


# Inventory and ethnobotanical assessment of plant species in Lagos State University, Ojo campus, Lagos, Nigeria

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Inventory and ethnobotanical assessment of plant species growing on Lagos State University (LASU) Ojo main campus, Lagos State, Nigeria, were carried out. The aim was to document the vegetation composition and ethnobotanical uses of plants in the study area with a view to developing strategies for their conservation. Plant species with their frequency of occurrence were compiled and their representatives were collected for proper identification. Ethnobotanical assessment was carried out through oral interviews of herbalists, herb sellers and others with experience in traditional medicine. A total of 35 plant species belonging to 25 families were recorded from the survey. Poaceae has the highest number of species; Anacardiaceae, Asteraceae, Asparagaceae, Combretaceae, Euphorbiaceae, Malvaceae and Moraceae were all represented with two species each while the remaining 17 families were represented with one species each. *Murraya paniculata* recorded the highest frequency of occurrence within the study area with 165 individual plants followed by *Ficus benjamina* with 134 plants, then *Ixora coccinea* with 121 plants and *Terminalia ivorensis* with 103 plants. *Anacardium occidentale*, *Araucaria heterophylla* and *Ficus carica* recorded the lowest frequency of occurrence with two plants each. The trees were the dominant plant habit (46%) followed by the shrubs (23%), grasses (17%) and herbs (14%). The plant species identified are of significant ethnobotanical uses ranging from food to medicine and ornamental. Effective conservation strategies for these plants include enacting laws against indiscriminate tree cutting, encouraging afforestation, proper maintenance of the parks and gardens and establishment of medicinal plant farms.

## Introduction

Taxonomic surveys have been helpful in documenting the species that had one time or an other existed in different locations within the country (Anoliefo et al. 2006; Soladoye et al. 2005, 2013) and the value of any biodiversity analysis and the adequacy of conservation measures depend on the quality of basic data, as put by Valdecasas and Camacho (2003). Similar studies have also been used to document medicinal plants reported to be valuable in the traditional management of ailments in Nigeria and other West African countries (Asase et al. 2005; Bhat, Etejerere & Oladipo 1990; Soladoye et al. 2014). Plants and animals are very important to human survival and thus need to be studied and taken adequate care of, because of their importance in maintaining the ecological balance of our region. Ogie-Odia et al. (2010) reported that forest diversity is increasingly threatened as a result of deforestation, fragmentation, climate change and other stressors. The rich flora diversity is a major source of raw plant materials that enable sustainability in the human communities now and in the future. In addition, research has equally shown that plant diversity could affect food web connectivity in a variety of ways (O'Gorman & Emmerson 2009). Higher plant diversity increases plant productivity and predator abundance (Haddad et al. 2009), which increases the amount of energy transfer among interacting species and thus increases food web connectivity. Consequently, such a measure should begin from the immediate environment and, hence, from our campus flora and fauna. Plants and animals are sources of food, shelter and clothing. A healthy ecosystem is built when it is maintained in a sustainable manner. Hence, this study was designed to establish the flora profile as well as to document the ethnobotanical values of plant species growing on Lagos State University main campus, Ojo, Lagos State, Nigeria with a view to develop strategies for their conservation.

Lagos State University, Ojo, was established in the year 1983 by then governor of Lagos State Mr Lateef Jakande and was located along Badagry Expressway, Ojo. In the beginning of her academic carrier, the university started with three faculties, namely Law and Humanities, Education and Science. Today, the university has 11 faculties and is to increase to more than that in the nearest future. In early 1984, the surrounding areas were highly forested and swampy and composed of varieties of different flora of trees, shrubs and grasses but today the vegetation is

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dominated by grasses and shrubs with trees sparsely distributed in the area. Currently, the flora is being deteriorated because of construction of new buildings such as new senate building, new faculty of Science building, new radio station, new auditorium, sandwich building and sport centre.

Today, the old landmass has given way to new vegetation replacing indigenous and exotic vegetation. The planting of exotic vegetation started in 1990 by the then head of the Botany Department. Not all the indigenous vegetation has the capacity of self-regeneration. Nowadays, the university campus is well rehabilitated and it is very important that the composition of the vegetation, the regeneration capacity of the vegetation and the importance of the tree species are studied.

