Ethnobotanical Studies of Professor Afolayan Wildlife Park, Ondo State, Nigeria: A Rich Resource for medicinal plants against common ailments Ondo State, Nigeria

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ABSTRACT

Ethnobotanical study of Professor Afolayan Wildlife Park was carried out to identify and document medicinal plants and their uses. Medicinal plants have been observed to be very effective in the treatment of ailments that defy orthodox medicine. In this study, common plants used were classified based on their families, parts used and the medicinal uses. Some of the plant families were briefly discussed and the plants local names provided. According to field survey, 40 plants were identified consisting of 20 families in the Park. The dominant families were Leguminosae (15.0%) and Sterculiaceae (12.5%) while the least dominant families include Caricaceae, Meliaceae, Loganiaceae, Poaceae and Verbenaceae. The medicinal uses of the plants varied, and the commonly used plant parts are leaves, bark, seeds, fruits and the whole plant which are used to treat ailments like malaria, stomach aches and diarrhoea. This study shows the high medicinal potentials of Professor Afolayan Wildlife Park, therefore the need for sustainable use and conservation of the Park.

Keywords: Plants, Wildlife Park, Medicinal, Ethnobotany, ailments, treatment, Professor Afolayan

Resumé

Une étude ethnobotanique du parc animalier du professeur Afolayan a été réalisée pour identifier et documenter les plantes médicinales et leurs utilisations. Les plantes médicinales se sont avérées très efficaces dans le traitement de maladies qui défient la médecine orthodoxe. Dans cette étude, les plantes couramment utilisées ont été classées en fonction de leurs familles, des parties utilisées et des usages médicinaux. Certaines des familles de plantes ont été brièvement discutées et les noms locaux des plantes ont été fournis. Selon l'enquête sur le terrain, 40 plantes ont été identifiées composées de 20 familles dans le parc. Les familles dominantes étaient les Leguminosae (15,0%) et les Sterculiaceae (12,5%) tandis que les familles les moins dominantes comprennent les Caricaceae, Meliaceae, Loganiaceae, Poaceae et Verbenaceae. Les usages médicinaux des plantes sont variés et les parties de plantes couramment utilisées sont les feuilles, l'écorce, les graines, les fruits et la plante entière qui sont

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utilisés pour traiter des affections comme le paludisme, les maux d'estomac et la diarrhée. Cette étude montre les potentiels médicinaux élevés du parc animalier du professeur Afolayan, d'où la nécessité d'une utilisation durable et de la conservation du parc.

Mots-clés : Plantes, Parc animalier, Médicinal, Ethnobotanique, affections, traitement, Professeur Afolayan

INTRODUCTION

Ethnobotany as defined by Balick and Cox (1996) is the study of how modern and indigenous people of a particular culture and region make use of indigenous plants. Given their extensive range of knowledge of medicinal plants, indigenous people remain the ultimate resource for retrieving this information for the purpose of application particularly in modern medicine. Tropical rainforest is particularly endowed with plants possessing curative properties. This richly bio-diverse environment provides a veritable trove of flora containing compounds of medicinal value which indigenous people have utilized and benefitted from for centuries.

From the ancient period, man lives closely associated with nature and depended on it for their survival. People use plants around them for many purposes like food, shelter, dyes, cosmetics, clothing, medicine etc. They gather the knowledge of usage from the environment and pass them through generation to generation with or without written documents.

As the global use of herbal medicinal products continues to grow and many new products are introduced into the market, public health issues and concerns surrounding their safety are also increasingly recognized. Although some herbal medicines have promising potential and are widely used, many of them remain untested and their use also not monitored (WHO, 2004; Ekor, 2013). Research has been geared towards finding scientific evidence for the claims as to the therapeutic efficacy of African herbs by traditional healers. Most of the published and unpublished written ethnomedicinal data with valuable and complementary information are scattered in many documents, some of which are not easily available. An interdisciplinary systematization, which certainly helps to predict the most promising candidates for further laboratory or clinical investigations, appears as useful work (Hatil Hashim EL-Kamali, 2009). Many infectious diseases are known to be treated with herbal remedies throughout the history of mankind. The maximum therapeutic and minimum side effects of herbal remedies have been verified in numerous scientific investigations. Even today, plant materials continue to play a major role in primary health care as therapeutic remedies in many developing countries. It has been reported that more than 80% of drug substances are either directly derived from natural products or developed from a natural compound (Maridass and John de Britto, 2008). While 50% of pharmaceuticals are derived from compounds identified or isolated from herbs or plants (Krief *et al.*, 2004).

