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The Kakamega Forest Medicinal Plant Resources and their Utilization by the Adjacent Luhya Community

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Abstract: Kakamega Forest is a rich natural setting endowed with abundant flora and fauna used by the local communities who once lived within the forest and those who now border it. There has been scarcity of information on plants used in basic traditional healthcare by the adjacent communities, Luhya, yet alternative medicine continues to fill in the gap left over by modern medicine. This study sought to survey and document plants used from the forest as medicine or in traditional healthcare and collect, identify and preserve specimens of such plants in the herbarium. Field observation and 240 open-ended interviews conducted during this research have indicated that the people highly value plant medicines for their primary healthcare needs and that the plants are used to cover a wide range of ailments and conditions affecting both man and his domestic animals. The diseases range from topical to internal and psychosomatic ailments, to simple as well as stubborn conditions. Such diseases include whitlow, measles, chickenpox and cancer amongst others. A total of one hundred and twenty herbal practitioners, over 18 years of age, were interviewed between March and September 2002 in this ethno-medicinal study. There have since been bi-annual follow up visits for more information. A total of 168 plant species spanning 74 plant families are reported herein. Moraceae topped the list with 10 species followed by the Euphorbiacea with 9. The most frequently used were *Zanthoxylum gillettii*, *Trichilia emetica*, *Olea capensis*, *Entada abyssinica* and *Croton macrostachyus*. The biological diversity, as a phytomedical resource has been indexed thus, contributing to the database of the Kakamega Forest plants. It is hoped that the report will be of use to policy makers. There are several plants with uses hitherto not reported, for instance *Craterispermum schweinfurthii* an aphrodisiac, *Allophylus abyssinica* for the hunch back, *Ensete edule* for measles and *Sapium ellipticum* for burns. This research has the potential for production and industrialization of the medicinal plants. Medicinal value of plants is hereby fronted as a reason for conserving and preserving biodiversity in Kakamega Forest.

Key words: Ethno-medicine, medicinal plants, primary healthcare, conservation, indigenous knowledge, Luhya

INTRODUCTION

Kakamega Forest, Kenya, forms part of the world's equatorial forest belt. The equatorial forests in Africa are the extension of the Amazonian forest system in South America (Kokwaro, 1988). As such, Kakamega Forest is a living remnant from the long Pleistocene period when great climatic changes occurred throughout the world. As human population increased, the forests further shrunk getting replaced by savannas or bush leaving behind pockets of forests in Zaire, Uganda and Kenya (KIFCON, 1994). Today, Kakamega Forest covers an area of only 327 km^2, but remains an important habitat for various species of animals and plants most of which are indigenous making the forest unique (Onyango *et al*., 2004; RoK, 2002). Timber exploitation continued into 1980s when it was finally realized that the forest was more valuable as a scientific resource than as a source of timber alone (KIFCON, 1994; RoK, 2002). This has fuelled the need to conserve the forest.

In the early 20th century, various Luhya clans established themselves around Kakamega Forest (Were and Wilson, 1968). The Luhya people are the focus of study. This community is rural and practitioners of herbal medicine remain active. Many people still supplement herbal remedies with modern medicine partly due to dearth of services or inadequacy of services rendered at most of the local health institutions and partly

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due to cultural practices, which still are deeply rooted (Were and Wilson, 1968). The population density of persons km^{-2} 861-Shinyallu, 1,485-Municipality, 645-Ikolomani and Kabras-352 and intensive land use around this forest is itself a danger to the very existence of the biological diversity of the area (RoK, 2002).

There still is a strong dependence of the Luhya on the use of plants especially for medicine to date. With forest destruction, the Luhya endanger their traditions and livelihood. This ethno medicinal study examines the traditional primary healthcare of the Luhya people around Kakamega forest since it has been little studied. Particular attention has been given to the custodians of Indigenous Knowledge (IK), specifically the healers, practitioners and other knowledgeable members of the society. The findings will expand the data and information available and will be of use to policy makers and health actors, while the custodians of knowledge are still alive and active.

