teething, Malaria | 0.07 | 25 | 0.05 | 0.05 | Iyama & Idu 2015 |
| Cleistopholis pietosus (Benth.) Engl. & Diels | Rutaceae | *Cleistopholis pietosus* | Leaves, stem bark | Insect bites, sore eyes, dysentery, Malaria, fungal infection | 0.08 | 71 | 0.05 | 0.08 | Iyama & Idu 2015 |
| Cnidoscolus ferruginea DC. | Conaraceae | *Cnidoscolus ferruginea* | Leaves | Insect bites, sore eyes, dysentery, Malaria, fungal infection | 0.13 | 77 | 0.25 | 0.19 | Iwadiso et al. 2012 |
| Cochlospermum tinctorium A. Rich | Cochlospermaceae | *Cochlospermum tinctorium* | Roots | Insect bites, sore eyes, dysentery, Malaria, fungal infection | 0.07 | 85 | 0.05 | 0.17 | Iyama & Idu 2015 |
| Coccoloba ulei L. | Rutaceae | *Coccoloba ulei* | Fruits | Insect bite, sore eyes, dysentery, Malaria, fungal infection | 0.15 | 90 | 0.4 | 0.26 | Iyama & Idu 2015 |
| Cola acuminata (P. Beauv.) Schott and Endl. | Sterculiaceae | *Cola acuminata* | Fruits | Insect bites, sore eyes, dysentery, Malaria, fungal infection | 0.07 | 85 | 0.05 | 0.07 | Iyama & Idu 2015 |
| Cola nitida K. Schum. | Sterculiaceae | *Cola nitida* | Leaves | Insect bites, sore eyes, dysentery, Malaria, fungal infection | 0.11 | 77 | 0.3 | 0.66 | Lawal et al. 2010 |
| Colocasia esculenta (L.) Schott | Araceae | *Colocasia esculenta* | Leaves | Insect bites, sore eyes, dysentery, Malaria, fungal infection | 0.03 | 50 | 0.1 | 0.33 | Alade & Ajibesin 2008 & 2012 |
| Scientific Name | Family | English Name | Local Name(s) | Uses & Conditions | Parts Used | Dose | Nature of Treatments | Reference(s) |
|-----------------|--------|--------------|---------------|------------------|------------|------|---------------------|--------------|
| Combretum racemosum P. Beauv. | Combretaceae | Stem resins, and garlic | Akumocha (IK.), Ajiokobale (Y.), Alele (O.) | Skin disease, malaria, Typhoid fever, cough, arthritis, pain | Leaves, stem bark | 0.1 | Decoction, poultices | Ajibesin et al. 2008 & 2012, Iyama & Idu 2015, 2017 |
| Crotalaria retusa L. | Fabaceae | Stem bark | Akwaji (I.) | Antioxidant activity, wound healing, anti-inflammatory | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Crotalaria juncea L. | Fabaceae | Juice extract | Ahihiara (I.), Agibe (Y.) | Antimicrobial activity | Leaves | 0.01 | Decoction, poultices | Iyama & Idu 2015 |
| Cyperus sp. | Cyperaceae | Juice extract | Bido (I.) | Antioxidant activity | Roots | 0.14 | Decoction, poultices | Iyama & Idu 2015 |
| Cuminum cyminum | Apiaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Seeds | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Curcuma longa L. | Zingiberaceae | Stem bark | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.03 | Decoction, poultices | Iyama & Idu 2015 |
| Datura stramonium L. | Solanaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Roots | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Echinocystis lobata (Lindl.) Schult. | Euphorbiaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Seeds | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Euphorbia hirta | Euphorbiaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Ficus carica | Moraceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Gaultheria procumbens (L.) A. Gray | Ericaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Helianthus annuus L. | Asteraceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Flowers | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Hypericum perforatum L. | Hypericaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Flowers | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Hyptis suaveolens | Lamiaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Ilex opaca | Aquifoliaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Leucas aspera | Verbenaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Lycopersicum esculentum Mill. | Solanaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Nicotiana tabacum L. | Solanaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Pelargonium graveolens | Geraniaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Flowers | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Pyrethrum aureum | Compositae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Ruta graveolens | Rutaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Scutellaria lateriflora | Lamiaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Roots | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Solanum lycopersicum | Solanaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Solanum tuberosum | Solanaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Terminalia catappa | Combretaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Vernonia amygdalina | Compositae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Fruits | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Zingiber officinale | Zingiberaceae | Juice extract | Iyama & Idu 2015 | Antimicrobial activity | Leaves | 0.05 | Decoction, poultices | Iyama & Idu 2015 |
| Scientific Name | Family | Common Names | Uses | Reference |
|-----------------|--------|--------------|------|-----------|
| Dalbergia lacinia Vale | Fabaceae | Ojo, abinire (Y.) | Dalbergia Sore throat, pimples, skin disease | Stem | 0.03 | 83 | 0.15 | 0.5 | s.w | Lawal et al. 2010 |
| Dalbergia latifolia Roxb. | Fabaceae | Oguon-aja (Y.) | Indian rosewood Yellow fever | | 0.05 | 60 | 0.05 | 0.1 | s.w | Lawal et al. 2010 |
| Daniellia ogrea Harms. | Fabaceae | Iyaa (Y.) | Nerves soothing, back pain | | 0.06 | 75 | 0.1 | 0.16 | s.w | Lawal et al. 2010 |
| Dennettia injeeta Bak. BDU 61 | Annonaceae | Nii (L.), Azt-igbeni (Y.) | Pepper Fruit | | 0.23 | 93 | 0.1 | 0.04 | s.e, s.w | Iyama & Idu 2015 |
| Dioscorea guineensis Wild. | Fabaceae | Ugbbe-nim (K.) | Velvet Tamarind Malaria, diarrhea, stomachache, toothache | Leaves | Infusion | 0.11 | 95 | 0.2 | 0.18 | s.s | Aikwaji et al. 2017 |
| Dioscorea scandens Sw | Rubiaceae | Onaedi (I.) | After birth womb cleansing in females, vermifuge | | 0.1 | 60 | 0.1 | 0.1 | s.e | Obute 2005 & 2007 |
| Dioscorea dumetorum (Knuth) Pax | Dioscoreaceae | Oba ocho (I.), E. suru-igbo (Y.) | African bitter Yam | | | | | | | |
| Dioscorea rotundata Poir | Dioscoreaceae | Fungi (K.) | White yam; West African yam | | | | | | | |
| Distemonanthus benthamianus Baill. | Fabaceae | Anyarhan (B.), Olasshi (IK.) | African satinwood | | | | | | | |
| Duraena arborea (Wild.) BDU 30 | Dracaenaceae | Odo (IK.) | African dragon tree | | | | | | | |
| Ekeis guineensis Jacq | Araceae | Nikwu, alku (U.), Obaekpe (U.), Ope, Eyin (Y.) | Oil palm | | | | | | | |
| Elaeis guineensis Jacq | Araceae | Ikeche (I.) | Goose grass, wiregrass | | | | | | | |
| Ensete citrulinum (Linn) Gaertn. | Poaceae | | | | | | | | | |
| Eremia scorzonera (Simons) G. Don. | Asteraceae | Ntrenie (K.) | Tassel flower | | | | | | | |
| Eremia sonchifolia (L.) DC | Asteraceae | Ogbonizu (I.), Odunudunodo (Y.) | Yellow tassel flower | | | | | | | |
| Enanta chinantha Oh BDU 03 | Annonaceae | Awopa (Y.) | African yellow wood | | | | | | | |
| Erythrina abyssinica L. | Fabaceae | Ologbogbe (Y.), Onugboghi (IK.), Echichi (IK.) | Yellow fever | | | | | | | |
| Erythrina senegalensis D.C. | Fabaceae | Ologbo-tere (Y.), | Parrot tree | | | | | | | |