The World Health Organization (2012) estimated that over 80% of the people in developing countries rely on traditional remedies such as herbs for their daily needs and about 855 traditional medicines include crude plant extracts (Biswas and Mukherjee, 2003). This means that about 3.5 to 4 billion of the global population rely on plants resources for drugs (Ekor, 2013). However, Sofowora (1982) opined that about 60-85% of the population in every country of the developing world rely on traditional medicine for the treatments of their ailments.

In Nigeria, herbal plants constitute one of the many resources of the forest on which the health of the average rural populace depends. For example, herbal medicine is the first line of treatment for 60% of children with high fever from malaria, while eighty-five per cent of Nigerians use and consult traditional medicine for healthcare, social and psychological benefits. Herbal medicines therefore serve as the repository of healing materials majorly for rural dwellers and are known to have minimum or no side effects (Gbile *et al*., 1986).

Many plants particularly the edible ones are mainly consumed for their nutritional values without much consideration given to their medicinal importance. This indeed has led to the destruction of these unique resources either knowingly or unknowingly. There are several varieties of these plants in the wild in the rural areas, but the gradual loss of flora genetic species deprives man of the opportunity to meet the future as well as catch up with present challenges of the use of plants for the enhancement of health of the individual. (Obute and Osuji, 2002).

The demands for inexpensive treatment methods to meet primary health care needs, with the African believe in the efficacy of traditional medicine and with the incessant health workers' strikes in Nigeria that make the few available hospitals and clinics ineffective coupled with the disappearing plant species have increased interest in ethnobotany studies among researchers. Therefore, this study was initiated to document all medicinal plants found in the Professor Afolayan Park, collect, classify the plants based on their types, uses and provide their local names.

MATERIALS AND METHODS

Study site

Professor Afolayan Wildlife Park (PAWP) is located in Akure, Ondo State, Nigeria. It lies between latitude 5°45´N and 7°52´N, and longitude 4°20´E and 6°5´E (Federal University of Technology, Akure Meteorological Station, 2004). It was formerly inhabited by people described as Obanla who used the place for farming before relocating. It falls in tropical rainforest belt of Nigeria with average annual rainfall of 1408.1mm during the rainy season between March and October. The relative humidity range is 80% to 100% during the rainy season and 50% to 70% during the harmattan period. The mean minimum temperature is 21p C while the mean maximum temperature is 32p C. The Park has an area of 8.89 hectares, and it is divided into three locations namely open area, cocoa plantation area and rocky outcrop area.

The Park was divided into six transects at intervals of 50 m along the breadth. Medicinal plant species in each transect were identified and recorded onsite. Ethnobotanical information on each plant identified were obtained from local herb sellers around Federal University of Technology, Akure community, elderly men and traditional medicine practitioners. This was done through oral interview using a structured questionnaire. The major questions asked were how the medicinal plant identified are used, part(s) of the plant used as medicine and the local name(s) of plants. Confirmation of identified herbs/plants was done at Forestry Research Institute of Nigeria herbarium, Ibadan where the voucher specimens were deposited as a reference for future studies.

