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RESEARCH ARTICLE

ETHNOMEDICINAL SIGNIFICANCE AND CONSERVATION STATUS OF TREE BARKS SOLD IN HERBAL MARKETS IN IBADAN, SOUTHWEST NIGERIA

*Borokini, T.I. and Clement, M.

Plant Genetic Resources Unit, National Centre for Genetic Resources and Biotechnology (NACGRAB),
Moor Plantation, Ibadan

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ABSTRACT

The study involved an ethnobotanical survey of tree barks sold in herbal markets in Ibadan Metropolis, their ethnomedicinal uses and their conservation status. Three herbal markets were visited, while 15 herb sellers were interviewed. Thirty-nine tree barks were collected from three herbal markets, and their ethnomedicinal uses were documented, ranging in their use for the treatment of fevers, respiratory infections, skin infection, gastro-intestinal problems and reproductive problems among many others. Twenty-one of them are considered abundant, while the rest were found to be endangered, critically endangered or vulnerable, with three of the tree barks yet to be identified. The identified tree species cut across 24 plant families with Caesalpiniaceae having the highest frequency of plant representatives. Information from 15 herb sellers interviewed were also documented. The authors advocated for sustainable harvesting of tree barks for the trees to survive and undergo bark re-growth.

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INTRODUCTION

Medicinal plants are any plant which contains substances that can be used for the therapeutic purposes in one or more of its organs or substances which are precursors for the synthesis of useful drugs¹. Despite the proliferation of colleges of Medicine in various Universities, churning out Medical Doctors every year, a significant percentage of Nigerians, especially in remote areas, are yet to have access to western medicine. Worse still, many people still spend hours in hospitals before they are given medical attention, indicating a very high ratio of medical doctors to Nigerian population. It was reported that reported that the ratio of traditional health practitioner to the population is 1:110, while the ratio of medical doctors to the population was 1:16,400². Even in urban centres where there are many hospitals, a large number of the people still depend on herbal medicine for their primary health care. And indeed, herbal medicine trade keeps growing and gaining more popularity among Nigerians. The yearly herbal medicine trade fair in Nigeria and the increasing publicity and patronage this attracts, irrespective of the social, educative or religious background of the people are indicative of acceptance of herbal medical practice³. Similarly, there is currently hardly any newspaper in Nigeria that does not have a column on herbal remedies at least once in a week⁴. The use of bark as a plant part in herbal medicine is very high, second in the most frequently used plant part after the leaf. The use of tree bark in the preparation of herbal medicine varies widely, in their preparation, mode of use, herbal formulations, and diseases treated. In an ethnobotanical survey carried out in

parts of southwestern Nigeria, it was reported that bark constitute 35% of the use-value of various plant parts⁵. Ibadan is considered the largest indigenous city in West Africa, located in the south western region of Nigeria, with the population of 2,550,593⁶ within 11 local government areas. With the land area of 128km², the overall population density of Ibadan metropolitan area is 586 persons per km². The city of Ibadan is located approximately on longitude 3°5' East of the Greenwich Meridian and latitude 7°23' North of the Equator. This study was conducted to document the number of tree barks sold in herbal markets in Ibadan and the effect of the debarking on the survival and conservation status of the trees.

MATERIALS AND METHODS

An ethnobotanical survey was conducted in three herbal markets in Ibadan – Bode, Oja-Iba and Ojee markets – between August 17 and 18, 2011. Systematic and informal interviews were conducted on a total of 15 herb sellers in the three markets visited to get information on the local names of the barks displayed for sale, the source and their ethnomedicinal uses, while portions of these barks were purchased to determine the price. The biological names of the tree barks were determined using the list by Gbile and Soladoye⁷.

RESULTS

Tree barks

A total of 39 different tree barks were identified and collected as barks displayed for sale in the three herbal markets

*Corresponding author: tbisrael@gmail.com

(Table 1), all of which have been donated and deposited at the herbarium of National Centre for Genetic Resources and Biotechnology (NACGRAB), Ibadan. In addition, the 39 trees cut across 24 plant families, with Caesalpiniaceae having the highest frequency of plant representatives. Furthermore, 21 of the 39 tree species were noted to be abundant or under cultivation, 10 were considered vulnerable, only 4 are considered endangered, while one, *Okoubakha aubrevillei* was considered as critically endangered. It should also be noted that 3 of the tree barks were yet to be identified.