## Materials and methods

### Study area

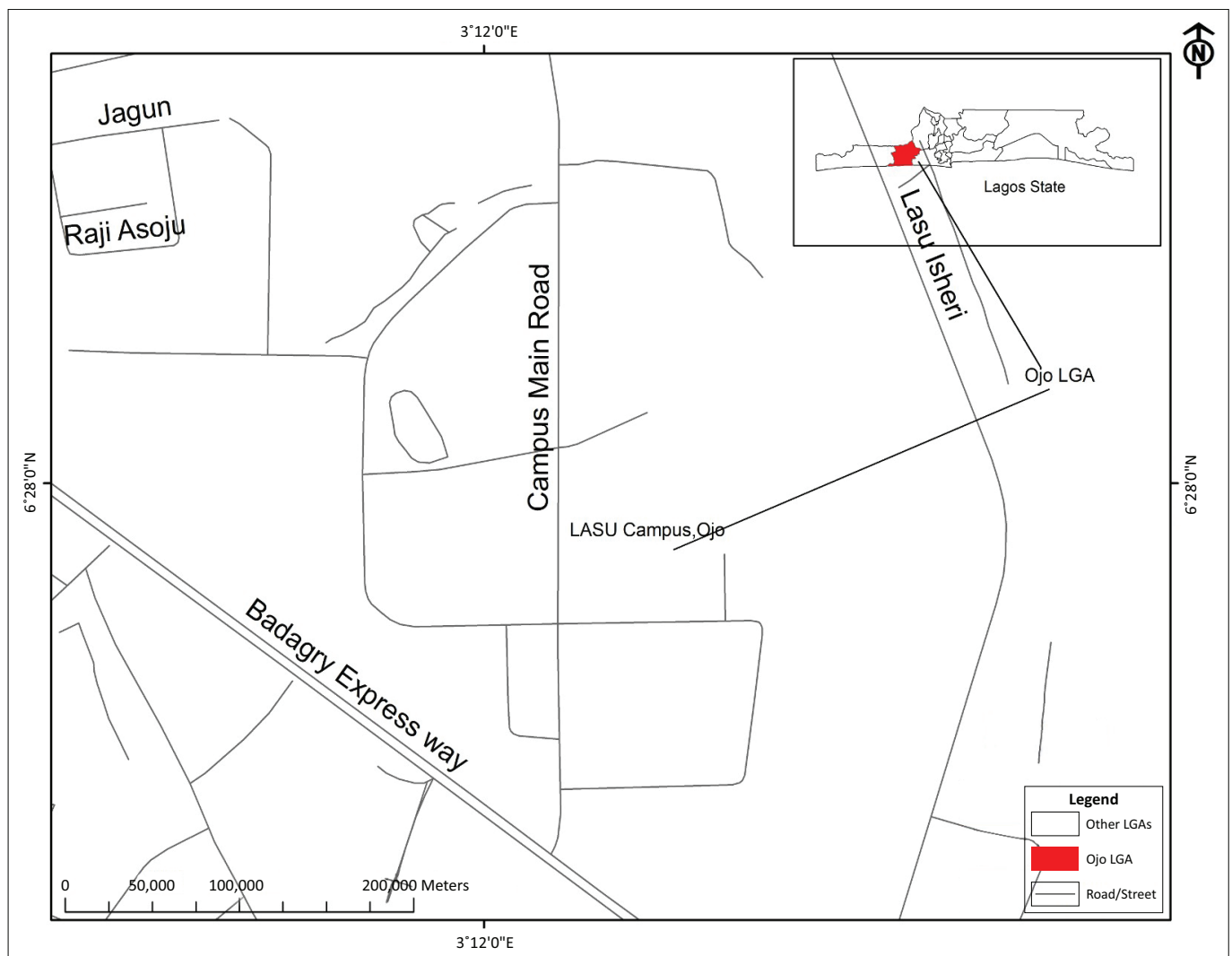
This study was conducted in Lagos State University, Ojo main campus, Lagos State, south-western Nigeria. It lies on latitude  $6.26^{\circ}\text{N}$   $3.11^{\circ}\text{S}$  and longitude  $6.467^{\circ}\text{W}$   $3.183^{\circ}\text{E}$  (Figure 1). The area is characterised by various floras such as grasses, shrubs

and trees. Trees are relatively dispersed and the vegetation is dominated by grasses and shrubs compared to trees. The terrain is flat and more than half is dominated by buildings. The vegetation is largely affected by human activities. The study area was divided into eight sampling plots as follows:

1. Faculty of Management Sciences and Iyana-Ipaja gate.
2. Faculty of Education, Faculty of Social Science and Faculty of Transport.
3. Faculty of Science.
4. Sports Centre and Student Affairs Division.
5. Master of Business Administrative and Information Communication and Technology (ICT) area.
6. Faculty of Law.
7. Faculty of Art.
8. Central administrative blocks and Iyana-Iba gate.