The growth of herbal medicine is on the rise worldwide by the trend of back to nature creating a new niche for plant-based healthcare (Cox, 1994). The WHO and other major bodies have stressed the need to employ traditional healthcare where appropriate in healthcare programs to achieve the health for all goals. This is also, part of the Millennium Development Goals and Vision 2030 for Kenya. Between 35,000-50,000 plants species are used medically yet only about 100 are used to obtain clinically important drugs or drug molecules. There is thus, scope to add to the list of plants used and those that can clinically be used.

MATERIALS AND METHODS

Study focus: Kakamega forest: The Kakamega Forest stretches from 0°10"-0°21"N and longitude 34°47'-'34°58"E. It is located in Kakamega and Vihiga Districts in Western Province of Kenya and lies within the Lake Basin North of the Equator. The reserve comprises of 5 blocks namely Malava (719 ha), Bunyala (825 ha), Kaimosi (200 ha), Maragoli (720 ha) and the main forest block Kakamega comprising of Isecheno (14.500 ha), Kisere (471 ha) and Buyangu (3,997ha) (Fig. 1).

Data collection: The study focused on the Luhya people. Emphasis was laid on ethno medicine, specifically, the phyto-medicines. The study involved interviews, photo taking and ocular observation. The observations were open, but non participatory so as to get more objective results. The interviews were oral and this required raport. Individuals were preferred to groups because of the nature of information required. The unstructured or semi

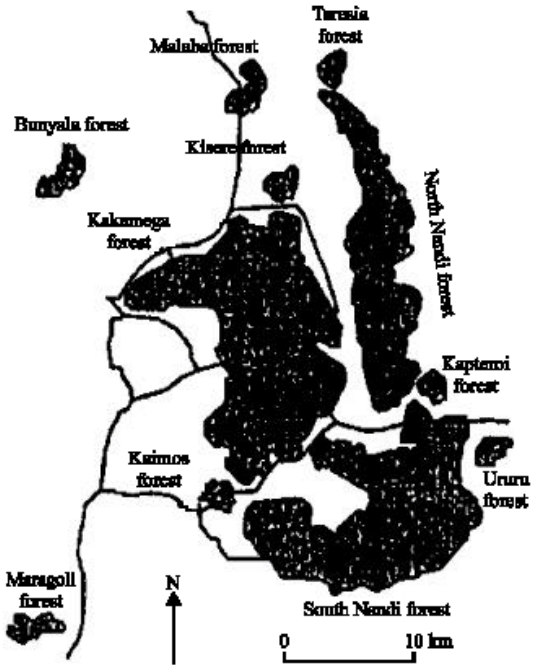

Fig. 1: Annex, OGUTU, 1997, 32

structured questions allowed the interviewees to give as much information as they could in a conversational atmosphere in a more or less confidential manner. Care was taken to avoid lies by confirming surprising answers and by not asking leading questions or those with implied responses. Questionnaire forms were often only filled in later and not during interview sessions. In total, 120 persons were interviewed over the 6-months period between March and September 2002. The local and scientific names were sought.

Specimen collection and processing: The plant specimens were collected, processed and dried in the university drier at 40°C. The ones that could not be identified immediately in the field were taken to the Nairobi University Herbarium (NAI) and the East Africa Herbarium (EA) (also referred to as the National Museums of Kenya Herbarium), for proper identification. Standard taxonomic procedures were diligently followed (Agnew and Agnew, 1994; Beentje, 1994; Judd *et al.*, 2008; Lawrence, 1951; Maundu and Tengnas, 2005; Stace, 1989) to ensure accuracy of scientific names to the corresponding local names. Simon Mathenge of University of Nairobi Herbarium and Kirika of the East Africa Herbarium confirmed the names. Taxonomic recognition of name changes has been given through authorities and synonyms where appropriate. The pressed plant materials were mounted, poisoned and stored as

voucher specimens in the University Herbarium, Maseno with duplicates to be deposited at the NAI and EA.

Questionnaires were used but the study situation remained tricky due to the forest management policy (Kenya Wildlife Service side and Kenya Forest Department renamed Kenya Forest Service). Purported remedies were regarded as valid if >3 independent persons gave the same account. But, since knowledge in traditional medical practice is highly secretive, all accounts were recorded for they could represent restricted knowledge that's very effective in disease management. The rest of the data was subjected to descriptive statistical analysis using Excel.

