Journal Pre-proof

Medicinal plants used by 'root doctors', local traditional healers in Bié province, Angola

B. Novotna, Z. Polesny, M.F. Pinto-Basto, P. Van Damme, P. Pudil, J. Mazancova, M.C. Duarte

PII: S0378-8741(19)31151-1

DOI: https://doi.org/10.1016/j.jep.2020.112662

Reference: JEP 112662

To appear in: *Journal of Ethnopharmacology*

Received Date: 23 March 2019

Revised Date: 6 February 2020

Accepted Date: 6 February 2020

Please cite this article as: Novotna, B., Polesny, Z., Pinto-Basto, M.F., Van Damme, P., Pudil, P., Mazancova, J., Duarte, M.C., Medicinal plants used by 'root doctors', local traditional healers in Bié province, Angola, *Journal of Ethnopharmacology* (2020), doi: https://doi.org/10.1016/j.jep.2020.112662.

Angolan flora includes over 7,000 species (1,096 endemic)

Traditional knowledge of medicinal plants is largely under-documented

Ethnobotanical survey conducted among knowledgable informants (traditional healers) in Bié province in Angola

Roots: the most commonly used plant part

In total 87 species belonging to 36 botanical families

26 species cited for the first time as ethnomedicine

Species with highest number of Use Reports:

- *Annona stenophylla* subsp. *nana* (14)
- *Securidaca longepedunculata* (14)
- *Paropsia brazzaeana* (10)
- *Alvesia rosmarinifolia* (9)
- *Aframomum alboviolaceum* (8)
- *Albizia antunesiana* (8)
- *Garcinia huillensis* (8)
- *Xylopia tomentosa* (8)

Medicinal plants used by 'root doctors', local traditional healers in Bié province, Angola

B. Novotna [a, b], Z. Polesny [a, *], M.F. Pinto-Basto [c], P. Van Damme [a, d], P. Pudil [a], J. Mazancova [e], M.C. Duarte [f]

[a] Barbora Novotna, Zbynek Polesny, Patrick Van Damme, Petr Pudil; Department of Crop Sciences and Agroforestry, Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Praha - Suchdol, Czech Republic

[b] Barbora Novotna; Department of General Anthropology, Faculty of Humanities, Charles University, U Kříže 8, 158 00 Praha 5 – Jinonice, Czech Republic

[c] Maria Fernanda Pinto-Basto; Instituto de Investigação Científica Tropical, Universidade de Lisboa, 1250-102 Lisboa, Portugal

[d] Patrick Van Damme; Laboratory of Tropical and Subtropical Agronomy and Ethnobotany, Ghent University, Coupure links 653, 9000 Ghent, Belgium

[e] Jana Mazancova; Department of Sustainable Technologies, Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Praha - Suchdol, Czech Republic

[f] Maria Cristina Duarte; CE3C – Center for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Campo Grande, 1749-016 Lisboa, Portugal

Authors' email addresses: B. Novotna (bara_novotna@hotmail.com), Z. Polesny (polesny@ftz.czu.cz), M.C. Duarte (mcduarte@fc.ul.pt), P. Van Damme (Patrick.VanDamme@UGent.be), P. Pudil (pudilp@ftz.czu.cz), J. Mazancova (mazan@ftz.czu.cz), M.F. Pinto-Basto (mariafbasto@gmail.com)

* Corresponding author: Zbynek Polesny, email: polesny@ftz.czu.cz

Authors contributions: ZP, BN and JM prepared the study concept and design; BN undertook the fieldwork, conducted data analysis and screened full text articles; MCD and MFPB provided taxonomic identification of plant specimens and contributed to the discussion on taxonomic and environmental aspects of the study; PVD, ZP and BN drafted the article narrative; ZP generated all figures and tables; PP screened titles and abstracts and generated all graphical work; all authors read, commented and approved the final manuscript.

Abstract

Ethnopharmacological relevance

This study is one of the first post-civil war efforts to document traditional botanical knowledge in Bié province, central Angola, in a first step to bring more studies on the use of medicinal plant resources in this area so as to bring new insights into Angolan bio-cultural diversity.

Aim of the study

Examine the variety of plant species used for medical purposes, as well as characterize their social and cultural values. Also, it is aimed to compare their uses in the studied region with those in Sub-Saharan Africa and report new ethnomedicinal uses.

Materials and methods

We documented traditional medicinal plant knowledge among professional herbalists in two areas in Bié province through participatory observation, semi-structured interviews and transect walks. Ethnobotanical information was quantified based on Use Reports to (1) rate traditional knowledge; and (2) determine most useful taxa.

Results

In total, 10 traditional healers shared information on their knowledge. A total of 87 plant species distributed among 57 genera and 36 botanical families were documented with Fabaceae being the best-represented family with 18 species, followed by Phyllanthaceae (6), Apocynaceae (5), Asteraceae (5), Rubiaceae (5), Lamiaceae (4), and Ochnaceae (3). Most medicinal plants are usually gathered at a distance from human settlements because of the belief in the higher efficacy of **'**wild**'** plants shared by all herbalists. Roots are the most common plant part used (79%), explaining why the consulted herbalists call themselves 'root doctors'.

Conclusions

The culturally most important medicinal species identified in this study, i.e. *Securidaca longepedunculata, Garcinia huillensis, Annona stenophylla, Afzelia quanzensis* and *Strychnos cocculoides*, were previously reported for the same use in neighbouring countries and elsewhere in Africa. Our study also indicates that there are several locally valuable species that have not yet been studied for their medical potential, to name a few: *Alvesia rosmarinifolia, Diplorhynchus condylocarpon, Eriosema affine, Paropsia brazzaeana, Rhus squalida, Sclerocroton cornutus* or *Xylopia tomentosa.* Moreover, the ethnomedicinal use of 26 species was reported for the first time to sub-Saharan Africa.

Classification: Ethnopharmacological field studies

Keywords: Africa, *Chokwe*, ethnobotany, ethnomedicine, *Ovimbundu*, traditional knowledge

Acknowledgements: We would like to acknowledge all herbalists of Bié province who participated in our study by sharing their knowledge. Namely, herbalists José Isombo, Rufino Venantio, Boano Venantio, Maria Nakamia, Theresa Odette, Luhana, Jorge, Maria, Rufino Lourdes and Sara Teresa. We would like to thank Adilson Valentimo Samala from Kuito and Maria Manuela Blabolil from Cuemba for their work as facilitators/translators during the fieldwork. We would like to acknowledge the Huambo herbarium (LUA), from the Instituto de Investigação Agrária in Huambo (Ministry of Agriculture and Forestry), and local administration in Kuito for their consent and support of our study.

Funding sources: This research was supported by the Internal Grant Agency of the Faculty of Tropical AgriSciences of the Czech University of Life Sciences Prague (grant number IGA

FTZ 20195009) and by the Portuguese Foundation for Science and Technology (UIDB/00329/2020).

Declarations of interest: none.

1. Introduction

Africa is considered the cradle of mankind with a rich biological and cultural diversity with numerous often region-specific healing practices (Gurib-Fakim et al., 2006). Millions of African people rely on medicinal plants for their primary healthcare (Antwi-Baffour et al., 2014). Reasons can be that lots of human settlements are close to natural vegetation, the free availability of these plants (Muthu et al., 2006), and the prohibitive cost of western allopathic practices and products (Rein, 2001).

It is estimated that 68% of Angolans live below the poverty line. In rural areas, 94% of households can be categorized as poor (Jacob, 2015). Angola is a country vulnerable to disease outbreaks, like yellow fever, malaria, or cholera, whereby specific events may overload the (formal) health services. Malaria, acute respiratory and diarrhoeal diseases, tetanus and malnutrition, combined with poor access to healthcare, damaged infrastructure and lack of trained health professionals, are the main causes of mortality (WHO, 2018). Sousa-Figueiredo et al. (2012) named malnutrition and anaemia as the main public health problems. The density of physicians per 1000 population was 0.17 in 2009, whereas nursing and midwifery personnel density is now at 1.66 (WHO, 2018). The maternal mortality rate is estimated at about 1,700 per 100,000 live births. This extremely high rate is attributed to common pregnancy-related conditions that are not adequately treated, since more than 70% of all deliveries are not institutional (WHO, 2018). By the year 2005, life expectancy was 40 years (WHO, 2005), whereas in the last census in 2014 it was at 52.7 years (WHO, 2018). Following Sierra Leone, Angola has the lowest life expectancy for women and men worldwide (WHO, 2015). The fertility rate of 6.8 is the world's second highest (WHO, 2018). In Angola, people’s access to biomedicine is mainly through the government’s official health care system. During the civil conflict, about 65% of medical facilities were destroyed, with

most damage occurring in rural areas (YGHR, 2016). The lack of health infrastructure, especially in these areas, is a serious problem resulting in particular dependence on traditional healers and herbal medicines (Queza et al., 2010).

Despite de high diversity of the vascular flora of Angola, with a total of 7,296 taxa, of which 1,069 are endemic (Figueiredo et al., 2009), and the recognized importance of plants for local populations (Huntley et al., 2019), only a few studies tackle the traditional use of plants in Angola. After the pioneering work of Ficalho (1884), embracing several former Portuguese colonies in Africa, most works are often addressing partial aspects of traditional medicine [e.g. Bossard 1993; Van-Dúnem and Batalha, 1994; Bossard, 1996 (Ovimbundu ethnic group, C and W Angola); Leyens and Lobin, 2009 (Bié province); Costa and Pedro, 2013; or Catarino et al., 2019 (Fabaceae species)]. Only recently, complex ethnobotanical studies documenting traditional plant use in different regions are surfacing [e.g. Heinze et al., 2017 (Cuanza Norte); Mawunu et al., 2016 (Ambuíla, Uíge); Urso et al., 2016 (mopane forests, S Angola); Göhre et al., 2016 (Bakongo tribes, N Angola) and Lautenschläger et al., 2018 (Uíge, N Angola)].

This lack of documentation can be attributed to the nearly three decades of civil war, which started after independence in 1975. During this period, little opportunity existed for field research (Figueiredo and Smith, 2008) and some areas were inaccessible due to landmines (Costa et al., 2004). Even before the war, the poor condition of some roads prevented explorers from reaching many, often isolated, regions. This situation prevails to some extent today. Only with certain areas of the country becoming increasingly accessible, a new interest in the botanical and cultural wealth of Angola is (re)surfacing (Klopper et al., 2009). During the civil war, majority of people have been displaced several times, lost many members of their families and have lost ties with their home communities. The redistribution of the population during and after the Angolan civil war forced people to settle in large

numbers in small areas, which has resulted in accelerated degradation of vegetation and soil (IFAD, 2014).

Angolan Herbal Pharmacopeia is still missing (Queza, 2010) and the general regulations for a National Pharmaceutical Policy (Presidential Decree n. 180/2010) establish the need to promote the elaboration of a pharmacopoeia of traditional medicines. It is therefore urgent to conduct ethnobotanical studies in biologically and culturally diverse regions of Angola, to at least get an idea of the relative importance of still existing knowledge, which is threatened by still increasing pressure on vegetation driven by socio-economic development and global change (Revermann and Finckh, 2019). These studies are also essential to evaluate the diversity of medicinal species in this country, allowing comparisons with other regions and with the overall African continent, where about 10% of the flora is estimated to be used in traditional medicine (Van Wyk, 2011).

The objective of the present study is to document the diversity of medicinal plants and related ethnomedicinal knowledge of 'professional' herbalists in Angola, namely of *Chokwe* and *Ovimbundu* ethnic groups in two contrasting study areas in Bié province. Some of these herbalists call themselves 'root doctors' as roots are the plant part most commonly used, although not the only one.

Through quantitative and qualitative analytical ethnobotanical methods, this research intends to examine the variety of plant species used for medical purposes, as well as their social and cultural value. Also, plant uses documented to this region are compared with those already reported to other countries in Sub-Saharan Africa in order to find wider perspective on their use and identify newly reported uses and species.

2. Material and methods

2.1. Study area and data collection sites

Bié province covers some 71,000 km². With 1,455,255 inhabitants (Brinkhoff, 2014), it is located on the central plateau of Angola, ranging from 1,200–1,800 m altitude. The plateau descends in the east to the basins of the Congo and Zambezi Rivers, and merges with the sandy Namib Desert in the south. The climate is subtropical, humid and moderate and temperatures do not fluctuate much over the year, with an annual average of 18°C in Kuito, the capital city (Klopper et al., 2009).

According to the global map of terrestrial ecoregions (Olson et al., 2001), this province is included in the 'Angolan miombo woodlands ecoregion', within the 'tropical and subtropical grasslands, savannas and scrublands biome'. Local agricultural systems are based on the cultivation of cassava, maize, sugar cane, coffee and peanuts, whereas the natural vegetation consists mostly of miombo woodland, a vegetation type dominated by the genera *Brachystegia*, *Julbernardia*, and *Isoberlinia* (Kowero et al., 2003).

The research was undertaken in two contrasting urban settings in Bié province (Figure 1). Kuito, with a population of 450,881 inhabitants (Brinkhoff, 2014), with a dense urban infrastructure, surrounded by open woodlands and agricultural lands. Here, most herbalists gather their plants near the town's outskirts. On the other hand, Cuemba municipality, a rural area populated by 56,963 people (Brinkhoff, 2014), is situated about 100 km northeast of Kuito. Due to damaged roads, it is difficult to reach this distance from Kuito in less than 10 hours. Most families in Cuemba depend on subsistence agriculture and more specifically on hunting of wild animals and non-timber forest product collection.

The *Ovimbundu* and *Chokwe* ethnic groups prevail in the area. Each of them has its own language, namely *Umbundu* and *Chokwe*, both being of *Bantu* origin and belonging to the Niger-Congo language family. Although these two languages are different in many

aspects, people in the area usually understand both. It is generally viewed in the area that more *Ovimbundu* people live in Kuito and more *Chokwe* people in Cuemba, while *Chokwe* are locally associated with the forest and are known to be more dependent on forest resources. However, both *Chokwe* and *Ovimbundu* live in both areas and seem to be represented in equal proportions among herbalists. More in general, *Ovimbundu* people inhabit the central plateau Angola (Huambo, Bié) and western coastal parts of Angola (Benguela, Kuanza Sul), while *Chokwe* inhabit eastern parts of Bié province, and eastern parts of Angola, bordering with Zambia (Bossard, 1996).

2.2. Data collection

The survey was undertaken between September and November 2013. Herbalists were identified in each study area through purposive sampling and snowball method (Tongco, 2007), which seeks to take advantage of the social networks of each respondent to provide a researcher with an ever-expanding set of potential contacts. In each locality this selection was assisted by a facilitator, who was a trustworthy member of community, instructed on aims and methods of our research project. S/he usually helped to identify the first herbalist, through local knowledgeable community members. The contact with the other herbalists identified through snowballing method was again established with their assistance and translation. In Cuemba, we recorded all the professional herbalists, 5 in total. In Kuito, we followed the snowballing method to establish closer contact with the same number of herbalists who were on the comparable professional level. We did not focus on stratification (e.g. gender, age or ethnic group) during the selection of collaborating herbalists, but rather on the professional status of selected herbalist. Being a specialized herbalist in our study means to be acknowledged by the local society as a herbal healer, to be perceived to possess

healing and spiritual power, and to be addressed by the local people with their health issues. Most information was obtained in Portuguese; however, in exceptional cases, one of the local languages was used and information translated into Portuguese.

Semi-structured interviews were conducted with the herbalists during transect walks in their crop fields and surrounding woodlands. The Code of Ethics of the International Society of Ethnobiology (2006) was followed during the fieldwork. Local authorities were consulted concerning permission for our study. Prior informed consent was obtained from herbalists through a signed form or orally, depending on the preference and literacy of the respective herbalist.

Each herbalist was asked to mention any medicinal plant that s/he knew and used, providing information on local name, plant parts collected, medicinal use, modes of preparation and administration, plant life-form, status of domestication (cultivated or wild), seasonal availability and any other additional information that came to their mind, for example important visual characteristics, seasonal variations or specific effects of the plant. Interviews were complemented with direct participant observation of therapeutic practices and preparation methods.

In total, 10 knowledgeable informants (herbalists) were individually interviewed: 3 men/2 women in Kuito and 2 men/3 women in Cuemba. The herbalists' age ranged between 51–73 years, with a mean of 60 years of age.

Because most of the interviewed herbalists perceived their knowledge either as a secret for spiritual or economic reasons, they did not wish to share their knowledge with other local herbalists or other local people. That is the reason why we decided to interview informants individually rather than using focus group discussions. A similar situation was described for a study in Zimbabwe (Ngarivhume et al., 2015). Interestingly, herbalists had no objection in sharing their knowledge with the international scientific community, because

they believe their knowledge is not of much use outside their cultural context. Specifically, some healers would say that their medicine has not any effect at all on 'white soul'.

Plants reported by herbalists were collected during transect walks. We further prepared voucher specimens complemented by photos of all mentioned plants. Plant species were identified using reference works for Angolan flora such as the Conspectus Florae Angolensis, albeit not complete (Exell and Mendonça, 1937, 1951, 1954, 1955; Exell and Fernandes, 1962, 1966; Exell et al., 1970; Shelpe et al., 1977) and Floras of surrounding regions, and deposited in LISC Herbarium (*Instituto de Investigação Científica Tropical*, University of Lisbon, Portugal). The nomenclature used follows Tropicos database (www.tropicos.org). The conservation status of the collected plants was checked by consulting the IUCN Red List of Threatened Species (IUCN, 2018) and 'The Catalogue of Life' database (Roskov et al., 2019).

2.3. Data analysis

Quantitative analysis used descriptive data, observations and responses to open questions gathered during the field work together with the additional taxonomic identification of plant specimens. All information gathered on the specific plant species use was transformed into use reports (UR), defined as one use of a species mentioned by an informant in the use category. The health disorders reported by informants were classified into ailment categories according to International Classification of Primary Care (ICPC, 2005) with regards to emic perspective observed during the fieldwork through particular description of ailments.

To find intercultural and local similarities in medicinal uses and species recorded in the field, a comparison was made by confronting uses and species by different groups. For

comparison of data documented in present study with previously published data on species used in Sub-Saharan Africa, online electronic databases including Google Scholar, ScienceDirect, Medline, Pubmed, SCOPUS and Open-thesis were used to search for relevant literature sources. Ethnobotanical literature available in the libraries was also examined. Webdatabases PROTA (Plant Resources of Tropical Africa, https://www.prota4u.org/database/) and *Société Française d'Ethnopharmacologie* (www.ethnopharmacologia.org) were used for crosschecking and further data search. Only medicinally used plant species reported from the region of sub-Saharan Africa were included.

3. Results

We documented a total of 224 vernacular names of medicinal plants. This corresponds to 114 taxa, with 87 plant species distributed among 57 genera and 36 botanical families univocally and taxonomically identified. Seven plants could only be identified down to genus level, two plants down to family level, and 18 were not identified taxonomically and therefore not included in further data analysis. Fabaceae was the most-represented family (21%), followed by Phyllanthaceae (7%), Apocynaceae (6%), Asteraceae (6%), Rubiaceae (6%), Lamiaceae (5%), and Ochnaceae (3%) (Table 1).

The 280 use reports were mostly distributed in the group of digestive disorders, with 81 URs within the ‘digestive’ category, followed by 45 URs in ‘pregnancy, family planning’ category, and 29 URs in the category ‘general’ (Table 2). From all species, the highest number of URs belonged to *Securidaca longepedunculata* Fresen (14), *Annona stenophylla* subsp. *nana* N. Robson (14), *Paropsia brazzaeana* Baill. (10), *Alvesia rosmarinifolia* Welw. (9), *Aframomum alboviolaceum* (Ridl.) K. Schum. (8), *Albizia antunesiana* Harms (8),

Garcinia huillensis Welw. ex Oliv. (8), and *Xylopia tomentosa* Exell (8). The plant life forms of the identified species are trees (31%), shrubs (35%), herbs (21%), subshrubs (10%), succulents (2%), or vines (1%). As shown in Figure 2, the most common mode of application was decoction (51%), followed by washes (10%). Washes and massages are applied co-dependently: herbalists call it washes, but traditionally these are in form of massages, since massages naturally complement the process, but are not essential for it. Descriptions of the administration and preparation of the medicinal remedies are listed for each species in Table 1. Among the different plant parts used (Figure 3) roots are the most commonly used (79%). Interestingly, roots and leaves, or roots and bark together were commonly mentioned for the need to be combined to prepare a decoction.

We can derive from our results that 34 species were cited by only 1 herbalist, whereas 53 species were cited by 2 or more herbalists. The most frequently cited species were *Securidaca longepedunculata* and *Annona stenophylla*, both cited by all 10 informants, followed by *Garcinia huillensis*, *Strychnos cocculoides* Baker and *Holostylon robustum* (Hiern) G. Taylor, cited by 6 informants.

We compared the knowledge of plants in the two different localities and ethnicities groups in our study. Only 10 plant species were used commonly by both *Ovimbundu* and *Chokwe* people, and both in Cuemba and Kuito. These species represent the most cited species in our study. The numbers of use reports and species used in each group, and commonly between them, are shown in Table 3. The highest number of coincidences was among the species used by herbalists from two different localities.

From the total number of 87 species documented in this study, ethnomedicinal uses of 26 species have been reported for the first time. The ethnomedicinal use of 57 species has already been documented in different coutries of Sub-Saharan Africa (see Table 4).

A total of 44 species (indicated by an asterisk in Table 1) have not yet been tested for their pharmacological potential and, impressively, 143 new uses (marked with a ‡ in Table 1), regarding 70 species, were reported.

4. Discussion

4.1. Medicinal plant species diversity

As in other studies from Angola (Göhre et al., 2016; Urso et al., 2016), South Africa (Mahwasane et al., 2013; Semenya and Maroyi, 2012; Afolayann et al., 2014) or Zimbabwe (Ngarivhume et al., 2015), the Fabaceae was the most-represented family. This is rather mundane, being the third-largest plant family prevailing in mopane woodland vegetation (Timberlake et al., 2010) with the 13,9 % percent of taxa of the family Fabaceae in the flora of Angola (Figueiredo et al., 2009); also, the Fabaceae, are typically used as medicine in Angola and in other areas of its high occurrence (Catarino et al., 2019).

In our study, 34 species were cited only by one herbalist. Among the remaining 53 species, *Aeschynomene dimidiata* Welw. ex Baker, *Brachystegia gossweileri* Hutch. & Burtt Davy, *Cassytha pondoensis*, *Droogmansia dorae* Torre, *Hypoxis polystachya* Welw. ex Baker, *Indigofera sutherlandioides* Welw. ex Baker, *Oxygonum pachybasis* Milne-Redh., *Vangueriopsis lanciflora* (Hiern) Robyns and *Vernonia britteniana* Hiern, just to mention the more frequently cited species in our study, were not reported in the ethnomedicinal context in any literature source and appear to be reported for the first time as medicinal plant species in our study.

The following four species were cited only once in our study and their use as medicinal plants cannot be supported by any literature sources: *Lantana angolensis* Moldenke, *Macrotyloma africanum* (Brenan ex R. Wilczek) Verdc., *Pentanisia rubricaulis* (K. Schum.) Kårehed & B. Bremer and *Uapaca gossweileri* Hutch. The remaining species cited only once in our study (30) were documented as medicinal plants also in other countries according to the publications we consulted (see Table 4). This could be perceived as evidence that despite the fact that medical knowledge in our study area is not openly shared among herbalists, it has solid ground based on its linkages with studies from other areas.

4.2. 'Root doctors': the environmental impact of Angolan medicinal plant use

Almost all species were cited to be accessible all year round. As they mainly use roots and/or leaves and most of the reported species are perennial, fresh material is always available. The herbal remedies were rarely stored in the form of dried plant material. Commonly, roots were collected and used fresh. Similar results were documented in Zimbabwe (Maroyi, 2011). In agreement with the findings of Bussmann (2006), Okello and Segawa (2007), Simbo (2010), and Ngarivhume et al. (2015), in different African regions, there is a prevailing belief that plants gathered from the wild are more effective. However, medicinal plants were usually collected near the homesteads or in other anthropic environments over quite a large gathering distance (10 km) from human settlements. These places were usually maintained by slash-and-burn agriculture practices. Indeed, as reported by Cabral et al. (2010), herbalists rely on areas with heavier woody component to go and collect their materials only when more accessible areas are degraded. In our study, herbalists possessed detailed knowledge of the surrounding environment of their farms or collection sites, which is vital due to the persisting

presence of land mines. Generally, they would not walk away from a well-explored path, even if the desired plants were only a few steps aside.

Roots are very important for the local healers, as they tend to describe, know and demonstrate a particular medical scent of the roots. Often, they characterize roots as the only real medicine. Significantly, most of the interviewed herbalists used the scent of the roots in order to recognize and distinguish the ethnospecies.

Similarly to the findings in traditional Zimbabwean medicine (Gelfand et al., 1985; Maroyi, 2011) and in the medicine of South Africa (York et al., 2011), a decoction prepared from the root was the most common way of preparation of herbal remedies in Bié province. When collecting the root or even trying to distinguish the ethnospecies, herbalists standardly uproot the whole plant, leaving the remainder of the plant behind. Thereof, the collection of the roots of medicinal plants is furthering the conservation concern. The alternative use of renewable plant parts like leaves might be considered, as some studies (e.g. Jena et al., 2017) point to close chemical and biological similarity between the roots and the leaves.

Although the conservation status of the collected plants was checked and showed no further conservation issues, Red List assessments of Angolan flora are scarce (e.g. all endemics species, except four, are considered Data-Deficient for the IUCN Red List of Threatened Species, Huntley et al., 2019). In neighbouring countries, the use of some species is already matter of conservation concerns [e.g. *Oldfieldia dactylophylla* (Welw. ex Oliv.) J. Léonard in Malawi, because of overexploitation of the roots (Manda et al., 2007); *Entada gigas* in Ghana and Benin (van Andel et al., 2015); and *Securidaca longepedunculata* in Nigeria (Abubakar et al., 2018)].