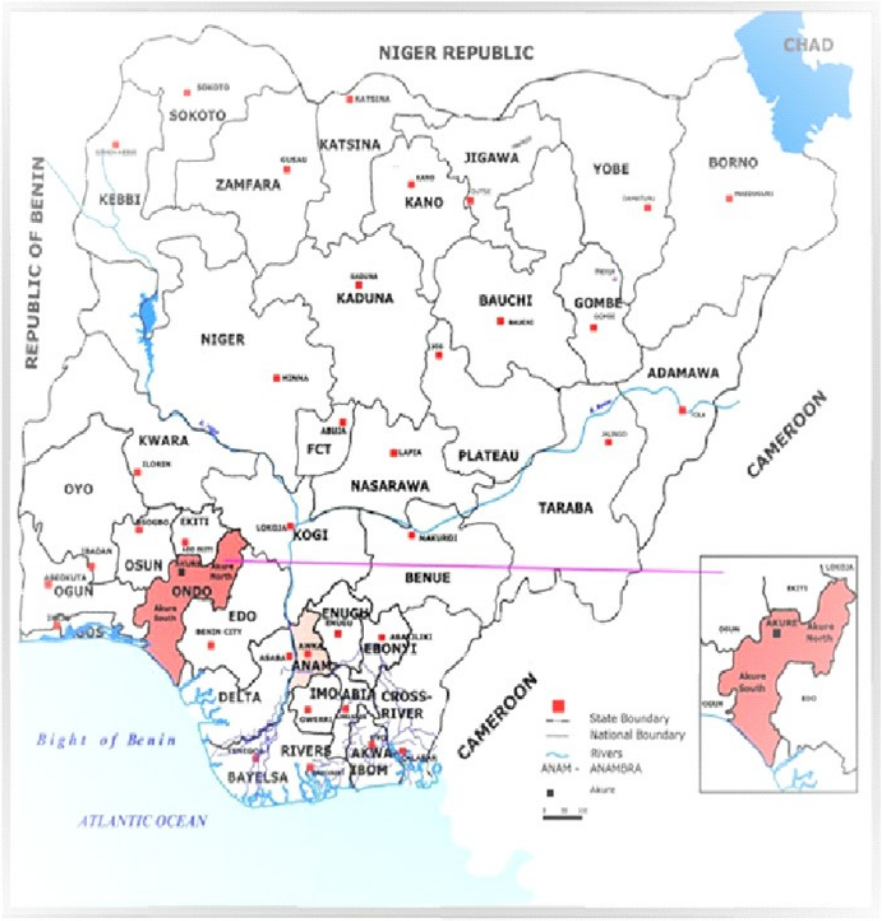

Figure 1a: Map of Nigeria showing Ondo State in red colour
Source: Rotowa et al. (2015)

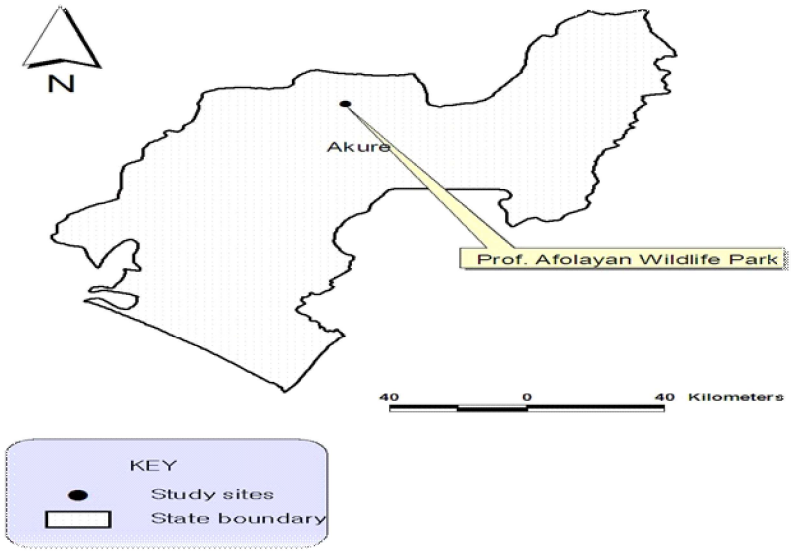

Fig. 1b: Location of Professor Afolayan Wildlife Park in Ondo State, Nigeria
***Source**: Oguntuase and Agbelusi, 2013*