RESULTS

Plants mentioned by various participants have been listed alphabetically for convenience. Unless otherwise stated, the disease or conditions and associated medicaments are those applicable to man. This summary is a species list that gives more information on tree species cited regarding range (number) of disease the plants can treat, parts used and other local names. The local names are in Luhya, a name that has been preferred to cater for all the dialects available since the adjacent communities are a mix across the various subgroups (Table 1).

Table 1: Plant list, local names are in Luhya language

Scientific name	Local name (s) in Luhya	Family	Part used	Disease cartegory
Acacia abyssinica Benth. *Calophylla* sp. Brenan	Omunyenya	Mimosaceae	St, bk, gum	Gut, wounds
Albizia gummifera (JF gmel.) C.A. Sm	Omukhunzulu	Mimosaceae	Bk, gum	Gut
Albizzia coriaria Oliv.	Omuperi/Musenzeli, musenzeri	Mimosaceae	st, bk	Eye, boils, flu, colic pains, gut, abdominal discomfort, constipation, stomachache, fertility, deworming, joints and backbone, STD, cardiac conditions, kidney ailments
Allophylus abyssinicus (Hochst.) Radlk.	Shisasari	Sapindaceae	lv, rt	Boils, childbirth, STD, hunchback and crooked limbs
Aningeria altissima (A. Chev.) Aubrev and Pellegr.	Mukangu	Sapotaceae	bk	Bechic
Antiaris toxicaria (Pers.) Lesch.	Mulundu /Omulundu, lulundu	Moraceae	lv, bk	fontanel gap, abdominal pains, STD, kidney ailments
Bequaertiodendron oblanceolatum (S. Moore) Heine and J.H.Hemsl.	Musamia	Sapotaceae	Fr	Scabies
Bersama abyssinica Fres.	Omuyundi, muyundi	Melianthaceae	Bk	Stomachache, joints and backbone, prostrate
Blighia unijugata Bak.	Shiarambatsa, shirambatsia	Sapindaceae	Bk	Veterinary
Bridelia micrantha (Hoechst.) Baill.	Shikangania, Kuluhanga luhanga-Shihanga Mulondang'ombe, Mukonang'ombe, Malesi king'ombe	Euphorbiaceae	rt, bk	Boils, flu, gut, stomachache, joints and backbone, STD, dysentery, diarrhoea
Carica papaya L.	Pawpaw	Caricaceae	rt, fr, lv	Skin, ringworms, cough, miscarriage, STD
Ceiba pentandra (L.) Gaertn.	Shikhori	Bombacaceae	Bk	General body illness
Celtis gomphophylla Bak. (Syn. *C. durandii* Engl.)	Musua/ muswa	Ulmaceae	Rt	Fertility, deworming, general body illness, STD
Chaetacme aristata Planch.	Likhoma/Likunga, Likhoma, likunga)/mtondo kwerayi?	Ulmaceae	lv	Skin, boils, fertility
Chorisia speciosa A. St. Hil		Bombacaceae	Bk	Wounds
Clerodendrum myricoides (Hochst.) Vatke	Shisilangoho, Shikuma	Verbenaceae	rt, lv, tw, bk	Sore throat, ear, superstition, chest problems, flu, stomachache, joints and backbones, STD, dysentery,diarrhoea, malaria, headache
Coffea eugenoides S. Moore	Nandi/wild coffee, Shirokhomoli/shikhokoli, ikawa, Nandi coffee/wild coffee	Rubiaceae	Lv	Heavy menses, stop menses, veterinary
Combretum molle G. Don	Shilaha/eshilaha, sheraha	Combretaceae	St	Warts, boils
Craterispermum schweinfurthii Hiern.	Murenjeretsia	Rubiaceae	Bk	Aphrodisiac, diarrhoea, malaria, veterinary
Croton macrostachyus Del.	Musutsu/mutswitswi, Shisutsu, Muswishi/ Musueshi	Euphorbiaceae	rt, bk, lv	Sore throat, flu, TB, uvula, haemostatics, stomachache, measles, STD, dysentery, diarrhoea, malaria
Croton megalocarpus Hutch.	Musine/Mukinduri	Euphorbiaceae	bk, lv, rt	Paralysis/stroke, chest problems, stomachache, arbortifacients, diarrhoea
Cupressus lusitanica	Mukhurabwa, mutarakwa, Cypruss/cypress	Cupressaceae	lv, gum, fr, bk	Superstition, toothache, deworming, measles, dysentery
Cussonia arborea A. Rich.	Shitandavasia = kitandawabasia	Araliaceae	Rt	Stomachache, childbirth, veterinary
Diospyros abyssinica (Hiern) F. White	Lusui	Ebenaceae	bk, tw, wp, rt	Superstition, STD, diarrhoea
Dracaena steudneri Engl.	Mkhuvambu/ mukhuvambu	Dracaenaceae (?inc. Agavaceae)	bk, lv	Superstition, stomachache, measles, diarrhoea, veterinary