4.3. Social aspects of medicinal plant use in Bié Province, Angola

The prevailing belief in the spiritual and magical origin of diseases was observed both during informal interviews with herbalists and their patients. Amongst the southern *Bantu* people, lack of health and misfortune are believed to stem from ancestral wrath, witchcraft and frequent use of rituals (Hammond-Tooke, 1998). They often point to disturbed social relations (Sobiecki, 2014). The herbalists in our study insisted we should include plants that can be considered 'magic' with no different status, because ailments as headache or sore throat are only consequences of acts of spiritual agents. Bossard (1996) observed that *Ovimbundu* people would not accept westernized medicine, because it only treats the body, but not the soul. During informal interviews, informants frequently mentioned they had negative experiences with the healthcare provided in hospitals and/or local health centers. On the contrary, they mentioned no negative observations of healthcare provided by traditional healers. Unsuccessful application of herbal remedy was often explained by the evil spirit force or curse upon the treated individual and further herbal medication was prescribed. Rarely, the patient would be sent to a hospital after the remedy failed. This was also documented in Zimbabwe (Ngarivhume et al., 2015). The traditional healers often spoke in parables and their description of health problems could easily be misinterpreted. This was described in South Africa by Sobiecki (2014), who explains that when the traditional knowledge is translated into other languages such as English, these metaphorical descriptions of medicinal plant use can seem to incorrectly reflect mysticism and/or superstition with no scientific basis.

Interestingly, the spiritual value of the plants was kept a secret, especially in Cuemba, while in Kuito herbalists were more opened to share more of their knowledge. This could perhaps point to the upcoming devaluation of traditional knowledge in the urban area. In Angola, herbalists are members of the community, however with particular status, 'on the border of life and death', described by Bossard (1996). Hence, medicinal plant knowledge is

transmitted mainly vertically, as herbalists keep certain essential secrets and practices to protect their knowledge. Besides the limited number of professional herbalists in the area, this mechanism can also contribute to the relatively high proportion of plant species cited by only one informant in our study.

4.4. Medicinal plants and uses compared by ethnicity and locality

The highest number of coincidences in our study was measured for the species used in the two localities, Kuito and Cuemba. This can be due to relatively short distance between the two areas as well as due to similarities in local flora in both areas. Significant species used only in Kuito were *Aeschynomene dimidiata* and *Gymnema sylvestre* (Retz.) R. Br. ex Schult.; species used only in Cuemba were *Psychotria eminiana* (Kuntze) E.M.A. Petit and *Scleria induta* Turrill.

The two ethnic groups were mixed in both areas. Even if there is general tendency to similarity of plant use in both areas studied, the use of medical plants by the two ethnic groups was more divergent. Therefore, it could be assumed that among the factors measured, ethnic difference has most significant impact on specific medical plant use. Despite the general difference in species and uses presented by different ethnic groups, there was only one medical plant frequently reported solely by *Chokwe* herbalists: *Erythrina abyssinica.* Plants frequently reported only by Ovimbundu herbalists were: *Gymnema sylvestre, Hypoxis polystachya, Lippia plicata* Baker and *Phyllanthus welwitschianus.* The remaining locally important species were all reported by both ethnic groups.

Owing to the low number of informants, gender comparison was not performed. However, we might mention the unusual high percentage of female healers in our study, because it is general African believe that traditional healers should be male (Okello and Segawa, 2007; Bekalo et al., 2009; Cheikhyousef et al., 2011). However, rare studies show

the gender equilibrate tendency (Ngarivhume et al., 2015). Despite some emic pattern (e.g. with male herbalists not mention commonly known 'plants for women' during the transect walk, as these were literally 'none of their business') medical plants used commonly and solely by women or by men were, as far as we could observe, not particularly related to any medicinal category. Intriguingly similar aspects of gender-related plant use were reported in the recent study from northern Angola (Lautenschläger et al., 2018), where neither in the context of gender-specific illnesses, neither in the general plant use, gender related patterns were observed.

4.5. Locally important ailment categories and culturally significant species

The majority of URs in our study falls within the digestive disorders category. *Annona stenophylla* subsp. *nana* was the most popular plant cited to ease stomachache followed by *Albizia adianthifolia* (Schumach.) W. Wight that is used to treat various kinds of gastro-intestinal disorders; similar uses, as well as other (Table 4), are reported to tropical Africa. Among the most important species in this category, *Eriosema affine* De Wild., *Cassytha pondoensis*, *Gymnema sylvestre* and *Holostylon robustum* have not been previously cited as medicinal species treating digestive problems (see Table 4).

The category 'Pregnancy, family planning' was the second most frequently cited in our study (45 URs). Women in Angola describe themselves as uncommonly fertile. The use of many medicinal plants in this category does not meet much agreement among informants or the studies we consulted. However, there is an assumption that the knowledge in the area of fertility-related issues can be of special value as it is presumably well-developed in Angola due to the high cultural focus on fertility which was observed in our study area. E.g., any woman would be encouraged by her family to undergo traditional treatment for infertility as

soon as she reaches age 16 and does not get pregnant, or as soon as she would not get pregnant two years after a previous birth.

The most-cited ailment in this category was pain during pregnancy and labour and the most common use was post-partum disinfection, while *Albizia adianthifolia* and *A. antunesiana* were the most commonly cited species for the treatment of pain. The use of both species in pregnancy and family planning issues is reported to tropical Africa (Table 4).

In another relevant ailment category – General – the common diseases were malaria, followed by elephantiasis and yellow fever. As for treatment of elephantiasis, there was an agreement on the use of *Psorospermum baumii*. This species was mentioned to be used in skin-related problems (Table 4), and veterinary uses in Africa (Matzigkeit, 1990), but locally it is described as a strong and significant medicine. *Securidaca longepedunculata*, reported for the treatment of malaria by our respondents, was also reported to cure malaria in Congo (Dibwe et al., 2012); extracts of this species have shown activity against a variety of microorganisms (Table 4) and have good prospects in the formal treatment of malaria (Adiele et al., 2013; Atawoli et al., 2003; Maiga et al., 2005; Rakuambo et al., 2004). Also reported for treating malaria, *Bobgunnia madagascariensis* (Desv.) J.H. Kirkbr. & Wiersema, is used for the same purpose in Namibia by *Ovambo* people (Mojeremane, 2012); in many areas and also in Bié province, it is believed to be a poisonous species, however with no evidence to corroborate this assumption (Lemmens et al., 2012).

4.6. Pharmacological potential

Among the high number of plant species not yet been tested for their pharmacological potential (44, see Table 1), several of them showed a high proportion of use reports, or were recognized as of local significance such as *Aeschynomene dimidiata*, a species only occurring

in Angola and DR Congo (Roskov et al., 2019), two countries with a manifest scarcity of ethnobotanical studies, *Holostylon robustum*, once mentioned as 'magical plant that can cure everything', *Lippia plicata*, and *Psorospermum baumii*. Interestingly, and as also reported in the recent study from Angola (Lautenschläger et al., 2018), *Annona stenophylla* subsp. *cuneata* N. Robson has not been previously ethnobotanically nor phytochemically examined.

Other plants with particular local significance that have not been tested for pharmacological potential are *Alvesia rosmarinifolia, Diplorhynchus condylocarpon, Eriosema affine, Rhus squalida* Meikle, *Sclerocroton cornutus* (Pax) Kruijt & Roebers, and *Xylopia tomentosa.*

The restricted distribution range of most of these species (limited to Angola and a few of the surrounding countries and including two endemisms *Holostylon robustum* and *Rhus squalida*) is certainly related with this lack of research.

5. Conclusion

The amount of medicinal plants used for a variety of ailments reflects the rich ethnomedicinal knowledge in Bié province in Angola. The preservation of this knowledge appears to be particularly secured due to the continuing reliance of local people on primary healthcare ensured by medicinal plant use and local healers.

The fact that roots are commonly used in the preparation of medical remedies suggests that continuous collection of plants together with land clearing practices may threaten local plant populations in future.

Collection focus on certain botanical families and species is in line with that reported from other studies conducted in Sub-Sahara Africa, notably in southern African countries.

Securidaca longepedunculata, *Garcinia huillensis*, *Annona stenophylla*, *Afzelia quanzensis*, *Paropsia brazzaeana, Psorospermum baumii* and *Strychnos cocculoides* are the most important medicinal plant species reported on here.

Though the limitations of this study, mainly resulting from restrictions imposed by the risky fieldwork, which was reflected particularly in the small number of herbalists resulting in low similarities in the plant use, we present a wealth of original information on traditional plants used in this region of Angola. This includes a few previously under-documented, but locally valuable species, such as *Aeschynomene dimidiata*, *Holostylon robustum*, *Lippia plicata*, *Psorospermum baumii* and *Vernonia britteniana*, and a high number of local uses not previously reported to other sub-Saharan regions.

Thought most of the uses reported were in line with the literature reviewed, several new ethnomedicinal uses, as well as new medicinal plant species were reported. In this regard, and in line with the above-mentioned low sampling, new uses cited by a single herbalist and not previously reported in Sub-saharan Africa should be treated with some caution. Also, the absence of pharmacological studies to a significant number of species, highlights the hidden medicinal wealthiness of Angola's flora demonstrating the urgent need for further documentation and preservation of the traditional botanical knowledge in the region.

References

Abu, A. H., Uchendu, C.N., 2010. Antispermatogenic effects of aqueous ethanolic extract of *Hymenocardia acida* stem bark in Wistar rats. Journal of Medicinal Plants Research. 4, 23, 2495-2502. http://dx.doi.org/10.5897/JMPR10.407.

Abubakar, U.S., Khalifa, B.I., Abdu, F., Sanusi, M., Gawuna, T.A., Adamu, J.G., Rogo, S.S., 2018. Threatened medicinal plants of Kano flora and the need for urgent conservation. International Journal of Conservation Science. 9, 1, 173-178.

Adamu Harami M., Abayeh, O.J., Agho, M.O., Abdullahi, A.L., Uba, A., Dukku, H.U., B.M. Teklele B., Bisrat H.M., Guta, M., 2005. An ethnobotanical survey of Bauchi State herbal plants and their antimicrobial activity. Journal of Ethnopharmacology. 97, 421-427. https://doi.org/10.1016/j.jep.2004.12.025.

Adebayo-Tayo, B.C., Adegoke, A.A. 2008. Phytochemical and microbial screening of herbal remedies in Akwa Ibom State, South Southern Nigeria. Journal of Medicinal Plants Research. 2, 11, 306-310.

Adiele, R.C., Fakae, B.B., Isuzu, I.U., 2013. Antihelmintic activity of Securidaca longepedunculata (Family: Polygalaceae) root extract in mice, in vitro and in vivo. Asian Pacific Journal of Tropical Medicine. 27, 841-846. https://doi.org/10.1016/S1995-7645(13)60150-9.

Adjanohoun, E., Ahyi, M.R.A., Ake Assi, L., Dan Dicko, L., Daouda, H., Delmas, M. de Souza, S., Garba, M., Guinko, S., Kayonga, A., N'Glo, D., Reynal, J.-L., Saadou, M., 1980. Contribution aux études ethnobotaniques et floristiques au Niger. Agence de coopération culturelle et technique, (A.C.C.T.). Paris.

Adjanohoun, E., Ahyi, M.R.A., Floret, J.J., Guinko, S., Koumaré, M., Ahyi, A. M. R., Raynal, J., 1993. Contribution aux études ethnobotaniques et floristiques au Uganda. Agence de coopération culturelle et technique, (A.C.C.T.). Paris.

Adjanohoun, E., V. Adjakidje, M.R.A. Ahyi, K. Akpagana, P. Chibon, A. El - Hadji, J. Eyme, M. Garba, J. - N. Gassita, M. Gbeassor, E. Goudote, S. Guinko, K. - K. Hodouto, P. Houngnon, A. Keita, Y. Keoula, W. P. Kluga - Ocloo, I. Lo, K. M. Siamevi, K. K. Taffame. 1986. Contribution aux études ethnobotaniques et floristiques au Togo. Agence de coopération culturelle et technique, (A.C.C.T.), Paris.

Adjanohoun, E., Adjakidje, V., Ahyi, M.R.A., Ake Assi, L., Akoegninou, A., d'Almeida, J., Apovo, F., Boukef, K., Chadare, M., Gusset, G., Dramane, K., Eyme, J., Gassita, J. - N., Gbaguidi, N., Goudote, E., Guinko, S., Houngnon, P., Issa L., Keita, A., Kiniffo, H. V., Kone, D. 1989. Contribution aux études ethnobotaniques et floristiques en République populaire du Bénin. Agence de coopération culturelle et technique, (A.C.C.T.). Paris.

Afolayann, A.J., Grierson, D.S., Mbeng, W.O., 2014. Ethnobotanical survey of medicinal plants used in the management of skin disorders among the Xhosa communities of the Amathole District, Eastern Cape, South Africa. Journal of Ethnopharmacology. 153, 220-232. https://doi.org/10.1016/j.jep.2014.02.023.

Ahua, K. M., Ioset J. R., Diallo D., Mauël J., Hostettmann K., 2007. Antileishmanial activities associated with plants used in the Malian traditional medicine. Journal of Ethnopharmacology. 110, 99- 104.

Akindele A., Salako O.A., Sofidiya M.A., Ajibulu A.J., 2016. Gastroprotective Effects of the Aqueous Seed Extract of *Entada gigas* (Linn.) Fawc. and Rendle (Fabaceae) in Ulcer Models in Rats. African Journal of Pharmacology and Therapeutics. 5, 3, 155-162.

Ali, N.M., Mazhar, S.A., Mazhar, B., Imtiaz, A., Andleeb, S., 2017. Antibacterial activity of different plant extracts and antibiotics on pathogenic bacterial isolates from wheat field water. Pakistan Journal of Pharmaceutical Sciences. 30, 4, 1321-1325.

Amenu, E., 2007. Use and management of medicinal plants by indigenous people of Ejaji area (Chelya woreda) West Shoa, Ethopia: An Ethnobotanical Approach. A Thesis submited to the school of graduate studies. Addis Ababan.

Ambe, G.A., Malaisse, F., 2000. Les plantes utilisées dans la médecine et la pharmacopée traditionnelles d'une population Malinke en Côte d'Ivoire. Rev. Méd. Pharm. Afr., 14, 121–130.

Amonkar, A., Chang, C.J., Cassady, J.M., 1981. 6-geranyloxy-3-methyl-1,8-dihydroxyanthrone, a novel antileukemic agent from *Psorospermum febrifugum* Sprach var Ferrugineum (Hook fil.) Experientia. 37, 11, 1138-1139. http://dx.doi.org/10.1007/BF01989881.

Amuri, B., Maseho, M., Simbi, L., Okusa, P., Duez, P., Byanga, K. 2017. Hypoglycemic and Antihyperglycemic Activities of Nine Medicinal Herbs Used as Antidiabetic in the Region of Lubumbashi (DR Congo). Phytotherapy Research. 31, 7, 1029-1033. http://dx.doi.org/10.1002/ptr.5814.

Amusan, O. O. G., Dlamini, P. S., Msonthi, J. D., Makhubu, L. P., 2002. Some herbal remedies from Manzini region of Swaziland. Journal of Ethnopharmacology. 79, 109 – 112. https://doi.org/10.1016/s0378-8741(01)00381-6.

Anokwuru, C. P., Sigidi, M. T., Zininga, T., Tshisikhawe, M.P., Shonhai, A., Ramaite, I.D.I., Traore, A.N., Potgieter, N., 2017. Phenolic contents, antioxidant activity and spectroscopic characteristics of *Pterocarpus angolensis* DC. stem bark fractions. Indian Journal of Traditional Knowledge. 16, 3, 400-406.

Antwi-Baffour, S.S., Bello, A.I., Adjei, D.N., Mahmood, S.A., Ayeh-Kumi, P.F., 2014. The place of traditional medicine in the African society: the science, acceptance and support. American Journal of Health Research. 2, 49-54. https://doi.org/10.11648/j.ajhr.20140202.13.

Arkinstall, W., 1979. Medicinal and useful plants collected in the Manianga district of the Republic of Zaïre. Revue de recherche scientifique. Spécial Médecine traditionnelle au Zaïre, Special edition, 135 – 158.

Arnold, H.-J., Gulumian, M., 1984. Pharmacopoeia of traditional medicine in Venda. Journal of Ethnopharmacology. 12, 35 -74.

Asase, A., Oteng-Yeboah, A.A., Odamtten, G.T., Simmonds, M.S.J., 2005. Ethnobotanical study of some Ghanaian anti-malarial plants. Journal of Ethnopharmacology. 99, 2, 273-279. http://dx.doi.org/10.1016/j.jep.2005.02.020.

Ashafa, A.O.T., Grierson, D.S., Afolayan, A.J. 2010a. In vitro antioxidant activity of extracts from the leaves of *Felicia muricata* thumb. An underutilized medicinal plant in the eastern Cape Province, South Africa. African Journal of Traditional Complementary and Alternative Medicines. 7, 4, 296-302.

Ashafa, A.O.T., Yakubu, M.T., Grierson, D.S., Afolayan, A.J., 2010b. Evaluation of aqueous extract of *Felicia muricata* leaves for anti-inflammatory, antinociceptive, and antipyretic activities. Pharmaceutical Biology. 48, 9, 994-1001. J.F. J.F. https://doi.org/10.3109/13880200903373664.

Atawodi, S.E., Yakubu, O.E., Umar, I.A., 2013. Antioxidant and Hepatoprotective Effects of *Parinari curatellifolia* Root. International Journal of Agriculture and Biology. 15, 3, 523-528.

Atawoli, S.E., Bulus, T., Ibrahim, S., Ameh, D.A., Nok, A.J., Mamman, M., 2003. In vitro trypanocidal effect of methanolic extract of some Nigerian savannah plants. African Journal of Biotechnology. 2, 317-321. https://doi.org/10.5897/AJB2003.000-1065.

Attitalla, IH. 2011. *Felicia muricata* Leaf Extract May not be Completely Safe for Oral Remedies. Asian Journal of Animal and Veterinary Advances. 6, 9: 884-885. https://doi.org/10.3923/ajava.2011.884.885.

Aubréville, A., 1950. Flore forestière Soudano-guinéenne (A.O.F - Cameroun - A.E.F) Office Recherche Scientifique d'Outre-Mer, Soc. Edit. Maritim. Col., Paris.

Ayele, Y., Urga, K., Engidawork, E., 2010. Evaluation of In Vivo Antihypertensive and In Vitro Vasodepressor Activities of the Leaf Extract of *Syzygium guineense* (Willd) D.C). Phytotherapy Research. 24, 10, 1457-1462. https://doi.org/10.1002/ptr.3141.

Ayobangira, S.F.X., Tsongo, K., Kirarahuma, M.J., 2000. Contribution à l'étude des plantes médicinales du Nord-Kivu: plantes antihémorroïdaires exploitées dans la ville de Goma. Rev. Méd. Pharm. Afr.14, 75 – 87.

Baerts, M., Lehmann, J., 1989. Guérisseurs et plantes médicinales de la région des crêtes Zaïre-Nil au Burundi. Musée royal de l'Afrique centrale, Tervuren, Belgique. Ann. Sc. Eco. 18.

Balagizi, I., Cihyoka, A., Mapatano S., 2005. Lexique et recueil des quelques pratiques en ethno-pharmacopée agro-vétérinaire au Kivu. Plate forme Diobass au Kivu.

Balagizi Karhagomba, I., Ntumba Kayembe, F., 1998. Plantes utilisées dans le traitement des helminthoses gastro-intestinales des petits ruminants dans le groupement d'Irhambi-Katana (Région du Bushi, Province du Sud-Kivu, Rép. Dém. du Congo). Recherches africaines, n°1, 90 – 99.

Banderembako, F., Ntitangirageza T., 1978. La médecine populaire au Burundi: quelques plantes médicinales. De le revue burundaise "Que vous en semble?" 35.

Bekalo, T.H., Woodmatas SD, Woldemariam ZA. 2009. An ethnobotanical study of medicinal plants used by local people in the lowlands of Konta Special Woreda, southern nations, nationalities and peoples regional state, Ethiopia. Journal of Ethnobiology and Ethnomedicine 5: 26–40. https://doi.org/10.1186/1746-4269-5-26.

Benoit-Vical, F., Njomnangsoh P., Poupat C., 2005. Evaluation of Senegalese plants used in malaria treatment: Focus on *Chrozophora senegalensis*. Journal of Ethnopharmacology. 116, 1, 43-38. https://doi.org/10.1016/j.jep.2007.10.033.

Bero, J., Ganfon, H., Jonville, M.C., Frederich, M., Gbaguidi, F., Demol, P., Moudachirou, M., 2009. In vitro antiplasmodial activity of plants used in Benin in traditional medicine to treat malaria. Journal of Ethnopharmacology. 122. https://doi.org/10.1016/j.jep.2009.02.004.

Bero, J., Beaufay, C., Hannaert, V., Herent, M.F., Michels, P.A., Quetin-Leclercq, J. 2013. Antitrypanosomal compounds from the essential oil and extracts of Keetia leucantha leaves with inhibitor activity on Trypanosoma

brucei glyceraldehyde-3-phosphate dehydrogenase. Phytomedicine. 20. 3-4. 270-274. http://dx.doi.org/10.1016/j.phymed.2012.10.010.

Bishayee, A., Chatterjee, M., 1994. Hypolipidaemic and antiatherosclerotic effects of oral *Gymnema sylvestre* R. Br. Leaf extract in albino rats fed on a high fat diet. 8, 2, 118-120. https://doi.org/10.1002/ptr.2650080216.

Bitsindou, M., Lejoly, J., 1996. Antidiarrheic plants among the Sundi in the subprefecture of Kindamba (Congo). Biodiversity of African Plants. 722-726.

Bizimana, N., Tietjen, U., Zessin, K-H, Diallo, D., Djibril, C., Melzig, M. F., Clausen, P.H., 2006. Evaluation of medicinal plants from Mali for their *in vitro* and *in vivo* trypanocidal activity. Journal of Ethnopharmacology. 103, 350 – 356. https://doi.org/10.1016/j.jep.2005.08.023.

Bonnefoux, Benedicto M., 1885-1937. Plantes médicinales du Hufla. Manuscrits n° 1 et n°2. Congrégation do Espirito Santo.

Bosch, C.H. 2011. *Cryptolepis oblongifolia* (Meisn.) Schltr. [Internet] Record from PROTA4U. Brink, M. & Achigan-Dako, E.G. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. http://www.prota4u.org/search.asp. Accessed 04 May 2019.

Bossard, E. 1993. Angolan medicinal plants used also as pesticides and/or soaps. Journal of Ethnopharmacology. 40, 1-19. https://doi.org/10.1016/0378-8741(93)90085-J.

Bossard, E., 1996. La medicine traditionnelle au centre et a l'ouest de l'Angola. Instituto de Investigação Científica Tropical. Lisboa.

Boulesteix, M., Guinko, S., 1979. Plantes médicinales utilisées par les Gbayas dans la région de Bouar (Empire Centrafricain). Quatrième colloque du Conseil africain de Malgache pour l'enseignement supérieur (C.A.M.E.S.), Libreville, Gabon, 23 – 52.

Bouquet, A., 1969. Féticheurs et médecines traditionnelles du Congo (Brazzaville). Mém. O.R.S.T.O.M., 36. http://www.docstoc.com/docs/41737230/Ficheurs-et-mecines-traditionn (accessed 10 September 2019)

Bouquet, A., Debray, M., 1974. Plantes médicinales de la Côte d'Ivoire. Travaux et Documents de l' O.R.S.T.O.M. 32. Paris.

Brinkhoff, T., 2014. City Population, https://www.citypopulation.de/php/angola-admin.php (accessed 23 February 2019).

Bruschi, P., Morganti, M., Mancini, M., Signorini M. A., 2011. Traditional healers and laypeople: A qualitative and quantitative approach to local knowledge on medicinal plants in Muda (Mozambique). Journal of Ethnopharmacology 138, 543– 563. https://doi.org/10.1016/j.jep.2011.09.055.

Bulpitt, C.J., 2005. The uses and misuses of orchids in medicine. QJM: An International Journal of Medicine, 98, 9, 625–631. https://doi.org/10.1093/qjmed/hci094.

Bunalema, L., Kirimuhuzya, C., Tabuti, J.R.S, Waako, P., Magadula, J.J., Otieno, N., Orodho, J.A., Okemo, P. 2011. The efficacy of the crude root bark extracts of *Erythrina abyssinica* on Rifampicin Resistant *Mycobacterium tuberculosis*. African Health Sciences. 11, 4, 587-593.

Burkill, H.M., 1985. The useful plants of west tropical Africa, Vol 5. Royal Botanic Gardens. Kew.

Bussmann, R.W., 2006 Ethnobotany of the Samburu of Mt. Nyiru, South Turkana, Kenya. Journal of Ethnobiology and Ethnomedicine. 2, 35-45. https://doi.org/10.1186/1746-4269-2-35.

Byavu, N., Henrard, C., Dubois, M., Malaisse F., 2000. Phytothérapie traditionnelle des bovins dans les élevages de la plaine de la Rusizi. Biotechnol. Agron. Soc. Environ. 4 (3), 135 – 156.

Cabral, A.I., Vasconcelos, M.J. Ooma, D., Sardinha, R., 2010. Spatial dynamics and quantification of deforestation in the central-plateau woodlands of Angola. Applied Geography. 31, 1185-1193. https://doi.org/10.1016/j.apgeog.2010.09.003.

Catarino, S., Duarte, M.C., Costa, E., Carrero, P.G., Romeiras, M.M., 2019. Conservation and sustainable use of the medicinal Leguminosae plants from Angola. PeerJ 7:e6736 https://doi.org/10.7717/peerj.6736.

Chabra, S.C., Mahunnah, R.L.A., Mshiu, E.N., 1990. Plants used in traditional medicine in Eastern Tanzania. IV. Angiosperms (Mimosaceae to Papilionaceae). Journal of Ethnopharmacology, 29, 295 – 323. https://doi.org/10.1016/0378-8741(91)90173-B.

Chabra, S.C., Mahunnah, R. L. A., 1994. Plants used in Traditional medicine by Hayas of the Kagera region, Tanzania. Economic Botany, 48 (2), 121-129. https://doi.org/10.1007/BF02908198.

Chambon, R., Leruth, A., 1954. Monographie des Bena Muhona - Territoire de Kongolo. District du Tanganika.Chap. XI. Utilisation des plantes médicinales en chefferie Muhona. Bulletin Agricole du Congo Belge (B.A.C.B.). 45, 3, 519 – 598.

