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## Abstract

**Background:** Local communities in sub-Saharan Africa have a long history of medicinal plant usage. Like in other parts of the developing world, rural and urban communities are still dependent on herbal medicines for primary health care, and the use of herbal medicines is still an integral part of their daily life and socio-cultural life style. The objective of this paper is to summarise information on the ethnobotany and pharmacology of *Kirkia acuminata* Oliv. throughout its distributional range.

**Materials and Methods:** The information documented in this article is derived from books, theses, scientific journals and reports obtained from library collections, Scopus, Pubmed, MEDLINE, ISI Web of Science, Google Scholar and Science Direct.

**Results:** *Kirkia acuminata* is the most known and widely distributed *Kirkia* species in the genus and is one of the most popular and promising plant resources due to its several beneficial uses. *Kirkia acuminata* is used to treat abdominal pains, backache, cholera, constipation, cough, diarrhea, dysentery, snake bites, toothache and wounds. Other applications include its use as charcoal; hedge, ornamental or shade; stock feed, timber and source of water during drought periods. Preliminary phytochemical assessment of roots and stem bark of *K. acuminata* showed presence of lignans, neo-lignans, nor-carotinoids and other compounds. The extracts of *K. acuminata* exhibited antibacterial and antimycobacterial activities. These phytochemical compounds may be responsible for the medicinal uses and biological activities demonstrated by *K. acuminata*.

**Conclusion:** Detailed research is required aimed at exploring mode of action of bioactive compounds of *Kirkia acuminata* that are responsible for the documented pharmacological effects. *Kirkia acuminata* is an important plant species that has potential to contribute to the primary health care and livelihood improvement of local communities in the geographical areas where it is indigenous and found in abundance.

**Key words:** Africa, ethnobotanical, *Kirkia acuminata*, livelihood needs, traditional medicine

## Introduction

Herbal medicines are an important source of pharmaceutical and health products in developing countries. The World Health Organization (WHO, 2002) estimates that between 70-80% of the population particularly in developing countries depend on herbal medicines to fulfil their primary health care needs and also for income generation and livelihood improvement. Rates (2001) also argues that about 25% of prescription drugs and 11% of drugs considered essential by the World Health Organisation are derived from herbal medicines and also a large number of synthetic drugs are obtained from precursor compounds originating from herbal medicines. One particular landmark contribution of ethnopharmacological studies to modern medicine was the discovery of quinine from *Cinchona* L. bark by researchers Caventou and Pelletier (Deutschländer et al., 2009). This novel discovery and documentation of other pharmaceutical drugs from plants led to interest in traditional medicines, their phytochemistry and bioactive assessment of such plants used as herbal medicines by local communities. Research by Konno (2004) showed that accessibility, efficacy and affordable cost in getting primary health care services are some of the main reasons why local people prefer traditional medicines to western pharmaceutical drugs in Ethiopia. Despite the increasing acceptance of herbal medicines in the management of primary health care in developing countries (Watt and Breyer-Brandwijk, 1962; Gelfand et al., 1985; Hedberg and Staugard, 1989; Burkill, 1995; Omer et al., 1998; Hostettmann et al., 2000; Koné et al., 2004; Flatie et al., 2009; van Wyk et al., 2009; Ribeiro et al., 2010; Maroyi, 2011, 2012; 2013, 2016; Maroyi and Mosina, 2014; Maroyi and Cheikhoussef, 2015), this traditional knowledge on herbal medicines is not adequately documented. *Kirkia acuminata* is among valuable medicinal plants in sub-Saharan Africa (Watt and Breyer-Brandwijk, 1962; Gelfand et al., 1985; Hedberg and Staugard, 1989; van Wyk et al., 2009; Maroyi, 2011, 2013), but there is a dearth of information on its medicinal uses, phytochemistry and pharmacological properties. *Kirkia acuminata* belongs to the monotypic genus *Kirkia* Oliver, a member of the dicot family Kirkiaceae that contains 6 species (Muellner, 2011). Genus *Kirkia* was named after Dr John Kirk later Sir (1832-1922), a Scottish physician and plant collector, who accompanied David Livingstone on his Zambezi expedition to central and southern Africa (Palmer and Pitman, 1972).