**References:**
- Iyama & Idu 2015
- Lawal et al. 2010
- Obute 2005 & 2007
- Ajibesin et al. 2008 & 2012
- Aikwaji et al. 2017
- Iyama & Idu. 2010
- Iyama & Idu 2015
- Lawal et al. 2015
- Aikwaji et al. 2017
- Iyama & Idu 2015
- Lawal et al. 2010
- Aikwaji et al. 2017
- Iyama & Idu 2015
| Genus/Species | Family | Common Name | Parts Used | Indications | Dose | Source |
|---------------|--------|-------------|------------|-------------|------|--------|
| Gossypium hirsutum | Malvaceae | Cotton | Leaves | Decoction, infusion | 0.02 | 75 | 0.15 | 0.8 | Iyama & Idu 2015 |
| Eucalyptus camaldulensis Dehnh. | Myrtaceae | Redgum | Leaves, stem bark | Decoction | 0.09 | 88 | 0.3 | 0.27 | Iyama & Idu 2015 |
| Euphorbia hirta L. | Euphorbiaceae | Spurge | Seeds | Decoction, topical application, aromatherapy | 0.14 | 97 | 0.3 | 0.18 | Akwa et al. 2017, Iyama & Idu 2015 |
| Ficus carica L. | Moraceae | Fig | Roots | Decoction | 0.03 | 83 | 0.05 | 0.16 | Iyama & Idu 2015 |
| Ficus exasperate Vahl. | Moraceae | Fig | Leaves | Decoction | 0.06 | 91 | 0.1 | 0.16 | Iyama & Idu 2015 |
| Ficus Zestapslowe Schmidt | Moraceae | Fig | Leaves | Decoction | 0.06 | 96 | 0.05 | 0.04 | Iyama & Idu 2015 |
| Funtumia elastica (Preuss) Stapf | Apocynaceae | Rubber tree | Roots | Infusion, poultice | 0.13 | 96 | 0.05 | 0.04 | Iyama & Idu 2015 |
| Garcinia kola | Clusiaceae | Bitter kola | Seeds | Infusion, mastication | 0.15 | 80 | 0.3 | 0.2 | Iyama & Idu 2015 |
| Gliricidia sepium Jacq. | Fabaceae | Gliricidia | Leaves | Decoction, poultices of oil extract | 0.06 | 50 | 0.15 | 0.3 | Iyama & Idu 2015 |
| Glycyrrhiza glabra L. | Leguminosae | Liquorice | Leaves, stem bark | Decoction | 0.02 | 50 | 0.3 | 1.3 | Iyama & Idu 2015 |
| Gmelina arborea Roxb. | Verbenaceae | Redwood | Leaves | Decoction | 0.09 | 66 | 0.1 | 0.11 | Iyama & Idu 2015 |
| Gongronema latifolium | Gesneriaceae | Kudzu | Leaves | Decoction with Citrus aurantium juice and Pine juice, juice extract | 0.13 | 96 | 0.4 | 0.26 | Iyama & Idu 2015 |
| Goosypium barbadense L. | Malvaceae | Cotton | Leaves | Decoction | 0.07 | 85 | 0.1 | 0.14 | Iyama & Idu 2015 |
| Goosypium herbaceum L. | Malvaceae | Flax | Leaves | Decoction | 0.03 | 50 | 0.05 | 0.16 | Iyama & Idu 2015 |
| Plant Family | Genus | Scientific Name | Common Names | Plant Part Used | Medical Uses | Dosage Form | Reference |
|-------------|-------|----------------|--------------|-----------------|-------------|------------|-----------|
| Bignoniaceae | Hyptis | suaveolens (L.) Post BOU 128 | Henna | Decoction, infusion | 0.05 | 70 | s.w | Iyama & Idu 2015 |
| Convolvulaceae | Ipomoea | involucrata P. Beauv BOU 129 | Wild Sage | Decoction, infusion | 0.11 | 50 | s.s, s.w | Iyama & Idu 2015 |
| Convolvulaceae | Ipomoea | mauritiana Jacq. BOU 146 | Boundary stick | Decoction, infusion | 0.06 | 50 | s.s, s.w | Akinsi et al. 2008 & 2012 |
| Euphorbiaceae | Jatropha | curcas J.S. Ellis & Soroja BOU 149 | Blood booster | Decoction, juice extract, poultices, soups | 0.21 | 95 | s.s, s.w | Alade & Ajibesin 2017, Akwaji et al. 2017 |
| Euphorbiaceae | Jatropha | gossypifolia L. BOU 150 | Botuje-pupa (Y.) | Decoction, juice extract | 0.1 | 75 | s.w | Iyama & Idu 2015 |
| Crassulaceae | Kalanchoe | pinnata (Lam.) Pers. BOU 169 | Resurrectio plant | Decoction, jace extract, | 0.13 | 80 | s.s, s.w | Alade & Ajibesin 2017, Akinwale et al. 2015 |
| Meliaceae | Kigelia | africana (A. Rich) Benth BOU 165 | Sausage tree | Decoction, infusion | 0.09 | 77 | s.s, s.w | Iyama & Idu 2015, Soladeoye et al. 2014 |
| Anacardiaceae | Lanaria | taraliola A. Rich BOU 170 | Dislocation | 0.06 | 75 | s.w | Lawal et al. 2010 |
| Verbenaceae | Zanthoxyloides | camara L BOU 153 | Wild Sage | Decoction | 0.06 | 75 | s.w | Iyama & Idu 2015 |
| Lythraceae | Lawsonia | inermis L. BOU 177 | Henna plant | Decoction | 0.03 | 50 | s.w | Iyama & Idu 2015 |
| Lecaniodiscus cucupianoloides Planch ex Benth. | Sapindaceae | Akkia (Y.) | Lecaniodiscus cucupianoloides | Malaria, fever, purgative, typhoid, jaundice, cough | Leaves, stem bark, seeds, roots | Decoction | 0.1 | 80 | 0.3 | 0.6 | s.w | Iyama & Idu 2015 |
| Lippia multiflora | Verbenaceae | Emfinin-goroporo, Emfinin-oko (Y.) | Sweet leaf | Malaria | Whole plant | Decoction | 0.06 | 60 | 0.1 | 0.08 | s.w | Iyama & Idu 2015 |
| Zephyra aloata Banks ex Gaertn. f. | BOU 155 | Ochnaceae | Pahan (Y.) | Iron wood | Malaria | Stem bark | Decoction | 0.03 | 50 | 0.1 | 0.16 | s.w | Iyama & Idu 2015 |
| Ludwigia-fuscosilicola (G. Don) Exell | BOU 144 | Onagraceae | Bini-sersen (B.) | Water primrose | Malaria | Leaves | Decoction | 0.06 | 75 | 0.1 | 0.08 | s.s | Iyama & Idu 2015 |
| Zaffu-cylindrical (L) M.J. Roem | BOU 165 | Curcubitaceae | Anamne (K.) | Sponge guard | Malaria | Leaves, stem, seeds, roots | Decoction, infusion | 0.06 | 50 | 0.15 | 0.3 | s.s | Ajibesin et al. 2008 & 2012 |
| Malotus cordifolius | Muell. | Euphorbiaceae | Ebewosa (B.) | Malaria | Leaves | Decoction | 0.05 | 80 | 0.05 | 0.1 | s.s | Iyama & Idu 2015 |
| Mangifera indica L. | BDU 170 | Anarcardiaceae | Mangoro (I.), Mankeo (IK.), Imagolo (U.) | Mango | Malaria, typhoid fever, diabetes, memory enhancer, headache, jaundice, skin disease, astringent, sore throat, dysentery | Baths, decoction, maceration, meals | 0.25 | 60 | 0.55 | 0.22 | s.e, s.s | Alade & Ajibesin 2017, Ariwaodo et al. 2012, Alwiwi et al. 2017 |
| Manihot esculenta Crantz | BOU 172 | Euphorbiaceae | Akpu, jigbe, Ugbon, jaiphu (I.), Imidaka (U.) | Cassava | Eye problems, wound healing, chronic otitis | Leaf juice extract, root decoction | 0.1 | 75 | 0.15 | 0.15 | s.e, s.s | Alade & Ajibesin 2017 |
| Manooma aittisuma A. Chev. | BOU 55 | Sterculiaceae | Ofun (Y.) | African black walnut | Constipation, leprosy, yaws, scabies, syphilis | Decoction, infusion | 0.11 | 95 | 0.3 | 0.22 | s.w | Lawal et al. 2010 |
| Aliaca excelsa (Welw.) C.C. Berg | BOU 183 | Meliaceae | Oje (I.), Iroko (Y.), | Iroko | Malaria, rheumatism, nausea, abdominal pain, insomnia | Stem bark, roots | Decoction | 0.07 | 50 | 0.3 | 0.4 | s.e, s.w | Iyama & Idu 2015, Lawal et al. 2010 |
| Microdesmis zuberula Hook. f. ex Planch. | BOU 166 | Euphorbiaceae | Uperi (I.), Ido-apata (Y.) | Microdesmis zuberula | Malaria | Leaves | Decoction | 0.03 | 50 | 0.05 | 0.16 | s.e, s.w | Iyama & Idu 2015 |
| Miltitaria griffoniana Ball. | BOU 122 | Fabaceae | Ito (Y.) | General weakness | | | | 0.07 | 50 | 0.05 | 0.06 | s.w | Lawal et al. 2010 |
| Momordica balsamina L. | BOU 173 | Cucurbitaceae | Sibfuka, Akbarndene (I.), Ejirin (Y.) | Haemorrhoid | Whole plant | Decoction | 0.06 | 75 | 0.05 | 0.08 | s.e, s.w | Ajibesin et al. 2008 & 2012 |
| Momordica charantia L. | BOU 248 | Cucurbitaceae | Allocase (I.), Akbarndene (IK.), Ejirin-were (Y.), | African cucumber, balsam pear | Malaria, ulcers, burns, skin infections, diabetes, convulsion, vermifuge, aphydosis, gonorrhea, yaws, boils, malignant ulcers, diabetes, gastrointestinal problems, viral diseases, female infertility, malaria | Leaves | Decoction, juice extract | 0.11 | 95 | 0.4 | 0.32 | s.e, s.w | Iyama & Idu 2015, Lawal et al. 2010, Soladoye et al. 2014 |
| Mondia whitei (Hook. f.) Skeels | BOU 186 | Penioplaceae | Issigun (Y.) | Mondia | Malaria | Whole plant, roots | Decoction | 0.06 | 50 | 0.05 | 0.08 | s.w | Iyama & Idu 2015 |