Family	Botanical Name	Local Name	Common Names	Parts Use	Medicinal Use	Confirmation references
Anacardaceae	*Spondia mombin*	Iyeye	Yellow mombin	Bark, leaves, fruits, root	Cough, sore throat, cold, measles	Ayoka *et al.*, 2008; Michel, 2004
Anacardaceae	*Mangifera indica*	Mangoro	Mango tree	Leaves, root, stem, bark	Malaria, high blood pressure	Ediriweera *et al.,* 2017
Apocynaceae	*Alstonia boonei*	Ahun	Pattern wood	Root, leaves, Bark	Breast development, antidote, malaria, yellow fever	Akinmoladun *et al.* (2007) and Olanlokun *et al.* (2020)
	Funtumia elastica		Wild rubber		Piles, impotence	Erhenhi and Obadoni, (2015)
Apocynaceae	*Crescentia cujete*	Ire	Calabash tree	Stem		Abd El-Ghani, (2016)
	Newbouldia laevis		Fertility tree	Fruits	Receptacle for herbal medicine	Jiofack *et al.* (2009)
Bignoniaceae	*Bombax buonopozense*	Igi sogba	Red silk cotton tree		Guinea worm, malaria, infertility	Temitope and Felix (2012)
Bignoniaceae	*Ceiba pentandra*	Akoko	Silk cotton tree	Bark, leaves, root Bark, leaves, fruits,	Stomach ache, blood tonic	Osuntokun *et al.* (2017)
Bombaceae	*Carica papaya*	Eso	Pawpaw	Leaves, bark	Diabetes, fever, gonorrhoea, asthma	Bamisaye *et al.* (2013)
Bombaceae	*Terminalia superba*	Araba	White Afara		Diabetes, malaria, syphilis	Oliver-Bever, (1960)
	Chromolaena odorata		Siam weed	Leaves, seeds, fruits	Laxative	Bamisaye *et al.* (2014); Omokhua *et al.* (2016).

Table 1: List of plants identified, the family name, local names and their uses

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Bombaceae	*Terminalia superba*	Araba	White Afara	Leaves, bark	Diabetes, fever, gonorrhoea, asthma	Bamisaye *et al.* (2013)
Caricaceae	*Chromolaena odorata*	Ibepe	Siam weed	Leaves, seeds, fruits	Diabetes, malaria, syphilis	Oliver-Bever, (1960) Bamisaye *et al.* (2014); Omokhua *et al.* (2016).
Combretaceae	*Diospyros mespiliformis*	Afara	Ebony tree	Root, bark	Laxative	
Compositae	*Manihot esculenta*	Akintola, Awolowo	Cassava	Leaves, Stem	Dysentery, headache, malaria, fever, tooth ache, skin disease	David *et al.* (2021); Adzu *et al.* (2002)
Ebenaceae	*Gliricida sepium*	Igi dudu	Mexican lilac	Root, bark, stem, leaves	Diarrhoea, Malaria	Ogunlesi *et al.* (2008); Mbayo *et al.* (2016)
Euphorbiaceae	*Albizia zygia*	Ege	Okuro, atanza, siris	Leaves, stem bark	Ulcer, eye drop, toothache, pain	Nazli *et al.* (2008)
Fabaceae	*Albizia ferruginea*	Agunmanive	False thorn, Albizia	Leaves, bark	Malaria	Oloyede and Ogunlade (2013)
Leguminosae	*Afzelia africana*	Ayinre-weere	Pod mahogany	Bark	Arthritis, sprain.	Lawal *et al.* (2010)
Leguminosae	*Dialium guineense*	Ayinre ogo	Black tamarind	Root, leaves, stem, bark	Constipation, dysentery	Akwaji *et al.* (2017)
Leguminosae	*Pterocarpus erinaceus*	Apa-igbo	White leadtree	Root, bark, seeds, leaves, stem	Stomach disorder, gonorrhoea	Besong *et al.* (2016)
Leguminosae	*Leucena leucocephala*		Cabbage tree			Olotu *et al.* (2017); Ezeja *et al.* (2012)
			Bush Sorrel			