Genus *Kirkia* is widespread in tropical Africa from Somalia and Ethiopia, south to Namibia and South Africa (Stannard, 1981). All species occur in dry habitats, usually in open woodlands and on limestone hills (Heywood et al., 2007; Stannard, 1981). Only one species, *K. acuminata*, synonym *Kirkia pubescens* Burt Davy is the most widespread, occurring in Zimbabwe, Zambia, Tanzania, South Africa, Namibia, Mozambique, Malawi, Democratic Republic of Congo (DRC), Botswana and Angola (Figure 1). It occurs up to 1 600 m altitude in bushland, woodland, savanna and rocky hillslopes (Brink, 2008; van Wyk and van Wyk, 1997). It generally grows on alluvial flats and sandy or loamy soils near rivers to dry soils and rocky slopes on well-drained and basic soils, but may also be found on various soil types (Brink, 2008).



**Figure 1:** Distribution of *Kirkia acuminata*. The map represents the documented native countries of the specie

*Kirkia acuminata* is commonly known as white seringa, other vernacular and common names are shown in Table 1. The specific epithet “acuminata” refers to the species “long and pointed leaflets” (Stannard, 1981). *Kirkia acuminata* grows in hot and dry areas, it is susceptible to frost and is drought resistant (Brink, 2008). It is a semi-deciduous, monoecious medium-sized tree growing up to 20 m tall with a stem diameter of up to 90 cm (Stannard, 1981; van Wyk and van Wyk, 1997). *Kirkia acuminata* stores water in its roots which enable the species to survive short periods of drought (Palgrave, 2000). The leaves are sticky when young, imparipinnate, alternate, narrowly ovate, tapering at the apex with finely serrated margins and crowded near the ends of branches (Palgrave, 2000). Flowers are functionally unisexual with free petals and sepals (Palmer and Pitman, 1972). Flowers are small, occurring in branched axillary inflorescences. Fruits are oblong-ellipsoid, thinly woody capsule and splitting into four valves (Palgrave, 2000).

*Kirkia acuminata* is the most known and widely distributed species in the genus *Kirkia*, and is one of the most popular and promising plant resources due to its several beneficial uses. Therefore, the objectives of this review are:

- i. To summarize traditional uses of *K. acuminata* throughout its distributional range using available literature, and
- ii. To highlight potential medicinal and economic importance of *K. acuminata* throughout its distributional range.

## Review procedure

Ethnobotanical uses of *K. acuminata* were collated from journal articles, theses, book chapters, books and abstracts. Relevant literature were obtained from Pubmed, MEDLINE, Science Direct, Google Scholar, Scopus and ISI Web of Science. Literature sources were identified by searching for terms such as folkloric uses, ethno medicine, folk medicine, traditional medicine, herbal medicine, indigenous medicine, horticultural uses, ethno botany and cultural uses, economic uses, phytochemistry and pharmacological properties of *K. acuminata*. Literature sources were identified by searching the library collections of the National Herbarium and Botanic Gardens (SRGH) in Harare, Zimbabwe and the University of Fort Hare library in Alice, South Africa.

## Vernacular names and traditional uses of *K. acuminata*

*Kirkia acuminata* is known by several vernacular names in its geographical areas of occurrence (Table 1). Literature survey showed no fewer than 30 common or vernacular names for *K. acuminata* (Table 1). Zimbabwe, South Africa and Botswana (in their descending order of importance) appear to have the highest number of common or vernacular names (Figure 2). The availability of *K. acuminata* in southern and central Africa and the fact that it is widely known and utilized, particularly in southern Africa, makes it an important plant resource. In general, local people rarely name plant species that they do not use. This long list of vernacular names for *K. acuminata* indicates that local people in southern Africa have an active interest in the species. A vernacular name often describes some