**Ethnobotany Research and Applications**
| Scientific Name                                      | Family       | Common Name                     | Uses                                                                 | Extracts | Uses                                                                 | Extracts | Uses                                                                 | Extracts | Uses                                                                 | Extracts | Uses                                                                 | Extracts |
|-----------------------------------------------------|--------------|---------------------------------|----------------------------------------------------------------------|----------|----------------------------------------------------------------------|----------|----------------------------------------------------------------------|----------|----------------------------------------------------------------------|----------|----------------------------------------------------------------------|----------|
| Morinda lucida Benth.                                | Rubiaceae    | Brimstone tree                   | Malaria, female infertility                                         | Decoction, juice extract | 0.11 | 50 | 0.1 | 0.09 | s.e, s.w | Iyama & Idu 2015, Soladoye et al. 2014 |
| Morinda morindaoides (Barker) Milne-Redh             | Rubiaceae    | Pijiu-awewe, Oju-ologbo (Y.)     | Morinda Malaria                                                        | Leaves, stem bark       | 0.05 | 90 | 0.05 | 0.1 | s.w | Iyama & Idu 2015 |
| Morinda oleifera Lam.                                | Moringaceae  | Ewe-igbole (Y.)                  | Horse radish tree Malaria, vitamin supplement, acute rheumatism      | Leaves                  | 0.25 | 60 | 0.2 | 0.08 | s.w | Alade & Ajibesin 2017, Iyama & Idu 2015, Lawal et al.2010 |
| Musa acuminata L.                                    | Musaceae     | Dwarf banana                     | Diabetes                                                              | Fruits                  | 0.03 | 50 | 0.05 | 0.16 | s.e | Akinsi et al.2017 |
| Musa paradisiaca L.                                  | Musaceae     | Mbana (I), Ogede (Y.)            | Plantain Malaria                                                      | Leaves, stem bark, fruits | 0.06 | 50 | 0.1 | 0.16 | s.e, s.w | Iyama & Idu 2015, Alade & Ajibesin 2017, Iyama & Idu 2015 |
| Musa sapientum L.                                    | Musaceae     | Ogede-were (Y.)                  | Banana Malaria                                                       | Decoction               | 0.05 | 70 | 0.05 | 0.1 | s.w | Lawal et al. 2010 |
| Musanga cerconoides R. Br. ex Tedlie BDU 212          | Moraceae     | Agbawo, Oro (Y.)                 | Corkwood Malaria, dysentery, cough, vermifuge                        | Leaves, stem bark, roots | 0.1 | 75 | 0.2 | 0.2 | s.w | Akinsi et al.2012 |
| Napoleonina imperialis P. Beav. BDU 240              | Lecythidaceae| Nineloloche, abakalakaba (I.)    | Vogel’s Napoleonina Blood clot removal in freshly birthed women        | Leaves                  | 0.15 | 80 | 0.2 | 0.13 | s.e | Osotimehin & B 2005 |
| Nasturtium officinale R. Br. BDU 401                 | Brassicaceae | Aguba (JK.)                      | Watercress Impotence                                                 | Leaves                  | 0.02 | 50 | 0.05 | 0.3 | s.s | Ajibesin et al. 2008 |
| Naucea ddeerinschi (De Wild) Merr. BDU 408           | Rubiaceae    | Ope (U.), Opepe (Y.)             | African peach Malaria                                                | Stem bark               | 0.06 | 50 | 0.05 | 0.08 | s.s, s.w | Iyama & Idu 2015 |
| Naucea saphroa (Smith) Bruce BDU 452                 | Rubiaceae    | Egbesi (Y.)                      | African peach Malaria                                                | Decoction               | 0.21 | 95 | 0.4 | 0.19 | s.s, s.w | Akinsi et al.2017, Iyama & Idu 2015 |
| Newbouldia laevii (Beauv.) Seeman ex Bureau BDU 399  | Bignonaceae  | Oginisi (O.), Oke-ogirish (I.), Akoko (Y.). | Smooth Newbouldia A, Tree of Life, Fertility tree Eye problems: childbirth, constipation, malaria, septic wounds, convulsion, epilepsy, bleeding, migraine, eye infection, skin disease, infertility | Leaves                  | 0.19 | 71 | 0.6 | 0.28 | s.e, s, s, s.w | Akinsi et al.2012, Iyama & Idu 2015, Alade & Ajibesin 2017 |
| Ocimum gratissimum L.                                | Lamiaceae    | Nchuxwee (I.), Eran, Ufuo-uyo (U.), Efinrin-age (Y.). | Tea bush, Scent leaf Constitution, Diabetes Miletus, vermifuge, malaria | Leases, leaf extract + riscum album | 0.25 | 60 | 0.2 | 0.08 | s.e, s, s, s.w | Iyama & Idu 2015, Alade & Ajibesin 2017 |
| Palestra hisuta (Thumb.) Schum. BDU 350              | Commmelinaceae | Ikpereatutul (U), Asatie (E.K.) | Palisota Rheumatism, arthritis, malaria, boils, gonorrhea | Leaves, stem | Decoction, infusion, topical application of leaf juice, poultice | 0.09 | 77 | 0.3 | 0.14 | s.e, s.s | Iyama & Idu 2015 |
| Pausinovi macrophylla Sabine BDU 352                 | Rosaceae     | Abere (Y.)                       | Neociz oil tree Malaria                                              | Seeds                   | 0.06 | 50 | 0.05 | 0.08 | s.w | Iyama & Idu 2015 |
| Parkia bicolor A. Chev. BDU 125                      | Fabaceae     | Iru (Y.)                         | Diarrhea, dysentry                                                   | Decoction               | 0.07 | 85 | 0.1 | 0.14 | s.e | Lawal et al. 2010 |
| Species | Family | Common Name | Use(s) | Ethanobotanical Use | Dose | Species | Reference |
|---------|--------|-------------|--------|---------------------|------|---------|-----------|
| *Parquetina nigrescens*(Afzel) | *Bullock* | *BDU 246* | African | *parquetina* | Leaves | Decoction, infusion | 0.06 | 75 | 0.08 | *Iyama & Idu* 2015 |
| *Parinacea sativa* L. | *BDU 213* | African | *ogbo* (Y.) | *Ewe* | Leaves | Decoction | 0.06 | 50 | 0.1 | *Ajiobum et al.* 2008 & 2013 |
| *Pentaclethra macrophylla* Benth. | *BDU 227* | African | *oil bean tree* | Leaves, pod, seeds, stem bark | Poultice of oil extract | 0.09 | 72 | 0.4 | *Akiwajid* et al. 2017 |
| *Piperomia pallucidis* (L.) H.B. & K. | *BDU 318* | *Periplocaceae* | African | *parquetina* | Leaves | Decoction | 0.11 | 86 | 0.1 | *Iyama & Idu* 2015 |
| *Pastinaca sativa* L. | *BDU 313* | *Apiaceae* | *Parsnip* | *Udeghe* (K.) | Leaves | Decoction | 0.06 | 50 | 0.1 | *Iyama & Idu* 2015 |
| *Pentaclethra macrophylla* Benth. | *BDU 227* | African | *oil bean tree* | Leaves, pod, seeds, stem bark | Poultice of oil extract | 0.09 | 72 | 0.4 | *Akiwajid* et al. 2017 |
| *Piper nigrum* Schum. & Thonn. | *BDU 191* | *Piperaceae* | African | *Malaria* | *Leaves* | Decoction, Tinctures | 0.17 | 88 | 0.1 | *Iyama & Idu* 2015, *Obute 2005 & 2007* |
| *Piperocarpus americanum* Mill | *BDU 211* | *Lauraceae* | African | *Avocado* | *Leaves* | Decoction, Juice extract | 0.17 | 98 | 0.2 | *Iyama & Idu* 2015, *Akwaji et al.* 2017 |
| *Piper guineense* Schum. & Thonn. | *BDU 279* | *Piperaceae* | African | *Climbing black pepper* | *Fruits* | Decoction | 0.18 | 80 | 0.2 | *Iyama & Idu* 2015, *Akwaji et al.* 2017 |
| *Piper nigrum* Schum. & Thonn. | *BDU 191* | *Piperaceae* | African | *Uziza* (I.) | *Leaves and seeds* | Decoction, Tinctures | 0.17 | 88 | 0.1 | *Iyama & Idu* 2015, *Obute 2005 & 2007* |
| *Prunus domestica* L. | *BDU 108* | *Rosaceae* | African | *Plum* | *Leaves* | Decoction, Topical application | 0.06 | 75 | 0.1 | *Iyama & Idu* 2015, *Luwai et al.* 2010 & *Ajuwu 2018* |
| Plant Name | Family | Common Names | Uses | Parts Used | Preparation | Antimicrobial Activity | References |
|------------|--------|--------------|------|------------|-------------|------------------------|------------|
| Psidium guajava L. | Myrtaceae | Guava | Anaemia, malaria, diarrhoea, dysentery, spews, stools, fever, pain, female infertility | Leaves, bark, root | Decoction, maceration | 0.23 | 65 | 0.5 | 0.19 | s.e, s.s, s.w | Alade & Ajibesin 2017, Iyama & Idu 2015, Soladoye et al. 2014, Lawal et al. 2010 |
| Pterocarpus osun Craib | Fabaceae | Camwood | Umbilical cord antisepsic, rheumatism, eczema, gonorrhoea, candidiasis, acne, amenorrhoea | Leaves, bark, root | Decoction, maceration | 0.22 | 90 | 0.4 | 0.15 | s.w | Akwaig et al. 2017, Lawal et al. 2010 |
| Pterocarpus santalinoides D.C | Fabaceae | Winged fruit | Malaria, anti-ageing | Leaves, stem | Decoction | 0.09 | 72 | 0.1 | 0.11 | s.e, s.w | Iyama & Idu 2015 |
| Pycanthus angolensis (Welw) Warb. | Myristicaceae | African nutmeg | Malaria, purgative, enema, skin disease | Leaves, stem, root | Decoction, powder | 0.09 | 75 | 0.2 | 0.18 | s.e, s.w | Iyama & Idu 2015 |
| Ricinus communis L. | Euphorbiaceae | Castor bean | As purgative, stomachaches, as vermifuge skin disease | Leaves, seeds | Decoction, juice, syrup, topical application | 0.27 | 60 | 0.2 | 0.4 | s.w | Iyama & Idu 2015 |
| Ruwolfia vomitoria Afzel | Apocynaceae | Viperwood, Swizzle stick | Malaria, skin disease, small pox, stomachache, gonorrhoea, waist pain, urogenital tract infection, hemorrhoid | Leaves, roots | Decoction, infusion | 0.18 | 80 | 0.4 | 0.22 | s.e, s.w | Iyama & Idu 2015 |
| Senna alata (L.) Roxb. | Fabaceae | Candle bush, Ringworm bush | Eczema, ringworm, abscess, inflammation, skin disease, bleeding, dysentery, female infertility, vermifuge | Leaves, roots | Infusion, juice extract poultice | 0.13 | 50 | 0.4 | 0.3 | s.s | Alade & Ajibesin 2017, Ariwaodo et al. 2012, Soladoye et al. 2014 |
| Senna fistula L. | Fabaceae | Pudding stick, Golden Shower | Malaria | Roots | Decoction | 0.05 | 70 | 0.05 | 0.1 | s.w | Iyama & Idu 2015 |
| Senna hirsuta (L.) Irwin & Barneby | Fabaceae | Shower tree | Eye ache, ear ache, antimicrobial, skin infection, purgative | Leaves | Juice extract, poultice | 0.06 | 75 | 0.3 | 0.41 | s.e | Ariwaodo et al. 2012 |