Cheikhyouseff, A., Shapi, M., Matengu, K., Ashekele, H.M., 2011. Ethnobotanical study of indigenous knowledge on medicinal plant use by traditional healers in Oshikoto region, Namibia. Journal of Ethnobiology and Ethnomedicine. 7, 10-19. https://doi.org/10.1186/1746-4269-7-10.

Chekole, G., Asfaw, Z., Kelbessa, E., 2015. Ethnobotanical study of medicinal plants in the environs of Tara-gedam and Amba remnant forests of Libo Kemkem District, northwest Ethiopia. Journal of Ethnobiology and Ethnomedicine. 11, 4. https://doi.org/10.1186/1746-4269-11-4.

Chevalier, A. 1905. Les végétaux utiles de l'Afrique tropicale française. Etudes scientifiques et agronomiques. 1, 3.

Chevalier, A. 1937. Les plantes magiques cultivées par les noirs d'Afrique et leur origine. Augmenté des communications personnelles de l'abbé André Walker à l'auteur. Rev. Bot. Appl., Agric. Trop., 7, 93 – 105.

Chifundera, K. 1987. Antivenomous plants used in the Zairean pharmacopoeia. African Study Monographs, 7, 21 -35.

Chimponda, T., Mukanganyama, S., 2010. Antimycobacterial activities of selected medicinal plants from Zimbabwe against *Mycobacterium aurum* and *Corynebacterium glutamicum.* Tropical Biomedicine. 27, 3, 595-610.

Chinemana, F., R.B. Drummond, S. Mavi & I. De Zoysa. 1985. Indigenous plant remedies in Zimbabwe. Journal of Ethnopharmacology. 14, 159 – 172. https://doi.org/10.1016/0378-8741(85)90084-4.

Chinsembu, K. C., Hedimbi, M., 2010. An ethnobotanical survey of plants used to manage HIV/AIDS opportunistic infections in Katima Mulilo, Caprivi region, Namibia. Journal of Ethnobiology ans Ethnomedicine. 6, 25. http://dx.doi.org/10.1186/1746-4269-6-25.

Chinsembu, K.C., 2016. Ethnobotanical study of medicinal flora utilised by traditional healers in the management of sexually transmitted infections in Sesheke District, Western Province, Zambia. Revista Brasileira de Farmacognosia-Brazilian Journal of Pharmacognosy. 26. 2. 268-274. http://dx.doi.org/10.1016/j.bjp.2015.07.030.

Chinsamy, M., Finnie, J.F., Van Staden, J. 2011. Rewiev The ethnobotany of South African medicinal orchids. South African Journal of Botany. 77, 2–9. https://doi.org/10.1016/j.sajb.2010.09.015.

Chipinga, J.V., Kamanula, J.F., Ben Moyo, P.B., 2018. Efficacy of Pterocarpus angolensis crude extracts against *Candida krusei, Staphylococcus aureus, Streptococcus agalactiae* and *Escherichia coli.* Malawi Medical Journal. 30, 4, 219-224. http://dx.doi.org/10.4314/mmj.v30i4.2.

Chipiti, T., Ibrahim, M.A., Koorbanally, N.A., Islam, M.S., 2013. In vitro antioxidant activities of leaf and root extracts of *Albizia autenesiana* Harms. Acta Poloniae Pharmaceutica. 70, 6, 1035-1043.

Chipiti, T., Ibrahim, M.A., Singh, M., Islam, M.S., 2015. In vitro alpha-amylase and alpha-glucosidase inhibitory effects and cytotoxic activity of *Albizia antunesiana* extracts. Pharmacognosy magazine. 11, 44, S231-S236. https://doi.org/10.4103/0973-1296.166018.

Cihyoka, M. A., 1994. AGEEP-Bushi, Bukavu. Expérience en pharmacopée vétérinaire traditionnelle au Bushi (Kivu/Zaïre). Métissages en santé animale de Madagascar à Haïti. Presses universitaires de Namur. 267 – 274.

Coronado, E.W., Sanchez-Escalante, J.J., Lopez-Cervantes, J., Robles-Zepeda, R.E., Velazquez, C., Sanchez-Machado, D.I., Garibay-Escobar, A., 2016. Antimycobacterial activity of medicinal plants used by the Mayo people of Sonora, Mexico. Journal of Ethnopharmacology. 190, 106-115. http://dx.doi.org/10.1016/j.jep.2016.05.064.

Costa, E., Martins, T., Monteiro, F. 2004. A checklist of Angolan grasses - Checklist das Poaceae de Angola. Southern African Botanical Diversity Network Report No. 28. SABONET. Pretoria.

Costa, E., Pedro, M., 2013. Medicina Vegetal de Angola. Agostinho Neto University, Botanical Center. Angola.

Cui, L., Lee, H.S., Ndinteh, D.T., Mbafor, J.T., Kim, Y.H., Le, T.V.T., Nguyen, P.H., Oh, W.K. 2010. New Prenylated Flavanones from *Erythrina abyssinica* with Protein Tyrosine Phosphatase 1B (PTP1B) Inhibitory Activity. Planta Medical. 76, 7, 713-718. http://dx.doi.org/10.1055/s-0029-1240682.

Cunningham, A.B., 1993. African medicinal plants: setting priorities at the interface between conservation and primary health care. People and Plants working paper 1. UNESCO. Paris.

Getie, M., Gebre-Mariam, T., Rietz, R., Hohne, C., Huschka, C., Schmidtke, M., Abate, A., Neubert, R.H.H., 2003. Evaluation of the anti-microbial and anti-inflammatory activities of the medicinal plants *Dodonaea*

viscosa, Rumex nervosus and *Rumex abyssinicus*. Fitoterapia. 74. 1-2. 139-143. http://dx.doi.org/10.1016/S0367-326X(02)00315-5.

Daruty, C., 1886. Plantes Médicinales de l'Ile Maurice et des Pays Intertropicaux. General Steam Printing Company, 6, rue du Gouvernement – Maurice.

Defour, G., 1994. Plantes médicinales traditionnelles au Kivu (République du Zaïre). Documentation du Sous-Réseau. Prélude.

Desta, B., 1994. Ethiopian traditional herbal drugs. Part III: Anti-fertility activity of 70 medicinal plants. Journal of Ethnopharmacology. 44, 199 – 209. http://dx.doi.org/10.1016/0378-8741(94)01187-7.

Desta, B., 1995. Ethiopian traditional herbal drugs. Part I: Studies on the toxicity and therapeutic activity of local taenicidal medications. Journal of Ethnopharmacology. 45, 27 – 33.

Djoukeng, J.D., Abou-Mansour, E., Tabacchi, R., Tapondjou, A.L., Bouda, H., Lontsi, D., 2005. Antibacterial triterpenes from *Syzygium guineense* (Myrtaceae). Journal of Ethnopharmacology. 101. 1-3. 283-286. https://doi.org/10.1016/j.jep.2005.05.008.

de Ruijter, A., 2006. *Diplorhynchus condylocarpon* (Müll.Arg.) Pichon. In: Schmelzer, G.H. & Gurib-Fakim, A. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale). Wageningen.

De Graer, A.M, 1929. L'art de guérir chez les Azande. Congo, Tome. 1, 2, 220 – 254.

de Wet, H., Nciki, S., van Vuuren, S.F., Sandy F. 2013. Medicinal plants used for the treatment of various skin disorders by a rural community in northern Maputaland, South Africa. Journal of Ethnobiology and Ethnomedicine. 9, 51. http://dx.doi.org/10.1186/1746-4269-9-51.

de Wet, H., Nkwanyanaa, M.N., van Vuurenb, S.F., 2010. Medicinal plants used for the treatment of diarrhoea in northern Maputaland, KwaZulu-Natal Province, South Africa. Journal of Ethnopharmacology. 130, 284–289. http://dx.doi.org/10.1016/j.jep.2010.05.004.

Desouter, S., 1991. Pharmacopée humaine et vétérinaire du Rwanda. Musée royal de l'Afrique centrale, Tervuren. Ann. Sc. Eco., 22.

Dhetchuvi, M. M., Lejoly J., 1990. Contribution à la connaissance des plantes médicinales du Nord-Est du Zaïre. Mitt. Inst. Allg. Bot. Hamburg. 23 b, 991 – 1006.

Diafouka, A., Lejoly, J., 1993. Plantes hypotensives utilisées en médecine traditionnelle à Brazzaville (Congo). Méricaments et aliments: L'approche ethnopharmacologique. Actes du 2e Colloque Européen d'Ethnophmacologie et de la 2ème Conférence internationale d'Ethnomédecine, Heidelberg. 4-27.

Diafouka, A. J. P., 1997. Analyse des usages des plantes médicinales dans 4 régions de Congo-Brazzaville. Doctoral thesis, Université libre de Bruxelles, Faculté des Sciences, Laboratoire de Botanique Systématique et de Phytosociologie.

Diallo, M. S. T., Traore, M. S., Balde, M.A., Camara, A.K., Balde, E.S., Traore, S., Oulare, K., Diallo, T.S., Laurent, S., Muller, R.N., 2019. Prevalence, management and ethnobotanical investigation of hypertension in two Guinean urban districts. Journal of Ethnopharmacology. 231, 73-79. http://dx.doi.org/10.1016/j.jep.2018.07.02.

Dibwe, D.F., Awale, S., Kadota, S., Tezuka, Y., 2012. Damnacanthal from the Congolese medicinal plant *Garcinia huillensis* has a potent preferential cytotoxicity against human pancreatic cancer PANC-1 cells. Phytotherapy Research. 26, 1920–1926. https://doi.org/10.1002/ptr.4672.

Disengomoka, I., Delaveau, P., 1983. Medicinal plants used for child's respiratory diseases in Zaire. Part I. Journal of Ethnopharmacology. 8, 257 – 263. https://doi.org/10.1016/0378-8741(83)90063-6.

Djeussi, D. E., Noumedem, Jaures A. K., Seukep, J.A., Fankam, A. G., Voukeng, I. K. Tankeo, S. B., Nkuete, A.H.L., Kuete, V., 2013. Antibacterial activities of selected edible plants extracts against multidrug-resistant Gram-negative bacteria. BMC Complementary and Alternative Medicine. 13, 164. https://doi.org/10.1186/1472-6882-13-164.

Doka, I.G, Yagi, S. M., 2009. Ethnobotanical Survey of Medicinal Plants in West Kordofan (Western Sudan). Ethnobotanical Leaflets 13, 1409-1416.

Durand, J.M. 1960. Les plantes bienfaisantes du Ruanda et de l'Urundi. Astrida.

Eguale, T., Tadesse, D., Giday, M., 2011. In vitro anthelmintic activity of crude extracts of five medicinal plants against egg-hatching and larval development of *Haemonchus contortus*. Journal of Ethnopharmacology. 137, 1, 108-113. http://dx.doi.org/10.1016/j.jep.2011.04.063.

Ejobi, F., Mosha, R.D., Ndege, S., Kamoga D., 2007. Etno-Veterinary Medicinal Plants of the Lake Victoria Basin: A Bioprospection. Journal of Animal and Veterinary Advances 6 (2), 257-261.

Eldeen, I.M.S., Elgorashi, E.E., Van Staden, J., 2005. Antibacterial, antiinflammatory, anti-cholinesterase and mutagenic effects of extracts obtained from some trees used in South African traditional medicine. Journal of Ethnopharmacology. 102, 457-464. https://doi.org/10.1016/j.jep.2005.08.049.

Elufioye, T.O., Bamgbose, M.O., Alabi, S.O., 2016. Evaluation of Antioxidant and Antiacne Activity of *Psorosperumum febrifugum* (Spach) and *Psorospermum corymbiferum (*Hochr.). British Journal of Pharmaceutical Research. 12, 5, UNSP 27984. http://dx.doi.org/10.9734/BJPR/2016/27984.

El-Kamali, H. H., 2009. Ethnopharmacology of Medicinal Plants used in North Kordofan (Western Sudan). Ethnobotanical Leaflets 13: 89-97. Available at: http://www.ethnoleaflets.com/leaflets/sudan.htm (accessed 06 September 2019).

Exell, A.W. & Fernandes, A., 1962. Conspectus Florae Angolensis, Vol. III, Fasc. 1. Leguminosae (Papilionoideae: Genisteae – Galegeae). Junta de Investigações do Ultramar. Lisboa.

Exell, A.W. & Fernandes, A., 1966. Conspectus Florae Angolensis, Vol. III, Fasc. 2. Leguminosae (Papilionoideae: Hedysareae – Sophoreae. Junta de Investigações do Ultramar, Lisboa, pp. 189-408.

Exell, A.W., Fernandes, A. & Mendes, E.J., 1970. Conspectus Florae Angolensis, Vol. IV. Rosaceae – Alangiaceae. Junta de Investigações do Ultramar e Instituto de Investigação Científica de Angola, Lisboa, pp. 1-401.

Exell, A.W. & Mendonça, F.A., 1937. Conspectus Florae Angolensis, Vol. I, Fasc. I. Ranunculaceae-Aquifoliaceae, Junta de Investigações Coloniais, Lisboa, pp. 1-176.

Exell, A.W. & Mendonça, F.A., 1951. Conspectus Florae Angolensis, Vol. I, Fasc. II. Malvaceae-Aquifoliaceae. Junta de Investigações Coloniais, Lisboa, pp. 177-422.

Exell, A.W. & Mendonça, F.A., 1954. Conspectus Florae Angolensis, Vol. II, Fasc. 1. Celastraceae-Connaraceae. Junta de Investigações do Ultramar, Lisboa, pp 1-152

Exell, A.W. & Mendonça, F.A., 1955. Conspectus Florae Angolensis, Vol. II, Fasc. 2. Leguminosae (Caesalpinioideae-Mimosoideae). Junta de Investigações do Ultramar, Lisboa, pp 153-322.

Feuya Tchouya, G. R., Souza, A., Tchouankeu, J. C., Yala, J.-F., Boukandou, M., Foundikou, H., Nguema, G.D., Obiang, F., Fekam Boyom, R., Mabika Mabika, E., Zeuko´o Menkem, D., Tantoh Ndinteh, J., Lebibi, J., 2015. Ethnopharmacological surveys and pharmacological studies of plants used in traditional medicine in the treatment of HIV/AIDS opportunistic diseases in Gabon. Journal of Ethnopharmacology. 162, 306–316.

Ficalho, C., 1884. Plantas Uteis da Africa Portuguesa. Impresa National. Lisboa.

Figueiredo, E., Smith, G.F., 2008. Plants of Angola. South African National Biodiversity Institute, Strelitzia 22. Pretoria.

Figueiredo, E., Smith, G.F., César, J., 2009. The flora of Angola: first record of diversity and endemism. Taxon. 58, 233-236.

Flatie, T., Gedif, K., Asres, T., Gebre-Mariam., 2009. Ethnomedical survey of Berta ethnic group Assosa Zone, Benishangul-Gumuz regional state, mid-west Ethiopia (Medicinal plants reported by household respondents of Berta ethnic group) Journal of Ethnobiology and Ethnomedicine 2009, 5, 14. https://doi.org/10.1186/1746-4269-5-14.

Frazão-Moreira, A., 2016. The symbolic efficacy of medicinal plants: practices, knowledge, and religious beliefs amongst the Nalu healers of Guinea-Bissau. Journal of Ethnobiology and Ethnomedicine. 12, 24. https://doi.org/10.1186/s13002-016-0095-x.

Freiburghaus, F., Ogwa, E.N., Mayunga, H. H., 1996. Nkunya, Ronald Kaminsky' and Reto Bruno. In vitro antitrypanosomal activity of African plants used in traditional medicine in Uganda to treat sleeping sickness. Tropical Medicine and International Health. 1, 6, 765 – 771.

Gakuubi, M. M., Wanzala, W., 2012. A survey of plants and plant products traditionally used in livestock health management in Buuri district, Meru County, Kenya. Journal of Ethnobiology and Ethnomedicine. 8, 39.

Gbolade, A. A., 2009. Inventory of antidiabetic plants in selected districts of Lagos State, Nigeria Journal of Ethnopharmacology. 121, 135–139. https://doi.org/10.1016/j.jep.2008.10.013.

Gelfand, M., Mavi, S., Drummond, R.B., Ndemera, B., 1985. The Traditional Medical Practitioner in Zimbabwe: His principles of Practice and Pharmacopoeia (Zambeziana). Mambo Press, Vol 17. Gweru.

Gessler, M.C., Tanner, M., Chollet, J., Nkunya M.H.H., Heinrich, M., 1995. Tanzanian Medicinal plants used traaditionally for the treatment of Malaria – *in-vivo* antimalarial and *in-vitro* cytotoxic activities. Phytotherapy Research. 9, 7, 504-508. https://doi.org/10.1002/ptr.2650090708.

Giday, M., 2001. An ethnobotanical study of medicinal plants used by the Zay people in Ethiopia. CBM: Skriftserie 3, 81 – 99.

Giday, M., Tilahum T., Abebe, A., Yalemtsehay M., 2007. Medicinal plants of the Shinasha, Agew-awi and Amhara peoples in northwest Ethiopia. Journal of Ethnopharmacology. 110, 516 – 525. https://doi.org/10.1016/j.jep.2006.10.011.

Giday, M., Asfaw, Z., Woldu, Z., Teklehaymanot, T., 2009. Medicinal plant knowledge of the Bench ethnic group of Ethiopia: an ethnobotanical investigation. Journal of Ethnobiology and Ethnomedicine. 5, 34. https://doi.org/10.1186/1746-4269-5-34.

Glover, P.E., Stewart, J., Gwynne, M.D., 1966. Masai and Kipsigis notes on East African plants, Part III - Medicinal uses of plants. East African Agricultural and Forestry Journal. 32, 2, 200 – 207.

Göhre, A., Toto-Nienguesse, A.B., Futuro, M., Neinhuis, C., Lautenschlager, T. 2016. Plants from disturbed savannah vegetation and their usage by Bakongo tribes in Uíge, Northern Angola. Journal of Ethnobiology and Ethnomedicine. 12: 42. https://doi.org/10.1186/s13002-016-0116-9.

Gororo, M., Chimponda, T., Chirisa, E., Mukanganyama, S., 2016. Multiple cellular effects of leaf extracts from *Parinari curatellifolia.* Bmc complemetary and alternative medicine. 16, 305. http://dx.doi.org/10.1186/s12906-016-1287-6.

Grønhaug, T. E., S. Glæserud, M. Skogsrud, N. Ballo, S. Bah, D. Diallo, B. S. Paulsen. 2008. Ethnopharmacological survey of six medicinal plants from Mali, West-Africa. Journal of Ethnobiology and Ethnomedicine. 4, 26. http://dx.doi.org/10.1186/1746-4269-4-26.

Gurib-Fakim, A., 2006. Medicinal plants: Traditions of yesterday and drugs of tomorrow. Molecular Aspects of Medicine. 27, 1-93. https://doi.org/10.1016/j.mam.2005.07.008.

Gweshelo, D., Muswe, R., Mukanganyama, S., 2016. In vivo and in vitro inhibition of rat liver glutathione transferases activity by extracts from *Combretum zeyheri* (Combretaceae) and *Parinari curatellifolia* (Chrysobalanaceae). BMC Complemetary and Alternative Medicine. 16, 238. http://dx.doi.org/10.1186/s12906-016-1235-5.

Haerdi, F., 1964. Afrikanische Heilpflanzen. Die Eingeborenen-Heilpflanzen des Ulanga- Distriktes Tanganjikas (Ostafrika). Acta tropica, Suppl. 8, 1-278. Verlag für Recht und Gesellschaft. Basel.

Hamil, F.A., Apio, S., Mubiru, N.K., Mosango, M., Bukenya-Ziraba, R., Maganyi, O.W., Soejarto D.D., 2000. Traditional herbal drugs of southern Uganda, Journal of Ethnopharmacology, 70, 281 -300. https://doi.org/10.1016/s0378-8741(00)00180-x.

Hammond-Tokke, W.D., 1998. Selective Borrowing? The Posibility of San Shamanistic Influence on Southern Bantu Divination and Healing Practices. The South African Archaeological Bulletin. 53, 9-15. https://doi.org/10.2307/3889257.

Haxaire, C. 1979. Phytothérapie et Médecine Familiale chez les Gbaya-Kara (République Centrafricaine. Doctoral thesis, Université de Paris, Faculty of Pharmacy.

Hedberg, I., Staugärd, F., 1989. Traditional medicine in Botswana. Traditional medicinal plants. The Nordic school of public health. Ipelegeng Publischers.

Heinrich, M., Edwards, S., Moerman, E.D., Leonti, M., 2009. Ethnopharmacological field studies: a critical assessment of their conceptual basis and methods. Journal of Ethnopharmacology. 124(1), 1–17. https://doi.org/10.1016/j.jep.2009.03.043.

Heinze, C., Ditsch, B., Congo, M.F., Lautenschläger, T., Neinhuis, C., 2017. First ethnobotanical analysis of useful plants in Cuanza Norte, North Angola. Research and Reviews Journal of Botanical Sciences. 6, 44–53.

Hines, D.A., Eckman K., 1993. Indigenous multipurpose trees of Tanzania. Uses and Economic Benefits for People. FO: Misc/93/9. Working Paper, FAO. Rome.

Hoet, S., Pieters, L., Muccioli, G.G., Habib-Jiwan, J.L., Opperdoes, F.R., Quetin-Leclercq, J., 2007. Antitrypanosomal activity of triterpenoids and sterols from the leaves of *Strychnos spinosa* and related compounds. Journal of Natural Products. 70, 8, 1360-1363. http://dx.doi.org/10.1021/np070038q.

Hostettman, K., Terreaux, C., 2000. Search for new lead compounds from higher plants. Chimia. 54, 11, 652-657.

Huffman, M.A., Page, J.E., Sukhdeo, M.V.K., Gotoh, S., Kalunde, M.S., 1996. Leaf-swallowing by chimpanzees, a behavioral adaptation for the control of strongyle nematode infections. International Journal of Primatology. 17, 475-503. https://doi.org/10.1007/BF02735188.

Huntley, B.J., Russo, V., Lages, F., Ferrand, N., 2019. Biodiversity of Angola. Science & conservation: a modern synthesis. Springer Nature. Cham.

Hutchings, A., Scott, A.H., Lewis, G., Cunningham, A., 1996. Zulu medicinal plants: an inventory. University of Natal Press, Pietermaritzburg.

Hyacinth, A., Nwocha, U.C., 2011. Antifertility activity of aqueous ethanolic extract of *Hymenocardia acida* stem bark in female rats. Iranian Journal of Reproductive Medicine. 9, 3, 217-222.

Ibrahim, J. A., Muazzam, I., Jegede, I. A., Kunle, O. F., Okogun, J. I., 2007. Ethno-medicinal plants and methods used by Gwandara tribe of Sabo Wuse in Niger state, Nigeria, to treat mental illness. African Journal of Traditional, Complementary and Alternative Medicines. 4, 2, 211 – 218.

ICPC. 2005. International Classification of Primary Care ICPC-2-R, Revised second edition, WONCA International Classification Committee, Oxford University Press. Oxford.

IFAD. 2014. Investing in rural people of Angola. International fund of agricultural development. Available at: https://www.ifad.org/documents/10180/e3938f85-ac56-4c1c-85bb-60431b399170. Accessed on 30 December 2016.

International Society of Ethnobiology (2006). International Society of Ethnobiology Code of Ethics (with 2008 additions). http://ethnobiology.net/code-of-ethics/ (accessed 26 May 2019)

IUCN. 2018. The IUCN Red List of Threatened Species. Version 2018-2. http://www.iucnredlist.org (accessed 30 October 2018).

Isa, A. I., Dzoyem, J. P., Adebayo, S.A., Suleiman, M.M., Eloff, J.N., 2016. African Journal of Traditional Complementary and Alternative Medicines. 13. 6. 22-26. http://dx.doi.org/10.21010/ajtcam.v13i6.5.

Isa, A.I., Awouafack, M.D., Dzoyem, J.P., Aliyu, M., Magaji, R.A., Ayo, J.O., Eloff, J.N. 2014. Some *Strychnos spinosa* (Loganiaceae) leaf extracts and fractions have good antimicrobial activities and low cytotoxicities. Bmc complementary and alternative medicine. 14, 456. http://dx.doi.org/10.1186/1472-6882-14-456.

Iyamah P.C., Idu, M., 2015. Ethnomedicinal survey of plantsused in the treatment of malaria in Southern Nigeria. Journal of Ethnopharmacology 173, 287–302. http://dx.doi.org/10.1016/j.jep.2015.07.008.

Jacob F., 2015. Angola in Odekon M. (Editor) The SAGE Encyclopedia of World Poverty, 2nd Ed. Skidmore College, USA.

Jena, A.K., Karan, M., Vasisht, K., 2017. Plant parts substitution based approach as a viable conservation strategy for medicinal plants: A case study of Premna latifolia Roxb. Journal of Ayurveda and Integrative Medicine 8(2), 68–72. https://doi.org/10.1016/j.jaim.2016.11.003

Jia, X.J., Liang, Y.E., Zhang, C., Wang, K., Tu, Y.B., Chen, M.W., Li, P., Wan, J.B., He, C.W., 2018. Polysaccharide PRM3 from *Rhychnosia minima* root enhances immune function through TLR4-NF-kappa B pathway. Biochimica et biophysica acta-general subjects. 1862, 8, 1751-1759. http://dx.doi.org/10.1016/j.bbagen.2018.05.012.

Jia, X.J., Zhang, C., Qiu, J.F., Wang, L.L., Bao, J.L., Wang, K., Zhang, Y.L., Chen, M.W., Wan, J.B., Su, H., 2015. Purification, structural characterization and anticancer activity of the novel polysaccharides from Rhychnosia minima root. Carbohydrate polymers. 132, 67-71. http://dx.doi.org/10.1016/j.carbpol.2015.05.059.

Kafoutchoni K.M., Idohou, R., Egeru, A., Salako, K.V., Agbangla, C., Adomou, A.C., Assogbadjo, A.E., 2018. Species richness, cultural importance, and prioritization of wild spices for conservation in the Sudano-Guinean zone of Benin (West Africa). Journal of Ethnobiology and Ethnomedicine. 14:67. https://doi.org/10.1186/s13002-018-0267-y.