characteristic feature of the plant species or the plant parts, for example *bastard marula* (Table 1). This English name translates into *false marula*, because *K. acuminata* superficially resembles *marula* (*Sclerocarya birrea* (A. Rich.) Hochst. These descriptive vernacular names often reflect a common spectrum of information regardless of country, language or dialect. Examples include *modumela* (Setswana, Botswana), Northern Sotho, Tswana (South Africa); *mubvumala*, *mubvumela* (Venda, South Africa); *mubvumira* (Shona, Zimbabwe), *umvumila* and *umvumile* (Ndebele, Zimbabwe) (Table 1). A similar trend is displayed by *mtumbu* (Nyanja, Malawi), *mtumbui* (Changana, Mozambique) and *Mtumbwi* (Nyanja: Malawi, Zambia) (Table 1). *Mzumba* is a Nyanja (Malawi), Senga (Zambia) and Tumbuka (Zambia) name for *K. acuminata* (Table 1). More research needs to be carried out in Angola, DRC and Tanzania, where documentation of vernacular names and uses of *K. acuminata* are missing. Given the fact that *K. acuminata* is common and widely used species in southern and central Africa, the absence of data in Angola, DRC and Tanzania is probably due to an overall lack of ethnobotanical research in these countries. This is unfortunate, considering the fact that DRC and Tanzania are characterized by enormous biocultural diversity of plant resources.

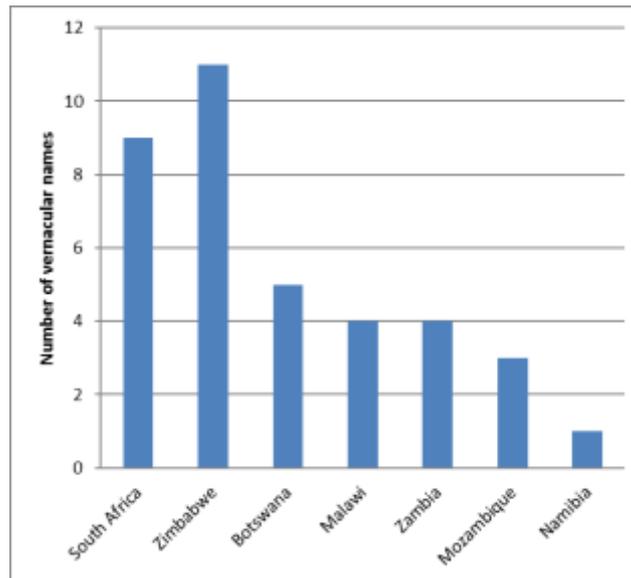


Figure 2: Vernacular names of *K. acuminata*

Table 1: Vernacular names of *K. acuminata*

Vernacular names	Language, country in brackets and reference(s)
Bastard marula	English (Zimbabwe) (Brink, 2008; Biegel and Mavi, 1972)
Ivomena	Setswana (Botswana) (Setshogo and Venter, 2003)
Modumela	Setswana (Botswana) (Motlhanka and Nthoiwa, 2013; Setshogo and Venter, 2003); Northern Sotho, Tswana (South Africa) (Schmidt et al., 2002)
Motsemodumo	Setswana (Botswana) (Setshogo and Venter, 2003)
Mountain kirkia	English (Namibia) (Brink, 2008)
Mozumina	Setswana (Botswana) (Setshogo and Venter, 2003)
Mtumbu	Nyanja (Malawi) (Theu, 1999)
Mtumbui	Changana (Mozambique) (Palgrave et al., 2007)
Mtumbwi	Nyanja (Malawi, Zambia) (Simute et al., 1998)
Mubvumala	Venda (South Africa) (Mbambezeli, 2004)
Mubvumela	Venda (South Africa) (Mbambezeli, 2004)
Mubvumira	Shona (Zimbabwe) (Chigora et al., 2007; Gelfand et al., 1985; Hyde et al., 2013; Maroyi, 2011, 2013; Biegel and Mavi, 1972)
Musanta	Tonga (Zambia, Zimbabwe) (Reynolds, 1968; Scudder, 1962; Biegel and Mavi, 1972)
Mutsakatidze	Shona (Zimbabwe) (Hyde et al., 2013; Biegel and Mavi, 1972)
Mutuhwa	Shona (Zimbabwe) (Hyde et al., 2013)
Mutuva	Shona (Zimbabwe) (Biegel and Mavi, 1972)
Mvumayila	Tsonga (South Africa) (Schmidt et al., 2002)
Mzumba	Nyanja (Malawi); Senga, Tumbuka (Zambia) (Simute et al., 1998)
N'tun'gundua	Sena (Mozambique) (Palgrave et al., 2007)
Ntungundwa	Nyanja (Malawi) (Theu, 1999)
Poko poko	Tsonga (Mozambique) (Palgrave et al., 2007)
Umsila-omhlophe	Zulu (South Africa) (Schmidt et al., 2002)
Umsilinga	Zulu (South Africa) (Schmidt et al., 2002)
Umvumila	Ndebele (Zimbabwe) (Biegel and Mavi, 1972)
Umvumile	Ndebele (Zimbabwe) (Gelfand et al., 1985; Hyde et al., 2013)