Leguminosae	*Anthocleista djalonensis*	Awin	Wireweed	Leaves, fruit, bark, stem, root	Fever, cough, tooth ache.	Kotchabhakdi *et al.* (2021)
Leguminosae	*Hibiscus surattensis*	Osun	Velvet leaf	Root, stem, bark	Asthma, bacterial and fungi skin infection	Lawal *et al.* (2010): bierer *et al.* (1995) Ogundaio *et al.*(2014)
Leguminosae	*Sida acuta*		Iroko tree	Leaves, seeds, root	Blood tonic	Karou *et al.*(2007; 2006 and 2005)
Loganiaceae	*Cissampelos owariensis*	Shapo	False iroko	Bark, leaves, root	Skin infection, purgative	Maroyi (2021)
Malvaceae	*Milicia excelsa*	Emo	Sand paper tree African mustard tree	Whole plant, leaves Leaves, root	Stomach ache, mystic uses.	Lawal *et al.* (2010); Udegbunam *et al.* (2013)
Malvaceae	*Antiaris africana*	Esoketu	Banana	Root, whole plant	Malaria, intestinal worm, ulcer Diseases	Kuete *et al.* (2018)
Menispermaceae	*Ficus exasperata*	Ewe jokoie	Guava	Root, bark	Lung diseases, skin, blood tonic	Adewole *et al.* (2011)
Moraceae	*Ficus capensis* *Musa sapientum*	Iroko	Coconut palm	Stem, bark, root	Rheumatism, malaria, abdominal pain	Owolabi *et al.* (2009)
Moraceae	*Psidium guajava* *Cocos nucifera*	Osiro	Bamboo African star apple	Leaves, bark, root, seeds Leaves, stem, root, fruits	Epilepsy, skin irritant, purgative. Stomach disorder, scabies, gonorrhoea	Erhenhi. 2019; Simbo. 2010. Gutiérrez *et al.* (2008); Joseph and Priya (2011)
Moraceae	*Bambusa vulgaris*	Ewe-egin	Wonderful cola	Leaves, fruits	Dysentery, leprosy, infertility, malaria	Lima *et al.* (2015); DebMandal and Mandal (2011)
Moraceae	*Chrysophyllum albidum*	Opoto	Kola nut	Leaves, stem, bark, fruits	Typhoid, malaria, jaundice	Gill (1992)
Musaceae	*Buchholzia coriacea*	Ogede were		Bark, root, fruits	Fever, diarrhea, stomach ache,	Adewusi and Bada (1997)
Myrtaceae	*Cola acuminata*	Gilofa	Star chest nut	Leaves	laxative, malaria	Chika *et al.* (2012)
Palmae	*Hildegardia barteri* *Sterculia tragacantha*	Agbon	Cocoa Gmelina	Bark, leaves Fruit, bark	Liver ailment, migraine, scabies, tooth ache, laxative Gonorrhoea	Sonibare *et al.* (2009); Oduebemi (2006). Balogun *et al.* (2017)
Poaceae	*Theobroma cacao* *Gmelina arborea*	Oparun	Ginger lily	Fruit	Fever, stomach ache	Sinan *et al.* (2015)
Sapotaceae	*Costus afer*	Agbalumo			Respiratory disorder, ulcer, fibroid, chest pain	Hassan *et al.* (2021)
Sterculiaceae		Obi-abata		Bark Leaves, roots,	Stimulants, fever, malaria.	Nadkarni (1994) Ezeijiofor *et al.* (2014).

Sterculiaceae	Obi-abata	Seeds, root	Epilepsy
Sterculiaceae	Okurugbedu	Root, leaves	Fever, whitlow, malaria
Sterculiaceae	Alawefon	Stem, leaves, fruit	Stimulants, tooth ache, blood tonic
Sterculiaceae	Koko		Stomach disorder, cough
Verbenaceae	Igi melina		Coughs, diabetes, cuts
Zingiberaceae	Ireke omode		

Source: Field Survey, 2018.

The study documented a total of 40 species of medicinal plants belonging to 24 families (Table 1). The dominant families were Leguminosae (15.0%) and Sterculiaceae (12.5%). The least dominant families include Caricaceae, Meliaceae, Loganiaceae, Poaceae and Verbenaceae with 2.5% each (Figure 1).