### Collection and identification of plant species

Field collection and identification of plant species occurring within the university community was conducted between June 2015 and November 2016. The occurrences of plant specimens in each zone were recorded. The collected plant species were identified by plant taxonomists in the Department



**FIGURE 1:** Map of Ojo Local Government Area (LGA) of Lagos State showing the location of the study area.

of Botany, Lagos State University. Correct names of the identified species follow International Plant Name Index (IPNI). A comprehensive list of species was thereafter carefully documented, along with their families, habits and local names by which they are known within the study area.

## Ethnobotanical assessment

Ethnobotanical information about the identified plant species was obtained through oral interviews. The interviews were conducted randomly with a total of 60 local respondents including herb sellers, herbalists, elderly people and others with knowledge of herbal medicine (Table 1). The

**TABLE 1:** Distribution of local informants in accordance with their age groups.

Age groups	Categories of informants				Total
	Herb sellers	Herbalists	Elderly people	Others	
31–40	5	-	-	1	6
41–50	10	3	-	2	15
51–60	5	2	2	2	11
61–70	6	2	4	1	13
71 and above	5	3	6	1	15
<b>Total</b>	<b>31</b>	<b>10</b>	<b>12</b>	<b>7</b>	<b>60</b>

**TABLE 2:** Distribution of plant species in Lagos State University campus.

Botanical name	Common name	Family	Habit
<i>Acalypha wilkesiana</i> Muell Arg.	Red acalypha	Euphorbiaceae	Shrub
<i>Anacardium occidentale</i> L.	Cashew	Anacardiaceae	Tree
<i>Andropogon gayanus</i> Kunth. II	Guinea grass	Poaceae	Grass
<i>Araucaria heterophylla</i> (Salisb.) Franco.	Monkeytail puzzle	Araucariaceae	Tree
<i>Archontophoenix cunninghamiana</i> H. Wendl.	King's palm	Arecaceae	Tree
<i>Axonopus compressus</i> (Sw.) Beauv	Carpet grass	Poaceae	Grass
<i>Azadirachta indica</i> A. Juss	Neem plant	Meliaceae	Tree
<i>Carica papaya</i> L.	Pawpaw tree	Caricaceae	Tree
<i>Casuarina equisetifolia</i> L.	Scotch pine	Casuarinaceae	Tree
<i>Canna indica</i> L.	Canna lily	Cannaceae	Herb
<i>Codiaeum variegatum</i> (L.) Blume	Croton	Euphorbiaceae	Shrub
<i>Cordyline fruticosa</i> (L.) A. Chev	Cordyline	Asparagaceae	Herb
<i>Cycas revoluta</i> Thunb.	Cycads	Cycadaceae	Shrub
<i>Cymbopogon citratus</i> Stapf.	Lemon grass	Poaceae	Grass
<i>Delonix regia</i> (Bojer ex Hook.) Raf.	Flame of the forest	Fabaceae	Tree
<i>Dieffenbachia seguine</i> (Jacq.) Schott.	Dumbcane plant	Araceae	Herb
<i>Eucalyptus globulus</i> Labill.	Blue gum	Myrtaceae	Tree
<i>Ficus benjamina</i> L.	Weeping fig	Moraceae	Tree
<i>Ficus carica</i> L.	Fig tree	Moraceae	Tree
<i>Gmelina arborea</i> Roxb.	Beechwood/Gmelina	Lamiaceae	Tree
<i>Hibiscus variegatum</i> L.	Variegated hibiscus	Malvaceae	Shrub
<i>Imperata cylindrica</i> (L.) Raeuschel.	Blady/cogon grass	Poaceae	Grass
<i>Ixora coccinea</i> L.	Wild ixora	Rubiaceae	Shrub
<i>Mangifera indica</i> L.	Mango	Anacardiaceae	Tree
<i>Murraya paniculata</i> (L.) Jack.	Orange jasmine	Rutaceae	Shrub
<i>Musa paradisiaca</i> L.	Banana	Musaceae	Herb
<i>Polyalthia longifolia</i> Thwaites	Masquerade tree	Annonaceae	Tree
<i>Ravenala madagariensis</i> Sonn.	Traveller's palm	Strelitziaceae	Tree
<i>Rheo discolor</i> L. B. Sm. & H. Rob	Boat lily	Commelinaceae	Herb
<i>Sansevieria trifasciata</i> hort. ex Prain	Snake plant	Asparagaceae	Shrub
<i>Sida acuta</i> Burm. f.	Wire weed	Malvaceae	Grass
<i>Terminalia catappa</i> L.	Indian almond	Combretaceae	Tree
<i>Terminalia ivorensis</i> A. Chev	Black afara	Combretaceae	Tree
<i>Tithonia diversifolia</i> (Hemsl.) A. Gray.	Mexican sunflower	Asteraceae	Grass
<i>Vernonia amygdalina</i> Del.	Bitter leaf	Asteraceae	Shrub