Kamat, V.S., Chuo, F.Y., Kubo, I., Nakanishi, K., 1981. Anti-microbial agents from an east-african medicinal plant *Erythrina abyssinica.* Heterocycles. 15, 2, 1163-1170.

Kamatenesi, M. M., Oryem-Origa, H. 2005. Traditional herbal remedies used in the management of sexual impotence and erectile dysfunction in western Uganda. African Health Sciences. 5, 40 – 49.

Kamatenesi, M. M., Oryem-Origa, H., Acipa, A., 2011. Medicinal plants of Otwal and Ngai Sub Counties in Oyam District, Nothern Uganda. Journal of Ethnobiology and Ethnomedicine. 7, 7 https://doi.org/10.1186/1746-4269-7-7.

Karou, S.D., Tchacondo, T., Ouattara, L., Anani, K., Savadogo, A., Agbonon, A., Ben Attaia, M., de Souza, C., Sakly, M., Simpore, J., 2011. Antimicrobial, antiplasmodial, haemolytic and antioxidant activities of crude extracts from three selected Togolese medicinal plants. Asian Pacific Journal of Tropical medicine. 4. 10. 808-813. http://dx.doi.org/10.1016/S1995-7645(11)60199-5.

Kasuku, W., Lula, F., Paulus, J., Ngiefu, N., Kaluila, D., 1999. Contribution à l'inventaire des plantes utilisées pour le traitement du paludisme à Kinshasa (R.D.C.). Rev. Méd. Pharm. Afr. 13, 95 – 102.

Katerere, D.R, Eloff, J.N., 2004. Variation in chemical composition, antibacterial and antioxidant activity of fresh and dried Acacia leaf extracts. South African Journal of Botany. 70, 2: 303-305. https://doi.org/10.1016/S0254-6299(15)30249-0.

Kayode, J, Aleshinloye, L. Ige, O. E., 2008. Ethnomedicinal Use of Plant Species in Ijesa Land of Osun State, Nigeria. Ethnobotanical Leaflets 12, 164-170.

Kayode, J., Ige, O.E, Adetogo, T. A., Igbakin, A. P., 2009. Conservation and Biodiversity Erosion in Ondo State, Nigeria: Survey of Plant Barks Used in Native Pharmaceutical Extraction in Akoko Region. Ethnobotanical Leaflets. 13, 665-667.

Kayonga, A., Habiyaremye, F. X., 1987. Médecine traditionnelle et plantes médicinales rwandaises. Contribution aux études ethnobotaniques de la flore rwandaise. Préfecture de Gisenyi. Univ. Nat. Rwanda. Centre universitaire de recherche sur la pharmacopée et la médecine traditionnelle. Curpamethra.

Kerharo, J., Adam J.G., 1964. Les plantes médicinales, toxiques et magiques des Niominka et des Socé des Iles du Saloum (Sénégal). Acta tropica, Suppl. 8, 279 – 334.

Kerharo, J., Adam J. G., 1974. La pharmacopée sénégalaise traditionnelle. Plantes médicinales et toxiques. Editions Vigot Frères. Paris.

Kibungu Kembelo, A.O., 2003. Quelques plantes médicinales du Bas-Congo et leurs usages. Available at: http://www.sie-cameroun.cm/?q=biblio/doc/4825 (accessed on 08 September 2019).

Kirby, G.C., Khumalongwenya, N.B., Grawehr, A. Fison, T.W., Warhurst, D.C., Philippson, J.D., 1993. Antimalarial activity from Mhekara (*Uapaca Nitida* Mull-Arg.), a Tanzanian tree. Journal of Ethnopharmacology. 40, 1, 47-51. https://doi.org/10.1016/0378-8741(93)90088.

Kisangau, D. P., Lyaruu, H. VM, Hosea, K.M., Joseph, C.C. 2007. Use of traditional medicines in the management of HIV/AIDS opportunistic infections in Tanzania: a case in the Buhkoba rural district. Journal of Ethnobiology and Ethnomedicine. 3, 29. https://doi.org/10.1186/1746-4269-3-29.

Klopper, R.R., Matos, S., Figueiredo, E., Smith, G.F., 2009. *Aloe* in Angola (Asphodelaceae: Alooideae). Bothalia 39, 19–35. https://doi.org/10.4102/abc.v39i1.228.

Kokwaro, J.O. 1976. Medicinal plants of East Africa. East African literature bureau. Kampala. Nairobi. Dar Es Salaam.

Kokwaro, J. O. 1987. Some common African herbal remedies for skin diseases: with special reference to Kenya. Medicinal and poisonous plants of the tropics. Proceedings of symposium of the 14th International botanical congress, Berlin, 24 july - 1 august 1987, 44-69.

Koné, M. W., Atindehou, K.K., Terre, H. , Tyraore, D., 2002. Quelques plantes médicinales utilisées en pédiatrie traditionnelle dans la région de Ferkessedougou (Côte - d' Ivoire). BIOTERRE, Rev. Inter. Sci. De la Vie et de la Terre N° spécial.

Koné, W.M., Atindehou, K.K., Terreaux, C., Hostettmann, K., Traore, D., Dosso, M., 2004. Traditional medicine in North Cote-d'Ivoire: screening of 50 medicinal plants for antibacterial activity. Journal of Ethnopharmacology. 93, 1, 43-49. https://doi.org/10.1016/j.jep.2004.03.006.

Koné, W. M.,.Koffi, A. G, Bomisso, E. L., Tra Bi, F. H., 2012. Ethnomedical study and iron content of some medicinal herbs used in traditional medicine in Côte d'Ivoire for the treatment of anaemia. African Journal of Traditional, Complementary and Alternative Medicines. 9(1), 81-87.

Koval, A., Pieme, C.A., Queiroz, E.F., Ragusa, S., Ahmed, K., Blagodatski, A., Wolfender, J.L., Petrova, T.V., Katanaev, V.L., 2018. Tannins from *Syzigium guineense* suppress Wnt signaling and proliferation of Wnt-dependent tumors through a direct effect on secreted Wnts. Cancer Letters. 435, 110-120. https://doi.org/10.1016/j.canlet.2018.08.003.

Kowero, G., Cambell, B.M., Sumaila, U.R., 2003. Policies and Governance Structures in Woodlands in Southern Africa. CIFOR. Bogor.

Kpodar, M., Karou, S. D., Katawa, G., Anani, K., Gbekley, H. E., Adjrah, Y., Tchacondo, T., Batawila, K., Simpore, J., 2016. An ethnobotanical study of plants used to treat liver diseases in the Maritime region of Togo. Journal of Ethnopharmacology. 181, 263–273. https://doi.org/10.1016/j.jep.2015.12.051.

Kuete, V., Ango, P.Y., Yeboah, S.O., Mbaveng, A.T., Mapitse, R., Kapche, G.D.W.F., Ngadjui, Bonaventure T., Efferth, T., 2014. Cytotoxicity of four *Aframomum* species (*A. arundinaceum, A. alboviolaceum, A. kayserianum and A. polyanthum*) towards multi-factorial drug resistant cancer cell lines. BMC Complementary and Alternative Medicine. 14, 340. https://doi.org/10.1186/1472-6882-14-340.

Kumar, H.K.N., Mohana, N.C., Nuthan, B.R., Ramesha, K.P., Rakshith, D., Geetha, N., Satish, S., 2019. Phyto-mediated synthesis of zinc oxide nanoparticles using aqueous plant extract of *Ocimum americanum* and evaluation of its bioactivity. SN Applied Sciences. 1, 6, 651. http://dx.doi.org/10.1007/s42452-019-0671-5.

Lamorde, M., Tabuti, J.R.S., Obua, C., Kukunda-Byobona, C., Lanyero, H., Byakika-Kibwika, P., Bbosa, G.S., Lubega, A., Ogwal-Okeng, J., Ryan, M., 2010. Medicinal plants used by traditional medicine practitioners for the treatment of HIV/AIDS and related conditions in Uganda. Journal of Ethnopharmacology. 130, 1, 43-53. http://dx.doi.org/10.1016/j.jep.2010.04.004.

Lampiao, F., Maliwichi-Nyirenda, C., Mponda, J., Tembo, L., Clements, C., 2018. A preliminary investigation of the effects of labour inducing plant, *Cissampelos mucronata*, on the outcomes of pregnancy using rat model. Malawi Medical Journal. 30. 3, 159-160. https://doi.org/10.4314/mmj.v30i3.5.

Lautenschläger, T., Monizi M., Pedro M., Mandombe J.L., Bránquima M.F., Heinze C., 2018. First large-scale ethnobotanical survey in the province of Uíge, northern Angola. Journal of Ethnobiology and Ethnomedicine, 14 (51). https://doi.org/10.1186/s13002-018-0238-3.

Leedal, G.P., 1975. 50 (Fifty) common plants of the upland grasslands, Southern Highlands, Tanzania.Biology Section MATI-Mbeya, Tanzania. Center for Economic Botany, Royal Botanic Gardens.Kew, Richmond, Surrey TW9 3AE, UK.

Lemmens, R.H.M.J., Louppe, D., Amoako, A.A., 2012. Timbers 2, Plant Resources of Tropical Africa. Prota. Wageningen.

Lengbiye, E.M, Ngbolua, K.M., Gédéon, N.B., Messi, L.M., Noté, O.P., Mbing, J.N., Dieudonné, E., Mpiana, P., Mpiana, P.T., 2018. *Vitex madiensis* Oliv. (Lamiaceae): phytochemistry, pharmacology and future directions, a mini-review. Journal of Pharmacognosy and Phytochemistry. 7, 2, 244-25.

Leyens, T., Lobin, W., 2009. Manual de plantas úteis de Angola. Bischöfliches Hilfswerk Misereor. Aachen.

Liu, M., Katerere, D.R., Gray, I.R., Seidel, V., 2009. Phytochemical and antifungal studies on *Terminalia mollis* and *Terminalia brachystemma*. Fitoterapia 80. 369–373. https://doi.org/10.1016/j.fitote.2009.05.006.

Lulekal, E., E. Kelbessa, T. Bekele, H. Yineger., 2008. An ethnobotanical study of medicinal plants in Mana Angetu District, southeastern Ethiopia. Journal of Ethnobiology and Ethnomedicine. 4, 10. https://doi.org/10.1186/1746-4269-4-10.

Luseba, D., D. Van der Merwe. 2006. Ethnoveterinary medicine practices among Tsonga speaking people of South Africa. Onderstepoort Journal of Veterinary Research. 73, 115–122.

Luseba, D., Elgorashi, E.E., Ntloedibe, D.T., Van Staden, J., 2007. Antibacterial, anti-inflammatory and mutagenic effects of some medicinal plants used in South Africa for the treatment of wounds and retained placenta in livestock. South African Journal of Botany. 73, 3, 378-383. http://dx.doi.org/10.1016/j.sajb.2007.03.003.

Mac Foy, C.A., Sama, A.M., 1983. Medicinal plants in Pujehun district of Sierra Leone. Journal of Ethnopharmacology. 8, 215 – 223. https://doi.org/10.1016/0378-8741(83)90055-7.

Magassouba, F.B., Dialloa, A., Kouyaté, M., Mara, F., Bangoura, O., Camara, A., Traoré, S., Diall, A.K., Camara, G., Traoré, S., Keita, A., Camara, M.K., Barry, R., Keita, S., Oularé, K., Barry, M.S., Donzo, M., Camara, K., Toté, K., Vanden Berghe, D., Totté, J., Pieters, L., Vlietinck, A.J., Baldé, A.M., 2007. Ethnobotanical survey and antibacterial activity of some plants used in Guinean traditional medicine. Journal of Ethnopharmacology. 114, 44 – 53. https://doi.org/10.1016/j.jep.2013.10.048.

Mahwasane, S.T., Middleton, L., Boaduo, N., 2013. An ethnobotanical survey of indigenous knowledge on medicinal plants used by the traditional healers of the Lwamondo area, Limpopo province, South Africa. South African Journal of Botany. 88, 69–75. https://doi.org/10.1016/j.sajb.2013.05.004.

Maiga, A., Diallo, D., Fane, S., Sanogo, R., Paulsen, B.S., Cisse, B., 2005. A survey of toxic plants on the market in the district of Bamako, Mali: traditional knowledge compared with a literature search of modern pharmacology and toxicology. Journal of Ethnopharmacology. 96, 183-193. http://dx.doi.org/10.1016/j.jep.2004.09.005.

Malik, J.K., Manvi, F.V., Alagawadi, K.R., Noolvi, M.N., 2008. Evaluation of anti-inflammatory activity of *Gymnema sylvestre* leaves extract in rats. International Journal of Green Pharmacy. 2, 2. http://dx.doi.org/10.4103/0973-8258.41184.

Makhafola, T.J., McGaw, L.J., Eloff, J.N., 2014. In vitro cytotoxicity and genotoxicity of five *Ochna* species (Ochnaceae) with excellent antibacterial activity. South African Journal of Botany. 91, 9-13. http://dx.doi.org/10.1016/j.sajb.2013.11.010.

Makgatho, M. E., Nxumalo, W., Raphoko, L. A., 2018. Anti-mycobacterial, -oxidative, -proliferative and -inflammatory activities of dichloromethane leaf extracts of *Gymnosporia senegalensis* (Lam.) Loes. South African Journal of Botany. 114, 217-222. https://doi.org/10.1016/j.sajb.2017.11.002.

Makumberlo, E., Lukoki L., Paulus, J.J., Luyindula, N., 2008. Stratégie de valorisation des espèces ressources des produits non ligneux de la savane des environs de Kinshasa: II. Enquête ethnobotanique (aspects médicinaux). Tropicultura. 26, 3, 129-134.

Malan Djah, F. 2009. Religion traditionnelle et gestion durable des ressources floristiques en Côte d'Ivoire: Le cas des Ehotilé, riverains du Parc National des Îles Ehotilé. VertigO - la revue électronique en sciences de l'environnement. 9, 2.

Malgras, D. 1992. Arbres et arbustes guérisseurs des savanes maliennes. Editions Karthala, 22 – 24. Paris.

Maliwichi-Nyirenda, C. P., Maliwichi, L. L., 2010. Medicinal plants used for contraception and pregnancy-related cases in Malawi: A case study of Mulanje. Journal of Medicinal Plants Research. 4(20), 2121 – 2127.

Manda, L., Tunon, H., Mkamanga, G.Y., Magombo, Z.L., 2007. Status and uses of *Oldfieldia dactylophylla* (Euphorbiaceae) in Malawi, University of Uppsala. http://www.slu.se/Global/externwebben/centrumbildningar-projekt/centrum-for-biologiskmangfald/Dokument/publikationer-cbm/Masteruppsatser/Leonard%20Manda%20Thesis.pdf (accessed 13 December 2017).

Manyarara, T.E., Chifamba, J., Tarugarira, F.T., 2016. Antifungal Activity of *Ziziphus mucronata* and *Erythrina abyssinica* Bark Crude Extracts on *Cryptococcus neofomans* and *Candida albicans* Species. British Journal of Pharmaceutical Research. 10, 3. http://dx.doi.org/10.9734/BJPR/2016/23843.

Mapi, J., 1988. Contribution à l'étude éthnobotanique et analyses chimiques de quelques plantes utilisées en médecine traditionnelle dans la région de Nkongsamba (Moungo). Doctoral thesis, 3ème cycle, Université de Yaoundé.

Maroyi, A., 2011. The gathering and consumption of wild edible plants in Nhema communal area, Midlands Province, Zimbabwe. Ecology of Food and Nutrition. 50, 506-525. http://dx.doi.org/10.1080/03670244.2011.620879.

Maroyi, A., 2013. Traditional use of medicinal plants in south-central Zimbabwe: review and perspectives. Journal of Ethnobiology and Ethnomedicine. 9, 31 -45. http://dx.doi.org/10.1186/1746-4269-9-31.

Maroyi, A., 2018. *Albizia adianthifolia*: Botany, Medicinal Uses, Phytochemistry, and Pharmacological Properties. The Scientific World Journal. Article ID 7463584. https://doi.org/10.1155/2018/7463584.

Marume, A., Matope, G., Katsande, S., Khoza, S., Mutingwende, I., Mduluza, T., Munodawafa-Taderera, T., Ndhlala, A.R. 2017. Wound Healing Properties of Selected Plants Used in Ethnoveterinary Medicine. Frontiers in Pharmacology. 8, 544. http://dx.doi.org/10.3389/fphar.2017.00544.

Masoko, P., Picard, J, Eloff, J.N., 2005. Antifungal activities of six South African *Terminalia* species (Combretaceae). Journal of Ethnopharmacology. 3, 99, 301-8.

Mathabe, M.C., Nikolova, R.V., Lall, N., Nyazema, N.Z., 2006. Antibacterial activities of medicinal plants used for the treatment of diarrhoea in Limpopo Province, South Africa. Journal of Ethnopharmacology. 105. 1-2, 286-293. http://dx.doi.org/10.1016/j.jep.2006.01.029.

Matzigkeit, U., 1990. Natural veterinary medicine. Ectoparasites in the Tropics Weikersheim, Josef Margraf Verlag. Weikersheim.

Mawunu, M., Bongo, K., Eduardo, A., Vua, M.M.Z., Ndiku, L., Mpiana, P.T., 2016. Contribution à la connaissance des produits forestiers non ligneux de la Municipalité d'Ambuila (Uíge, Angola): Les plantes sauvages comestibles [Contribution to the knowledge of no-timber forest products of Ambuila Municipality (Uíge, Angola): The wild edible plants]. International Journal of Innovation Science Research. 26, 9.

Mbayo, M. K., Kalonda, E. M., Muya, R. K., Tshisand, P. T., Kanangila, A. B., Maseho, F. M., Kihuya, E. N., Bakari, S. A., Kahumba, J. B, Lumbu. J. B. S., 2016. Test d'activité antimitotique et étude chimique préliminaire de quelques Euphorbiaceae du Katanga méridional (RDC). Phytotherapie. 1-11. http://dx.doi.org/10.1007/s10298-016-1060-5.

McGaw, L.J., Jager, A.K., vanStaden, J., 1997. Prostaglandin synthesis inhibitory activity in Zulu, Xhosa and Sotho medicinal plants. Phytotherapy Research. 11, 2, 113-117. https://doi.org/10.1002/(SICI)1099-1573(199703).

Mohammed, M.M.D., Ibrahim, N.A., Awad, N.E., Matloub, A.A., Mohamed-Ali, A.G., Barakat, E.E., Mohamed, A. E., Colla, P.L. 2012. Anti-HIV-1 and cytotoxicity of the alkaloids of *Erythrina abyssinica* Lam. growing in Sudan. Natural Product Research. 26, 17, 1565-1575. http://dx.doi.org/0.1080/14786419.2011.573791.

Mojeremane, W., 2012. Bobgunnia madagascariensis (Desv.) J.H. Kirkbr. & Wiersema. Netherlands: Wageningen: Prota (Plant Resources of Tropical Africa). http://www.prota4u.org/protav8.asp?p=Bobgunnia+madagascariensis (accessed 21 April 2015).

Mongalo, N.I., McGaw, L.J., Finnie J.F, Van Staden, J., 2015. *Securidaca longipedunculata* Fresen (Polygalaceae): A review of its ethnomedicinal uses, phytochemistry, pharmacological properties and toxicology. Journal of Ethnopharmacology. 165, 215-226. https://doi.org/10.1016/j.jep.2015.02.041.

More, G., Tshikalange, T.E., Lall, N., Botha, F., Meyer, J.J.M. 2008. Antimicrobial activity of medicinal plants against oral microorganisms. Journal of Ethnopharmacology. 119, 3, 473-477. http://dx.doi.org/10.1016/j.jep.2008.07.001.

Moshi, M.J., Mbwambo, Z.H., Nondo, R.S.O., Masimba, P.J., Kamuhabwa, A., Kapingu, M.C., Thomas, P., Richard, M., 2006. Evaluation of ethnomedical claims and brine shrimp toxicity of some plants used in Tanzania as traditional medicines. African Journal of Traditional, Complementary and Alternative Medicines 3, 48□58.

Moyo, M., Gomba, M., Nharingo, T., 2015. Afzelia quanzensis bark extract for green synthesis of silver nanoparticles and study of their antibacterial activity. International Journal of Industrial Chemistry. 6, 4.

Muazu, J., Kaita, A. H., 2008. A review of Traditional plants used in the treatment of epilepsy amongst Hausa / Fulani tribes in Northern Nigeria. African Journal of Traditional, Complementary and Alternative Medicines, 5 (4), 387 – 390.

Muganga, R., Angenot, L., Tits, M., Frederich, M., 2010. Antiplasmodial and cytotoxic activities of Rwandan medicinal plants used in the treatment of malaria. Journal of Ethnopharmacology. 128, 1, 52-57. http://dx.doi.org/10.1016/j.jep.2009.12.023.

Mukandiwa, L., McGaw, L.J., Eloff, J. N., Naidoo, V., 2012. Extracts of four plant species used traditionally to treat myiasis influence pupation rate, pupal mass and adult blowfly emergence of *Lucilia cuprina* and *Chrysomya marginalis* (Diptera: Calliphoridae). Journal of Ethnopharmacology. 143, 3, 812-818. https://doi.org/10.1016/j.jep.2012.07.041.

Mukazayire, M.J., Minani, V., Ruffo, C. K., Bizuru, E., Stévigny, C., Duez, P., 2011. Traditional phytotherapy remedies used in Southern Rwanda for the treatment of liver diseases. Journal of Ethnopharmacology. 138, 415–431. http://dx.doi.org/10.1016/j.jep.2011.09.025.

Mukungu, N., Abuga, K., Okalebo, F., Ingwela, R., Mwangi, J., 2016. Medicinal plants used for management of malaria among the Luhya community of Kakamega East sub-County, Kenya. Journal of Ethnopharmacology. 194, 98–107. http://dx.doi.org/10.1016/j.jep.2016.08.050.

Mulaudzi, R.B., Ndhlala, A.R., Kulkarni, M.G., Finnie, J.F., Van Staden, J., 2013. Anti-inflammatory and mutagenic evaluation of medicinal plants used by Venda people against venereal and related diseases. Journal of Ethnopharmacology. 146, 1, 173-179. http://dx.doi.org/10.1016/j.jep.2012.12.026.

Mulisa, E., Asres, K., Engidawork, E., 2015. Evaluation of wound healing and anti-inflammatory activity of the rhizomes of *Rumex abyssinicus* J. (Polygonaceae) in mice. BMC Complementary and Alternative Medicine. 341. http://dx.doi.org/10.1186/s12906-015-0878-y.

Munodawafa, T., Chagonda, L.S., Moyo, S.R. 2013. Antimicrobial and Phytochemical Screening of some Zimbabwean Medicinal Plants. Journal of Biologically Active Products from Nature. 3, 5-6. https://doi.org/10.1080/22311866.2013.782759.

Musa, M. S., Abdelrasool, F. E., Elsheikh, E. A., Ahmed, L. A. M. N., Mahmoud, A. L. E., Yagi, S. M., 2011. Ethnobotanical study of medicinal plants in the Blue Nile State, South-eastern Sudan. Journal of Medicinal Plants Research. 5(17), 4287-4297.

Muthaura, C.N., G.M. Rukunga, S.C. Chhabra, G.M. Mungai & E.N.M. Njagi. 2007. Traditional phytotherapy of some remedies used in treatment of malaria in Meru district of Kenya. South African Journal of Botany. 73, 3, 402-411. https://doi.org/10.1016/j.sajb.2007.03.004.

Muthaura, C.N., Keriko, J.M., Keriko, J. M., Mutai, C., Yenesew, A., Gathirwa, J.W., Irungu, B. N. Nyangacha, R., Mungai, G.M., Derese, S., 2015. Antiplasmodial potential of traditional antimalarial phytotherapy remedies used by the Kwale community of the Kenyan Coast. Journal of Ethnopharmacology. 170, 148-157. https://doi.org/10.1016/j.jep.2015.05.024.

Muthu, C.M., Ayyanar, N., Ignacimuthu, S., 2006. Medicinal plants used by the traditional healers in Kancheepuram District of Tamil Nadu, India. Journal of Ethnobiology and Ethnomedicine. 2, 43-57. https://doi.org/10.1186/1746-4269-2-43.

Muyobela, J., Nkunika, P.O.Y., Mwase, E.T., 2016. In vitro acaricidal activity of *Bobugnnia madagascariensis* Desv. against *Amblyomma variegatum* (Fabricius) (Acari: Ixodidae). Tropical Animal Health and Production. 48, 3, 625-631. https://doi.org/10.1007/s11250-016-1009-6.

Nasimolo, J., Kiama, S. G., Gathumbi, P.K., Makanya, A.N., Kagira, J.M., 2014. Erythrina abyssinica prevents meningoencephalitis in chronic Trypanosoma brucei mouse model. Metabolic Brain Disease. 29, 2, 509-519. http://dx.doi.org/10.1007/s11011-014-9488-5.

Natabou, D.F., 1991. Contribution à l'étude de la médecine et de la Pharmacopée traditionnelles au Bénin: Tentatives d'intégration dans le système de santé officiel. Thesis Université Cheikh Anta Diop.

Ndubani, P., Hojer, B., 1999. Traditional healers and the treatment of sexually transmitted illnesses in rural Zambia. Journal of Ethnopharmacology. 67, 1, 15-25. http://dx.doi.org/10.1016/S0378-8741(99)00075-6.

Neuwinger, H.D., 2000. African traditional medicine: a dictionary of plant use and applications. Medpharm Scientific. Stuttgart.

Ngarivhume, T., van Klooster, C.H.I.E.A, de Jong, J.T.V.M, Van der Westhuizen, J.H., 2015. Medicinal plants used by traditional healers for the treatment of malaria in the Chipinge district in Zimbabwe. Journal of Ethnopharmacology. 159, 224-237. https://doi.org/10.1016/j.jep.2014.11.011.

Ngezahayo, J., Havyarimana, F., Hari, L., Stevigny, C., Duez, P., 2015. Medicinal plants used by Burundian traditional healers for the treatment of microbial diseases. Journal of Ethnopharmacology. 173, 338-351. https://doi.org/10.1016/j.jep.2015.07.028.