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| Scientific Name | Family | Common Name | Uses (Cure) | Plant Parts | Uses | Standard Deviation | s.e.s.s | s.w | Reference |
|----------------|--------|-------------|-------------|-------------|------|-------------------|---------|-----|-----------|
| *Senna occidentalis* (L.) Link | Fabaceae | *Akridiagbara* (L.), *Ewe* (Y.) | Negro coffee, coffee | Leaves, roots | Infusion, poultices | 0.08 | 88 | 0.2 | 0.4 | s.s | Ajibesin et al. 2008, 2012, Iyama & Idu 2015 |
| *Senna podocarpa* Guil. & Perr. | Fabaceae | *Asunwoneble* (Y.) | Senna | Leaves, stem bark | Decoction | 0.04 | 75 | 0.05 | 0.13 | s.w | Iyama & Idu 2015, Lawal et al. 2010 |
| *Senna javanica* Lam. | Fabaceae | *Kasaa* | Malaria, laxatives | Leaves, stem bark | Decoction | 0.07 | 50 | 0.1 | 0.14 | s.e, s.s, s.w | Iyama & Idu 2015, Lawal et al. 2010 |
| *Scopanita dulcis* L. | Plantaginaceae | *Anymideede* (O-M.) | Sweet-broom, licorice weed | Leaves | Juice extract | 0.11 | 95 | 0.15 | 0.13 | s.s | Babawale et al. 2016, Abere et al. 1993 |
| *Sida arorida* Burm. f. | Malvaceae | *Udo, Nulinyriyah* (I.) | Broom weed | Malaria | Stem | Decoction | 0.09 | 77 | 0.05 | 0.06 | s.e | Iyama & Idu 2015 |
| *Solanium lycopersicum* L. | Solanaceae | *Tomatos* (I) | Tomatoes, vire berry | Leaves, fruit | Juice extract | 0.06 | 50 | 0.1 | 0.16 | s.e, s.w | Afolayan 2020 |
| *Solanium nigrescens* L. | Solanaceae | *Ebe-ape* (U.), *Anara* (O.) | Black Common Nightshade | Whole plants, leaves | Decoction | 0.14 | 75 | 0.2 | 0.14 | s.s | Ajibesin et al. 2008, 2012, Iyama & Idu 2015 |
| *Solanostemon monostachyus* (P. Beauv.) Briq. | Lamaceae | *Egba* (Ik.) | Measles, malaria | Leaves | Decoction | 0.07 | 50 | 0.1 | 0.14 | s.s | Ajibesin et al. 2008, 2012 |
| *Songthum bicolor* (L.) Moench | Poaceae | *Poroporo-okababa* (Y) | Guinea corn | Leaves | Decoction | 0.22 | 90 | 0.05 | 0.02 | s.w | Iyama & Idu 2015, Soladoye et al. 2014 |
| *Spigodora campylocarpa* P. Beauv | Bignoniaceae | *Ohunu, mogutoro* (Y.) | African tulip, Scarlett bells | Malaria | Stembark | Decoction | 0.03 | 50 | 0.05 | 0.16 | s.w | Iyama & Idu 2015 |
| *Sphenocentrum jojolayanum* Pierre | Menispermaceae | *Akerejupon* (Y) | Sphenocentrum | Malaria, female infertility | Roots | Decoction | 0.03 | 50 | 0.1 | 0.33 | s.w | Iyama & Idu 2015, Soladoye et al. 2014 |
| *Spondias mombin* L. | Anacardiaceae | *Iyeye* (Y.), *Aginiran* (Ox) | Hoggilum | Leaves, stem bark | Decoction | 0.14 | 71 | 0.5 | 0.32 | s.s, s.w | Ainaaodio et al. 2012, Iyama & Idu 2015, Soladoye et al. 2014 |
| *Tachytyaspera cayennensis* (L.C. Rich) Schua | Verbanaceae | *Ebe* (U.), *Obibo* (Y.), *Mbeku* (K.) | Rats’s rat, Vervaine, Blue Snakeweed | Malaria | Leaves | Decoction | 0.05 | 60 | 0.1 | 0.2 | s.s, s.w | Ajibesin et al. 2008, 2012, Iyama & Idu 2015, Lawal et al. 2010 |
| *Tachytyaspera indica* (L.) VanH | Verbanaceae | *Ohudun* (O-M) | Rooter comb | Fever, malaria | Leaves | Juice extract | 0.16 | 90 | 0.1 | 0.06 | s.s, s.w | Ajibesin et al. 2008, 2012, Iyama & Idu 2015, Lawal et al. 2010 |
| *Arceaula setifera* Doll. | Sterculiaceae | *Osawe, kukuju* (Y.) | Constipation | | | 0.12 | 50 | 0.05 | 0.04 | s.w | Lawal et al. 2010 |
| *Zizania media* (L.) Vill. | Caryophyllaceae | *Ahilaosuiko* (IK.) | Chickweed | Leaves | Decoction | 0.06 | 83 | 0.15 | 0.3 | s.s | Ajibesin et al. 2008, 2012, Iyama & Idu 2015, Lawal et al. 2010 |
| *Synaloe nodiflora* Gaertn | Asteraceae | *Alugani* (Y.) | Synedrella | Malaria, sores, skin infection | Leaves | Decoction | 0.1 | 90 | 0.15 | 0.15 | s.w | Ainaaodio et al. 2012, Iyama & Idu 2015 |
| botanical name | family | common name | parts used | properties and uses |
|----------------|--------|-------------|------------|---------------------|
| *Talnara butisocorum* (L.) Juss. | Portulaceae | Segbebeke | Leaves | Juice extract, decoction | 0.15 | 93 | 0.1 | 0.06 | s.s | Akwaji et al. 2017 |
| *Talnara occidentalis* Hook. f. | Cucurbitaceae | *Ligu* (L.) | Fluted pumpkin | Leaves, fruits | Juice extract, poultice | 0.3 | 90 | 0.4 | 0.13 | s.w | Anwaodo et al. 2012, Soladoye et al. 2014 |
| *Terminalia ivoniarana* A. Chev | Combretaceae | Afara-dudo (Y.) | Black afara | Leaves, stem bark | Decoction | 0.09 | 50 | 0.1 | 0.16 | s.w | Iyama & Idu 2015, Lawal et al. 2010 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Talnara butisocorum* (L.) Juss. | Portulaceae | Segbebeke | Leaves | Juice extract, decoction | 0.15 | 93 | 0.1 | 0.06 | s.s | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| *Ficus accuminata* O. K. Hill | Moraceae | Elifosiviwe (Y.), Akoko (IK.) | Leaves, stem bark | F. and remedies | 0.14 | 96 | 0.4 | 0.3 | s.s, s.w | Akwaji et al. 2017 |
| Scientific Name       | Family      | Common Names                                         | Uses                                         | Dosage | Application | Authors                           | Year       |
|-----------------------|-------------|------------------------------------------------------|----------------------------------------------|--------|-------------|-----------------------------------|------------|
| *Tussilago farfara* L. | Asteraceae  | Coltsfoot, Malaria                                    | Leaves, Decoction                           | 0.05   | 80          | Ajibesin et al. 2008 & 2012       |            |
| *Urena lobata* L.     | Malvaceae   | Congo jute, Caesar weed                               | Leaves                                      | 0.05   | 80          | Iyama & Idu 2015                  |            |
| *Uvaria chamae P. Beauv* | Asteraceae  | Cluster pear, leaves, stem bark, roots                | Decoction                                   | 0.05   | 80          | Iyama & Idu 2015                  |            |
| *Vernonia amygdalina* L. | Asteraceae  | Bitter leaf, leaves, sap                               | Juice extract, mastication, poultice         | 0.13   | 73          | Iyama & Idu 2015                  |            |
| *Xylopia aethiopica* (Dunal) A. Rich | Annonaceae | Ethiopian pepper, leaves, seeds                        | Decoction, tincture, mastication, poultice   | 0.14   | 81          | Iyama & Idu 2015                  |            |
| *Zanthoxylum leprieurii* Guill. & Perr. | Rutaceae | Fagara, Ata (Y.)                                      | Malaria, toothache, rhinitis                | 0.06   | 60          | Iyama & Idu 2015                  |            |
| *Zanthoxylum zanthoxy-loides* Lam. | Rutaceae | Fagara, Ata (Y.)                                      | Asthma, anti-sickling, stem, roots           | 0.15   | 80          | Lawal et al. 2010                 |            |
Figure 4. Frequency of plant parts usage