Fig. 1: Photograph showing tree barks displayed for sale in Bode market



Fig 4: Photograph showing some of the collected tree barks

Diseases treated, herbal preparation and administration

Table 1 shows that the diseases treated with these barks vary widely, to include fevers, respiratory infections, gastro-intestinal problems, reproductive problems, venereal diseases, pile and haemorrhoids, mouth infections, body pains, rheumatism among many others. Furthermore, the mode of preparation of the bark for herbal medicine varies from decoction, infusion to maceration, while decoction is the most frequently-used method for preparing the barks for herbal medicine and oral administration is the most frequently used way of taking the herbal medicine formulation from the tree barks.

Herb sellers

Furthermore, all the fifteen herb sellers interviewed are females and Yoruba-speaking people. Most of which they are within the age range of 31-40, and the number of years spent in the business of herb sale ranges from 7 to 20 years. The highest formal education by the herb sellers is primary school education by only one of the 15 herb sellers interviewed, however they all have a good arithmetic grasp in money counting.

Price of barks

No price fluctuation in the herb value was observed as the interviewees claimed the current price of the barks have been relatively stable over the past one year. Most of the barks were sold at N20 (US\$5 per kg.). However, the bark of *Okoubakha aubrevillei* and *Erythrophleum suaveolens*, were sold for N100 (US\$25 per kg.) and N50 (US\$12.5 per kg.) respectively. The prices are however dependent on the bargaining ability of the buyer.

Source

The herb sellers stated that the source of the tree barks vary widely from forests and the wild areas in Iseyin, Okeho, Mamu, Ijebu, Oyo, Badagry, Ilorin and other areas. However, bark of scarce tree like *Okoubakha aubrevillei* came from Onitsha, Anambra state.



Fig 2: Photograph showing some of the collected tree barks



Fig. 3: Photograph showing some of the collected tree barks

Table 1. List of tree barks sold in herbal markets in Ibadan Metropolis, their ethnomedicinal uses and conservation status

S/N	Local name	Biological name	Plant family	Disease treated, Preparation and usage	Conservation status
1	Oganwo	<i>Khaya grandifoliola</i> C. DC.	Meliaceae	Bark decoction is taken for malaria. It is used in the form of concoction for the treatment of convulsion, cough, stomach ache, fever, threatened abortion, rheumatism and dermatomycosis.	Endangered
2	Pear	<i>Persea americana</i> Mill.	Lauraceae	Bark is used to treat cough and asthma, and digestive orders as well as for the stimulation of menstruation in women.	Abundant/cultivated
3	Ahun	<i>Alstonia boonei</i> De Wild.	Apocynaceae	Bark decoction is taken for the treatment of Malaria and haemorrhoids. An infusion in cold water of the stem bark is drunk as a cure for venereal diseases, worms, snakebite and rheumatic pains and to relax muscles. It is also taken internally or used as a bath as a remedy for dizziness. An infusion of root and stem bark is drunk as a remedy for asthma; a liquid made from the stem bark and fruit is drunk once daily to treat impotence. Cut <i>Alstonia boonei</i> bark, <i>Citrus aurantifolia</i> (10 fruits), <i>Citrus paradise</i> fruits, <i>Zingiber officinale</i> , <i>Allium sativum</i> , <i>Allium cepa</i> in water/soda water for a concoction/decoction. Drink to treat rheumatoid arthritis.	Vulnerable
4	Mangoro	<i>Mangifera indica</i> L.	Anacardiaceae	Bake decoction taken singly or with mango leaves to treat Malaria	Abundant/cultivated
5	Iree	<i>Funtumia elastica</i> P. Preuss.	Apocynaceae	Bark decoction to treat fever and Haemorrhoids.	Vulnerable
6	Opon	<i>Lannea welwitschii</i> (Hiern) Engl	Anacardiaceae	Bark decoctions are administered to treat fever.	Abundant
7	Awopa	<i>Enantia chlorantha</i> Oliv.	Annonaceae	Bark decoction taken orally to treat Haemorrhoids, fever including malaria, gastric and duodenal ulcers, liver complaints, tuberculosis, diarrhoea, infections of the urinary tract, rheumatism and intercostal pain, and are applied externally to treat skin complaints and fatigue. Bark powder is applied to wounds, sores and skin ulcers. The bark is reputed to have aphrodisiac properties to improve male sexual performance. Bark infusion is used for the treatment of cough and wounds.	Endangered
8	Iya	<i>Daniellia oliveri</i> (Rolfe) Hutch. & Dalz.	Caesalpiniaceae	Stem bark used for the treatment of toothache, colic diseases, skin diseases	Abundant
9	koko	<i>Theobroma cacao</i> Linn.	Sterculiaceae	Bark decoction is taken one small cup, three times daily for blood supply and for the treatment of malaria.	Abundant/cultivated
10	Egbesi	<i>Sarcocephalus latifolius</i> (Smith) Bruce	Rubiaceae	Bark decoction for the treatment of malaria, infusions and decoctions of the bark and leaves are used for the treatment of stomach pains, fever, diarrhoea, and against parasites, like nematodes in men and animals.	Vulnerable
11	Opoto	<i>Ficus capensis</i> Thunb.	Moraceae	The stem bark is used for the treatment of threatened abortion. Bark decoctions or infusions are used against pain, rheumatism, diarrhoea, stomach problems, oedema in children, infertility and as a galactagogue. The powdered bark is applied on skin rashes and mouth sores. Bark macerations are drunk for treatment of fever and cough.	Abundant
12	Ogbigbo/ogbogbo	<i>Hypoestes forskoolii</i> (Vahl) Roem. & Schult	Acanthaceae	Bark decoction for treating skin infections.	Abundant
13	Oruwo	<i>Morinda lucida</i> Benth.	Rubiaceae	Decoctions and infusions of root, bark and leaves are recognized remedies against different types of fever, including yellow fever, malaria, trypanosomiasis and feverish condition during childbirth.	Abundant
14	Ira	<i>Bridelia micrantha</i> (Hochst.) Baill	Euphorbiaceae	Stem bark decoction is taken orally for the treatment of mouth wash, treatment of cough, pile, Haemorrhoids and prevention of miscarriage.	Vulnerable
15	Afara	<i>Terminalia superba</i> Engl. et Diels	Combretaceae	<i>Terminalia superba</i> bark decoction is given for diarrhoea and dysentery. The inner-bark is used as a macerate for mouthwash to treat gingivitis and thrush. Bark decoctions and macerations are used to treat wounds, sores, haemorrhoids, diarrhoea, dysentery, malaria, vomiting, gingivitis, bronchitis, aphthae, swellings and ovarian troubles, and as an expectorant and anodyne.	Vulnerable
16	Sapo	<i>Anthocleista djalonensis</i> (A. Chev.)	Loganiaceae	<i>Anthocleista djalonensis</i> bark, <i>Aframomum melegueta</i> fruit, <i>Rauvolfia vomitoria</i> stem bark, <i>Allium sativum</i> bulb, <i>Allium ascolanicum</i> bulb, <i>Eugenia aromatica</i> flower, <i>Acacia nilotica</i> fruit, <i>Dalbergieuna welwitschii</i> root, <i>Mondora myristica</i> fruit are washed and cut into pieces and placed in a 4 liter keg and	Vulnerable