Ngulde, S.I., Sandabe, U.K., Abounader, R., Dawson, T.K., Zhang, Y., Iliya, I., Hussaini, I.M., 2019. Ethanol Extract of *Securidaca longipendulata* Induces Apoptosis in Brain Tumor (U87) Cells. Biomed Research International. Article Number: 9826590. http://dx.doi.org/10.1155/2019/9826590.

Nguta, J.M., Mbaria, J.M., Gakuya, D.W., Gathumbi, P.K., Kiama, S.G., 2010. Traditional antimalarial phytotherapy remedies used by the South Coast community, Kenya. Journal of Ethnopharmacology. 131, 256–267. http://dx.doi.org/10.1016/j.jep.2010.06.031.

Nguyen, T.L., Rusten, A., Bugge, M.S., Malterud, K.E., Diallo, D., Paulsen, B.S., Wangensteen, H. 2016. Flavonoids, gallotannins and ellagitannins in *Syzygium guineense* and the traditional use among Malian healers. Journal of Ethnopharmacology. 192, 450-458. http://dx.doi.org/10.1016/j.jep.2016.09.035.

Nhukarume, L., Chikwambi, Z., Muchuweti, M., Chipurura, B., 2010. Phenolic content and antioxidant capacities of *Parinari curatelifolia*, *Strychnos spinosa* and *Adansonia digitata*. Journal of Food Biochemistry. 34. 207-221. http://dx.doi.org/10.1111/j.1745-4514.2009.00325.

Nondo, R.S.O, Mbwambo, Z.H., Kidukuli, A.W., Innocent, E.M., Mihale, M.J., Erasto, P., Moshi, M.J., 2011. Larvicidal, antimicrobial and brine shrimp activities of extracts from *Cissampelos mucronata* and *Tephrosia villosa* from coast region, Tanzania. BMC Complementary and Alternative Medicine. 11, 33. https://doi.org/10.1186/1472-6882-11.

Nordeng, H., Al-Zayadi, W., Diallo, D., Ballo, N., Paulsen, B.S., 2013. Traditional medicine practitioners' knowledge and views on treatment of pregnant women in three regions of Mali. Journal of Ethnobiology and Ethnomedicine. 9, 67. https://doi.org/10.1186/1746-4269-9-67.

Nsimundele, L., 1968. Répertoire des plantes médicinales des régions côtieres du Mayumbe et du Bas-Congo, 1966-1968. Notes non publiées de Léopold Nsimundele, Chef du bureau forestier / Inéac Luki, Institut National pour l'Etude Agronomique du Congo.

Nwafor, S.V., Okoye, C.F. 2005. Antiulcer properties of the ethanol root extract of *Cissampelos mucronata*. Pharmaceutical Biology. 43, 396-403. https://doi.org/10.1080/13880200590963222.

Nyakabwa, M., Dibaluka, W., 1990. Plantes médicinales cultivées dans la zone de Kabondo à Kisangani (Zaïre). African Study Monographs. 11, 2, 87–99.

Obasi, T.C., Braicu, C., Iacob, B.C., Bodoki, E., Jurj, A., Raduly, L., Oniga, I., Berindan-Neagoe, I., Oprean, R., 2018. Securidaca-saponins are natural inhibitors of AKT, MCL-1, and BCL2L1 in cervical cancer cells. Cancer Management and Research. 10, 5709-5724. http://dx.doi.org/10.2147/CMAR.S163328.

Ohmori, R., Iwamoto, T., Tago, M., Takeo, T., Unno, T., Itakura, H., Kondo, K., 2005. Antioxidant activity of various teas against free radicals and LDL oxidation. Lipids, 40, 8, 849-853. https://doi.org/10.1007/s11745-005-1447-4.

Offiah, N.V., Makama, S., Elisha, I.L., Makoshi, M.S., Gotep, J.G., Dawurung, C.J, Oladipo, O.O., Lohlum, A.S., Shamaki, D. 2011. Ethnobotanical survey of medicinal plants used in the treatment of animal diarrhoea in Plateau State, Nigeria. Veterinary Research. 7, 36. https://doi.org/10.1186/1746-6148-7-36.

Oguntoye, S,O., Bello, O.M., Fasinu, P.S., Khan, I.A., Ali, Z., Khan, S.I., Usman, L.A., 2018. Evaluation of Selected Nigerian Medicinal Plants for in vitro Antiprotozoal Activit. Natural Products Journal. 8, 3, 175-184. http://dx.doi.org/10.2174/2210315508666180101162950.

Okello, J., Segawa, P., 2007. Medicinal plants used by communities of Ngai Subcounty, Apac District, northern Uganda. African Journal of Ecology. 45, 6–83.

Oladosu, I.A., Lawson, L., Aiyelaagbe, O.O., Emenyonu, N., Afieroho, O.E., 2017. Anti-tuberculosis lupane-type isoprenoids from *Syzygium guineese* Wild DC. (Myrtaceae) stem bark. Future Journal of Pharmaceutical Science. 3. 2. 148-152. http://dx.doi.org/10.1016/j.fjps.2017.05.002.

Olaleye, M.T., Amobonye, A.E., Komolafe, K., Akinmoladun, A.C., 2014. Protective effects of *Parinari curatellifolia* flavonoids against acetaminophen-induced hepatic necrosis in rats. Saudi Journal of Biological Sciences. 21, 5, 486-492. http://dx.doi.org/10.1016/j.sjbs.2014.06.005.

Olson, D.M., Dinerstein E., Wikramanayake E.D., Burgess N.D., Powell G.V.N., Underwood 393 E.C., D'amico J.A., Itoua I., Strand H.E., Morrison J.C., Loucks C.J., Allnutt T.F., Ricketts T.H., Kura Y., Lamoreux J.F., Wettengel W.W., Hedao P., Kassem K.R., 2001. Terrestrial Ecoregions of the World: A New Map of Life on Earth. BioScience 51: 933. https://doi.org/10.1641/0006-3568(2001)051.

Ondo, J.P., Lekana-Douki, J.B., Bongui, J.B., Edou, E.S.Z., Zatra, R., Toure-Ndouo, F.S., Elomri, A., Lebibi, J., Seguin, E., 2012. In vitro antiplasmodial activity and cytotoxicity of extracts and fractions of *Vitex madiensis*, medicinal plant of Gabon. Tropical Medicine & International Health. 17, 3, 316-321. https://doi.org/10.1111/j.1365-3156.2011.02922.

Orwa, C., Mutua, A., Kindt, R., Jamnadass, R., Anthony S., 2009. Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. Accessed on 05 September 2019.

Pallant, C.A., Steenkamp, V., 2008. In-vitro bioactivity of Venda medicinal plants used in the treatment of respiratory conditions. Hum Expl Toxicol. 27(11), 859-866. https://doi.org/10.1177/0960327108099526.

Paulos, B.T., Gedif Fenta, D., Bisrat D., Asres K., 2016. Health seeking behavior and use of medicinal plants among the Hamer ethnic group, South Omo zone, south western Ethiopia. Journal of Ethnobiology and Ethnomedicine. 12, 44. https://doi.org/10.1186/s13002-016-0107-x.

Peni, I.J., Elinge, C.M., Yusuf, H., Itodo, A.U., Agaie, B.M., Mbongo, A.N., Chogo, E., 2010. Phytochemical screening and antibacterial activity of *Parinari curatellifolia* stem extract. Journal of Medicinal Plants Research. 4, 20, 2099-2102.

Peter, E.L., Rumisha, S.F., Mashoto, K.O., Malebo, H.M., 2014. Ethno-medicinal knowledge and plants traditionally used to treat anemia in Tanzania: A cross sectional survey. Journal of Ethnopharmacology. 154, 3, 767-773. https://doi.org/10.1016/j.jep.2014.05.002.

Perez, A.J., Hassan, E.M., Pecio, L., Omer, E.A., Kucinska, M., Murias, M., Stochmal, A., 2015. Triterpenoid saponins and C-glycosyl flavones from stem bark of *Erythrina abyssinica* Lam. and their cytotoxic effects. Phytochemistry Letters. 13. 59-67. http://dx.doi.org/10.1016/j.phytol.2015.05.013.

Phillips, E.P., 2011. A contribution to the flora of the Leribe Plateau and environs. Annals of the South African Museum. 16: 1–379. In: The medical ethnobotany of Lesotho: a review. Bothalia 41,1: 209–228.

Pierce, A., 1999. Gymnema Monograph: Practical Guide to Natural Medicine. Stonesong Press Book. New York.

Preuss, H.G., Bagchi, D., Bagchi, M., Rao, C.V., Dey, D.K., Satyanarayana, S., 2004. Effects of a natural extract of (-)-hydroxycitric acid (HCA-SX) and a combination of HCA-SX plus niacin-bound chromium and *Gymnema sylvestre* extract on weight loss. Diabetes Obes Metab. 6, 3, 171-80. http://dx.doi.org/10.1111/j.1462-8902.2004.00328.x.

Queza, A.J., 2010. Sistema Nacional de Saúde Angolano e Contributos Luz da Reforma do SNS Português. https:// repositorio-aberto.up.pt/bitstream/10216/50407/2/Sistema%20Nacional% 20de%20Sade%20Angolano%20e%20Contributos%20%20Luz%20 da%20Reforma%20do%20SNS%20Portugus.pdf (accessed 18 April 2019)

Quattrocchi, U., 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology (5 Volume Set). CRC Press. London.

Rabearivony, A.D., Kuhlman, A.R., Razafiarison, Z.L., Raharimalala, F., Rakotoarivony, F., Randrianarivony, T., Rakotoarivelo, N., Randrianasolo, A., Bussmann, R.W., 2015. Ethnobotanical Study of the Medicinal Plants Known by Men in Ambalabe, Madagascar. Ethnobotany Research & Applications 14:123-138. http://dx.doi.org/10.17348/era.14.0.123-138.

Rakotoarivelo, N.H., Rakotoarivony, F., Ramarosandratana, A.V., Jeannoda, V.H., Kuhlman, A.R., Randrianasolo, A., Bussmann, R.W., 2015. Medicinal plants used to treat the most frequent diseases encountered in Ambalabe rural community, Eastern Madagascar. Journal of Ethnobiology and Ethnomedicine. 11, 68. 10.1186/s13002-015-0050-2.

Rakotondrafara, A., Rakotondrajaona R., Rakotoarisoa M., Ratsimbason M., Rasamison V.E., Rakotonandrasana S.R., 2018. Ethnobotany of medicinal plants used by the Zafimaniry clan in Madagascar. The Journal of Phytopharmacology, 7, 6, 483-494.

Rakuambo, N.C., Meyer, J.J., Hussein, A., 2004. Xanthone isolated from *Securidaca longepedunculata* with activity against erectile dysfunction. Fitoterapia. 75, 497-499. https://doi.org/10.1016/j.jep.2008.06.018.

Razafindraibe, M., Kuhlman, A.R., Rabarison, H., Rakotoarimanana, V., Rajeriarison, C., Rakotoarivelo, N., Randrianarivony, T., Rakotoarivony, F., Ludovic, R., Randrianasolo, A., Bussmann, R.W., 2006. Medicinal plants used by women from Agnalazaha littoral forest (Southeastern Madagascar). Journal of Ethnobiology and Ethnomedicine. 2, 22. https://doi.org/10.1186/1746-4269-9-73.

Rein, J., 2001. International Governance Through Trade Agreements: Patent Protection for Essential Medicines. Northwestern Journal of International Law & Business. 21, 379-408.

Revermann, R., Finckh, M., 2019. Vegetation Survey, Classification and Mapping in Angola. In: Huntley B., Russo V., Lages F., Ferrand N. (eds) Biodiversity of Angola. Springer, Cham.

Rhode-Livingstone Museum. 1974. The Occasional Papers of Rhode-Livingstone Museum. Manchester University press. Manchester.

Ribeiro, A., Romeiras, M.M., Tavares, J., Faria, M.T., 2010. Ethnobotanical survey in Canhane village, district of Massingir, Mozambique: medicinal plants and traditional knowledge. Journal of Ethnobiology and Ethnomedicine. 6, 33. https://doi.org/10.1186/1746-4269-6-33.

Rodegem F.M., 1970. Dictionnaire Rundi-Français. Annales du Musée royal de l'Afrique centrale, Tervuren (Belgique). Série in - 8°, Sc. humaines, 69.

Rodrigues A.M.L., 1977. Note pour l'étude de l'ethnobotanique dans la culture Tshokwe. Contribuicoes para o Estudo da Antropologia Portuguese. Vol X - Fasciculo 1. Coimbra.

Roskov, Y., Ower, G., Orrell, T., Nicolson, D., Bailly, N., Kirk, P.M., Bourgoin, T., DeWalt, R.E., Decock, W., Nieukerken, E. van, Zarucchi, J., Penev, L. eds. 2019. Species 2000 & ITIS Catalogue of Life, 20th February 2019. Digital resource at www.catalogueoflife.org/col. Species 2000: Naturalis, Leiden.

Ruffo, C.K., 1991. A Survey of medicinal plants in Tabora region, Tanzania. In: Traditional Medicinal Plants. Dar Es Salaam University Press. Tanzania.

Ruffo, C.K., Birnie, A., Tengnas, B., 2002. Edible Wild Plants of Tanzania. Regional Land Managment Unit, Nairobi.

Samanga, K.K.L., Rao, G.V., Reddy, G.C., Kush, A.K., Diwakar, L., 2014. Synthetic racemates of abyssinone I and II induces apoptosis through mitochondrial pathway in human cervix carcinoma cells. Bioorganic Chemistry. 56, 54-61. http://dx.doi.org/10.1016/j.bioorg.2014.06.004.

Samie, A., Obi, C.L., Lall, N., Meyer, J.J.M., 2009. In-vitro cytotoxicity and antimicrobial activities, against clinical isolates of *Campylobacter* species and *Entamoeba histolytica*, of local medicinal plants from the Venda region, in South Africa. Annals of Tropical Medicine and International Health. 103(2): 159-70. doi: 10.1179/136485909X384992.

Sanusi, J., Jibia, A.B., Runka, J.Y., Liadi, S., Abubakar, A.A., Zurmi, R.S., 2015. Antimicrobial activity of aqueous and ethanol extracts of violet plant. International Journal of Pharmaceutical Sciences and Research. 6, 8, 3276-3284. http://dx.doi.org/10.13040/IJPSR.0975-8232.6(8).3276-84.

Saotoing, P., Vroumsia, T., Tchobsala, F-N., Tchuenguem Fohouo, A.-M., Njan Nloga, Messi, J., 2011. Medicinal plants used in traditional treatment of malaria in Cameroon. Journal of Ecology and the Natural Environment. 3, 3, 104-117.

Satdive, R.K., Abhilash, P., Fulzele, D.P., 2003. Antimicrobial activity of *Gymnema sylvestre* leaf extract. Fitoterapia. 74, 7-8, 699-701.

Schaller, F., Rahalison, L., Islam, N., Potterat, O., Hostettmann, K., Stoeckli-Evans, H., Mavi, S., 2000. A new potent antifungal 'quinone methide' diterpene with a cassane skeleton from *Bobugnnia madagascariensis*. Helvetica Chimica Acta. 83, 2, 407-413. https://doi.org/10.1002/(SICI)1522-2675(20000216).

Segawa, P., Kasenene, J.M. 2007. Medicinal plant diversity and uses in Sango bay area, Southern Uganda. Journal of Ethnopharmacology. 113, 521–540. https://doi.org/10.1016/j.jep.2007.07.014.

Semenya, S.S., Maroyi, A., 2012. Medicinal plants used by Bapedi traditional healers to treat diarrhoea in the Limpopo Province, South Africa. Journal of Ethnopharmacology. 144, 395-401. https://doi.org/10.1016/j.jep.2012.09.027.

Semenya, S.S., Maroyi, A., Potgieter, M.J., Erasmus, L.J.C., 2013. HERBAL MEDICINES USED BY BAPEDI TRADITIONAL HEALERS TO TREAT REPRODUCTIVE AILMENTS IN THE LIMPOPO PROVINCE, SOUTH AFRICA. Afr J Tradit Complement Altern Med. 10(2):331-339. ent Altern Med. 10 (2), 331-339. http://dx.doi.org/10.4314/ajtcam.v10i2.19.

Semenya, S.S, Potgieter M.J., 2014. Bapedi traditional healers in the Limpopo Province, South Africa: their socio-cultural profile and traditional healing practice. Journal of Ethnobiology and Ethnomedicine 10, 4. http://dx.doi.org/10.1186/1746-4269-10-4.

Sewani-Rusike, C.R. 2010. Plants of Zimbabwe as anti-fertility agents. African Journal of Traditional, Complementary and Alternative Medicines. 7, 3, 253–257.

Shelpe, E.A.C.L.E., Jermy, A.C. & Launert, E., 1977. Conspectus Florae Angolensis, Vol. Pteridophyta. Junta de Investigações Científicas do Ultramar, Lisboa, pp. 1-197.

Shinkafi, T.S., Bello L., Hassan, S.W., Ali, S. 2015. An ethnobotanical survey of antidiabetic plants used by Hausa–Fulani tribes in Sokoto, North west Nigeria. Journal of Ethnopharmacology. 172, 91–99. https://doi.org/10.1016/j.jep.2015.06.014.

Simbo, D.J., 2010. An ethnobotanical survey of medicinal plants in Babungo, Northwest Region, Cameroon, Journal of Ethnobiology and Ethnomedicine. 6, 8-12. https://doi.org /10.1186/1746-4269-6-8.

Sobiecki, J.F., 2014. Psychoactive Plants: A Neglected Area of Ethnobotanical Research in Southern Africa. EthnoMed. 8(2), 165-172. https://doi.org/10.1080/09735070.2014.11917631.

Sobiecki, J.F. 2008. A review of plants used in divination in southern Africa and their psychoactive effects. Southern African Humanities. 20, 333–351, Pietermaritzburg.

Sofidiya, M., Odukoya, O., Afolayan, A., Familoni, O., 2009. Phenolic contents, antioxidant and antibacterial activities of *Hymenocardia acida*. Natural Product Research. 23.

Sonibare, M.A., Gbile, Z.O., 2008. Ethnobotanical survey of anti-asthmatic plants in South Western Nigeria. African Journal of Traditional, Complementary and Alternative Medicines. 5, 4, 340-345. http://dx.doi.org/10.4314/ajtcam.v5i4.31288.

Sousa-Figueiredo, J.C., Gamboa, D., Pedro, J.M., Fançony, C., Langa, A.J., Soares Magalhães, R.J., 2012. Epidemiology of malaria, schistosomiasis, geohelminths, anemia and malnutrition in the context of a demographic surveillance system in Northern Angola. PLoS One 7:e33189. https://doi.org/10.1371/journal.pone.0033189.

Ssemakalu, C.C., Razwinani, M., Maepa, M.J., Motaung, K.S., 2016. *Pterocarpus angolensis* crude extracts induce the expression of collagen type II in articular cartilage in vitro. African Journal of Complementary and Alternative Medicines. 13, 1, 76-84. http://dx.doi.org/10.4314/ajtcam.v13i1.11.

Staner, P., Boutique, R., 1937. Matériaux pour l'étude des plantes médicinales indigènes du Congo Belge. Mém. Institut royal colonial belge, Section des Sc. naturelles et médicales. 8, 6.

Steele, J.C.P., Warhurst, D.C., Kirby, G.C., Simmonds, M.S.J., 1999. *In vitro* and *in vivo* evaluation of betulinic acid as an antimalarial. Phytotherapy Research. 13, 2, 115-119. http://dx.doi.org/10.1002/(SICI)1099-1573(199903).

Steenkamp, V., 2003. Traditional herbal remedies used by South African women for gynaecological complaints. Journal of Ethnopharmacology 86, 97–108. http://dx.doi.org/10.1016/s0378-8741(03)00053-9.

Sugihara, Y., Nojima, H., Matsuda, H., Murakami, T., Yoshikawa, M., Kimura, I., 2000. Antihyperglycemic effects of gymnemic acid IV, a compound derived from *Gymnema sylvestre* leaves in streptozotocin-diabetic mice. J Asian Nat Prod Res. 2, 4, 321-7. https://doi.org/10.1080/10286020008041372.

Sunderland, T.C.H., Obama, C., 1998. Etude préliminaire de marché sur les produits forestier non ligneux en Guinée équatoriale. Document FAO. Available at: http://www.fao.org/docrep/x2161f/x2161f23.htm. (accessed on 06 September 2019).

Tabuti, J.R., Lye, K.A., Dhillion, S.S., 2003. Traditional herbal drugs of Bulamogi, Uganda: plants, use and administration. Journal of Ethnopharmacology. 88, 19-44. https://doi.org/10.1016/S0378-8741(03)00161-2.

Taderera, T., Chagonda, L.S., Gomo, E., Shai, L.J., 2015. Inhibitory activity of α-glucosidase and α-amylase by *Annona stenophylla* root extract as mechanism for hypoglycaemic control of DM. International Journal of Pharmacy Photon, 106, 436-444.

Tadesse, D., 1994. Traditional use of some medicinal plants in Ethiopia.Vol. 1, 273-293. Proceedings of the 13th plenary meeting of AETFAT, Zomba, Malawi. 1, 2. Edited by J.H. Seyani & A.C. Chicuni. National herbarium and Botanic Gardens of Malawi. Zomba.

Tadesse, S.A., Wubneh, Z.B., 2017. Antimalarial activity of *Syzygium guineense* during early and established Plasmodium infection in rodent models. BMC Complementary and Alternative Medicine. 17. 21. https://doi.org/10.1186/s12906-016-1538-6.

Tagne, A.M., Marino, F., Cosentino, M., 2018. *Tithonia diversifolia* (Hemsl.) A. Gray as a medicinal plant: A comprehensive review of its ethnopharmacology, phytochemistry, pharmacotoxicology and clinical relevance. Journal of Ethnopharmacology. 220, 94-116. https://doi.org/10.1016/j.jep.2018.03.025.

Tamokou, J.D., Chouna, J.R., Fischer-Fodor, E., Chereches, G., Barbos, O., Damian, G., Benedec, D., Efouet, A.P.N., Wabo, H.K., 2013. Anticancer and Antimicrobial Activities of Some Antioxidant-Rich Cameroonian Medicinal Plants. PLoS ONE. 8, 2, e55880. http://dx.doi.org/10.1371/journal.pone.0055880.

Tankeu, F.N., Pieme, C.A., Nya, C.P.B., Njimou, R.J., Moukette, B.M., Chianese, A., Ngogang, J.Y., 2016. In vitro organo-protective effect of bark extracts from *Syzygium guineense* var *macrocarpum* against ferric-nitrilotriacetate-induced stress in wistar rats homogenates. BMC Complementary and Alternative Medicine. 16. 315. https://doi.org /10.1186/s12906-016-1263-1.

Tanko, Y., Yaro, A.H., Isa, A.I., Yerima, M., Saleh, M.I.A., Mohammed, A., 2007. Toxicological and hypoglycemic studies on the leaves of *Cissampelos mucronata* (Menispermaceae) on blood glucose levels of streptozocin-induced diabetic wistar rats. Journal of Medicinal Plant Research. 1, 5, 113-116.

Tapsoba, H., Deschamps, J.P., 2006. Use of medicinal plants for the treatment of oral diseases in Burkina Faso. Journal of Ethnopharmacology. 104, 68–78. https://doi.org /10.1016/j.jep.2005.08.047.

Tatsimo, J.S.N, Toume, K., Nagata, T., Havyarimana, L., Fujii, T., Komatsu, K., Monoglycerol ester, galloylglucoside and phenolic derivatives from *Gymnosporia senegalensis* leaves. Biochemical Systematics and Ecology. 83. 33-38. https://doi.org/10.1016/j.bse.2018.12.014.

Tchacondo, T., Karou, S.D., Batawila, K., Agban, A., Ouro-Bang'na, K., Anani, K.T., Gbeassor, M., Souza, C. de. 2011. Herbal remedies and their adverse effects in Tem tribe traditional medicine in Togo. African Journal of Traditional, Complementary and Alternative Medicines. 8(1), 45-60. https://doi.org/10.4314/ajtcam.v8il.60522.

Telefo, P.B., Lienou, L.L., Yemele, M.D., Lemfack, M.C., Mouokeu, C., Goka, C.S., Tagne, S.R., Moundipa, F.P., 2011. Ethnopharmacological survey of plants used for the treatment of female infertility in Baham, Cameroon. Journal of Ethnopharmacology. 136, 178–187. https://doi.org/10.1016/j.jep.2011.04.036.

Teklay, A., Abera, B., Giday, M., 2013. An ethnobotanical study of medicinal plants used in Kilte Awulaelo District, Tigray Region of Ethiopia. Journal of Ethnobiology and Ethnomedicine. 9, 65. http://dx.doi.org/10.1186/1746-4269-9-65.

Teklehaymanot, T., Giday, M., Medhim, G., Yalemtsehay, M.Y., 2007. Knowledge and use of medicinal plants by people around Debre Libanos monastery in Ethiopia. Journal of Ethnopharmacology. 11, 271–283. http://dx.doi.org/10.1016/j.jep.2009.04.005.

Terrac, M. L., 1947. Contribution à l'étude des plantes médicinales de Madagascar, de la Réunion et de l'île Maurice. Doctorate thesis. Université de Paris. Imprimerie Vuibert. Paris.

Timberlake, J., Chidumayo, E., Sawadogo, L., 2010. Distribution and Characteristics of African Dry Forests and Woodlands. In Chidumayo E., Gumbo D.J. (Eds). The Dry Forests and Woodlands of Africa Managing for Products and Services. London. Earthscan. 11-42.

Togola, A., Diallo, D., Dembélé, S., Barsett, H., Paulsen, B.S., 2005. Ethnopharmacological survey of different uses of seven medicinal plants from Mali, (West Africa) in the regions Doila, Kolokani and Siby. Journal of Ethnobiology and Ethnomedicine. 1, 7. http://dx.doi.org/10.1186/1746-4269-1-7.

Tongco, M.D.C., 2007. Purposive sampling as a tool for informant selection. Ethnobotany Research and Applications. 5, 147–158.

Tolossa, K., Debela E., Athanasiadou S., Tolera A., Ganga G., Houdijk J.G.M. 2013. Ethno-medicinal study of plants used for treatment of human and livestock ailments by traditional healers in South Omo, Southern Ethiopia. Journal of Ethnobiology and Ethnomedicine. 9, 32. http://dx.doi.org/10.1186/1746-4269-9-32.