Vumaila	Hlengwe (Shangaan) (Zimbabwe) (Biegel and Mavi, 1972)
White kirkia	English (South Africa) (Schmidt et al., 2002; van Wyk and van Wyk, 1997)
White seringa	English (South Africa, Zimbabwe) (Hyde et al., 2013; van Wyk and van Wyk, 1997)
White syringa	English (Botswana) (Motlhanka and Nthoiwa, 2013; Setshogo and Venter, 2003); (Zambia) (Simute et al., 1998); (Zimbabwe) (Hyde et al., 2013)
Witsering	Afrikaans (South Africa) (Schmidt et al., 2002; van Wyk and van Wyk, 1997)

*Kirkia acuminata* is used to treat various human ailments as summarized in Table 2. The bark, fruit and roots are used to treat numerous health complaints, including abdominal pains, backache, cholera, constipation, cough, diarrhea, dysentery, snake bites, toothache and wounds. *Kirkia acuminata* is also used as an antiemetic, to fatten babies and to induce vomiting (Table 2). The preparation and administration of *K. acuminata* remedies do however vary. Infusion or decoction is taken against abdominal pains, backache, cholera, constipation, cough, diarrhea, dysentery and as an antiemetic and to induce vomiting (Table 2). The fruit sap or juice is applied on wounds and used as an antidote on snake bites. In Zimbabwe, pulverized roots are used as remedy for toothache (Brink, 2008). Many similarities can be recognized when the ethnomedicinal uses of *K. acuminata* are considered in totality over its distributional range in southern and central Africa (Table 2). For example, bark infusion of *K. acuminata* is taken as a remedy for abdominal pains in South Africa (van Wyk and Wink, 2004) and Zimbabwe (Gelfand et al., 1985). Root decoction is taken against cough in Botswana (Motlhanka and Nthoiwa, 2013), Mozambique (Gelfand, 1957), South Africa (van Wyk and Wink, 2004) and Zimbabwe (Gelfand et al., 1985). Fruit juice of *K. acuminata* is used as a snake bite antidote in Botswana (Motlhanka and Nthoiwa, 2013) and Zimbabwe (Gelfand et al., 1985; Maroyi, 2011, 2013). Such similarities may be ascribed to shared cultural heritage about *K. acuminata* through exchange of its ethnobotanical information. Research by Gilmore (1932) revealed that the relations of people to their indigenous plants and that of other regions near or further away aids in measuring their cultural status and their contacts with each other via how these plant resources are utilized.