Figure 5. Method of preparation of herbal remedies.

**Frequency of plant therapeutic use**
Malaria showed a higher frequency (25.94%) in plant therapeutic applications, followed by skin troubles (10.9%), stomach ailments/vermifuge (10.8%), respiratory ailments (7.38%), dental carries/analgesic (4.86%), infertility/fibroid (4.5%), antiviral (3.96%), bone related issues and sexually transmitted disease each having a value of 3.6%, hemorrhoids, eye troubles and heart disease each having a value of 2.7% respectively (Table 3).

**Relative frequency of citation (RFC)**
This is a statistical indicative of how users frequently cite a plant for different diseases. The RFC value for the species in southern Nigeria ranged between 0.02-0.30 (Table 4). The highest RFC values for species was reported for *T. occidentale* (0.30), *R. communis* (0.27), *A. precatorius* and *A. indica* (0.26), *C. limon*, *C. citratus*, *M. indica*, *M. oleifera*, *O. gratissimum* and *V. amygdalina* (0.25 each), *A. melegueta*, *A. cordifolia*, *C. papaya*, *C. aurantifolia*, *D. tripetala*, *P. guajava* and *Z. officinale* (0.23 each), *A. montanus*, *A. boonei*, *A. djalonensis*, *E. guineense*, *E. senegalensis* and *P. osun* (0.22 each). On the other hand, the highest RFC values for ethnomedicinal applications (Table 4) was reported for malaria (1.0), skin troubles, stomach troubles/vermifuge (0.4 for each) and respiratory ailments (0.25).


Table 4. Ethnomedicinal application of medicinal plants in Southern Nigeria

| Ethnomedicinal applications | Frequency of citation of ailments (FC) | Relative frequency of citation (RFC) RFC¼ FC/N (N = 200) |
|-----------------------------|----------------------------------------|----------------------------------------------------------|
| Malaria                     | 200                                    | 1.0                                                      |
| Typhoid                     | 9                                      | 0.04                                                     |
| Respiratory diseases        | 50                                     | 0.25                                                     |
| Heart diseases              | 17                                     | 0.08                                                     |
| Bone issues                 | 23                                     | 0.12                                                     |
| Skin troubles               | 77                                     | 0.4                                                      |
| Infertility/Fibroid         | 30                                     | 0.15                                                     |
| Convulsions, fainting, stuttering, epilepsy | 12 | 0.06 |
| Stomach troubles /vermifuge | 80                                     | 0.4                                                      |
| Diabetes                    | 16                                     | 0.08                                                     |
| Antiviral                   | 25                                     | 0.13                                                     |
| Antibacterial               | 14                                     | 0.07                                                     |
| Antifungal                  | 12                                     | 0.06                                                     |
| Aphrodisiac                 | 5                                      | 0.03                                                     |
| Eye troubles                | 17                                     | 0.09                                                     |
| Dental cares/ analgesic     | 32                                     | 0.16                                                     |
| Sexually transmitted diseases | 23                              | 0.12                                                     |
| Haemorrhoids                | 17                                     | 0.09                                                     |
| Astringent                  | 3                                      | 0.02                                                     |
| Insanity/Insomnia           | 6                                      | 0.03                                                     |
| Asperity, anemia, low immunity & sickling | 20 | 0.1 |
| Hair growth                 | 2                                      | 0.01                                                     |
| Dysmenorrhreal, amenorrhea & blennorrhagia | 12 | 0.06 |
| Womb fixing & poor lactation | 13                              | 0.07                                                     |
| Anti-venoms                 | 8                                      | 0.04                                                     |
| Earache & infection         | 6                                      | 0.03                                                     |
| Vaginal/Urogenital infection | 6                                  | 0.03                                                     |
| Renal ailment/diuretic      | 7                                      | 0.04                                                     |

Informant consensus factor (ICF)
Malaria and renal ailment (Table 5) had the highest value (0.28), followed by stomach troubles/vermifuge, wound fixing and poor lactation (0.25 each), earache/infection, insanity, insomnia and memory enhancer, vaginal and urogenital infection (0.20 each).