Table 1: Continue

Scientific name	Local name (s) in Luhya	Family	Part used	Disease cartegory
Ehretia cymosa Thonn.	Likati/shikati, shikuti	Boraginaceae	rt, tw	Boils, stomachache
Ensete edule (J.F. Gmel.) Horan, (Syn. *Ensete ventricosum* (Welw.) Cheeseman)	(Lisitsi/masitsi, Litsitsi) liruku	*Musaceae*	Tuber, fr	Measles
Entada abyssinica A. Rich.	Musembe	Mimosaceae	bk, tw, lv	Scabies, flu, TB, stomachache, childbirth, fertility, deworming, joints and backbones, STD, dysentry, diarrhoea, cardiac conditions, kidney ailments, cancer, veterinary
Erythrina abyssinica DC	Shirembe, mrembe,	Fabaceae	lv, bk, lv,	Superstition, skin, flu, haemostatics, stomachache,
Abyssinica sp.	Omurembe, omrembe, murembe	(Papilionaceae)	tw, wp	stomach ulcers, deworming, STD, mumps, veterinary
Eucalyptus globulis	Blue gum	Myrtaceae	Lv	Measles, flu
Euclea divinorum Hiem.	Mujendasi/muchendasi	Ebenaceae	Rt	Sore throat
Euphorbia tirucalli L.	Euphorbia (eshikhoni).	Euphorbiaceae	Sap	Warts
Fagaropsis angolensis (Engl.) Dale	Shingulutse, Shingululutse	Rutaceae	tw, bk	Chest problems, gut, induce menopause, stomachache, STD
Ficus exasperata Vahl.	Omuseno, museno	Moraceae	bk	
Ficus lutea Vahl.	Mukavakava, alukhava, alukhaba, alukhaaba, mkava, Alukhava/alukhaaba, Shikalava/shikalaba, shikholove, Likalava	Moraceae	rt, lv, bk	Sore throat, asthma, heavy menses, general illness, veterinary
Ficus natalensis Hochst.	Mutoto, Omutoto	Moraceae	bk	Toothache
Ficus sur Forssk. (Syn. *F. capensis* Thunb.)	Musingu	Moraceae	Bk	Toothache
Ficus sycomorus L.	Omukhuyu, mukhuyu	Moraceae	Sap, bk	Toothache, colic pains, gut, abdominal discomfort, constipation
Ficus thonningii Bl.	Mutoto, Muyundi	Moraceae	bk, lv	Chest problems, stomachache, malaria, veterinary
Funtumia africana (Benth) Stapf.	Mutondo/omutondo	Apocynaceae	lv, bk	Boils, dysentry, diarrhoea
Grevillea robusta A. Cunn. Ex. R. Br.	Bipilia, ilieyo	Proteaceae	Bk	Sore throat, ear, superstition, chest problems, flu, toothache