**Table 2:** Ethnobotanical uses of *K. acuminata*

Use	Plant part(s) used and preparation	Country practised and reference(s)
<b>Medicinal uses</b>		
Abdominal pain	Bark infusion taken by mouth	South Africa (van Wyk and Wink, 2004); Zimbabwe (Gelfand et al., 1985)
Antiemetic	Bark infusion taken by mouth	Zimbabwe (Gelfand et al., 1985)
Backache	Bark infusion taken by mouth	Gelfand, 1956
Cholera	Bark decoction drunk or bark powder mixed with food	Zimbabwe (Chigora et al., 2007; Maroyi, 2013)
Constipation	Bark decoction drunk or bark powder mixed with food	Zimbabwe (Chigora et al., 2007; Maroyi, 2013)
Cough	Root decoction taken by mouth	Botswana (Motlhanka and Nthoiwa, 2013); Mozambique (Gelfand 1957); South Africa (Van Wyk and Wink, 2004); Zimbabwe (Gelfand et al., 1985)
Diarrhea	Bark decoction drunk or bark powder mixed with food	Zimbabwe (Chigora et al., 2007; Maroyi, 2013)
Dysentery	Bark decoction drunk or bark powder mixed with food	Zimbabwe (Chigora et al., 2007; Maroyi, 2013)
Snake bite antidote	Fruit juice applied on bitten part	Botswana (Motlhanka and Nthoiwa, 2013); Zimbabwe (Gelfand et al., 1985; Maroyi, 2011, 2013)
To fatten babies	Baby washed with root infusion	Zimbabwe (Gelfand et al., 1985)
Toothache	Tooth washed with decoction of pulverized roots	Zimbabwe (Brink, 2008; Standard, 1981)
Toothache	Burnt root powder rubbed on painful tooth	Zambia (Simute et al., 1998; Storrs, 1979)
Vomiting	Bark infusion is taken by mouth	South Africa (van Wyk and Wink, 2004)
Wounds	Fruit juice applied to wounds	Zimbabwe (Gelfand et al., 1985; Maroyi, 2011, 2013)
<b>Other uses</b>		
Charcoal	Wood made into charcoal	Malawi (Brink, 2008)
Hedge, ornamental, shade	Grown and managed as hedge, cattle enclosure, live fence, ornamental, stock shade and shade tree in home gardens	Malawi (Abbot and Homewood, 1999; Theu, 1999); South Africa (Schmidt et al., 2002); Zambia (Simute et al., 1998); Zimbabwe (Brink, 2008)
Religious significance	Often planted in grave-yards in memory of the deceased	Senga, Zambia (Simute et al., 1998)
Religious significance	Shona people believe that ancestral spirits live in <i>K. acuminata</i> branches	Shona, Zimbabwe (Mavi and Shava, 1997; Taringa, 2006)
Source of water	Swollen roots are used as a source of water during drought	South Africa (Schmidt et al., 2002); Zambia (Simute et al., 1998); Zimbabwe (Brink, 2008)
Stock feed	Leaves and seeds browsed by game and livestock	Botswana (Aganga and Mosase, 2001); Zambia (Simute et al., 1998); Zimbabwe (Sibanda and Ndlovu, 1992)
Timber, wood	For construction poles; wood for carving and furniture	Botswana (Motlhanka and Nthoiwa, 2013); Malawi (Abbot and Homewood, 1999); South Africa (Schmidt et al., 2002); Zambia (Simute et al., 1998); Zimbabwe (Brink, 2008)
Weaving	Root bark made into cloth	Zambia (Simute et al., 1998; Scudder, 1962); Zimbabwe (Brink, 2008; Standard, 1981)

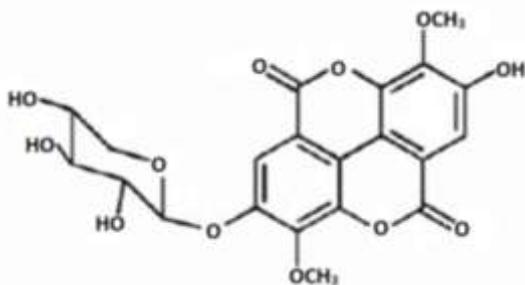
In addition to the medicinal uses, *K. acuminata* is grown around homestead boundaries as a barrier or hedge or live fence and also as an ornamental and shade tree. In South Africa, Zambia and Zimbabwe, *K. acuminata* is commonly used as a live fence, around fields, gardens, homesteads and schools as a form of protection against animals and around enclosures (kraals) for livestock. The poles of *K. acuminata* take root and grow easily (Palgrave, 2000), this observation explains the high proportion of study households (23%) with the species growing around their homesteads as live fence in Malawi (Abbot and Homewood 1999).

*Kirkia acuminata* provides timber for poles, planks and wood used to make household utensils (bowls, spoons), carts, musical instruments, tourist items, veneer and plywood (Scudder, 1962; Heywood et al., 2007; Brink, 2008). In Malawi, *K. acuminata* is used to make ornaments, utensils, chessboards and furniture, which include the famous chief chairs mainly because of the hardness and finishing quality, accessibility and customer preference of the wood (Theu, 1999). *Kirkia acuminata* is a favoured species in Zimbabwe for carving giraffes, elephants and other animals (Cunningham et al., 2005). In South Africa, the wood is considered suitable for cabinet work, flooring, light construction, vehicle bodies, interior trim, agricultural implements, boxes and crates, core stock, matches, toys and novelties, turnery, hardboard and particle board and as pulpwood (Scudder, 1962). The wood is not durable or insect proof but saws easily and blunts tools, due to the presence of silica crystals and therefore, frequent sharpening of cutting edges is necessary (Schmidt et al., 2002). It polishes readily, glues satisfactorily and slices and peels well (Schmidt et al., 2002). In Malawi, the wood is made into charcoal (Brink, 2008). The fiber obtained from the bark, young shoots and roots of *K. acuminata* is strong and in Zambia and Zimbabwe, it is used for weaving and making cloth (Scudder, 1962; Stannard, 1981; Brink, 2008). The seeds and leaves of *K. acuminata* are browsed by game and livestock in Botswana (Aganga and Mosase, 2001) and Zimbabwe (Sibanda and Ndlovu, 1992). The swollen roots are used as a source of water in times of drought (Stannard, 1981; Schmidt et al., 2002).