consent of all the respondents was sought before the interviews. The interviews were held in local language (Yoruba); hence, there was no need for interpreters and this allowed accurate data recording. The information collected included the local names, ethnobotanical uses, the parts used, modes of preparation and administration of the identified plants.

## Results

The profile of the local respondents interviewed for the ethnobotanical uses of the identified plant species on Lagos State University main campus is shown in Table 1.

Thirty-five plant species belonging to 25 families were found within the Lagos State University campus as shown in Table 2. Family Poaceae had the highest number of species (16%) followed by families Anacardiaceae, Asparagaceae, Asteraceae, Combretaceae, Euphorbiaceae, Malvaceae and Moraceae with two species each (8%) while the remaining families were represented with one species each (4%) as represented in Table 3. *Murraya paniculata* recorded the highest frequency of occurrence within the study area with 165

**TABLE 3:** Species distribution within the identified families.

Families	Number of species
Anacardiaceae	2
Annonaceae	1
Araceae	1
Araucariaceae	1
Arecaceae	1
Asparagaceae	2
Asteraceae	2
Cannaceae	1
Caricaceae	1
Casuarinaceae	1
Commeliaceae	1
Combretaceae	2
Cycadaceae	1
Euphorbiaceae	2
Fabaceae	1
Lamiaceae	1
Malvaceae	2
Meliaceae	1
Moraceae	2
Musaceae	1
Myrtaceae	1
Poaceae	4
Rubiaceae	1
Rutaceae	1
Strelitziaceae	1

individual plants followed by *Ficus benjamina* with 134 plants then *Ixora coccinea* with 121 plants and *Terminalia ivorensis* with 103 plants. *Anacardium occidentale*, *Araucaria heterophylla* and *Ficus carica* recorded the lowest frequency of occurrence with two plants each (Table 4.) Trees were the dominant plant habit, comprising 16 angiosperm species (46% of the total enumeration). This was followed by shrubs with eight species (23%), grasses with six species (17%) and herbs with five species (14%) as shown in (Figure 2). The identified plant species were of significant ethnobotanical values ranging from food to medicinal and ornamental as represented in Table 5.

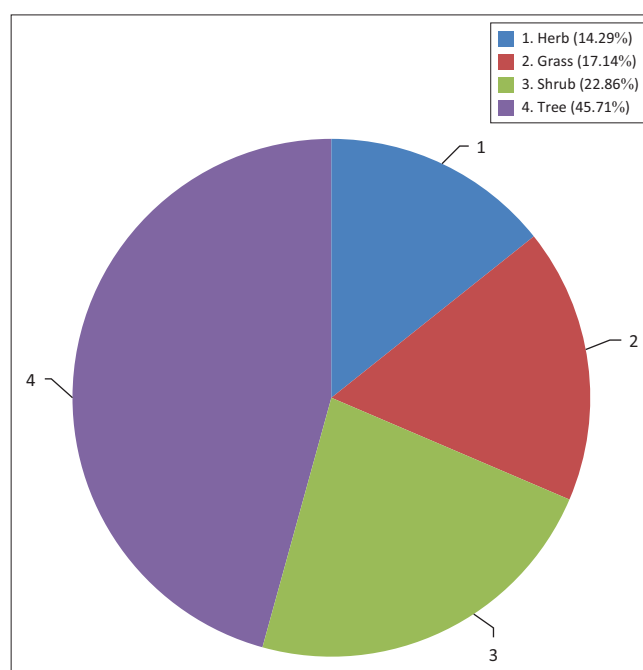
## Discussion

This study was able to compile the flora diversity on Lagos State University campus. In the various sampling plots, plant species varies in diversity and occurrence; *T. ivorensis* and *Ficus benjamina* were well dominated in all the plots. This work is related to the flora in Bowen University Iwo, Osun State, where research was conducted on the angiosperm diversity, (Anoliefo et al. 2006; Soladoye et al. 2005). Similar survey was conducted which was based on some medicinal plant species of Southwestern University Nigeria campus, Ogun State, Nigeria; a total of 90 plant species belonging to 48 families and 85 genera were recorded in which Euphorbiaceae has the highest number of species (8) followed closely by Asteraceae (6) and Papilionaceae (5 species) (Soladoye et al. 2013). Similar survey was conducted on the endangered tree species in Cross River State and its environs; 85 endangered tree species were reported (Oguntala et al. 1996).