Tona, L., Kambu, K., Mesia, K., Cimanga, K., Apers, S., De Bruyne, T., Pieters, L., Totte, J., Vlietinck, A.J. 1999. Biological screening of traditional preparations from some medicinal plants used as antidiarrhoeal in Kinshasa, Congo. Phytomedicine. 6, 1, 59-66. http://dx.doi.org/10.1016/S0944-7113(99)80036-1.

Tona, L., Kambu, K., Ngimbi, N., Cimanga, K., Vlietinck, A.J., 1998. Antiamoebic and phytochemical screening of some Congolese medicinal plants. Journal of Ethnopharmacology. 61, 1, 57-65. http://dx.doi.org/10.1016/S0378-8741(98)00015-4.

Traoré, A., Derme, A. I., Sanon, S., Gansane, A., Ouattara, Y., Nebié, I., Sirima, S.B., 2009. Connaissances ethnobotaniques et pratiques phytothérapeutiques des tradipraticiens de santé de la Comoé pour le traitement du paludisme: processus d'une recherche scientifique de nouveaux antipaludiques au Burkina Faso. Ethnopharmacologia. 43, 35-46.

Tropicos.org. Missouri Botanical Garden. http://www.tropicos.org (accessed on 30 July 2019).

Tsaffack, M., Nguemeving, J.R., Kuete, V., Tchize, B.L.S.N., Mkounga, P., Beng, V.P., Hultin, P., Tsamo, E., Nkengfack, A.E., 2009: Two New Antimicrobial Dimeric Compounds: Febrifuquinone, a Vismione-Anthraquinone Coupled Pigment and Adamabianthrone, from two *Psorospermum* Species. Chemical & Pharmaceutical Bulletin. 57, 10, 1113-1118. http://dx.doi.org/ 10.1248/cpb.57.1113.

Tshibangu, J.N., Chifundera, K., Kaminsky, R., Wright, A.D., Konig, G.M., 2002. Screening of African medicinal plants for antimicrobial and enzyme inhibitory activity. Journal of Ethnopharmacology. 80, 1, 25-35. https://doi.org/10.1016/S0378-8741(01)00409-3.

Tuenter, E., Exarchou, V., Balde, A., Cos, P., Maes, L., Apers, S., Pieters, L., 2016. Cyclopeptide Alkaloids from *Hymenocardia acida*. Journal of Natural Products. 79, 7, 1746-1751. http://dx.doi.org/10.1021/acs.jnatprod.6b00131.

Tugume, P., Kakudidi, E.K., Buyinza, M., Namaalwa, J., Kamatenesi, M., Kalema, J., 2016. Ethnobotanical survey of medicinal plant species used by communities around Mabira Central Forest Reserve, Uganda. Journal of Ethnobiology and Ethnomedicine. 12, 5. http://dx.doi.org/10.1186/s13002-015-0077-4.

Udoamaka, F., Ezuruike N., Prieto, J.M., 2014. The use of plants in the traditional management of diabetes in Nigeria: Pharmacological and toxicological considerations. Journal of Ethnopharmacology. 155, 857–924. http://dx.doi.org/10.1016/j.jep.2014.05.055.

Umar S., Abubakar A, Ibrahim H, Sallau A.B., Natasha O. 2014. Isolation of Phospholipase A2 Inhibitor from *Cryptolepis oblongifolia* (Meins) Schltr. Journal of Natural Sciences Research, 4, 4, 63-67.

Urso, V., Signorini, M.A., Tonini, M., Bruschi, P., 2016. Wild medicinal and food plants used by communities living in Mopane woodlands of southern Angola: Results of an ethnobotanical field investigation. Journal of Ethnopharmacology, 177, 126–39. https://doi.org/10.1016/j.jep.2015.11.041.

Uys, A.C.U., Malan, S.F., van Dyk, S., van Zyl, R.L. 2002. Antimalarial compounds from *Parinari capensis*. Bioorganic & Medicinal Chemistry Letters. 12, 16, 2167-2169. http://dx.doi.org/10.1016/S0960-894X(02)00350-5.

van Andel, T.R., Croft, S., van Loon, E.E., Quiroz, D., Towns, A.M., Raes, N., 2015. Prioritizing West African medicinal plants for conservation and sustainable extraction studies based on market surveys and species distribution models. Biological Conservation. 181. 173-181. http://dx.doi.org/10.1016/j.biocon.2014.11.015.

Van Puyvelde L., Ngaboyisonga M., Rwangabo P.C., Mukarugambwa S., Kayonga A., Runyinya-Barabwiriza. 1977. Enquêtes ethnobotaniques sur la médecine traditionnelle rwandaise. Tome 1: Préfecture de Kibuye. Univ. Nat. Inst. Nat. Rech. Sc. Butare.

Van-Dúnem, A., Batalha, M., 1994. Plantas medicinais de Angola: medicamentos ao alcance de todos. Cooperação Portuguesa, Embaixada de Portugal. Luanda.

Van Wyk, B.-E. 2011. The potential of South African plants in the development of new medicinal products. South African Journal of Botany, 77, 812–829.

Verbeeck, A., 1948. Inlandse Geneesmiddelen. Aequatoria. Revue des Sciences Congolaises. 1, 11. 23–31.

Verengai, W., Chagonda, L., Chitindingu, K., Marume, A., Taderera, T., 2017. An anti-diabetic poly-herbal medicine prepared from extracts of *Annona stenonophylla*, *Citrus limon* and *Zingiber officinale*. International Journal of Pharmaceutical Sciences and Research. 8, 3, 1048-1055. https://doi.org/10.13040/IJPSR.0975-8232.8(3).1048-55.

Verger, P.F. 1995. Ewé: The use of plants in Yoruba society. Editoria Schwarcz. Sao Paulo.

Wagate, C.G., Mbaria, J.M., Gakuya, D.W, Nanyingi, M.O., Kareru, P.G., Njuguna, A., Gitahi, N., Macharia, J.K., Njonge, F.K., 2010. Screening of some Kenyan Medicinal Plants for Antibacterial Activity. Phytotherapy Research. 24, 1, 150-153. http://dx.doi.org/10.1002/ptr.2866.

Waterman, C., Smith, R.A., Pontiggia, L., DerMarderosian, A., 2010. Anthelmintic screening of Sub-Saharan African plants used in traditional medicine. Journal of Ethnopharmacology. 127. 3. 755-759. http://dx.doi.org/10.1016/j.jep.2009.11.025.

Watt, J.M., Breyer-Brandwijk, M.G., 1962. The medicinal and poisonous plants of southern and eastern Africa. E. & S. Livingstone Ltd. Edinburg and London.

WHO. 2005. Angola. https://www.who.int/hac/crises/ago/background/Angola_Dec05.pdf (accessed on 18 April 2019).

WHO. 2015. Health status and trends. http://www. aho.afro.who.int/sites/default/files/publications/5101/Atlas2016-en_Healthstatus-and-trends.pdf. (accessed 18 April 2019).

WHO, 2018. Angola. Country cooperation strategy. https://apps.who.int/iris/bitstream/handle/10665/136994/ccsbrief_ago_en.pdf;jsessionid=DEC2B57A9AADA64111A45417EB19EB6E?sequence=1 (accessed 18 April 2019).

Wome, B. 1985. Recherches ethnopharmacognosiques sur les plantes médicinales utilisées en médecine traditionnelle à Kisangani (Haut-Zaïre). Doctoral thesis, Université libre de Bruxelles, Faculty of Science.

Yadav, A., Kaushik, A., Joshi, A., 2018. Green synthesis of silver nanoparticles using *Ocimum sanctum* L. and *Ocimum americanum* L. for their antibacterial potential. International Journal of Life Science and Pharma Research. 8, 1, 42-49.

Yenesew, A., Induli, M., Derese, S., Midiwo, J.O., Heydenreich, M., Peter, M.G., Akala, H., Wangui, J., Liyala, P., Waters, N.C., 2004. Anti-plasmodial flavonoids from the stem bark of *Erythrina abyssinica*. Phytochemistry. 65, 22, 3029-3032. http://dx.doi.org/10.1016/j.phytochem.2004.08.050.

YGHR. 2016. Angola: Health Care in a War-Torn Country. https://yaleglobalhealthreview.com/2016/03/01/angola-health-care-in-a-war-torn-country/ (accessed 18 April 2019)

York, T., de Wet, H., van Vuuren, S.F., 2011. Plants used for treating respiratory infections in rural Maputaland, KwaZulu-Natal, South Africa. Journal of Ethnopharmacology. 135, 3, 696-710. http://dx.doi.org/10.1016/j.jep.2011.03.072.

York, T., van Vuuren, S.F., de Wet, H., 2012. An antimicrobial evaluation of plants used for the treatment of respiratory infections in rural Maputaland, KwaZulu-Natal, South Africa. Journal of Ethnopharmacology. 144, 1, 118-127. http://dx.doi.org/10.1016/j.jep.2012.08.038.

Youmsi, R.D.F., Tsouh Fokou P.V., Menkem E.Z., Bakarnga-Via I., Keumoe R., Nana V., Fekam Boyom F., 2017. Ethnobotanical survey of medicinal plants used as insect repellents in six malaria endemic localities of Cameroon Journal of Ethnobiology and Ethnomedicine 13, 33. https://doi.org/10.1186/s13002-017-0155-x.

Zerbo, P., Millogo-Rasolodimby, J., Nacoulma-Ouédraogo, O. G., Van Damme, P., 2011. Plantes médicinales et pratiques médicales au Burkina Faso: cas des Sanan. Bois et Forêts des Tropiques. 307, 1.

Zininga, T., Anokwuru, C.P., Sigidi, M.T., Tshisikhawe, M.P., Ramaite, I.I.D., Traore Afsatou N., Hoppe, H., Shonhai, A., Potgieter, N., 2017. Extracts obtained from *Pterocarpus angolensis* DC and *Ziziphus mucronata* exhibit antiplasmodial activity and inhibit heat shock protein 70 (Hsp70) function. Molecules. 22, 8, http://dx.doi.org/10.3390/molecules22071224.

Figure captions

Figure 1. Study area map

Figure 2. Number of use reports for each mode of preparation/application

Figure 3. Plant parts used for medicinal purposes

Table 1. Ethnobotanical information on medicinal plants used by traditional local healers in Bié province, Angola

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Acacia sieberiana DC., Fabaceae BNKT207	Usonge	T	4	3	B	W	[‡]Provokes abortion	Crushed bark	Bath
				1		R	[‡]Asthma	Decoction	Orally
[!*] *Aeschynomene dimidiata* Welw. ex Baker, Fabaceae BNKT205	Kaleuka	S	4	2	R	A	[‡]Elephantiasis	Crushed root	Rectal suppository
				2	L	D	[‡]Stomach pain	Decoction	Orally
Aframomum alboviolaceum (Ridl.) K. Schum., Zingiberaceae BNKT257	Kahafu, Mutfuntu, Matundu, Olongombe	H	8	2	R	A	Yellow fever	Decoction	Orally
				2		D	Stomach pain	Fresh root	Bath
				1		L	Rheumatic pain	Fresh root	Bath
				1		W	[‡]Provokes abortion	Fresh root	Bath, poultice
				1	WP	K	Haemorrhoids	Heated root	Bath
				1		X	Dysmenorrhea	Heated root	Bath
Afzelia quanzensis Welw., Fabaceae BNKB109	Mualatoulo, Mulimbo	T	3	2	R	L	Pain in legs	Heated	Poultice
				1		Z	Black magic	-	-
Albizia adianthifolia (Schuma ch.) W. Wight, Fabaceae BNKB27, BNKB102, BNKT148	Mucasa, Olumbala	S	6	3	B, L	W	Pain, pregnancy	Tablet	Rectal suppository
				1	R	D	Vomiting	Infusion with tepid water	Orally
				1			Diarrhoea	Infusion with tepid water	Orally
				1		X	Dysmenorrhea	Decoction	Bath

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Albizia antunesiana Harms, Fabaceae BNKB42, BNKB107	Enduramos, Kakuata, Osese, Ungolo	S	8	1	L	Y	Impotence	Decoction	Orally
				2	R	D	Stomach pain, worms	Infusion	Orally
				1					
				1		N	[‡]Cerebral fever	Decoction	Bath, 30min
				2		W	Pain, pregnancy	Decoction	Bath, 30 min
				2			[‡] Postpartum haemorrhoids	Decoction	Bath, 30 min
[!*] *Alvesia rosmarinifolia* Welw., Lamiaceae BNKB50, BNKT135, BNKT228, BNKT253	Muchila Wakawa, Chite, Chindumula, Muniagagila	H	9	2	L	N	[‡] Insomnia (children)	Fresh leaves infusion	Bath
				1	R		[‡] Headache	Infusion, mixed with *Rytigynia* sp.	Massage
				2		W	[‡] Prevents abortion	Fresh leaves infusion	Wash and bath
				1				Infusion	Orally
				1	B	X	[‡] Repeated pregnancy	Decoction	Orally
				1		D	[‡] Dysmenorrhea	Decoction	Topically
				1		A	[‡] Toothache	Decoction	Massage
							[‡] Elephantiasis		
Aloe zebrina Baker, Asphodelaceae BNKT223	Chandala	S	1	1	R, L	K	Haemorrhoids	Decoction	Externally
[*] *Ampelocissus obtusata* (Welw. ex Baker) Planch., Vitaceae BNKT158	Gobendakulana	S	1	1	R	W	[‡] Hemorrhage during pregnancy, after labour	Decoction	Drink 3 times a day

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Annona stenophylla subsp. *cuneata* N. Robson BNKB55 subsp. *nana* N. Robson, Annonaceae BNKB26, BNKB77, BNKB90, BNKB120	Mupepe, Eyolo, Mulolo, Ondulu	S	14	2	R	A	Malaria	Decoction	Orally
				5		D	Stomach pain, constipation	Decoction	Orally
				1		W	[‡] Provokes abortion	Decoction of mixture with *Bacopa* sp. roots	Orally
				1		X	[‡] Contraceptive	Infusion	Orally
				2		Y	Long-lasting labour	Mixed with *kissangua*[□]	Orally
				2			Dysmenorrhea		Orally
				1			Impotence		Orally
Bacopa sp., Scrophulariaceae BNKT267	Casati	S	1	1	R	W	[‡] Labour induction	Decoction of mixture with *Annona stenophylla* root	Orally
Bobgunnia madagascariensis (Desv.) J.H. Kirkbr. & Wiersema, Fabaceae BNKB31	Ganja	S	3	1	R	A	Malaria and vertigo after malaria	Decoction	Application on eyes
				1	F	D	[‡] Stomach pain	Fresh fruit	Eating
				1		W	[‡] Postpartum disinfection of womb	Dried fruit infusion	Bath
[!*] *Brachystegia gossweileri* Hutch. & Burtt Davy, Fabaceae BNKB74, BNKT261	Mosamba	T	2	1	R	K	[‡] Haemorrhoids	Decoction	Orally
				1	L	Z	[‡] Magic (brings good luck)	Fresh leaves	Bath

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[!*] *Brackenridgea arenaria* (De Wild. & T. Durand) N. Robson, Ochnaceae BNKB20	Lipi, Omia, Mufuco	T	3	2 1	WP R, L	S N	[‡] Dry lips [‡] Epilepsy	Balm Decoction	Topically Drink 3 times a day
Bridelia sp., Phyllanthaceae BNKB110	Munukenuke	T	1	1	L	D	[‡] Diarrhoea	Decoction	Orally
[!] *Cassytha pondoensis* Engl., Lauraceae BNKB14	Lavava	H	4	1 1 1 1	WP	D	[‡] Stomach pain [‡] Constipation [‡] Vomiting [‡] Diarrhoea	Decoction Decoction Decoction Decoction	Orally Orally Orally Orally
Chrysophyllum bangweolense R.E. Fr., Sapotaceae BNKT134, BNKT260, BNKT268	Filanganga, Olonganga, Mumbanko, Umondoyo	T	5	1 1 1 1	L R R W	A D 	[‡] Malaria Appetizer Worms, constipation (children) [‡] Epistaxis [‡] Labour induction	Decoction Infusion Enema Decoction Tablet	Orally Orally Rectal suppository Applied in nose Vaginal pessary
Cissampelos mucronata A. Rich., Menispermaceae BNKB4, BNKB48	Cacapa, Chitangila, Nofungi	L	6	1 1 1 2	R L B 	N R W Y	Headache Epistaxis Cough Postpartum bleeding Genital dysfunction	Decoction Fresh leaf Fresh bark Decoction Fresh bark	Orally Applied in nose Chewing Orally Chewing

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[!*] *Clitoria kaessneri* Harms, Fabaceae	Omue, Mungantu	S	2	1	B	A	[‡] Malaria with fever	Decoction, tablet	Orally
BNKB78, BNKB8				1	R	D	[‡] Stomach pain	Infusion	Orally
Cryptolepis oblongifolia (Meisn.) Schltr., Apocynaceae	Mumbanku, Olonganga	S	2	1	R	D	Constipation (children)	Infusion	Orally
BNKT259				1		W	[‡] Long-lasting labour	Tablet	Vaginal pessary
[!*] *Ctenium newtonii* Hack., Poaceae	-	H	1	1	WP	A	[‡] Persistent malaria	Decoction	Orally
BNKB18									
[*] *Diodella sarmentosa* (Sw.) Bacigalupo & E.L. Cabral, Rubiaceae	Calumbulu	H	1	1	L	S	Skin inflammation	Chopped fresh leaves mixed with cold water	Topically
BNKB54									
Diospyros sp., Ebenaceae	Muvulia, Melakava	T	2	1	R, L	S	[‡] Dry and peeling skin	Infusion	Bath
BNKB52, BNKT140				1		L	[‡] Spinal pain	Decoction	Orally
Diospyros batocana Hiern, Ebenaceae	Unjongolo	T	4	1	R	A	[‡] Malaria	Decoction	Orally
				1	L	D	Diarrhoea	Infusion	Orally
BNKB91, BNKB12				1		S	Skin rashes	Chopped fresh leaves	Wash
				1		W	Postpartum haemorrhage	Decoction	Bath, 30 min

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[!*] *Diplorhynchus condylocarpon* (Müll. Arg.) Pichon, Apocynaceae BNKB10, BNKB99	Chingole, Olofifa	T	7	1 3 3	F R W	D	[‡] Colic [‡] Bloody diarrhoea (children) Womb disinfection	Dried fruit Infusion Decoction	Tepid bath Orally Wash
[!*] *Droogmansia dorae* Torre, Fabaceae BNKB15, BNKT216	Kopokambunda, Mununga, Nunga	T	2	1 1	R	K L	[‡] Haemorrhoids [‡] Fracture	Decoction Crushed root	Bath Topically
Englerophytum magalismontanum (Sond.) T.D. Penn., Sapotaceae BNKB19, BNKB75, BNKB118	Mupepe, Usakalala	T	3	1 1 1	R	R Z	[‡] Cough [‡] Epistaxis [‡] Sorcery (cures everything)	Infusion Fresh root Decoction	Orally Applied in nose Orally or topically
Entada gigas (L.) Fawc. & Rendle, Fabaceae BNKB125	Chieke	S	1	1	R	D	Flatulence	Decoction	Orally
[*] *Eriosema affine* De Wild., Fabaceae BNKB39, BNKB131	Ondembi	S	3	1 1 1	R L	A D	Malaria [‡] Stomach pain [‡] Diarrhoea	Decoction Decoction Decoction	Orally Orally Orally
Erythrina abyssinica Lam., Fabaceae BNKB121	Mulunku	S	3	3	R	D	[‡] Constipation (children)	Young roots	Enema

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[*] *Eulophia cucullata* (Sw.) Steud., Orchidaceae BNKT266	Casangalala	H	1	1	R	D	[‡] Constipation (children)	Boiled root	Poultice on the stomach
Felicia muricata Nees, Asteraceae BNKT269	Camalo	H	1	1	R, S, F	X	[‡] Dysmenorrhea	Decoction	Orally
Garcinia huillensis Welw. ex Oliv., Clusiaceae BNKB38, BNKB56, BNKB98, BNKT15, BNKT172	Kachingole, Lueni, Munjindo	T	8	1	R	Y	Impotence	Infusion with tepid water or *kissangua*	Orally
				2	B	L	[‡] Arthritis	Decoction	Orally
				2		D	Diarrhoea	Decoction	Orally
				1			Stomach pain	Decoction	Orally
				1		K	Haemorrhoids	Decoction	Bath
				1		W	[‡] Provokes abortion	Decoction	Orally
Gymnema sylvestre (Retz.) R. Br. ex Schult., Apocynaceae BNKB76, BNKT152, BNKT199, BNKT231	Ndondo	H	6	2	R	D	[‡] Stomach pain	Decoction	Orally
				1			[‡] Constipation	Decoction	Orally
				2		W	Pains during pregnancy	Decoction	Massage
				1		S	Skin irritation	Balm	Topically

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Gymnosporia senegalensis (Lam.) Loes., Celastraceae BNKB13	Sasambia	T	1	1	R	D	Bloody diarrhoea	Decoction	Orally
[*] *Holostylon robustum* (Hiern) G. Taylor, Lamiaceae BNKB89, BNKT144, BNKT250	Calapa, Chicamba, Epombisamuku	H	7	1 1 1 1 1 1 1	L R S Y L	Z D 	[‡] Cures everything [‡] Appetizer [‡] Microbes in stomach [‡] Stomach pain [‡] Boils (children) [‡] Impotence [‡] Wounds	Leaf juice Decoction Decoction Infusion Decoction Decoction	Orally Orally Orally Orally Topically Orally Poultice
Hymenocardia acida Tul., Phyllanthaceae BNKT149	Muehe	T	2	1 1	R L	D R	Diarrhoea Cough	Decoction Fresh leaf	Orally Chewing
[!*] *Hypoxis* cf. *subspicata* Pax, Hypoxidaceae BNKB219	Withomahondo	H	1	1	R	S	[‡] Rheumatism	Crushed root	Bath, massage
[!*] *Hypoxis polystachya* Welw. ex Baker, Hypoxidaceae BNKT230	Tumbanjale	H	3	1 1 1	R	Y K B	[‡] Dysmenorrhea [‡] Haemorrhoids [‡] Anaemia	Decoction Decoction Decoction	Orally Bath Bath

Table 1. Continued

Species, family and voucher specimen No. [!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated	Preparation	Administration
[!*] *Indigofera sutherlandioides* Welw. ex Baker, Fabaceae BNKT146	Mujindagelo	S	2	1	R	D	[‡] Worms in stomach	Infusion with tepid water	Orally
				1			[‡] Constipation (children)	Infusion with tepid water	Orally
[!*] *Laggera crispata* (Vahl) Hepper & J.R.I. Wood, Asteraceae BNKT255	Muyoyo	H	2	1	R	Y	[‡] Dysmenorrhea	Decoction	Orally
				1		D	[‡] Constipation	Tablet	Orally
[*] *Landolphia camptoloba* (K. Schum.) Pichon, Apocynaceae BNKB53, BNKB99	Mupemba	T	4	1	R	H	Bleeding from ear	Decoction	Application ear
				1	L	A	[‡] Elephantiasis	Decoction	Massage
				1		L	[‡] Wounds	Poultice	Topically on wound
				1		D	Water in stomach	Infusion	Massage
[!*] *Lantana angolensis* Moldenke, Verbenaceae BNKB127	Mundugudu dudu	H	1	1	R	W	[‡] Flatulence during pregnancy	Decoction	Bath
[*] *Leptactina benguelensis* (Welw. ex Benth. & Hook. f.) R.D. Good, Rubiaceae BNKB100	Chambologi ngi	S	1	1	B	D	[‡] Stomach pain, [‡] constipation	Decoction	Orally

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[*] *Lippia plicata* Baker, Verbenaceae BNKB6, BNKB43, BNKT222	Ondembi	H	4	2 2	L R	R L	Sore throat [‡] Muscle relaxant	Decoction Decoction	Mouth wash Massage
[!*] *Macrotyloma africanum* (Brenan ex R. Wilczek) Verdc., Fabaceae BNKB1	Cacunde	H	1	1	R	D	[‡] Appetizer (children, pregnant women)	Decoction	Orally
Maytenus sp., Celastraceae BNKB35	Ovanga, Uteke	T	3	1 1 1	R L	D N R	[‡] Dysmenorrhea [‡] Tranquilizer [‡] Cough	Decoction Decoction Decoction	Orally Wash, bath Orally
[!*] *Memecylon flavovirens* Baker, Melastomataceae BNKB63, BNKB3	Musoso, Ogitunda	S	2	1 1	R L	L W	[‡] Rheumatic pain [‡] "when woman has no menstruation"	Crushed root mixed with water Chopped leaves	Massage Vaginal pessary
[!] *Mucuna stans* Welw. ex Baker, Fabaceae BNKT201	Eyumbi	S	1	1	R	L	[‡] Weak legs	Fresh roots infused in hot water	Massage
Ocimum americanum L., Lamiaceae BNKT127	Mununganunga, Mundugudu	S	2	1 1	R	L W	[‡] Leg fracture, injury from land-mines Flatulence during pregnancy	Heated in the pot Infusion	Topically Sitting bath

Table 1. Continued

Species, family and voucher specimen No. [!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Ochna pulchra Hook., Ochnaceae BNKB20, BNKB2	Omia	S	2	1 1	R	D	Diarrhoea Vomiting	Infusion	Orally
[*] *Ochna pygmaea* Hiern, Ochnaceae BNKT258	Omia	S	1	1	R	N	[‡] Epilepsy	Decoction	Orally
[*] *Oldfieldia dactylophylla* (Welw. ex Oliv.) J. Léonard), Picrodendraceae BNKB11; BNKB24; BNKB58	Filanganga, Chicanga, Losilulu	T	5	1 1 1 1 1	R L	A D X L	[‡] Malaria Worms Appetizer Dysmenorrhea Pain under ribs	Decoction Crushed root Infusion Decoction Infusion	Orally Enema Orally Massage Orally
[!*] *Oxygonum pachybasis* Milne-Redh., Polygonaceae BNKB63	Mucocoto, Musoso	H	2	1 1	R	D A	[‡] Diarrhoea [‡] Fever (children)	Decoction Decoction	Orally Orally
[*] *Parinari capensis* Harv., Chrysobalanaceae BNKB49	Tomatoma	H	2	1 1	L	D	[‡] Diarrhoea [‡] Stomach pain	Decoction	Orally
Parinari curatellifolia Planch. ex Benth., Chrysobalanaceae BNKT156	Mutongo	T	1	1	R	W	[‡] "To turn baby head down in womb before labour"	Decoction	Orally