Fidelity level (FL)
Fidelity levels (FL) of the 236 species are presented in Table 3. The results are justified by the relative importance of the species to the indigenes in the study area and the therapeutic effectiveness of the plant species. High FL is an indicative of a particular disease in an area and the use of a species for its cure (Bibi et al. 2014). Species with high FL values are as follows: Elaeis guineense (99), Euphorbia hirta (97), Chrysophyllum cainito, Citrus limon, Cnestis ferruginea, Cymbopogon citratus, Funtumia africana, Gongronema latifolium, Terminalia superba, Dacryodes edulis, Oacis caroata, Dialium guineense, Dracaena arborea, Eleusine indica, Iatropha curcas, Mansonia altissima, Momordica charantia, Nauclea latifolia, Pergularia daemia, Scoparia dulcis, Alstonia boonei, Anthocleista djalonensis, Apilla africana, Azadirachta indica, Cannabis sativa, Cocos nucifera, Erythrina senegalensis, Morinda morindoides, Pterocarpus osun, Sorghum bicolor, Stachyta raphtha indica, Syndrella nodiflora, Telfairia occidentalis, Terminalia avicennioides, Ximenia americana respectively.

Relative popularity level (RPL)
A total of 88 species were frequently cited by the respondents for treating various diseases but only 15 species had high relative popularity level (RPL) and these include: Abrus precatorius (0.8), Afromomum melegueta (0.7), Carica papaya, Newbouldia laevis and Vernonia amygdalina (0.6 each), Alchornea cordifolia, Ananas camosus, Baphia pubescence, Chromolaena odorata, Chrysophyllum cainito, Citrus aurantifolia, Citrus limon, Dalbergia lactea, Psidium guajava, Spondias mombin (0.5 each) respectively. Species most frequently cited by the respondents were accepted as popular while those not frequently cited were viewed as unpopular.
Table 5. Informant consensus factor (ICF) values for 22 different diseases categories

| Category of diseases                  | Number of species | Percentages (% of species) | Number of use citation | Percentages (% of use citation) | ICF value |
|---------------------------------------|-------------------|----------------------------|-------------------------|---------------------------------|-----------|
| Malaria                               | 144               | 61                         | 200                     | 28.7                            | 0.28      |
| Typhoid                               | 8                 | 3.38                       | 9                       | 1.3                             | 0.11      |
| Respiratory disorders                 | 41                | 17.37                      | 50                      | 7                               | 0.18      |
| Heart related ailment                 | 15                | 6.4                        | 17                      | 4.4                             | 0.13      |
| Arthritis, rheumatism & bone cares    | 20                | 8                          | 23                      | 3.29                            | 0.13      |
| Skin troubles                         | 61                | 26                         | 77                      | 11                              | 0.22      |
| Infertility                           | 25                | 11                         | 30                      | 4.3                             | 0.17      |
| Convulsion, fainting, epilepsy & stuttering | 10            | 4                          | 12                      | 1.71                            | 0.18      |
| Stomach troubles                      | 60                | 25                         | 80                      | 11.49                           | 0.25      |
| Asperity, anemia, low immunity & sickling | 17            | 7                          | 20                      | 2.86                            | 0.15      |
| Dismenorrheal, amenorrhea & blennorrhrea | 10           | 4                          | 12                      | 1.71                            | 0.13      |
| Womb fixing & poor lactation          | 10                | 4                          | 13                      | 1.86                            | 0.25      |
| Earache & infection                   | 5                 | 2.1                        | 6                       | 0.85                            | 0.2       |
| Diabetes                              | 14                | 6                          | 16                      | 2.29                            | 0.13      |
| Viral infection                       | 22                | 9                          | 25                      | 3.58                            | 0.13      |
| Eye trouble                           | 15                | 6.35                       | 17                      | 2.43                            | 0.13      |
| Tooth ache & pain                     | 27                | 11                         | 32                      | 4.58                            | 0.16      |
| Sexually transmitted diseases         | 20                | 8                          | 23                      | 3.95                            | 0.13      |
| Hemorrhoid                            | 15                | 6                          | 17                      | 2.44                            | 0.13      |
| Insanity, insomnia, memory enhancer   | 5                 | 2                          | 6                       | 0.86                            | 0.2       |
| Vaginal & Urogenital infection        | 5                 | 2.1                        | 6                       | 0.86                            | 0.2       |
| Renal ailment                         | 6                 | 2.5                        | 7                       | 1                               | 0.28      |

Use value (UV)

The relative importance of any species is revealed by its use value (Vendruscolo and Mentz 2006). A high use value was given by *Carpolobia lutea* (2.66), *Heliotropium indicum* (1.5), *Citrus limon* (1.41), *Glyphaea brevis* (1.3), *Baphia pubescence* (1.0), *Xylopia aethiopica* (0.72), *Bixa orellana* (0.66), *Anthonotha macrophylla* (0.58), *Ceiba petandra*, *Combretum racemosum*, *Dalbergia lactea* and *Dioscoreae rotundata* (0.5 each) respectively.

Discussion

Southern Nigeria has a high prevalence rate of malaria, typhoid, fevers, colds and chills, catarrh, flu, river blindness, respiratory disorders, eye problems and skin infections. In the past, programs established to eradicate numerous health problems in Nigeria have been inadequate. These have led to little improvement in the health status, especially in southern Nigeria. The study was undertaken to document information on the common plant resources employed in the ethnomedicinal practices of the indigenous people of the southern Nigeria, and to explore ways of sensitizing genuine conservation efforts.

Socio-demographic information and gender-based assessment on the use of medicinal plants by respondents

A high percentage was reported for persons above the age of 40 on the use of medicinal plant (82%) when compared to those below that age (18%). Also, herbal practitioners <40 (25%) and herbal practitioners >40 (75%), herbal vendors < 40 (27%) and herbal vendors > 40 (73%). This may be attributed to a lack of interest in
ethnomedicine by the younger generation due to westernization and a poor communication between the older and younger generation. Similar trends in the area have been reported by Iyama & Idu 2015.

The statistical results show that both male and females make use of medicinal plants. However, women had a higher knowledge of medicinal uses of plants (52%) in the study area than men (48%). This agrees with earlier studies carried out in the area (Iyama & Idu 2015).

**Regional biodiversity of southern Nigeria**

Biodiversity involves different spheres of biological variety including inter alia, species richness, taxonomic richness, genetic differences in each taxon, communities, ecosystems and landscapes inhabited by organisms and the indigenous knowledge of nature possessed by the indigenes living on the land (Kunwar et al. 2009, Ubom 2010). This review has attempted to assess the ethnomedicinal plant resources in southern Nigeria, highlighting the medicinal uses, mode of preparation and administration of herbal drugs. It also indicates the level of species richness as well as biodiversity in the study area. A total of 236 plant species belonging to 80 families were reported in this research review and these plants have shown certain adaptations to the region. Fabaceae family had the highest occurrence of plant species which numbered 30, Asteraceae 14 and Euphorbiaceae 13. South-Western Nigeria had the highest regional occurrence of plant species of about 47%, south-south 31% and south-east 22%. This suggests a relationship between the use of these medicinal plants, their distribution pattern and level of abundance in Southern Nigeria. Earlier research have reported legumes as having a high level of abundance and wide distribution across the ecological zones of Nigeria (Ayodele & Yang 2012, Iyama & Idu 2015). Furthermore, ethnomedicinal uses of many species reported in this review have been reported by past research (Ariwoodo et al., 2012, Ajibesin et al., 2008, Iyamah & Idu, 2015). The high level of plant species in the South-west of Nigeria may stem from low rate of hydrocarbon mining and crude oil exploratory activities as in the south-south and, gullies and hills in the south-east. Also, it may be due to the high level of preservation of ancient sacred groves, and forest landscapes or sanctuaries by the indigenes of south-western Nigeria for fetish or superstitious reasons.