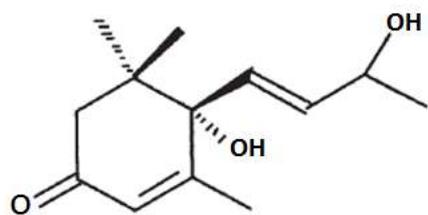
*Kirkia acuminata* is considered sacred in South Africa, Zambia and Zimbabwe. The Shona people in Zimbabwe consider it morally wrong to cut *K. acuminata* trees in most rural areas (Stannard, 1981; Mavi and Shava, 1997; Taringa, 2006). The Shona people also believe that *K. acuminata* trees are imbued with spirits, particularly ancestral spirits (Mavi and Shava, 1997; Taringa 2006). As a result, this tree is a vital part of religious life because it belongs to the ancestors. In some rural communities, a *K. acuminata* truncheon is usually propagated by every newly-married man to appease his ancestral spirits so that they would protect him from witchcraft and evil (Mavi and Shava, 1997). In the "bringing back home the ancestor ritual", Shona people use the branches of *K. acuminata*. They symbolically drag the branches of *K. acuminata* from the deceased's grave to the homestead (Taringa, 2006). A similar observation was made by Simute et al. (1998) in some rural communities in Zambia, where *K. acuminata* is often planted in grave-yards in memory of the deceased. *Kirkia acuminata* is also used by the Shona people in Zimbabwe to ritually mark the establishment of a new homestead (Taringa, 2006). All these traditional applications of *K. acuminata* resulted in its protection in most rural communities and can only be cut with the permission of the chief (Taringa, 2006).

### Active medicinal components

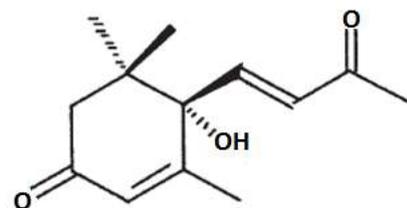
Research by Etkin (1986) revealed that the use of plants as herbal medicines can be explained by the presence of physiologically active phytochemical compounds as well as the ascribed meaning of the species to a cultural group. Phytochemical analysis of *K. acuminata* roots which are usually used in traditional medicine resulted in the isolation of 3,3'-di-O-methylellagic acid 4-O- $\beta$ -D-xylopyranoside (**1**) (Figure 3) (Diakanamwa et al., 1991). From the stem bark hexane extract of *K. acuminata*, Mulholland et al. (2003) isolated two nor-carotenoids, (+)-(6*S*,7*E*,9*R*)-blumenol A (**2**), (+)-(6*S*,7*E*)-dehydrovomifoliol (**3**) and (+)-de-*O*-methylsasiadiplodin (**4**). Three lignans, (+)-dihydrodehydrodiconiferyl alcohol (**5**), (+)-lyoniresinol (**6**) and (-)-*ent*-isolariciresinol (**7**) were isolated from the dichloromethane extract; while methanol extract yielded neolignan, (-)-4',9,9'-trihydroxy-3'-methoxy-3.0.8',4.0.7'-neolignan (**8**) (Mulholland et al., 2003). Preliminary chemical and pharmacological studies on *K. acuminata* conducted so far have shown promising results with the possibility that these phytochemical compounds may be responsible for the medicinal uses and biological activities demonstrated by *K. acuminata*.