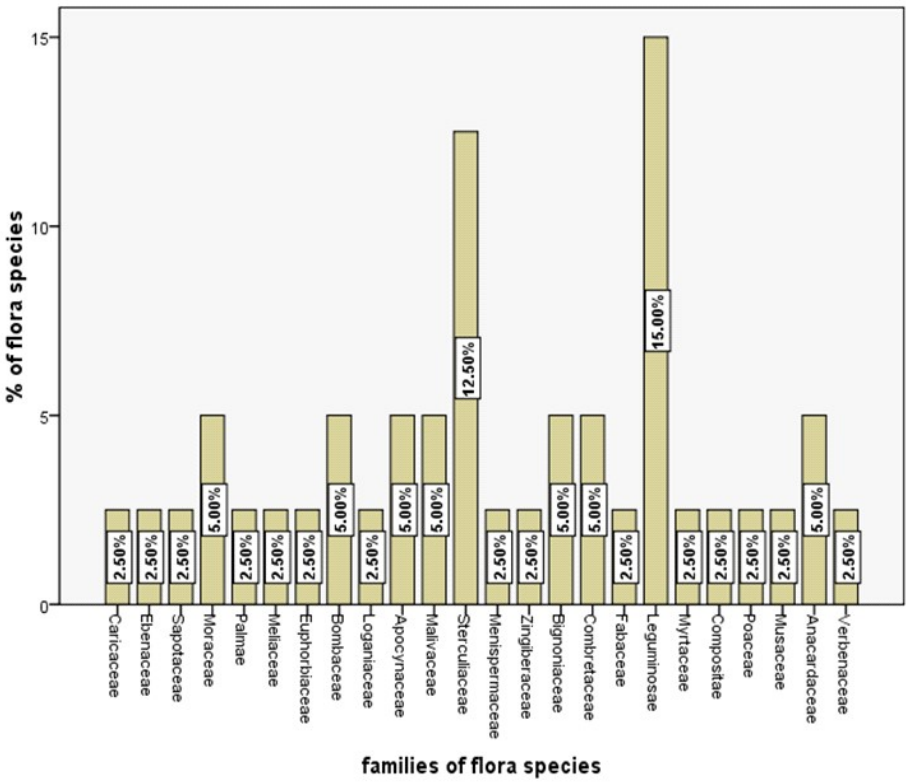

Figure 1: Bar chart showing the families of identified flora species in Professor Afolayan Wildlife.

All the plant species identified in the Park are known to be used as medicinal for a wide variety of purposes by the communities around the Park. Fifty-eight (58) different medicinal indications were recorded to cure or alleviate common ailments or alleviate different illnesses and pains (Table 1). The highest number of species (13) that represented 32.5% of total species were used to cure malaria, with 7 species reported to cure fever, 6 species reported to cure tooth ache while 4 species each are used to cure cough, stomachache, stomach disorders and also used as blood tonic

andlaxative. The results from the survey of the Park show that most of the plants identified have multiple uses and only very few plants had just one use for curing ailments.

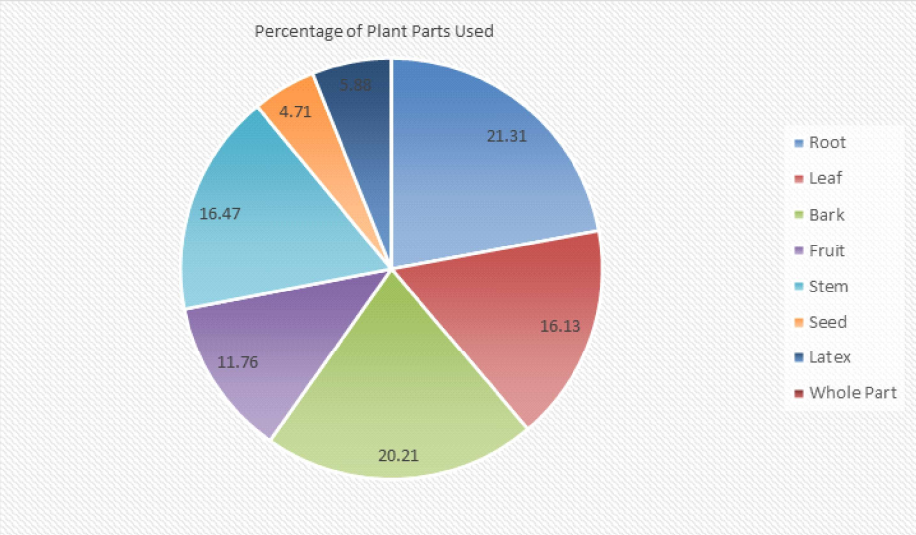

Figure 2: Pie Chart showing the percentage of plant parts used for medicinal purposes