17	Jebo	<i>Entandrophragma utile</i> (Dawe & Sprague) Sprague	Meliaceae	soaked with clean water and alcoholic beverages for three to four days. One tea cup of the extract is taken thrice daily until the hemorrhoid disappears. The stem, rootbark and leaves are used to treat malaria, jaundice, diabetes and abscesses. The leaves and stembark are used as malarial remedy. Bark sap is taken or used as a wash to treat stomach-ache and kidney pain, it is rubbed in to relieve rheumatism, and it is dropped into the eyes to treat eye inflammations and into the ear to treat otitis. A massage with the bark maceration is considered useful as tonic and stimulant. Charred and pulverized bark, mixed with salt and palm oil, is rubbed into scarifications to treat headache. The bark is claimed to heal peptic ulcers.	Endangered
18	Amuje	<i>Bryocarpus coccineus</i> Schum and Thonn.	Connaraceae	The plant is used for the treatment of venereal diseases, impotency, earache, jaundice, piles, sore of mouth and skin, tumour, wounds, stomatitis, swellings, rheumatism and as a urinary sedative.	Vulnerable
19	Obi	<i>Cola nitida</i> (Vent.) Schott et Endl	Sterculiaceae	Bark decoction is used to treat Haemorrhoids. The bark is prepared as a tonic to treat dysentery, coughs, diarrhoea and vomiting.	Abundant/cultivated
20	Arira	<i>Detarium microcarpum</i> Guill. & Perr.	Caesalpiniaceae	The bark, leaves and roots of <i>Detarium microcarpum</i> are prepared as infusions or decoctions to treat rheumatism, venereal diseases, urogenital infections, haemorrhoids, caries, biliousness, stomach-ache, intestinal worms and diarrhoea including dysentery. They are also used against malaria, leprosy and impotence. A decoction of the powdered bark is widely taken to alleviate pains such as headache, sore throat, back pain and painful menstruation. The fresh bark or leaves are applied to wounds to prevent infections.	Vulnerable
21	Igba	<i>Entada abyssinica</i> Steud. ex A. Rich	Mimosaceae	A decoction of the bark is taken for coughs, chronic bronchial engorgement, rheumatic pains and abdominal pain.	Vulnerable
22	Abafe	<i>Piliostigma thonningii</i> (Schum.) Milne-Redh.	Caesalpiniaceae	The bark, root and leaves are used in treating leprosy, smallpox, yellow fever, chest pain, cough, bronchitis, wounds, chronic ulcers, diarrhoea, toothache and gingivitis. Stem bark used to treat dysentery, toothache, snake bite and as anthelmintic. The most frequent use of the bark of <i>P. thonningii</i> is in treating cough, usually as an infusion or by chewing of the bark. The bark infusion or maceration also enters into the treatment of malaria and leprosy.	Abundant
23	Yaa/iyaa	<i>Daniella ogea</i> (Harms) Rolfe ex Holl	Caesalpiniaceae	Bark decoction taken orally to treat body pains.	Abundant
24	Oori	<i>Vitex doniana</i> Sweet	Verbenaceae	Powdered bark added to water is taken to treat colic, and a bark extract is used to treat stomach complaints and kidney troubles. The bark is also used against leprosy and liver diseases, and to control bleeding after childbirth.	Abundant
25	Ponhan	<i>Lophira alata</i> Banks ex Gaertn.	Ochnaceae	Bark decoction is taken for malaria, sniffing the bark is used as a traditional treatment for headache. Bark decoction is taken, one small cup three times daily to treat typhoid.	Abundant
26	Okuku	<i>Ancistrophyllum secundiflorum</i> (P. Beauv.) Wendl	Araceae	Bark decoction is used for the treatment of malaria	Vulnerable
27	Ponpola, tooro,	<i>Bombax buonopozense</i> P. Beauv.	Bombacaceae	The bark is used as an ointment for ringworm, skin diseases and craw-craw. The bark is also used for stomach ache, as blood tonic and as emmenagogue.	Abundant
28	elegun Oruru	<i>Spathodea campanulata</i> P. Beauv.	Bignoniaceae	The bark is used in the treatment of fungal infections, impetigo, herpes, scabies as well as other skin infections.	Abundant
29	Asofeyeje	<i>Rauvolfia vomitoria</i> Afzel.	Apocynaceae	Stem bark is used for treating haemorrhoids and as aphrodisiac.	Abundant
30	Obo	<i>Erythrophleum suaveolens</i> (Guill. & Perr.) Brenan	Caesalpiniaceae	Bark concoction is used to take birth twice daily for skin irritation. The bark, is used as emetic and purgative. The crushed bark is applied to swellings caused by <i>Filaria</i> .	Endangered
31	Igi nla	<i>Okoubakha aubrevillei</i> Pellegr. & Normand	Santalaceae	Skin problems, including those caused by syphilis and leprosy, are treated by washing with, or bathing in a macerate or infusion of the bark in water. External application of bark preparations is also practised to counteract poisoning. Bark macerate is drunk to cure tachycardia and is taken as a vapour bath or as nose drops to cure oedema.	Critically endangered
32	Lawale/aidan tooro	<i>Senna fistula</i> Linn.	Caesalpiniaceae	Bark decoction used as a laxative. The barks of <i>Canthium subcordatum</i> , <i>Khaya senegalensis</i> , <i>Senna fistula</i> and <i>Stephania dinklagei</i> are pulverized in a part, while the leaves of <i>Viscum album</i> , <i>Synsepalum dulcificum</i> , <i>Dialium guineense</i> , <i>Clerodendron splendens</i> <i>Carica papaya</i> and <i>Moringa oleifera</i> as well as	Abundant