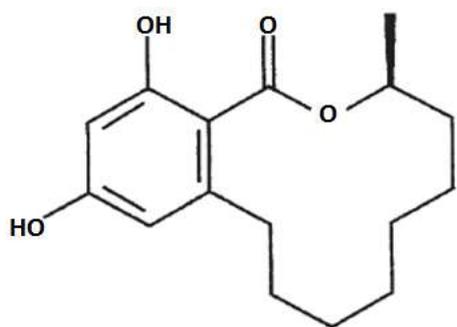
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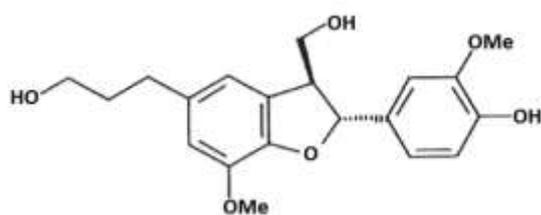
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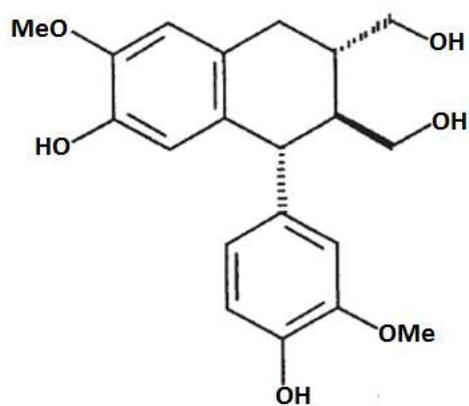
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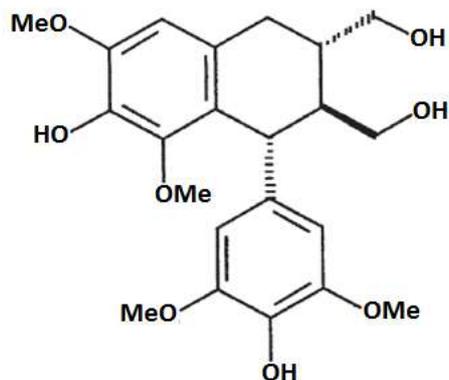
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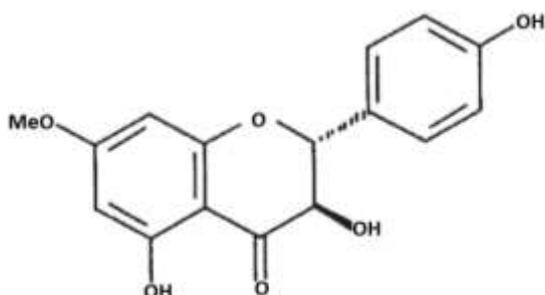
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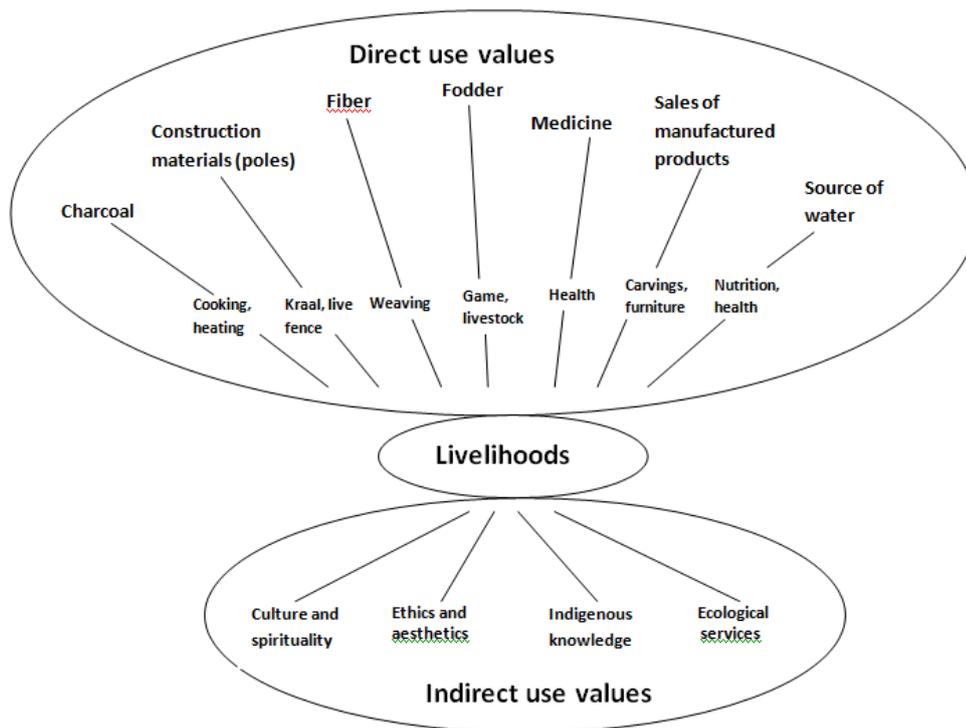
**Figure 3:** Lignans, nor-carotonoids and other compounds isolated from *K. acuminata*