Table 1. Continued

Species, family and voucher specimen No. [!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[*] *Paropsia brazzaeana* Baill., Passifloraceae BNKT147, BNKT188, BNKT248	Muanga, Uvanga, Osalala	S	10	3 1 1 2 2 1	L R	N S A R D	[‡] Insomnia (children) [‡] Tranquilizer Boils [‡] Malaria Cough Constipation	Chewed leaves Fresh leaves Crushed root Decoction Tablet	Spat on child Poultice Massage Orally Inhalation Enema
[!*] *Pentanisia rubricaulis* (K. Schum.) Kårehed & B. Bremer, Rubiaceae BNKT204	Uso	H	1	1	L	S	[‡] Boils	Fresh leaf	Poultice
[!*] *Philenoptera pallescens* (Welw. ex Baker) Schrire, Fabaceae BNKB33	Uvandenenu	T	1	1	R	L	[‡] "Pain in legs after hard work"	Infusion	Orally
[*] *Phyllanthus welwitschianus* Müll. Arg., Phyllanthaceae BNKT237	Kalomenko, Mucula	S	3	1 1 1	R	D N L	[‡] Toothache, inflammation of jowls [‡] Headache [‡] Fontanelle closure	Decoction Decoction Decoction	Applied on tooth Orally Orally
[*] *Psorospermum baumii* Engl., Hypericaceae BNKT167	Muhota	T	3	3	R, L	A	[‡] Elephantiasis	Fresh roots or leaves mixed with water or oil	Massage of the leg repeated several times

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Psorospermum febrifugum Spach, Hypericaceae BNKT167	Cutalala, Kachingole, Musele, Chihoho	T	2	2	R	D	Diarrhoea	Decoction	Orally
[*] *Psychotria eminiana* (Kuntze) E.M.A. Petit, Rubiaceae BNKB44, BNKT240, BNKT133	Ndombua wasalala, Muneku, Mulesa	S	3	1 1 1	R	W R K	[‡] Stomach pain during labour [‡] "Loss of breath" [‡] Epistaxis	Infusion Infusion Decoction	Orally Orally Inhalation
[!*] *Pteris friesii* Hieron., Pteridophyta BNKB112	Mungayava	F	1	1	L	D	[‡] Worms	Decoction	Orally
Pterocarpus angolensis DC., Fabaceae BNKT154	Mucula	T	2	1 1	R	X, Y W	Venereal diseases Postpartum bleeding	- Infusion	Massage Orally
[!*] *Rhus squalida* Meikle, Anacardiaceae BNKB2, BNKB67, BNKB73, BNKT264	Asangalala, Ohamba hamba, Bunguasana, Mulima, Kahafu	S	4	2 2	R	Y W	[‡] Impotence [‡] Postpartum haemorrhoids	Decoction Decoction	Drink cooled Orally

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Rumex abyssinicus Jacq., Polygonaceae BNKT26	Mutetenbolonga	S	1	1	R	A	[‡] Hepatitis	Decoction	Orally
[!] *Rhynchosia minima* (L.) DC, Fabaceae BNKB92, BNKT138	Chisango, Kunambambi	H	4	1	B	W	[‡] Repeated pregnancy short time after childbirth	Decoction	Drink for both mother and child, in mixture with fresh roots (bath for child)
				2	R	L	[‡] Weak legs (children)	Roots mixed with cold water	Massage of legs
				1	L	D	[‡] Diarrhoea	Decoction, tablet	Orally
Rytigynia sp., Rubiaceae BNKT252	Mutomatoma	S	1	1	L	S	[‡] "Curse by sorcerer, brings back good luck"	Decoction	Bath
[*] *Scleria induta* Turrill, Cyperaceae BNKB2, BNKB40	Casinde, Esinde, Uovosenge	H	3	1	R	D	[‡] Appetizer (children, pregnant women)	Decoction	Orally
				1		Y	[‡] Impotence	Decoction	Orally
				1		X	[‡] Dysmenorrhea		

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[*] *Sclerocroton cornutus* (Pax) Kruijt & Roebers, Euphorbiaceae	Kachila, Misombo, Obongenget, Ongengete	S	6	1	L	S	Snake bite	Chewed leaves	Topically on wound, while the skin is stretched
BNKB93, BNKT153				1	B	N	Headache	Fresh fruit	Eating
				1		D	Stomach pain	Fresh fruit	Eating
				1	R	X	Dysmenorrhea	Fresh fruit	Eating
				1			Uterine relaxant	Crushed fresh root	Massage
				1		K	Epistaxis	Fresh root	Applied in mouth and nose
Securidaca longepedunculata Fresen., Polygalaceae	Muchacha, Mulesese, Utata	T	14	4	R	A	Malaria	Crushed root	Decoction
				1		R	Cough	Crushed root	Chest poultice, massage
				1		S	Boils		Topically
BNKB132, BNKT251				1		Y	Impotence	Decoction or balm	Massage
				3		L	Wounds	Decoction or balm	Topically on wound
				2		D	Stomach pain	Decoction	Orally
				1	S	N	Headache with diarrhoea (children)	Decoction	Bath repeat several times during 24 hours
				1		W	"Helps to conceive"	Crushed stems, decoction	Orally

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
Smilax anceps Willd., Smilacaceae BNKT182	Asangalala, Mucalale	S	3	1	R	X	Long-lasting menstruation	Decoction	Orally
				1		L	[‡] "Child cannot speak"	Decoction	Orally
				1		S	[‡] Snake bite	Fresh root	Topically on wound
[*] *Stomatanthes africanus* (Oliv. & Hiern) R.M. King & H. Rob., Asteraceae BNKB65	Chipolela	H	1	1	R	D	[‡] Gastric ulcers	Decoction	Orally
[*] *Strophanthus welwitschii* (Baill.) K. Schum., Apocynaceae BNKB3, BNKB70, BNKT218	Calimboli, Olohojungu, Kachingole	H	6	1	R	K	[‡] Haemorrhoids	Decoction or mixed with *kissangua*	Orally
				1		Y	[‡] Impotence	Decoction	Orally
				1		X	[‡] Dysmenorrhea	Decoction	Orally
				1	L	A	[‡] Elephantiasis	Decoction	Massage
				1		W	[‡] To provoke abortion	Infusion	Drink 3 days
				1		S	Skin irritation	Decoction	Topically

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[*] *Strychnos cocculoides* Baker, Loganiaceae BNKB71, BNKB95	Mueila, Tugambomb, Chisumbi, Mulolo, Upole	T	6	1	R	X	Dysmenorrhea	Decoction	Orally
				1		D	Colic (new-borns)	Infusion	Orally
				1		N	[‡] Cerebral ischemia	-	Bath
								Decoction	Bath
				1		S	Boils on legs	-	Orally
				1		A	[‡] Hemorrhage due to injury	Decoction	Orally
				1		W	[‡] Postpartum bleeding		
Strychnos spinosa Lam., Loganiaceae BNKB96	Tagambomb o	T	1	1	R	K	Haemorrhoids	Crushed root	Enema
Syzygium guineense (Willd.) DC., Myrtaceae BNKB34	Mucula, Ogitundua, Ukulakula	T	3	1	R	L	[‡] Rheumatism	Crushed fresh root	Massage
				1		W	[‡] To provoke abortion	Decoction	Bath
				1		D	Diarrhoea	Decoction	Orally
Terminalia brachystemma Welw. ex Hiern, Combretaceae BNKT166	Mueila	T	2	2	R	X	Dysmenorrhea	Added to *funge*[§] Tablet	Eating Vaginal pessary
Tithonia diversifolia (Hemsl.) A. Gray, Asteraceae BNKB114	Mumono	S	1	1	R	D	Worms in stomach	Decoction	Orally

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[!*] *Uapaca benguelensis* Müll. Arg., Phyllanthaceae BNKB84, BNKB123	Mungengodengo	T	1	1	R	D	[‡] Stomach pain	Decoction	Orally
[!*] *Uapaca gossweileri* Hutch., Phyllanthaceae BNKT261, BNKB74	Lombola	T	1	1	R	D	[‡] Diarrhoea	Infusion	Orally
[!] *Uapaca nitida* Müll. Arg., Phyllanthaceae BNKT256	Tatembula	T	1	1	R	D	[‡] Diarrhoea	Infusion	Orally
[*] *Vangueriopsis lanciflora* (Hiern) Robyns, Rubiaceae BNKB111	Musole	H	2	1 1	R L	N D	[‡] Hyper myopia [‡] Diarrhoea	Infusion Infusion with tepid water	Orally Bath
[!] *Vernonia britteniana* Hiern, Asteraceae BNKT220, BNKT265	Kamahantu, Musese, Kambumbi	S	6	2 2 2	R	W X Y	[‡] Postpartum treatment for genitals [‡] Dysmenorrhea [‡] Boils on genitals	Decoction Decoction Decoction	Bath Bath Bath
Vitex madiensis subsp. *milanjiensis* (Britten) F. White, Lamiaceae BNKT243	Muchiluchilu	S	1	1	R	N	Headache	Decoction	Orally

Table 1. Continued

Species, family and voucher specimen No.[!*]	Vernacular name	Life-form[$]	UR per category	UR per disease	Part used[@]	Ailment category[†]	Therapeutic uses/Symptoms treated[‡]	Preparation	Administration
[*] *Xylopia tomentosa* Exell, Annonaceae BNKB17, BNKB57	Mujimbajimba, Muvunbaloca, Eliminambomue, Olohasa, Onjamba	S	8	2	R	A	[‡] Malaria	Decoction	Orally
				1		W	[‡] Morning sicknesses during pregnancy	Decoction	Orally
				1	L	D	[‡] Against abortion	Decoction	Orally
				1			[‡]Water in stomach, [‡] Diarrhoea	Decoction	Orally
				1		K	[‡] Heartpain	Infusion	Orally
				1		X	[‡] Dysmenorrhea	Infusion	Orally
				1			[‡] Aphrodisiac	Infusion	Orally

[†] Use category: A (General); B (Blood, blood forming); D (Digestive); H (Ear); K (Circulatory); L (Musculoskeletal); N (Neurological); R (Respiratory); S (Skin); W (Pregnancy, family planning); X (Female genital); Y (Male genital); Z (Social)

 kissangua: is a traditional beverage of *Ovimbundu* people of southern Angola made of fermented corn.

[§] *funge*: is local side-dish made of cassava flour.

[*] Species not subjected to any phytochemical study to date.

[!] Species not reported by any previous ethnobotanical study.

[‡] Ethnomedicinal uses not reported in previous studies

[$] Life form: C – climber, H – herb; L – liana; S – shrub; T – tree.

[@] Part used: B – bark; F – fruit, L – leaf, R – root, S – stem; WP – whole plant.

Table 2. Ailment categories presented according to the descending order of the number of species reported.

Ailment category	No. of species[a]	No. of UR[b]	% of total UR
Digestive (D)	48	81	28.9
Pregnancy, family planning (W)	30	45	16.7
General (A)	20	29	10.3
Musculoskeletal (L)	17	21	7.5
Neurological (N)	16	16	5.7
Skin (S)	13	16	5.7
Female genital (X)	11	20	7.1
Respiratory (R)	11	16	5.7
Male genital (Y)	10	18	6.4
Circulatory (K)	10	11	3.9
Social (Z)	6	3	1.7
Blood, blood forming (B)	5	3	1.7
Ear (H)	1	1	0.4

[a] A taxon may be reported in more than one ailment category; [b] UR: Use Reports

Table 3. Total number of medicinal species and uses reported according to ethnicity and study site; number of coincidences between the two (shared species and uses)

Group	No. of species	Species shared	No. of uses	Uses shared
Chokwe	63	28	123	14
Ovimbundu	58		157	
Kuito	53	34	127	17
Cuemba	73		153	

Table 4. Investigated plant species with previously reported ethnomedicinal uses and pharmacological properties

Species	Previously reported ethnomedicinal uses*	Reported pharmacological properties
Acacia sieberiana	**Angola:** vertigo, pneumonia, bronchitis, rage, bites, nightmares, toothache (Bossard, 1996); **Benin:** diuretic, syphilis, leprosy, acne, orchitis, cold, renal pain, gonorrhea (Natabou, 1991), skin disorders (Giday, 2001); **central Africa:** incontinence (Chevalier, 1905); **Congo:** malaria (Dhetchuvi and Lejoly, 1990), protecting foetus against water sips (Chambon and Leruth, 1954), cold (Staner and Boutique, 1937), constipation diarrhea, piroplasmosis (Balagizi et al., 2005), gonorrhea (Watt and Breyer-Brandwijk, 1962); **Guinea:** acne, uteral disorders, gonorrhea, orchitis, cold, renal pain (Aubréville, 1950); **Mali:** diuretic, acne, syphilis, leprosy, urinary diseases, gonorrhea, orchitis, cold, renal pain (Malgras et al., 1992); **Nigeria:** diarrhea (Offiah et al., 2011); **Senegal:** weakness, stomachache, diuretic, schistosomiasis, gonorrhea, fetish (Kerharo and Adam, 1964), sterility, schistosomiasis (Kerharo and Adam, 1974); **Sudan:** cough (Doka and Yagi, 2009); **Tanzania:** tuberculosis in enfants, renal diseases (Haerdi, 1964); **Uganda:** after giving birth (Ejobi et al., 2007), dysenteria, epilepsy (Kamatenesi et al., 2011), impotence (Kamatenesi-Mugisha and Oryem-Origa, 2005)	Antibacterial, antiinflammatory, anticholinesterase effects (Eldeen et al., 2005), antibacterial and free radical scavenging activity (Katerere and Eloff, 2004)
Aframomum alboviolaceum	**Angola:** vermifuge, alimentary complement (Urso et al., 2016), headache, yellow fever, respiratory diseases, epilepsy (Göhre et al., 2016); **Cameroon:** insect bite, skin disorders (Youmsi et al., 2017); **Congo:** blindness, headache, cough, fever, stomachache, hemorrhoids, stomachache (Makumberlo et al., 2008), **Guinea-Bissau:** stomachache (Frazão-Moreira, 2016), human nutrition, malaria, cough, contra-indicated with pregnant women, milk stimulation for nursing women, fever and malaria, stomachache, fortify infants, dermatosis, yellow fever, hemorrhoids, anemia in children, sexual weakness, painful menstruation, against itching or insect bite, hipache, nausea in pregnant women, women infertility, absence of menstruation, strengthening bones, snake bite, stomachache, intestinal worms, tuberculosis, tooth decay, fever, wound healing, swelling and edema, miscarriage, vertigo, bad body smell, magico-religious (Kafoutchoni et al., 2018)	Cytotoxicity, anticancer (Kuete et al., 2014), antibacterial (Djeussi et al., 2013)
Afzelia quanzensis	Anemia (Peter et al., 2014), bilharziasis, eye complaints, for general luck (Hutchings et al., 1996), aphrodisiac, eczema, restricted internal use (Orwa et al, 2009), gonorrhea, chest pains, kidney problems, bilharziasis, eye problems and snake bite (Hines and Eckman, 1993)	Antibacterial (Moyo et al., 2015)
Albizia adianthifolia	Diabetes, eye problems, gastrointestinal problems, haemorrhoids, headache, neurodegenerative disorders, purgative, reproductive problems in women, respiratory problems (bronchitis), wounds and pain, skin disorders, sexually transmitted infections, lower respiratory infections, diarrheal diseases, ischaemic heart disease, cough, sinusitis, dysentery, stomachache, hypertension (Maroyi et al., 2018), enema (Cunningham, 1993)	Acetylcholinesterase inhibitory, anthelmintic, antiamoebic, antibacterial, antimycobacterial, anti-sexually transmitted infections, antifungal, anti-inflammatory, antioxidant, anxiolytic and antidepressant, cognitive-enhancing, haemolytic, hypoglycemic and antihyperglycemic, immunomodulatory cytotoxicity (Maroyi et al., 2018); antibacterial, anti-inflammatory and anticholinesterase effects (Eldeen et al., 2005)
Albizia antunesiana	**Mozambique:** toothache (Bruschi et al., 2011); **Zimbabwe:** purgative, diarrhea, gonorrhea, aphrodisiac, women infertility, convulsions, blenhorragie (Maroyi, 2011)	Non-cytotoxic *in vitro* (Chipiti et al., 2015), antioxidative (Chipiti et al., 2013)
Aloe zebrina	**Angola:** wounds, constipation, inflammation, urinary diseases, snake bite, back pain, sterility, vertigo, fever, parasitosis, schistosomiasis, vomiting, hemorrhoids, epilepsy, gonorrhea, burns, hepatitis, hypertension, madness (Bossard, 1996); **Mozambique:** eye diseases, wounds, liver disorders (Ribeiro et al., 2010); **Namibia:** HIV/AIDS, herpes (Chinsembu and Hedimbi, 2010); **South Africa:** wounds, colibacilose (Luseba and Van der Merwe, 2006)	Cytotoxicity (Mukandiwa et al., 2012)
Ampelocissus obtusata	**Zimbabwe:** diarrhea (Maroyi, 2011), post-coital contraception (Sewani-Rusike, 2010)	-
Annona stenophylla subsp. *nana*	**Namibia:** HIV/AIDS, skin disorders (Chinsembu and Hedimbi, 2010); **Zimbabwe:** furuncles, sexually transmissible diseases, snake bite, chest pain, HIV/AIDS (Maroyi, 2013), stomach ache (Munodawafa, 2013), anti-infective, antiviral, antioxidant and antidiabetic activities (Gelfand et al., 1985)	Antidiabetic (Verengai et al., 2017; Taderera, 2015)
subsp. *cuneata*	**Angola:** after loss of pregnancy, enema, anaemia, cleaning stomach, constipation, diarrhea, epilepsy, hemorrhoids, hernia, women infertility, influenza, malaria, human nutrition, parasitic worms, scoliosis, stomachache (Lautenschläger et al., 2018)	-

Table 4. Continued

Species	Previously reported ethnomedicinal uses	Reported pharmacological properties
Bobgunnia madagascariensis	**Ivory Coast:** malaria (Koné et al., 2004); **Namibia:** emetic, to treat schistosomiasis, leprosy and earache, abortifacient, anthelminthic (roots), malaria, against snakebite and venereal diseases (Mojermane et al., 2012); **Mali:** against liver diseases (Ahua et al., 2007).	Acaricidal (Muyobela et al., 2016), antibacterial (Koné et al., 2004), antifungal (Schaller et al., 2000; Hostettman et al. 2000)
Chrysophyllum bangweolense	**Tanzania:** diarrhea (Ruffo, 1991), bilharziasis, syphilis, gonorrhea (Moshi et al., 2006)	Anticancer (Moshi et al., 2006)
Cissampelos mucronata	Early induction of labor (Lampiao et al., 2018); **Congo:** snake bite (Chifundera, 1987); **Ethiopia:** constipation, diarrhea, painful menstruation, sterility/impotence, amebiase, pain during lactation, renal diseases (Lulekal et al., 2008), weakness and unstoppable shaking (Flatie et al., 2009); anthelmintic, provokes diarrhea (Tolossa et al., 2013), wound healing (Paulos et al., 2016); **Kenya:** wounds (Kokwaro, 1987), malaria (Muthaura et al., 2007); **Madagascar:** induces vomiting (Daruty, 1886); **Nigeria:** malaria, ulcers, stomachache (Katasayal et al., 2015); **Sudan:** malaria, infarct, stomachache, magic (El-Kamali, 2009); **Tanzania:** snake bite, poisoning, stomachache (Ruffo, 1991); **Uganda:** children nourishment (Adjanohoun et al., 1993)	Antimalarial (Muthaura et al., 2015; Tshibangu et al., 2002, Gessler et al., 1995), antibacterial and larvicidal (Nondo et al., 2011), antimalarial (not confirmed; Benoit-Vical et al., 2008), antidiabetic (Tanko et al, 2007), antiulcer (Nwafor et al., 2005), antimicrobial (Tchibangu et al., 2002)
Cryptolepis oblongifolia	**Benin/Zambia:** gonorrhoea; **Mozambique:** malaria, **Tanzania/Zimbabwe:** cough, stomachache, diarrhea in children, aphrodisiac; **Zambia:** wounds (Bosch, 2011)	Antiinflammatory (Umar et al., 2014)
Diodella sarmentosa	Wounds (Rabearivony et al., 2015); **Madagascar:** wounds, metrorrhagia, abdominal colic (Rakotondrafara et al., 2018)	-
Diospyros batocana	Indigestion, diarrhea, fever, snake bite, infertility, venereal diseases; **Malawi:** headache and stomach problems, cough, chronic cough, cuts, pneumonia and pulmonary tuberculosis, measles, anorexia, digestive tract; **Tanzania:** rectal prolapse, diabetes, testicle inflammation, sore eyes, facilitates giving birth (de Ruijter, 2006)	-
Englerophytum magalismontanum	Abdominal pain, rheumatism, headaches, epilepsy (Ruffo et al., 2002), arthritis, rheumatism, vermifuges, paralysis, epilepsy, convulsions, spasms (Burkill, 1985); **South Africa:** diabetes (Semenya and Potgieter, 2014)	Antimicrobial, cytotoxicity (More et al., 2008)
Entada gigas	Rituals (van Andel et al., 2015); **Equatorial Guinee:** diuretic (Sunderland and Obama, 1998); **Gabon:** against bad spirits (Chevalier, 1937; Malan Djah, 2009); **Madagascar:** diarrhea (Rakotoarivelo et al., 2015), fevers (Daruty, 1886)	Antiulcer (Akindele et al., 2016)
Eriosema affine	**Angola:** prevents abortion, chest pain, malaria, vomiting, nightmares, epilepsy, flu (Bossard, 1996)	-
Erythrina abyssinica	HIV/AIDS (Lamorde et al., 2010), vomiting (Tugume et al., 2016); **Burundi:** cough (Rodegem, 1970), eyes, strenghtens breastmilk, female sterility, cough, epistaxis, depression, protection black magic (Baerts and Lehmann, 1989); **central Africa:** stomach problems (Balagizi et al., 1998); **Congo:** eye inflammation, snake bitse, antihelmentic, diphtheria (Defour, 1994), tuberculosis, eye inflammation (Cihyoka, 1994), wounds (Byavu et al., 2000), hemorrhoids (Nyakabwa and Dibaluka, 1990); **Kenya:** wounds, dermatosis, boils (Kokwaro, 1987), internal pain (Glover et al., 1966); **Kenya/Uganda/Tanzania:** snake bite, gonorrhea, syphilis, collique, stomach ache (Kokwaro, 1976); **Rwanda:** eye inflammation (Desouter, 1991), wounds, snake bites, lepre (Durand, 1960), dysentery, meningitis, jaundice (Kayonga and Habiyaremye, 1987), hemorrhoids (Ayobangira et al., 2000); **Tanzania:** stomach pain (Chabra et al., 1990); **Uganda:** candide (Hamil et al., 2000), epilepsy (Adjanohoun et al., 1993); **Zimbabwe:** cough, rougeole, bilharziose, cachexie, psychose (Gelfand et al., 1985)	Anticancer (Samanga et al., 2014), wound healing properties (Marume et al., 2017), prevents meningoencephalitis (Nasimolo et al., 2014), antimicrobial (Kamat et al., 1981), antibacterial (Nguyen et al., 2016; Wagate et al., 2010), antimalariall (Yenesew et al., 2004), antihyperglycemic (Amuri et al., 2017), anti-HIV, antiviral (Mohammed et al., 2012), antidiabetic (Cui et al., 2010), antifungal (Manyarara et al., 2016) cytotoxic (Perez et al., 2015), antimycobacterial (Bunalema et al., 2011)
Eulophia cucullata	**Malawi:** fertility problems, to prevent epilepsy (Bulpitt, 2005); **South Africa/Madagascar:** love charm, impotence, infertility (Chinsamy et al., 2011)	-