The study revealed that among plants identified as having medicinal uses in the study area 82.50% were trees, 10.00% herbs and 7.50% shrubs. This shows that Prof. Afolayan Wildlife Park is a forest ecosystem made up of tall trees, short trees and few grasses.

The study also revealed that the commonly used flora part for medicine is the root (Figure 3) with 21.31% (Figure 2). Others include bark (20.21), stem (16.47%), leaf (16.13%), fruit (11.76%), latex (5.88%), seed (4.71%) and whole plant (3.53%). The roots have the highest major plant parts used because it is believed by the communities that roots contain high concentration of active ingredients for the preparation of medicinal purpose. This assertion is supported by the studies conducted by Hunde *et al.,* (2006); Yineger and Yewhalaw, 2007; Teklehaymanot and Giday, 2007 in which roots were reported as the most widely used plant parts. Studies conducted by Erhenhi, (2019) and Simbo (2010) reported the use of *Musa sapientum* for treating malaria, while Michel (2004) confirmed the use of *Spondia mombin* for treating cough, *Newbouldia laevis* for treating guinea worm and *Ceiba pentandra* for treating fever. All the authors mentioned confirmed some of the results obtained for this study on the use of the plants recorded as good for traditional medicines.

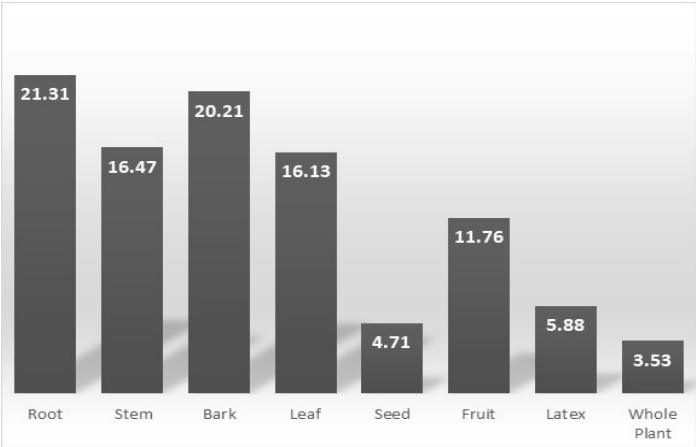

Figure 3: Plant Parts used for Medicinal Purposes

Observation from the ethnomedicinal survey showed that the plants were used for different ailments in different localities. It was equally discovered that the medicinal plants have other uses as some could be used as vegetables, fruits, trees, ornamentals etc. The different uses can be explained by the fact that, a single plant can serve many purposes or perform different functions.

While collecting ethnobotanical information, it was observed that traditional medicine has wide acceptability among the local community in the study area. Indeed, majority of the people in the study area use these plants as cures for one ailment or another.

CONCLUSION

Ethnomedicinal studies are very important to understand the social, cultural and economic factors influencing ideas and actions concerning health and illness and also to get information on types of diseases and health problems.

The study reveals that Professor Afolayan Wildlife Park is a home endowed with flora species that can serve as a research niche for students and taxonomists. It can also serve as an outdoor recreation for tourists and potential visitors. However, there is the need for the management of the Park to develop good harvesting practices for the medicinal plants in the park in order to sustain the growth and development of the Park. Destructive harvesting and habitat loss should be prevented as these could lead to over-exploitation or extinction of medicinal plants in the Park. It will therefore be of major importance if researches into phytochemical and pharmacological properties of some important medicinal plants in this park are carried out for future studies and reference.

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