Harungana madagascariensis Lam. Ex. Poir	Musila/Munamusai/ Mwinyalira matsai, muranga, mnamsai, Shamasai/shisamatsayi	Clussiaceae (Guttiferae)	lv, fr, bk	Eye, superstition, scabies, flu, stomachache, heavy menses, general body illness, dysentry, malaria
Kigelia africana (Lam.) Benth. (Syn *K. aethiopium* (Fenzl.) Dandy, *K. pinnata* (Jacq. DC.))	Eshiololwe...	Bignoniaceae	Fr	Childbirth
Kigelia moosa Sprague	Murabe/Omurabe/ muratina, Eshiololwe…	Bignoniaceae	Bk, rtfr	Gut, measles, topical
Lannea fulva(Engl.) Engl.	Muvumbi/Mubumbe/ bwinyanya, kumubumbu, lumuvumbu, luvungu, lubungu	Anacardiaceae	Bk	Gut, diarrhoea
Lannea schimperi (A.Rich) Engl.	Mwembu, kumugumbu	Anacardiaceae	bk	Gut, diarrhoea, dysentery
Maesa lanceolata Forrsk.	Mushebeshebe, Mushevesheve	Myrsinaceae	seeds, rt, bk, lv	Superstition, boils, colic pains, snakebite, STD, headache
Mangifera indica J. Koning ex L.	Mango	Anacardiaceae	fr	Constipation
Markhamia lutea (Benth.) K. Schum.	Lusiola	Bignoniaceae	lv, bk, rt	Sore throat, flu, stomachache, measles, cardiac conditions, kidney ailments, veterinary
Maytenus heterophylla (Eckl. and Zeyh.) Robson	Litsoyi	Celastraceae	Rt, tw	Gut
Melia azedarach L.	Neem, mwarubaini	Meliaceae	lv, bk	Stomachache, gut, dysentery, diarrhoea, malaria, measles, kidney ailments
Morus mesozygia, Stapf. (Incl. *M. lactea* (Sim Mildbr.)	Omunuku, munugu	Moraceae	bk, st	Urinary tract infection, veterinary
Musa paradisiaca L.	Plantain/banana	Musaceae	Fl	Ear, asthma, cough
Olea capensis L. subsp. Welwitschii Friis and P.S. Green	Mutukuyo/mtukuyu/ Elgon teak	Oleaceae	bk, rt, tw	Scabies, chest problems, flu, gut, constipation, stomachache, childbirth, prenatal care, fertility, joints and backbones, STD, dysentry, diarrhoea, cancer, urinary tract infection
Persea americana Mill.	Avocado	Lauraceae	fr	Skin, gut
Piliostigma thonningii (Schumach.) Milne-Redh.	Shiboyeramboko shivoyelamboko)	Caesalpiniaceae	bk, lv, rt	Ear, superstition, stomachache, chilbirth, fractures, veterinary, vegetables, colic pains
Pinus patula		Piniaceae	Lv,	Fflue, respiratory
Pittosporum mannii Hook. F.	Mmonyo monyio	Pittosporaceae	bk, rt	Boils, STD