**Therapeutic application of medicinal plants**

Medicinal plants play crucial role in the treatment of various ailments by the indigenous people in Southern Nigeria. Enormous health challenges and lack of adequate resources to access primary health care by the indigenes of southern Nigeria have made community elders with vast knowledge on the collection and administration of medicinal plants collaborate to provide treatment with the use of these plants. Basic factors that have promoted the use of these ethnomedicinal plants are affordability and availability, which are favored by the climate, soil type, swamps, water, and sunlight and so are easily cultivated within this region (Ajibesin et al. 2012).

Decoction (48.9%) was the most common method of herbal drug preparation in the study area. Treasure et al. 2021 reported similar findings in the study area on the use of decoction prepared by boiling or steeping the plant material in water.

A higher frequency of use (25.94%) was reported for malaria in plant therapeutic applications. Southern Nigeria is a coastal region noted for its tropical rainforest, high amount of rainfall and sunshine. A major challenge the area has to deal with is problems of poor drainage and waste disposal systems. The higher relative frequency of citation for malaria may arise from high level of infestation and numerous breeding grounds for mosquitoes in the area due to poor drainage and waste disposal systems.
Table 6. Pharmacological applications of Ethnomedicinal Plants of southern Nigeria

| Plants/Family                  | Relative frequency of citation (RFC) | Ethnomedicinal applications/biological activities                                                                 | Isolated Phytochemicals / Enzymes                  | Stage of clinical trial | References |
|-------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------|------------|
| Brachystegia eurycoma (Fabaceae) | 0.17                                 | Analgesic, anti-inflammatory, antimicrobial, wound healing, antioxidant, blood glucose lowering, liver enzyme lipid profile, gastrointestinal modulating, growth inhibitory, cytotoxic activities | -                                               | Ivv                     | Atawodi 2017 |
| Tetracarpidium conophorum (Euphorbiaceae) | 0.19                                 | Detoxification of venoms, anti-diarrhea activity, male fertility enhancing activities, antioxidant activities, anti-chelating activity, anti-ulcer and wound healing activities, treats stomach disorders, controls high blood pressure | Isolectins from T. conophorum seed extracts, polyphenolic compounds (3-galactoside, lactoside, 3-pentoside, 3-arabinoside, quercetin, p-coumaric-acid and 3and 5-caffeoylquinic acids), alkaloids, steroids and a moderate concentration of tannins | Ivv                     | Animashaun et al. 1994, Amaral et al. 2004, Periera et al. 2007, Olabinrin et al. 2010, Ezealisiij et al. 2014 a&b, Ikpe 2014, Nwachoko & Jack 2015, Chikezie 2017 |
| Azadirachta indica (Meliaceae) | 0.26                                 | Malaria fever, jaundice, syphilis, anthelmintics, skin disease, eczema, ringworm, emetic, laxative, sore throat, antifungal, immunostimulant, antibacterial, antiviral, antimicrobial, measles | Over 135 compounds have being isolated and are mainly grouped into two major classes: isoprenoids and its derivatives – gedunin – possess anti-malarial properties | Ivv, ivv                | Udeinya 1993, Dhara et al. 1999, Adesegun & Coker 2001, NNMDA 2005 & 2008, Udeinya et al. 2006, Odugbemi 2008, Alshawsh et al. 2009 |
| Cymbopogon citratus (Poaceae)  | 0.25                                 | Malaria, cough, sprains, lumbago, stomach tonic, stimulant, cold, chest pains, rheumatic joints, diaphoretic, diuretic, ringworm | Terpenoids, aldehydes, Essential oils like geranial | Ivv, ivv                | Bidla et al. 2004, Tchoumbougnang et al. 2005, Odugbemi 2008), NNMDA 2008 |
| Mangifera indica (Anacardiaceae) | 0.25                                 | Malaria, yellow fever, anemia, liver disease, diarrhea, diabetes, skin lesion, high blood pressure, hemorrhage, emmenagogue, | Xanthone Glycosides – Mangiferin, saponins, steroids and tannins | Ivv                     | Awe 1998, NNMDA 2005&2008, Aiyeloa & Bello 2006, Odugbemi 2008 |
| Plant                      | Scientific Name | Activity                                                                 | Plant Descriptor                  | Sources                                                                 |
|---------------------------|-----------------|---------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|
| *Carica papaya*           | *Carica papaya*  | Malaria, gonorrhea, syphilis, amebic dysentery, roundworms, abortifacients, emmenagogue, diabetes, medicinal recipes, hemostatic, hernia, infections of urinogenital systems, blennorrhagia, orchitis, papain enzyme as meat tenderizer, convulsion, mental disorder | Papain                            | Bhat & Surolia 2001, Odugbemi, 2008, Avwioro 2010                      |
| *Psidium guajava*         | *Psidium guajava*| Malaria fever, diarrhea, stomachache, cough, laxative, dysentery, irregular menstruation sore throat, laryngitis, skin ulcers, astringent, antispasmodic, rheumatism, epilepsy, cholera, convulsions, mouth swelling | Flavonoids, carbohydrates, saponins, anthraquinones and terpenoids  | Nundkumar & Ojewole 2002, NNMDA 2005 & 2008, Obute 2006               |
| *Citrus aurantifolia*     | *Citrus aurantifolia* | Fever, jaundice, stomachache ache, antimicrobials, abdominal ulcer, gonorrhea, carminative, hypertensive, flavoring agents, measles, cough, toothache, anthelmints, scurvy, insecticides | Alkaloids, saponins, flavonoids and glycosides | Obute 2006, Odugbemi *et al.* 2007 & 2008, NNMDA (2013), Bapna *et al.* 2014. |
| *Enantia chlorantha*      | *Annonaceae*     | Malaria, typhoid fever, antimicrobials, jaundice, rickettsia, infective hepatitis, hemostatic, uterus stimulant, ulcer | Alkaloids, Phenolics              | NNMDA 2008, Odugbemi 2008, Ayoade & Musbau 2010.                     |
| *Vernonia amygdalina*     | *Asteraceae*     | Malaria, itching, ring worms, weak erection, tonic, astringent, diarrhea, antimicrobials, nervous diseases, gingivitis, toothache, | Bitter sesquiterpenes lactones compounds, (i.e. vernolide, vernodalin, hydroxyvernolide and the steroid | Tona *et al.* 2004, NNMDA 2005, Odugbemi 2008, Omorogie *et al.* 2011 |
| Species                      | Value | Common Uses                                                                 | Related Constituents | Literature References                                                                 |
|------------------------------|-------|-----------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------|
| Morinda lucida (Rubiaceae)   | 0.11  | Malaria, typhoid fever, yellow fever, cerebral congestion, dysentery, dressing of wound, diabetes, heart disease, stomachache, purgative, emetic, diuretic, jaundice, flatulence, anti-cancer, low sperm count, analgesic, laxative, trypanocidal activity, ulcers, leprosy, gonorrhea. | Dammacanthal         | Awe & Makinde 1998, NNMDA 2005 & 2008, Odugbemi et al. 2007.                         |
| Ocimum gratissimum (Lamiaceae)| 0.25  | Fever, cough, convulsion, cold, catarrh, bronchitis, colic, chest pain, diarrhea, miscarriage, nasal bleeding, insect repellent, antimicrobials, anthelmintics, hypertension, diabetes, piles, antibacterial. | Essential oils       | Ngemenya et al. 2004, Olorunniyi & Morenikeji 2013                                  |
| Chromolaena odorata (Asteraceae)| 0.17  | Malaria fever, typhoid fever, diabetes, diuretic, rheumatic pains, tumor, anti-inflammation, stomach pain, antimicrobial, dysentery, headache, toothache, hemostatic, skin diseases. | Quercetin-4’-methyl ether | Odugbemi 2007 & 2008, Ukpal & Amaechi 2012, Olorunniyi & Morenikeji 2013, Ezenyi et al. 2014 |
| Anacardium occidentale (Anacardiaceae) | 0.19  | Malaria, typhoid fever, white coating of the tongue, toothache, sore gums, dysentery, purgative, elephantiasis, leprosy, ringworms, scurvy, diabetes, warts, anthelmintics, caries. | Tannins              | Odugbemi 2007 & 2008, Razalia et al. 2008, Olorunniyi & Morenikeji 2013              |
| Ananas comosus (Bromeliaceae) | 0.15  | Malaria, Typhoid fever, cough, anthelmintics, digestive.                     | Bromelian            | Rajendra et al. 2012, Olorunniyi & Morenikeji 2013                                 |
| Species                          | Chemical Constituents                                                                 | Notes                                | References                                                      |
|---------------------------------|---------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------|
| **Persea americana** (Lauraceae) | problems, fibrinolytic action, inhibiting platelet aggregation, interfering with the growth of malignant cells, removing skin (debridement), anti-inflammatory, enhancing drug absorption, purgative, emmenagogue, vermifuge, enzyme bromelaine for meat tenderizer, treats angina pectoris, bronchitis, sinusitis, surgical trauma, osteoarthritis, cardiovascular disease | 1,2,4-dihydroxy derivatives aliphatic alcohols, called avocadenols | Dike *et al.* 2012, Falodun *et al.* 2014 |
| **Nauclea latifolia** (Rubiaceae) | Malaria, hypertension, analgesic, anti-inflammatory, anti-convulsant, hypoglycaemic, vasorelaxant, diuretic, parasitic skin diseases, peptic ulcer, aphrodisiac, insomnia, gastrointestinal disorders. | Flavonoids, saponin, terpenoids and tannin, Alkaloids. | Benoit-Vicala *et al.* 1998, Traore *et al.* 2000, Odugbemi 2008 |
| **Alstonia boonei** (Apocynaceae) | Malaria fever, anti-inflammatory, stomach pain, tonic, anthelmintics, yellow fever, filaria worms, breast development, antidote. | Alkaloid-alstonine, Terpenoids | Tantchou *et al.* 1986, Okpekon *et al.* 2004, NNMDA 2005 & 2008, Obute 2006, Odugbemi 2008, Majekodunmi *et al.* 2008 |
The relative frequency of citation value for the species in southern Nigeria ranged between 0.02-0.30. However, the highest RFC values for species were reported for *T. occidentale* (0.30). In ethnomedicinal applications, the highest relative frequency of citation value was reported for malaria (1.0). Relative frequency of citation in ethnomedicinal studies is used to select plant species having high medicinal values for intensive research and drug discovery (Malik *et al.* 2019).