33	Afoforo	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	Then the two mixture parts are mixed together, poured into a container with clean water and boiled. One tea cup is administered thrice daily for haemorrhoids until the ailment is cured in about two weeks.	Abundant
34	Kaju	<i>Anacardium occidentale</i> L.	Anacardiaceae	Both bark and leaf decoctions are used as a gargle, inhalation, drink, lotion, bath or vapour bath for coughs, sore throat, asthma, bronchitis, gonorrhoea, yellow fever, toothache, as a vermifuge, and it is known to have anti plasmodium properties. Bark infusion is drunk to control dysentery.	Abundant/cultivated
35	Ooro	<i>Antaris toxicaria</i> Leschenault	Moraceae	Bark decoction is taken once daily for 10 days to treat oral infection. Stem bark used to treat diabetes and haemorrhoids, stem and bark extracts are used extensively for the treatment of diarrhea, dysentery and colonic pain.	Abundant
36	Eemi	<i>Vitellaria paradoxa</i> G. Don	Sapotaceae	An infusion of the stem bark and leaves of the plant is used as a remedy for toothache and sore gums while the astringent bark is given for severe diarrhea and thrush.	Abundant
37	Rere	<i>Trichilia rubescens</i> Oliv.	Meliaceae	The stem bark of <i>Antiaris africana</i> , when ground with fresh pepper (<i>Capsicum annum</i>) and alligator pepper (<i>Aframomum melegueta</i>) into a paste is ethnobotanically used in Nigeria to relieve rheumatic, respiratory and stomachic pains.	Abundant
				A bark infusion is used as an eyewash as a footbath to help extract jiggers, and to neutralize the venom of the spitting cobra. The bark is used to suppress cough and also to treat leprosy. Stem bark is used for the treatment of dysentery, hemorrhoids, schistosomiasis, coughs, jaundice, nausea, diarrhea, constipation, headaches, fever.	Abundant
				Bark decoction is used to treat parasitic diseases, fever, gonorrhoea, enema, antiseptics. The bark decoctions are used to treat bronchitis, stomach-ache, diarrhoea, dizziness, insanity and sexual impotence. They are also administered as an enema to treat constipation and abdominal complaints.	Abundant