Table 1: Continue

Scientific name	Local name (s) in Luhya	Family	Part used	Disease cartegory
Plectranthus barbartus Andr.	Eshirookho, shilauha... shilokho	Lamiaceae	bk, lv	Stomachache, gut, fractures, dysentry, diarrhoea
Prunus africana	Mwililitsa	Rosaceae	bk, lv	Joints/ backbone, STD, prostrate conditions, cancer, urinary tract infection
Psidium guajava L.	Lipera	Myrtaceae	bk, rt	Cancer
Sapium ellipticum (Krauss) Pax	Mutseso/omutseso, Musese) /Mutheso/musetso	Euphorbiaceae	Bk	Burns, veterinary
Senna spectabilis Irwin et Barneby.		Caesalpiniaceae	bk, rt	Joints and backbone, STD
Sesbania sesban (L.) Merr.	Omukhule, lukhule/ lukhula, mukhule	Fabaceae (Papilionaceae)	Lv	Childbirth, poultry
Spathodea campanulata P. Beauv. (Syn *S. nilotica* Seem.)	Mutsulio/Nandi flame, Muthulio	Bignoniaceae	Bk	Superstition, burns, stomach problems, arbortifacients, fertility, STD, veterinary
Syzygium cumini (L.) Skeels	Zambarau	Myrtaceae	Bk, fr	Dysentery, gut
Syzygium guineense (Willd.) DC.	Musioma/Musirinya, Shitotole, kumusitole kumusemwa	Myrtaceae	bk, tw	Fertility, kidney ailments, veterinary
Terminalia mollis Laws	Olokhongwe	Combretaceae	bk	Gut, diarrhoea, stomachache
Trichilia emetica Vahl.	Munyama/Omunyama, irojo, musinzi, mnyama	Meliaceae	bk, lv, rt, tw	Scabies, boils, chest problems, flu, whooping cough, TB, gut, constipation, stomachache, prenatal care, abortifacients, fertility, deworming, joins and backbones, measles, STD, dysentry, diarrhoea, cardiac conditions, veterinary
Trilepisium madagascariensis DC. (Syn. *Bosqueia phoberos*)	Mbalakaya	Moraceae	Bk	Joint and backbone
Vangueria apiculata K. Schum	Shikhomoli/shikhomoli /Okukhomoli	Rubiaceae	lv, tw	Stop menses, veterinary
Vangueria infausta Burch.	Mukhomoli	Rubiaceae	Lv	Stop menses
Vernonia amygdalina Delile	Mululusia, Musululitsa, Munyerasulusi, Shisululitsa, Shikulusi/shikuku shikulusu)	Asteraceae	Rt	Stitches
Warburgia ugandensis Sprague	Apachi/abachi	Canellaceae	Rt, bk, tw	Chest, asthma, respiratory, flu, sore throat cough,
Zanthoxyllum gillettii (DE Wild.) Waterm. (Not Z. *macroph.*)	Shikhuma, /shihuma	Rutaceae	Bk	Sore throat, scabies, chest problems, stomachache, Gut, general, conditions, oral/bucal rheumatism, malaria, headache, cardiac conditions, gout, veterinary

bk: bark; fl: flower; fr: fruit; lv: leaves; rt: root; st: stem; tb: tuber; tw: twigs; wp: whole plant; sa: sap; se: seed; rh: rhizome; gu: gum;

DISCUSSION

The survey revealed that information about plants is fairly widespread considering that of the 120 persons interviewed; 110 (91%) gave positive response. Only 10 (9%) totally refused. The 40 confirmed that they knew a lot about plants used in medicine but were reluctant to divulge their knowledge. Of the 110 who gave information, 14 (12.7%) gave uses of plants, but not plant names meaning that knowledge was there; 10 others (9%) gave only two remedies each though they were very knowledgeable; 4 others (3.6%) only listed names of plants used, but not how or for what; the rest (74.67%), majority, gave information freely. If the widespread knowledge was an indicator of potential use, then one could state that plant resources were heavily used in medicine. Out of the 110, who were positive, only 17 (16.36%) were not sure of names of some plants used. Thus, the people had a good folk knowledge of plants.

The local Luhya names provided the key to local biodiversity communication about. The problem is that local names may be general and imprecise. For instance, shikuma refers to two unrelated plants, *Clerodendrum* and *Hoslundia* (Verbenaceae and Lamiaceae, respectively). Scientific names provide a precise tool to understand and retrieve information on plants. Documented in this report are 168 plant species of medicinal value. Of these 21 were herbs, 4 were twiners or lianas, 14 were climbers, 45 were shrubs, 82 were trees and 1 creeper. About 75% of these were shrub/tree species. They were spread across major plant families Moraceae and Euphorbiaceae afforded 10 species each followed by Lamiaceae with 9 records. The species range included poisonous plants such as *Funtumia africana* and *Tabernamontana ventricosa.* Most records were indigenous taxa though some introduced species such as *Cupressus lusitanica*, *Grevillea robusta*, *Eucalyptus globulis*, *Sesbania sesban*, *Acrocarpus fraxinifolius*, *Pinus patula Punica granata* (Pomegranate) and *Melia azedarach* ended up in the local pharmacopoeia indicating that culture is dynamic. This study reports on tree species of medicinal value. Other categories will appear in subsequent publications.