Plants found in the study area are of significant economic importance, ranging from medicinal to food and ornamental.

**TABLE 4:** Frequency of occurrence of plant species on Lagos State University campus.

Name of plant	Number	Percentage
<i>Murraya paniculata</i>	165	12.20
<i>Ficus benjamina</i>	134	9.90
<i>Ixora coccinea</i>	121	8.94
<i>Terminalia ivorensis</i>	103	7.61
<i>Tithonia diversifolia</i>	90	6.65
<i>Acalypha wilkesiana</i>	85	6.28
<i>Cymbopogon citratus</i>	70	5.17
<i>Axonopus compressus</i>	70	5.17
<i>Polyalthia longifolia</i>	58	4.29
<i>Azadirachta indica</i>	54	3.99
<i>Sida acuta</i>	50	3.70
<i>Andropogon gayanus</i>	50	3.70
<i>Vernonia amygdalina</i>	40	2.96
<i>Imperata cylindrical</i>	35	2.59
<i>Dieffenbachia seguine</i>	31	2.29
<i>Delonix regia</i>	30	2.22
<i>Codiaeum variegatum</i>	25	1.85
<i>Gmelina arborea</i>	23	2.11
<i>Archontophoenix cumminghamiana</i>	18	1.33
<i>Cordyline fruticosa</i>	15	1.11
<i>Sansevieria trifasciata</i>	15	1.11
<i>Hibiscus variegatum</i>	10	1.70
<i>Rheo diversicolor</i>	10	0.74
<i>Canna indica</i>	9	0.67
<i>Terminalia catapa</i>	8	0.59
<i>Casuarina equisetifolia</i>	6	0.44
<i>Cycas revolute</i>	6	0.44
<i>Mangifera indica</i>	6	0.44
<i>Eucalyptus globulus</i>	5	0.37
<i>Musa paradisiaca</i>	5	0.37
<i>Carica papaya</i>	3	0.02
<i>Ravenala madagascariensis</i>	3	0.22
<i>Anacardium occidentale</i>	2	0.15
<i>Araucaria heterophylla</i>	2	0.15
<i>Ficus carica</i>	2	0.14
<b>Total</b>	<b>1353</b>	<b>100</b>