Frequency of sale

It could be observed that there is high rate of patronage of the herbal products, especially the tree barks in these herbal markets. The herb sellers claimed that they sell in wholesale to people from Ijebu areas of neighbouring Ogun state and other parts of Oyo state, while they also sell little quantities to direct consumers.

Frequency of supply

In Bode market, the herb sellers explained that the herb gatherers bring the barks and other plant parts a day to the main market day, which is every 8 days.

DISCUSSION

This study has shown a wide range of tree barks used in herbal medicine in Ibadan. However, debarking of the trees for bark harvesting is likely to have adverse effects on the survival and growth of the trees. Though most trees have the ability to regenerate and re-grow the bark, this ability varies from tree to tree. A general field observation in parts of south-western Nigeria is that tree species that appear to have quick regrowth of their harvested bark are persistently extracted soon after each recovery. Not all trees re-grow their bark and there appears to be a range of variation in recoverability⁸. It was further

reported that at one extreme in Cameroon, *Faurea macnaghtorca* and *Podocarpus henkelli* are the species most sensitive to bark removed while *Warburgia salutaris* (Bertol.f.) Chiov. and *Prunus africana* (Hook.f.) Kalkman are at the other extreme where complete bark re-growth can occur after the trunk has been ring-debarked⁹. Furthermore, *Alstonia boonei* De Wild., *Entandrophragma angolense* (Welw.) C. DC., *Khaya grandifoliola* C. DC., *K. senegalensis* (Desr.) A. Juss. and *Spondias mombin* L., were reported to belong to the fast re-growth group while bark of *Adansonia digitata* L., *Gliricidia sepium* (Jacq.) Walp., *Newbouldia laevis* (Pal.) Bureau and *Theobroma cacao* L. had relatively slow re-growth¹⁰. However, the negative impact of continuous debarking of a tree or shrub may be manifested by some species since the coppicing ability and vulnerability to attacks of pests, vary with the physiology and anatomy of the different species. As bark also vary in morphology and anatomy; this may influence the capacity of a species to withstand continuous bark extraction.

Despite the importance of bark in ethnomedicinal practice, their identification, especially in dry states continues to be a major problem⁸. This study also confirms this with a lot of difficulty in identifying the tree barks and 3 of them are yet to be identified. Information on bark anatomy of tropical trees and its use in taxonomy is scarce¹¹. Whitmore¹² introduced certain criteria for the identification and classification of different species on the basis of bark morphology. Whitmore's and other criteria were applied by Yunus et al¹³ for field identification of 103 Indian trees. A key for identifying bark of some

frequently – used medicinal trees will enhance their use in herbal preparations. Fashola and Egunyomi⁸ designed a key for identifying tree barks. Herb gatherers and collectors need to be given proper orientation on the debarking of trees and the need for sustainable bark harvesting of slow bark re-growing trees for their survival. In addition, this study further affirms the fact that conservation attention needs to be given to *Okoubakha aubrevillei* as the tree continually suffers over-exploitation in West Africa, where the tree is endemic.

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