Many plant harvesters were only interested in short term gains going by the many dried up and or over

debarked trees. Many *Trichilia emetica* trees had dried up due to poor harvesting. Different plant parts (roots, bark, gum, sap, seeds, fruit, flowers, twigs) were valued for treating varied or similar diseases. This explains why certain specific taxa were targeted for their bark, roots or rhizomes. Root destruction impacts negatively on plants such as *Markhamia lutea* hence, the forest. *Eucalytptus globulis* and *Melia azedarach* amongst others had useful leaves. Under controlled harvest species survival may be guaranteed, but if this fails, sustainability becomes questionable and the future of the forest as well.

Diseases managed, ranged from the common upper respiratory tract infections to reproductive health. That there was such specialized and discrete categories such as barrenness, schizophrenia and stroke inter alia, indicated that the traditional herbal practice was fairly specific and could supplement and complement modern medicine where, appropriate. The herbal remedy for measles, referred to as neem or mwarubaine turned out to be *Melia azedarach* and not the expected *Azadirachta indica*. Neither plant is mentioned in Kokwaro (1988). The *Azadirachta indica* in Maundu and Tengnas (2005) is in fact *Melia azedarach*, a case of confusion resulting from plants looking alike in vegetative phase. With proper screening, plants and plant products can be isolated and be used for drug development or homeopathic medicine or even industrialization (Gurib-Fakim, 2006; Ludeki *et al*., 2006).

The high incidence of diseases related to poor hygiene such as dysentery and diarrhea has been attributed to the poor economy hence, poverty, while changing lifestyles and habits have accelerated problems related to the circulatory, respiratory systems and STDs as well as in reproductive health like barrenness and impotence. Though, use by women is now on the increase, mostly men use *Craterispermum schweinfurthii* as an aphrodisiac. Although, there were antidotes for such stimulants, the knowledge remained a guarded secret hence, lacks in this report. Traditional knowledge pertaining to such stimulants was widespread, a pointer to their efficacy.

The fact that there were medications for problematic diseases like mental illness, stroke, syphilis, cancer and urinary tract infections, medications for congenital anomalies like the hunch back, resistant fungal skin infections and medications for pre-and post-natal care for mother and child showed that primary healthcare was strong. Considering that many dermatological conditions are resistant and difficult to treat yet are purportedly managed traditionally suggests that a lot of scientific gains can be made from this report. There was a precautionary note whenever toxic plants appeared in the local pharmacopoeia; *Funtumia africana*, *Antiaris toxicaria* and *Ficus sycomorus* are examples. Considering that many Western drugs originated from toxic plants through phytochemical studies, for instance Digitoxin and Digoxin from Digitalis, it is probable that such plants could in future prove to be sources of new drugs (Arwa *et al*., 2008; Mcgaw and Eloff, 2005; Onyango *et al*., 2004).

Zanthoxylum gilletii seeds are also used in spicing tea, favored for its medicinal value against flu and common chest ailments. *Toddalia asiatica* and *Zanthoxylum gillettii* twigs are also used as toothbrushes. Other than stimulating, the gums and removing food particles, they have antimicrobial properties (Sofowora, 1982). The *Zanthoxylum* has been shown to contain antimicrobial derivatives and alkaloids against common oral infections (El-Said *et al*., 1971). Though herbal, remedies appeared specialized, the same preparation could be used against other specified diseases making them appear general and broad range in action.

In this report, the most heavily utilized remedies were arboreal species (75%). The most targeted taxa were *Trichilia emetica*, *Harungana madagascariensis*, *Entada abyssinica*, *Zanthoxylum gillettii*, *Fagaropsis angolensis*, *Olea capensis*, *Croton macrostachyus* and *C. megalocarpus* and *Prunus africana*. There is a strong scientific basis for plant use in medicine. *Combretum* and *Zanthoxylum* have been shown to contain potent anti-microbial activity (Masoko *et al*., 2007; Sofowora, 1982). This possibly explains why *Combretum* is used to clear skin warts, while *Zanthoxylum* features across divergent medications ranging from chest conditions, sore throat, skin rashes and scabies, gut problems, general illnesses and gonorrhea amongst others. This is in line with findings that *Combretum* contains combrestatins that inhibited the growth of several human leukaemia and solid tumour derived cell lines *in vitro* and *in vivo* (Hartwell, 1982; Powis, 1994) and have the capacity to inhibit tubulin polymerization as well as the ability to suppress angiogenesis (Dark *et al*., 1997; Dorr *et al*., 1996; El-Zayat *et al*., 1993; Pettit *et al*., 1998). *Combretum* also contains antioxidants (Masoko and Eloff, 2007). Cold infusions of *O. gratissimum* have been shown to contain thymol, which is both anthelminthic and antimicrobial hence, its antidiarrheal effects. Its aqueous decoctions have no antibacterial effect but have been shown to calm down gut muscles *in vitro* hence, their use in controlling gut related problems hence, its traditional use.