**FIGURE 2:** Distribution of plant habit within Lagos State University campus.

**TABLE 5:** Ethnobotanical uses of identified plant species in Lagos State University campus.

Botanical name	Ethno-botanical uses
<i>Acalypha wilkesiana</i>	Used to treat skin irritations and diseases in children
<i>Anacardium occidentale</i>	Treatment of fever, diarrhoea, hypotension and sore throat
<i>Andropogon gayanus</i>	Valuable hay and green fodder grass and also used for weaving grass mats and thatching
<i>Araucaria heterophylla</i>	Ornamental
<i>Archontophoenix cunninghamiana</i>	Ornamental
<i>Axonopus compressus</i>	Curative herbal bath and to treat heart problems
<i>Azadirachta indica</i>	Treatment of skin diseases, healthy hair, improve liver function, detoxify the blood, pest and disease control, fever reduction, dental treatments, cough, asthma, ulcers, piles, intestinal worms and urinary diseases
<i>Carica papaya</i>	Treatment of high blood pressure, dyspepsia, constipation, amenorrhoea, general debility, expel worms and stimulate reproductive organs
<i>Casuarina equisetifolia</i>	Antidiabetic, anti-hyperlipidemic and antibacterial
<i>Canna indica</i>	Treatment of gonorrhoea and amenorrhoea; also considered to be demulcent, diaphoretic and diuretic
<i>Codiaeum variegatum</i>	Treatment of fever, antibacterial and antiamoebic
<i>Cordyline fruticosa</i>	Used to soothe sore back muscles and to aid nerve and muscle relaxation
<i>Cycas revoluta</i>	Used in the treatment of cancer
<i>Cymbopogon citratus</i>	To treat rheumatic pains, fever, flatulence and digestive disorders
<i>Delonix regia</i>	Ornamental and also used in the treatment of earache, constipation and diabetes
<i>Dieffenbachia seguine</i>	Ornamental
<i>Eucalyptus globulus</i>	Treatment of cough, cold and catarrh
<i>Ficus benjamina</i>	Treatment of wounds, bruises and rheumatic headache
<i>Ficus carica</i>	Edible and also used as anti-inflammatory agent
<i>Gmelina arborea</i>	Improves appetite and used for the treatment of ulcers, headache, abdominal pains and urinary tract discharge
<i>Hibiscus variegatum</i>	Used as fumigants and insect repellants
<i>Imperata cylindrica</i>	To treat digestive disorders and as anti-helminthic
<i>Ixora coccinea</i>	Used for dysmenorrhea and skin diseases
<i>Mangifera indica</i>	Treatment of malaria and fever; also used as anti-inflammatory and antimicrobial agent
<i>Murraya paniculata</i>	Ornamental and also used as anti-inflammatory and anti-diarrhoea
<i>Musa paradisiaca</i>	Edible and used for the treatment of gastric disorders
<i>Polyalthia longifolia</i>	Ornamental and used for the treatment of fever
<i>Ravenala madagariensis</i>	Ornamental
<i>Rheo discolour</i>	Used for cough, colds and nose bleed
<i>Sansevieria trifasciata</i>	Treatment of ear pains, boils and fever
<i>Sida acuta</i>	Treatment of asthma, ulcers and venereal diseases; also used as anti-helminthic
<i>Terminalia catappa</i>	The fruits are edible while the leaves are used as anticancer, antidiabetic and anti-inflammatory
<i>Terminalia ivorensis</i>	To treat skin diseases, inflammation and voice loss
<i>Tithonia diversifolia</i>	Used for sore throat, malaria, bruises and fractures
<i>Vernonia amygdalina</i>	Edible and also used medicinally to treat fever, malaria and purgative, anti-diabetic chemopreventive and immune booster

Similar to the results of the ethnobotanical assessment of the identified plant species, some of the plants in the study area have been reported to have significant ethnobotanical values. *Acalypha wilkesiana* for skin irritations and diseases (Omaga & Azeke 2014), *Azadirachta indica* for malaria (Alzohairy 2016), *Cycas revoluta* as antimicrobial (Mathur et al. 2011), *Cymbopogon citratus* as anti-diarrhoeal (Shah et al. 2011), *Dieffenbachia seguine* as ornamental (Cuartas & Farfan 2006), *Eucalyptus globulus* for cold, coughs and nasal congestion (Patil & Nitave 2014), *Gmelina arborea* as laxative and anti-helminthic (Pathala, Harini & Hedge 2015), *Mangifera indica* as food and antioxidant (Parvez 2016), *Musa paradisiaca* for diabetes (Kumar et al. 2012), *M. paniculata* as anti-inflammatory (Dosoky et al. 2016), *Vernonia amygdalina* as purgative, antioxidative and chemopreventive (Farombi & Owoeye 2011) and so on. This justifies the importance of plant species in the maintenance of ecosystem and as a source of livelihood for man; hence, these must be conserved properly (Soladoye et al. 2015).

## Conclusion

This study showed that Lagos State University is rich in plant biodiversity that are of significant ethnobotanical value; thus, the need to conserve them from further deterioration because of

human activities is very paramount. From this investigation, there are many important medicinal plants found in the study area which could serve as sources of raw materials to pharmaceutical and cosmetic industries as well as other manufacturing industries in Nigeria and globally. Bio-prospecting in this area would lead to income generation for the university community. Medicinal plants identified also have marketing potentials; therefore, efforts should be geared towards creating an enabling environment for their existence and preventing over-exploitation. Indigenous knowledge of these medicinal plants should also be properly preserved so that such would not be lost. Deforestation which is a major problem in the study area should be discouraged and afforestation practices encouraged in the area. Construction work and developmental projects should consider plants species found in the study area and proper analysis should be done before commencement of such projects.

## Acknowledgements

### Competing interests

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this article.

## Authors' contributions

A.A.A. was the project leader. A.A.A. conceptualised, designed and supervised the project. O.J.S. made conceptual contributions, carried out the literature search and edited the manuscript while O.J.A. carried out data acquisition and analysis as well as manuscript preparation.

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