Among the 64 most cited species in this study, 18 species have been investigated for their medicinal potencies based on reports obtained from previous studies on *in vitro* and *in vivo* activities of these plant species (Table 4). Earlier documentation have shown *Azadirachta indica* contains phytochemicals such as alkaloids, flavonoids, terpenoids, saponins, tannins, phenols and cardiac glycosides (Ayeni and Yahaya, 2010), *Chromolaena odorata* contains Quercetin-4’-methyl ether (Odugbemi, 2007 & 2008), *Cymbopogon citratus* contains alkaloids, saponins, tannins, anthraquinones, steroids, phenols and flavonoids (Asaolu *et al.* 2009), and *Tetracarpidium conophorum* contains isolectins isolated from seed extracts, polyphenolic compounds such as 3-galactoside, lactoside, 3-pentoside, 3-arabinoside, quercetin, p-coumaric-acid and 3- and 5-cafeoylquinic acids, alkaloids, steroids and a moderate concentration of tannins (Amaral *et al.* 2004). In same vein, *Vernonia amygdalina* have been reported to contain Bitter sesquiterpenes lactone compounds such as vernolide, vernoldalin, hydro-xyvernolide and the steroid related constituents, vernonoside B1 and vernonoid B1. Dike et al. 2012 stated various protective and therapeutic effects associated with these phytochemicals.

Plants therapeutic uses in southern Nigeria were mostly in the treatment of malaria, skin troubles, stomach ailments and vermifuge, respiratory ailment, dental cares and as analgesic. Plant species reported in the review are either administered singly or in combination with other plants of similar medicinal value in treatment of ailments to provide synergy for total elimination of disease-causing pathogens and aid quick recovery.

Decoction, infusion, poultices, and juices were the most used route in herbal drug preparation. However, plants had high incidence of oral consumption as decoction. The decoctions are usually boiled and drunk, this may indicate that the active ingredients found in most of the plants are not volatile.

Different parts of the medicinal plants are usually employed in preparation of herbal remedies. The parts of medicinal plants mostly used in herbal drug preparation were leaves, followed by stembark and root. Several studies have reported similar observation (Asase *et al.* 2010, Nguta *et al.* 2010, Ighere *et al.* 2011, Olorunnisola *et al.* 2013, Traore *et al.* 2013, Lyama & Idu 2015). A higher preference towards leaves may be resultant of common knowledge of leaves as the main photosynthetic organs in plants. Also, leaves act as storehouse for end products of photosynthesis or exudates which may contain more bioactive secondary metabolites for protection against predators such as Herbivores. Some of these compounds may be of medicinal value to the human body (Bhattarai *et al.* 2006). It has been established that the use of leaves poses less threat to the continued existence of plant species when compared to the use of underground parts like roots, stem, bark, or the use of entire plants (Zheng & Xing, 2009, Lyama & Idu 2015).

The major issues that pose certain limitations on the use of plant as drugs are lack of information on the social, biochemical, and economic benefits that could be derived from the industrial utilization of medicinal plants, poor incentives for standardization of product, little information on the market potential and trading possibilities of these medicinal plants (Oladeji 2016).

**Previous studies or documentation**

Several studies have been made on the ethnomedicinal plants in selected areas (Ighere *et al.* 2011, Nwazuoma & Dappa 2013, Odugbemi *et al.* 2017, Anowi & Christian 2019, Chijindu *et al.* 2020, Chukwuma *et al.* 2020) or for specific uses (Lyamah & Idu 2015, Babawale *et al.* 2018, Ayeni & Aliyu 2018, Chinedu & Uyanwa 2019, Afolayan *et al.* 2020) across southern Nigeria in the past but not for the whole of southern Nigeria. Ethnomedicinal applications, biological activities, isolated phytochemicals, and active compounds as well as the status of scientific validation of the 18 listed plants, are shown in Table 4. These plants have been previously reported to contain various phytochemicals. Phytochemical extractions like Isolectins from *Tetracarpidium conophorum* seed extracts, polyphenolic compounds like 3-galactoside, lactoside, 3-pentoside, 3-arabinoside, quercetin, p-coumaric-acid and 3- and 5-cafeoylquinic acids (*Tetracarpidium conophorum*), tannins (*Anacardium occidentale, Azadirachta indica*, *Magnifera indica, Nauclea latifolia*, and *Tetracarpidium conophorum*), alkaloids (*Alstonia boonei, Azadirachta indica*, *Nauclea latifolia, Citrus aurantifolia, Enantia chlorantha* and *Tetracarpidium conophorum*), saponins (*Citrus aurantifolia, Psidium guajava, Nauclea latifolia and Mangifera indica*), glycosides (*Citrus aurantifolia* and *Mangifera indica*).
indica), terpenoids (Alstonia boonei, Cymbopogon citratus. Psidium guajava, Vernonia amygdalina and Nauclea latifolia), flavonoids (Citrus aurantiifolia, Psidium guajava and Nauclea latifolia), polyphenolic compounds (Tetracarpidium conophorum), steroids (Tetracarpidium conophorum), essential oils (Cymbopogon citratus and Ocimum gratissimum).

Conclusion
Bioactivity and toxicity by in vitro and in vivo standard tests should be made on herbal drug extracts of the presented species for scientific validation of their efficacy, as well as isolation and possible identification of potentially active compounds. This holds a ray of hope for compounding of phtyo-drugs in an era of growing resistance of pathogenic organisms to chemically synthesized drugs. Increased anthropogenic activities in the coming years could emerge as a potential threat to conservation of biodiversity of plant species in southern Nigeria. Hence, a call is made for conservation of these species for their perpetuation.

Declarations
List of abbreviations: HIS: Health Information System, NHIS: National Health Insurance Scheme, S.E: South–East, S.S: South South, S.W: South West, E: Edo, Y: Yoruba, I: Igbo, B: Bini, U: Urhobo, E: Efik, IK: Ikwerre, IB: Ibibio, EK: Ekpere, K: Kalabari, O: Ogoni, O-M: Oboso-Mbube, U: Ijaw, BDÚ: Bioresources Development Centre Ubulu-Uku Herbarium, FC: citation frequency, N: total number of respondents, ICF: Informant consensus factor, Nur: Number of use citations for a disease category, Nt: Number of species used by informants in a given use category, FL: Fidelity level, RPL: Relative popularity value, UV: Use value.

Ethics approval and consent to participate: Informed prior consent was obtained from all respondents before commencement of the interview. Data were collected with respect to confidentiality, anonymity and consent.

Consent for publication: Not applicable
Availability of data and materials: The data was not deposited in public repositories.
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