Tannins are known to occur in the bark of trees and shrubs (Kokwaro, 1993) hence, their use in herbal medicine. The low solubility of tannins and their ability to coagulate proteins has been exploited medically in cases of diarrhoea and dysentery and even the urinogenital system (Eldin and Dunford, 1999). The *Acacia* sp. are rich in gallotannins and catechins, which explains why they are used in against diarrhoea (Sofowora, 1982). The bark of *Albizzia* and *Acacia* are rich in not only tannins but also gum. The tannins are capable of precipitating proteins thereby aiding in wound healing while, the gums act as emulsifying agents in the gut (Kokwaro, 1993; Sofowora, 1982). *Zanthoxylum* has been known to contain analgesic, antibiotic and counter-irritant properties hence, its use in treating flu, toothache, rheumatism, cancer, sickle cell and snakebites amongst others (El-Said *et al*., 1971; Hesse, 2002). Though, the bark and root are used most often, research has proved that antisickling compounds are richest in the leaves.

There were hardly any cases of schisostomiasis encountered, attributed to the widespread *Croton macrostachyus* whose seeds have molluscidal properties (El-Kheir and Salih, 1979). The informants felt there were more cancer cases. This could be due to changing habits and lifestyles, for instance sweet potatoes, *Ipomoea batatas* was a common food as well as wild fruits like *Physalis peruviana*. This is not the case any more yet *Ipomoea* has been found to contain lung-cancer-specific pneumotoxic furan derivative, an antineoplastic agent, while *Physalis* contains physalin an antileukemia lactone (Chiang *et al*., 1992a, b; 1992; Cragg and Suffness, 1988; Rowinsky *et al*., 1993).

In general, plant drugs were mainly administered in liquid form as decoctions, infusions and gargles among others. Solids like charcoal (carbon) or semi carbon dust, powders or ash were occasionally applied on wounds, burns and the tongue among others. Only in two cases was latex, a semisolid material administered. Topical applications included steam inhalation as in steam bath or regular bath, poultices or ointments or skin incisions. This would enable the drug to reach body tissues fast through body orifices and the lungs. With 75% of plants used belonging to category of trees and shrubs meant that too much extraction would be deleterious to the forest since there is a 75% chance that a remedy collected from the forest is likely to be from a tree. Climbers and monocots were seldom used. The parts used range between roots, leaves and twigs from trees, shrubs and climbers. The use of inflorescence (as in *Ensete edule*) or fruits (as in *Kigelia africana*) was rare. Tree species are too big to be used as whole plants, hence, the parts.

Certain aspects of herbal knowledge were localized and restricted within the community. As such remedies for snakebites, feminine conditions, bone fractures and anemia were hardly cited and guarded yet those for diarrhea, malaria, STD and stomachache were readily available (Owuor *et al*., 2005). There are new findings. Burn treatment with *Sapium ellipticum* and *Spathodea campanulata* with positive results is new. *Allophylus abyssinica* is used to straighten up the extra curvature of the spinal column in those with the hunchback, best used during the early stages of onset and *C. schweinfurthii* an aphrodisiac are new findings. Such plants could be used in poverty alleviation through sales of parts or seedlings. The medicinal value of plants is therefore, fronted as a reason for conserving Kakamega forest.

CONCLUSION

This research has provided a detailed and comprehensive documentation of some of the commonly used medicinal plants in Kakamega forest, hence the need to conserve the forest. Report covers new uses and new records. It confirms how plants can be used to improve the value of the environment and reduce human suffering.

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