Table 4. Continued

Species	Previously reported ethnomedicinal uses	Reported pharmacological properties
Felicia muricata	**South Africa:** headache (Phillips, 1917), not safe for oral use (Attitalla, 2011)	Antiinflammatory, antinociceptive and antipyretic (Ashafa et al., 2010a), antioxidant (Ashafa et al., 2010b), prostangladin synthesis inhibition (McGaw et al., 1997)
Garcinia huillensis	**Congo:** hypertension (Diafouka and Lejoly, 1993), lactation problems, constipation, cough, cold, tuberculosis , hemorrhoids, gonorrhea, painful and excessive menstruation, impotence (Kibungu Kembelo, 2003), stomachache (Makumberlo et al., 2008); **Uganda:** trypanosomiasis (Freiburghaus et al., 1996)	Anticancer (Dibwe et al., 2012), antidiarrheic (Bitsindou and Lejoly, 1996)
Gymnema sylvestre	**Nigeria:** diabetes, obesity, ulcers, diuretic, laxative, asthma, hepatitis, inflammation, snake bite, antimicrobial, antimalarial (Udoamaka et al., 2014); **Tanzania:** aphrodisiac (Ruffo, 1991);	Antiobesity (Pierce, 1999; Preuss et al., 2004), antidiabetic (Sugihara et al., 2000), hypolipidaemic (Bishayee and Chatterjee, 1994), antimicrobial (Satdive and Abhilash, 2003), antiinflammatory (Malik et al., 2008), free radical scavenging activity (Ohmori et al., 2005)
Gymnosporia senegalensis	Diarrhea (de Wet et al., 2010), microbial diseases (Ngezahayo et al., 2015); **South Africa:** impotence (Semenya et al., 2013)	Antibacterial (Mathabe et al., 2006), antibacterial and cytotoxic (Tatsimo et al., 2019), antimycobacterial (Makgatho et al., 2018)
Holostylon robustum	Tuberculosis, vertigo, cough (Bossard, 1996)	-
Hymenocardia acida	**Angola:** cough, tuberculosis, asthma (Bossard, 1996), diarrhea, skin disease, stomachache (Kerharo and Adam, 1964); **Benin:** tetanus, psychose (Adjanohoun et al., 1989); **Congo:** eye problems (Haxaire, 1979), bronchitis, tuberculosis, anemia, epilepsy, stomach problems, angine (Diafouka, 1997); **Guinea:** hypertension (Diallo et al., 2019); **Mozambique:** painful menstruation, vomiting, general weakness (Bruschi et al., 2011), skin diseases, anemia, cough, epilepsy (Bouquet, 1969); **Senegal:** laxative, toothache (Kerharo and Adam, 1964)	Hypertension (Diallo et al., 2019), antiprotozal (Oguntoye et al., 2018), antimalaria and cytotoxicity (Tuenter et al., 2016), antispermatogenic (Abu and Uchendu, 2010), antifertility (Hyacinth and Nwocha, 2011), antioxidant and antibacterial (Sofidiya et al., 2009)
Landolphia camptoloba	Conjunctivitis (Neuwinger, 2000)	-
Leptactina benguelensis	**Angola:** immobile foetus, chest pain, cough, hemoptysis (Bossard, 1996)	-
Lippia plicata	**Tanzania:** Leaf swallowing by chimpanzees (Huffman et al, 1996); cough (Quattrocchi, 2012)	-
Ocimum americanum	**Cameroon:** constipation (Simbo, 2010); **Congo:** nourishment, malaria (Wome, 1985), snake bite (Chifundera, 1987), rheumatism (De Graer, 1929), gonorrhea (Verbeeck, 1948), epilepsy (Kibungu Kembelo, 2003); **Ethiopia:** cough, ascariasis, child health (Bekalo et al., 2009); **Reunion:** dry cough, fevers, flu, vermifuge, rheumatism (Arnold and Gulumian, 1984); **Rwanda:** cough, asthma (Durand., 1960), **Senegal:** calms stomach (Kerharo and Adam, 1964) **Sierra Leone:** convulsion (Mac Foy and Sama, 1983); **South Africa:** vein diseases (Arnold and Gulumian, 1984)	Antioxidant, antimicrobial (Kumar et al., 2019), antimicrobial and antibacterial (Yadav et al., 2018)
Ochna pulchra	**South Africa:** ritual, psychoactive effects (Sobiecki, 2008); **Zimbabwe:** myopia (Gelfand et al., 1985), stomachache (Maroyi, 2013)	Antibacterial (Makhafola et al., 2014)
Ochna pygmaea	**Angola:** wounds, painful labor, dysmenorrhea, cough, tuberculosis, pneumonia, weak poison (Bossard, 1996)	-
Oldfieldia dactylophylla	**Angola:** not to be used by pregnant women, dysmenorrhea, sterility, tuberculosis, to stop menstruation, sorethroat (Bossard, 1996), fever, stomachache (Bonnefoux, 1937); **Tanzania:** gonorrhea, aphrodisiac, hernie (Ruffo, 1991)	-
Parinari capensis	Respiratory diseases (York et al., 2011), skin disorders (De Wet et al., 2013), hemorrhoids (Kayode et al., 2008)	Antimalarial (Uys et al., 2002), antimicrobial (York et al., 2012)

Table 4. Continued

Species	Previously reported ethnomedicinal uses	Reported pharmacological properties
Parinari curatellifolia	Anemia (Peter et al., 2014), **Angola:** cough, black magic, provokes abortion (Bossard, 1996); **Burundi:** laxative, vomiting, against black magic, chest pain, colic, psychose (Baerts and Lehmann, 1989); **Central African Republic:** tuberculosis (Boulesteix and Guinko, 1979); **Ivory Coast:** cough (Ambe and Malaisse, 2000); **Mali:** trypanosomiasis (Bizimana et al., 2006); **Namibia:** HIV/AIDS, herpes simplex, tuberculosis, diarrhea (Chinsembu and Hedimbi, 2010); **Tanzania:** tachycardy (Chabra and Mahunnah, 1994); **Togo:** pinworms, epilepsy, psychose (Adjanohoun, 1986); **Uganda:** stomachache, jaundice (Segawa and Kasenene, 2007); **Zimbabwe:** diarrhea (Chinemana and Drummond, 1985), sedative, uterine disorders (Gelfand et al., 1985), constipation, toothache (Maroyi, 2013)	Antioxidant (Karou et al., 2011), antioxidant and hepatoprotective (Atawodi et al., 2013), antimicrobial (More et al., 2008), antimycobacterial (Chimponda and Mukanganyama, 2010), antibacterial (Peni et al., 2010), cytotoxicity (Gororo et al., 2016), cytoprotective (Gweshelo et al., 2016), hepatoprotective (Olaleye et al., 2014)
Paropsia brazzaeana	**Congo:** rheumatism, pain, amoebic dysentery; **Zimbabwe:** gonorrhea, toothache (Neuwinger, 2000)	Antidiarrhoeic, antibacterial, antiamoebic and antispasmodic (Tona et al., 1999), antiamoebic (Tona et al., 1998)
Phyllanthus welwitschianus	Aphrodisiac, wound dressing (Burkill, 1985); **Angola:** antiabortion (Urso et al., 2016)	-
Psorospermum baumii	scabies (Rhode-Livingstone Museum, 1974); **South Africa:** tick repellent (Watt and Breyer –Brandwijk, 1962)	-
Psorospermum febrifugum	Antileucemic (Amonkar et al., 1981); **Angola:** scabies, fevers, leprosy (Bonnefoux, 1937) fever, scabies cough, tuberculosis, nightmare, prolonged menstruation, leprosy, possession, madness (Bossard, 1996), skin diseases, leper (Göhre et al., 2016); **Benin:** epilepsy (Adjanohoun et al. 1989); **Burundi:** scabies, placenta (well placed), colic, psychose, analgetic (Baerts and Lehmann, 1989), headache, body pains (Verger, 1995); **Congo:** asthma in children (Disengomoka and Daleveau, 1983), dysenteria, diarrhea, cough, rheumatism (Diafouka, 1997), skin irritation, leprosy (Arkinstall, 1979); **Malawi:** contraceptive (Maliwichi-Nyirenda and Maliwichi, 2010); **Mali:** diuretic, fever, scabies, malaria, stomach pain (Malgras, 1992); **Rwanda:** colic, scabies (Van Puyvelde et al., 1977); **Tanzania:** skin diseases (Chabra et al., 1990), meningitis (Kisangau et al., 2007); **Uganda:** boils, herpes, cough, stomach pain (Hamil et al., 2003), wound, boils, dry cough (Tugume et al., 2016), fevers, jaundice, facilitates labor, syphilis, boils (Segawa and Kasanene, 2007); **Zimbabwe:** pneumonia, syphilis (Gelfand et al., 1985)	Antioxidant, antiacne (Elufioye et al., 2016), anticancer, antimicrobial (Tamokou et al., 2013), HIV/AIDS (Lamorde et al., 2010), antimicrobial (Tsaffack et al., 2009) (Kisangau et al., 2007), anticancer (Moshi et al., 2006)
Psychotria eminiana	Snake bite (Neuwinger, 2000)	-
Pterocarpus angolensis	**Angola:** lactation problems, wounds, prevents abortion, prevents stillbirth, chest pain, sterility, impotence, asthma, epilepsy, stomachache, amenorrhea, hepatitis, coma, agony, aliment complement (Bossard, 1996), wounds, dysenteria (Bonnefoux, 1937); **Congo,/Angola (chokwe):** eye disease (Rodrigues, 1977); **Congo:** painful breast, female sterility, prolonged excessive menstruation; **Ethiopia:** hypertension (Chekole et al., 2015); **Namibia:** leg pain, cough, hemorrhage (Cheikhyousef et al., 2011), **South Africa:** gono, venereal diseases, fontanella new born (Arnold and Gulumian, 1984), general pain (Luseba et al., 2007); **Tanzania:** schistosomiasis, anemia, stomach (Chabra et al., 1990), cathar, eye disease, wounds, rheumatism, aphrodisiac (Gelfand et al., 1985), headache, dysenteria, cough, cathar, menorrhagia (Haerdi, 1964), wounds, diarrhea (Ruffo, 1991); **Zimbabwe:** febrile convulsions, diarrhea (Chinemana et al., 1985), painful eyes, ear pain, menorrhagia, female infertility (Maroyi, 2011)	Antibacterial, antifungal (Chipinga et al., 2018), collagen expression (Ssemakulu et al., 2016), antioxidant (Anokwuru et al., 2017), antiinflammatory (Mulaudzi et al., 2013), antimalarial (Zininga et al., 2017), antiamoebic antibacterial (Samie et al., 2009), antibacterial, antiinflamatory, wound healing (Luseba et al., 2007)
Rumex abyssinicus	**Angola:** prevents miscarriage, chest pain, malaria, vomiting, nightmare, epilepsy, hallucination (Bossard, 1996); **Burundi:** madness (Rodegem, 1970), abortion (Desta, 1994), mycosis, migrain, cough (Banderembako and Ntitangirageza, 1978); **Cameroon:** malaria (Mapi, 1988); **Congo:** anthelminthic (Defour, 1994); **Ethiopia:** hypertension (Teklehaymanot et al., 2007), abortion or contraception (Desta, 1994), headache, toothache (Teklay et al., 2013); **Kenya:** wounds (Kokwaro, 1987), malaria (Mukungu et al., 2016); **Madagascar:** syphilis, colic, pain (Terrac, 1947), **Rwanda:** cough (Kayonga and Habiyaremye, 1987), constipation, purgative, diuretic, gonorrhea, vomiting (Durand, 1960), liver disease (Mukazayire et al., 2011), eye disease (Gakuubi and Wanzala, 2012); **Tanzania:** syphilis (Leedal, 1975); **Uganda:** impotence, prolonged menstruation (Kamatenesi-Mugisha and Oryem-Origa, 2005)	Antibacterial, antimicrobial, antiinflammatory (Getie et al., 2003), wound healing, antiinflammatory (Mulisa et al., 2015) anticancer, antimicrobial (Tamokou et al., 2013), antimalarial, cytotoxicity (Muganga et al., 2010), anthelmintic (Eguale et al., 2011), antibacterial (Ali et al., 2017) immunopotentiator (Jia, 2018), antimycobacterial (Coronado et al., 2016), anticancer andpurification activity of roots (Jia et al., 2015)

Table 4. Continued

Species	Previously reported ethnomedicinal uses	Reported pharmacological properties
Scleria induta	Wounds, gingivitis (Neuwinger, 2000)	-
Sclerocroton cornutus	**Central African Republic:** hernia; **DRC:** facilitate childbirth, treat female sterility, cough and river blindness, insect and snake bites, toothache, scurvy and stomatitis sore feet, skin diseases, drunk as a purgative and anthelminthic, filariasis (Lemmens et al., 2012)	-
Securidaca longepedunculata	**Angola:** pregnancy problems (Urso et al., 2016), scabies encephalitide, tachycardy, vertigo, tuberculosis, rage, epilepsy, rheumatism, inflammation knee, hepatite, hydropsy, madness (Bossard, 1996), wound, snake bite, malaria, cancer, hepatite (Bossard, 1996); **Benin:** wounds, headache, snake bite, bronchitis, fever, hemorrhage, veneral diseases, vermifuge (Natabou, 1991); **Botswana:** tuberculosis, against black magic (Hedberg and Staugard, 1989); **Burundi:** laxative, purgative, prevents abortion, intestinal parasites, nausea, psychose (Baerts and Lehmann, 1989); **Burkina Faso:** constipation, malaria, vomiting, sedative, spasms (Traore et al., 2009), wounds (Tapsoba and Deschamps, 2006), neurological problems, infections, infestations, poisoning, sensorial, digestive, musculoskeletal (Zerbo et al., 2011); **Cameroon:** malaria (Saotoing et al., 2011); **Congo:** malaria (Dibwe et al., 2012); **Ethiopia:** cough, (Desta, 1995), muscular problems, herpes, malaria (Teklehaymanot et al., 2007); **Guinea Conakry:** antiseptic, antiinfection (Magassouba et al., 2007); **Ivory Coast:** intestinal pain, anemia, convulsion in children, closing fontanelle (Koné et al., 2012), cephalgies, general pain, vermifuge, rheumatism (Bouquet and Debray, 1974); **Kenya:** antimalarial (Nguta et al. 2010); **Mali:** dysmenhorhea (Grønhaug et al., 2008), headache, poison or suicide, menstruation pain (Nordeng et al., 2013), **Niger:** madness, calming, ritual (Ibrahim et al., 2007); **Nigeria:** sexually transmitted infections, hernias, coughs, fever, ascariasis, constipation, headache, rheumatism, stomachache, malaria, tuberculosis, pain, epilepsy, pneumonia, skin infections, aphrodisiac (Mongalo et al., 2015), diabetes (Shinkafi et al., 2015), erectile disfunction, arthritis, tumors, cough, inflammation, antipyretic, analgesic, convulsions (Udoamaka et al., 2014), asthma (Sonibare and Gbile, 2008), psychoactive effects (Sobiecki, 2008), epilepsy (Muazu and Kaita, 2008); **Tanzania:** meningitide, AIDS/HIV (Kisangau et al., 2007); **Togo:** liver diseases (Kpodar et al., 2016), malaria, hemorrhoids, stomachache (Tchacondo et al. 2011), trypanosomiasis (Bizimana et al., 2006), hemorrhoids, dermatoses, headache, snake bite, stomachache (Maiga et al., 2005), cathar, constipation, asthenia eye problems, laxative, diuretic, pains, purgative, against worms, toothache, leprosy, intestinal problems, bronchitis, malaria, syphilis, headache, snake bite, tuberculosis, meningitis, rage, antipoison, stomachache, rheumatism, liver cirrhose, spiritual possession (Malgras, 1992); **South Africa:** contraceptive (Steenkamp, 2003), malaria (Iyamah and Idu, 2015); **Sudan:** rashes, eye disease (Musa et al., 2011); **Senegal:** headache, snake bite, stomachache, syphilis (Kerharo and Adam, 1964); **Uganda:** diarrhea, headache, body pain, epilepsy (Okello and Ssegawa, 2007), malaria (Tadesse, 1994), theileriosis, diarrhea, muscle abscess, headache, snakebite, inflammation, fever, antidote, flu, hernia, madness (Tabuti et al., 2003); **Zimbabwe:** epilepsy (Maroyi, 2011), epilepsy, pain, sexually transmitted diseases (Maroyi, 2013)	Anticancer (Ngulde et al., 2019; Obasi et al., 2018), antimicrobial (Sanusi et al., 2015), antiinflammatory, antibacterial activity, antimalarial, antimycobacterial antifungal activity, hyperglycemic activity, diabetic induced enzyme inhibition, anticonvulsant, anxiolytic and sedative effect, insecticidal (Mongalo et al., 2015), antibacteria (Pallant and Steencamp, 2008), antifungal, antivirus, antiprotozoa (Maiga et al., 2005)
Smilax anceps	**Angola:** cough, epileptic symptoms (Göhre et al., 2016), HIV/AIDS, stomachache (Feuya Tchouya et al., 2015); **Cameroon:** female sterility, gonorrhea, syphilis, malaria (Telefo et al., 2011); **Congo:** skin problems, prolonged painful menstruation (Kibungu Kembelo, 2003); **Ethiopia:** infection of ears (Giday et al., 2009); **Nigeria:** HIV/AIDS (Kayode et al., 2009); **Madagascar:** excessive tiredness, convulsion (Razafindraibe et al., 2006)	Antimicrobial (Adebayo-Tayo and Adegoke, 2008)
Stomatanthes africanus	Skinny cattles (Lulekal et al., 2008)	-
Strophanthus welwitschii	Scabies (Bossard, 1996), cardiotonique (Nsimundele, 1968)	-
Strychnos coculloides	**Angola:** sexual stimulant (Urso et al., 2016); **Congo:** reduces large breast, epilepsy (Kibungu Kembelo, 2003), hemorrhoids (Makumberlo et al., 2008); **Zambia:** sexually transmitted infections (Chinsembu, 2016; Ndubani, 1999); **Zimbabwe:** impotence, gonorrhea, stomachache, abdominal pains, sorethroat, aphrodisiac (Maroyi, 2013; Maroyi, 2011)	-

Table 4. Continued

Species	Previously reported ethnomedicinal uses	Reported pharmacological properties
Strychnos spinosa	**Angola:** prevents miscarriage, sterility, impotence, cough, tuberculosis, pneumonia, flu, constipation, stomachache (Bossard, 1996); **Ghana:** malaria (Asase et al., 2005); **Guinea:** antiseptic, antiinfection (Magassouba et al., 2007); **Mali:** trypanosomiasis (Bizimana et al., 2006), urinary infection, hemorrhoids (Togola et al., 2005), conjunctivity, eye diseases, diarrhea, tuberculosis, toothache, stomachache, hernia (Malgras, 1992); **Mozambique:** snake bite, difficult labor, sexual diseases, hernie (Bruschi et al., 2011); **Niger:** dysmenhorrhea, calming (Adjanohoun et al., 1980); **Senegal:** diarrhea, colic (Kerharo and Adam, 1964), black magic (Kerharo and Adam, 1964); **Sudan:** hypertension (Doka and Yagi, 2009); **Tanzania:** gonorrhea, syphilis, intestinal pain (Ruffo, 1991), meningitis, encephalitis (Haerdi, 1964); **Togo:** female infertility, stomachache (Tchacondo et al., 2011); **Zambia**: sexually transmitted diseases (Ndubani and Höjer, 1999); **Zimbabwe:** gonorrhea, stomachache, genital diseases (Maroyi, 2013; Maroyi, 2011)	Antiinflammatory (Isa et al., 2016), antibacterial (Isa et al., 2014), antitrypanosomal (Bero et al., 2013), antioxidant, radical scavening activity (Nhukarume et al., 2010), anthelmintic/antiparasitic (Waterman et al., 2010), antimalarial (Bero et al., 2009), antitrypanosomial (Hoet et al., 2007), antimalarial (Asase et al., 2005)
Syzygium guineense	**Angola:** diarrhea (Bossard, 1996), occasional alimentary supplement (Bossard, 1996); **Burundi:** laxative, purgative, against black magic (Baerts and Lehmann, 1989), mental disease in children (Giday, 2007); **Ethiopia:** eye disease, wounds (Giday et al., 2009), diarrhea (Chekole et al., 2015), infertility (Göhre et al., 2016), internal parasites (Amenu, 2007); **Guinée Conakry:** antiseptic, antiinfection (Magassouba et al., 2007); **Ivory Coast:** cough children (Koné, 2002); **Mali:** diarrhea, toothache, stimulates lactation, general strengthening (Malgras, 1992), skin problems (Lulekal et al., 2008); **Namibia:** HIV/AIDS, diarrhea (Chinsembu and Hedimbi, 2010); **Nigeria:** stimulant (Adamu Harami et al., 2005), diabetes, hypertension, cardio-protection, diarrhea, inflammation, immunostimulation, anticancer (Udoamaka, 2014), antidiabetic (Gbolade, 2009), retention of urine (Lulekal et al., 2008); **South Africa:** diarrhea (Amusan et al., 2002); **Tanzania:** chronic diarrhea, HIV/AIDS (Kisangau, 2007); **Uganda:** jaundice (Segawa and Kasenene, 2007)	Cancer-preventive (Koval et al., 2018), antituberculosis (Oladosu et al., 2017), antimalarial (Tadesse and Wubneh, 2017), leaves rich in polyphenols (Nguyen et al., 2016), antioxidant and protective effects in liver and brain liver homogenate (Tankeu, 2016), antihypertensive (Ayele et al., 2010), antibacterial (Djoukeng, 2005)
Terminalia brachystemma	**Angola:** wounds, painful labor, dysmenorrhea, cough, tuberculosis, pneumonia, poison, nephralgia (Bossard, 1996), new born, scorpion bite, cough, pneumonia, syphilis, colic, children flu (Gelfand et al., 1985)	Antifungal (Liu et al., 2009; Masoko, 2005)
Tithonia diversifolia	Diabetes, malaria, fever, pains, diarrhea, hepatitis, infectious diseases and other conditions (Baerts and Lehmann, 1989), topically as poultice or bath to wounds, bruises, skeletomuscular disorders, abscesses, dermatological conditions, and stomachache (Rodrigues, 1977)	Antiinflammatory, analgesic, antimalarial, antidiabetic, antibacterial antifungal, antiviral, antioxidant, hypolipidemic and antiobesity, antiulcer, antiemetic, hepatoprotective effect, antivenin and antidiarrheal effect (Tagne et al., 2018)
Uapaca benguelensis	-	Antimitotic effect (Mbayo et al., 2016)
Uapaca nitida	-	Antimalarial (Steele et al., 1999; Kirby et al., 1993)
Vangueriopsis lanciflora	Mumps, infertility, strengthen baby, ritual, nightmares headaches (Lemmens et al., 2012)	-
Vitex madiensis	Premenstrual and gynecologic affections, bacterial infections, gastrointestinal problems and inflammation, repellent, cough, cold, diarrhea and dysentery, diabetes, anemia, conjunctivitis, fatigue, headaches, mental disorders, respiratory problems, evil back among women, leprosy, fever, jaundice (Lengbiye et al., 2018); **Angola:** difficult labor, malaria, stomachache in child (Bossard, 1996); **Central Africa:** conjuntivities, oxyures, epilepsy, rheumatism, softens clitoris (Hexaire, 1979); **Congo:** malaria (Kasuku et al., 1999), epilepsy, psychose (Bouquet, 1969), lactation problems, epilepsy, stomachache (Diafouka et al., 1997), flu, hemorrhoid, stomachache (Makumberlo et al., 2008); **Guinea-Bissau:** pregnancy (Frazão-Moreira, 2016); **Uganda:** diarrhea, cough (Okello and Segawa, 2007)	Larvicidal, laxative, anthelminthic, reduces cholesterol, antiinflammatory (Lengbiye et al., 2018), antimalarial (Ondo et al., 2012), antidiabetic/hypoglycemic (Amuri et al., 2017)
Xylopia tomentosa	HIV/AIDS (Chinsembu, 2016)	-

* Ethnomedicinal uses not assigned to particular country indicate reports for Africa in general.

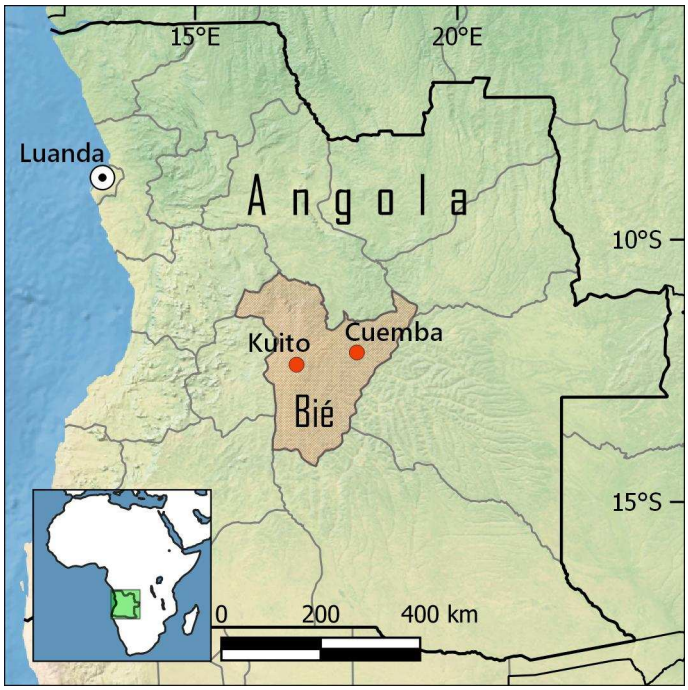

Figure 1. Study area map

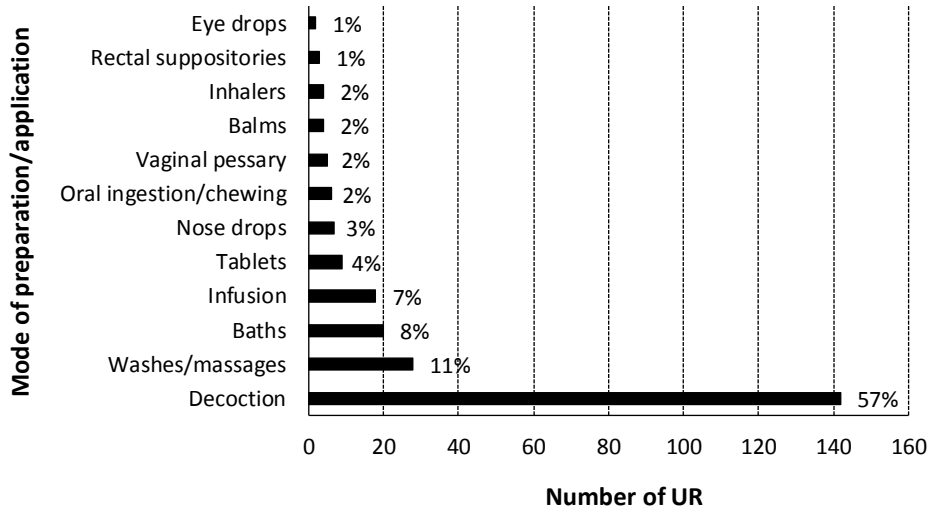

Figure 2. Number of use reports for each mode of preparation/application

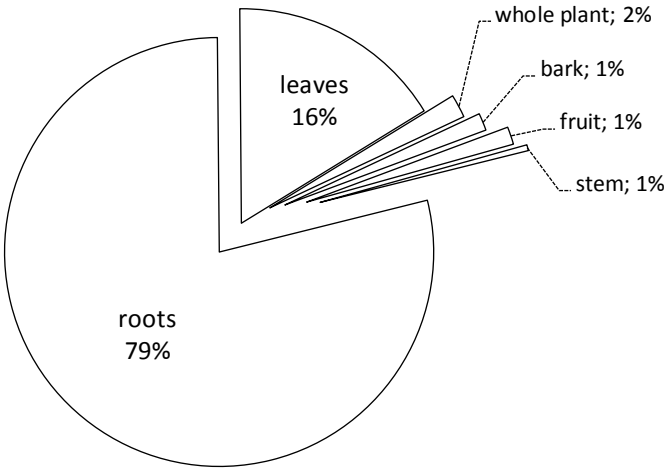

Figure 3. Plant parts used for medicinal purposes