### Antimicrobial activity

*Kirkia acuminata* plant parts have been used for centuries to treat microbial infections in humans and scientific studies carried out so far have validated its traditional antimicrobial uses. Up to now, only a few pharmacological experiments directly dealing with the documented traditional uses of *K. acuminata* (Table 2) have been performed. In a preliminary antibacterial screening, acetone, dichloromethane, hexane and methanol extracts of *K. acuminata* inhibited the growth of *Enterococcus faecalis*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* (Masoko, 2013). In this study, *Enterococcus faecalis* was the most sensitive microorganism with average MIC value of 0.1 mg/ml followed by *E. coli* (0.31 mg/ml), *S. aureus* and *P. aeruginosa* were resistant with MIC values of 0.97 mg/ml and 1.25 mg/ml respectively (Masoko, 2013). Acetone, dichloromethane, hexane and methanol extracts demonstrated antimycobacterial activity with MIC values ranging between 0.31 to 0.63 mg/ml against *Mycobacterium smegmatis* (Mmushi et al., 2010). But acetone extracts of *K. acuminata* demonstrated antimycobacterial activity with 1 g of leaf extract diluted to 211.1 ml with water able to inhibit the growth of *Mycobacterium smegmatis* (Mmushi et al., 2010).

### Future prospects and conclusions

*Kirkia acuminata* is an important source of charcoal, construction materials, fiber, fodder, furniture, medicines and economic livelihoods as some families harvest its products for sale (Table 2, Figure 4). Interest in non-timber forest products (NTFPs) is increasing rapidly and the use of these products constitute a source of income to many rural people in southern Africa. These practices offer an opportunity for the poorest people to earn a living, as producers and traders without requiring large capital investments. These activities are undertaken to provide supplementary cash required to meet school fees, food, cash for other household requirements, etc. Apart from these direct use values, *K. acuminata* has indirect use values centred around its religious significance, societal value and ecological importance (Figure 4). However, if the use of *K. acuminata* for woodcarving, charcoal production and furniture is to be sustained, there is need for sustained management of its population. The long term benefits of this management style include activities such as better management of the species and the environment, direct access to NTFPs income by beneficiaries, health improvement, technology transfer and entrepreneurship.



**Figure 4:** Conceptual model of *Kirkia acuminata* utilization, modified from Shackleton and Gumbo (2010)

According to Farnsworth et al. (1985), traditional and local uses of medicinal plants are the starting point for the development of new pharmaceutical drugs from the same plant species. Therefore, medicinal plants like *K. acuminata* with a long history of traditional applications are likely to have phytochemical compounds and biological activities to support their applications in traditional medicine. *Kirkia acuminata* is a well-known medicinal plant that has been in regular demand among local communities and practitioners of traditional medicines in southern and central Africa. The traditional uses of *K. acuminata* are referred to in many folkloric and ethnobotanical studies done in southern and central Africa, where the species is still used as a primary source of traditional medicines. Reports of the uses of *K. acuminata* for the same ailment in southern and central Africa indicate that the species is a valuable source of ethnomedicine. Preliminary pharmacological studies carried out so far on crude extracts of *K. acuminata* provided support for some of the documented traditional uses, and have revealed this species to be a valuable source of medicinally important molecules.

While there are gaps in the studies conducted so far on *K. acuminata* which need to be bridged in order to exploit its full potential, it is still clear that this is a multipurpose species with extraordinary potential for the future. Today, traditional medicine continue to provide solutions to the health needs of poor people who cannot afford expensive pharmaceutical drugs prescribed in clinics, hospitals and private health facilities. *Kirkia acuminata* represents a plant species that can significantly contribute to human health and livelihood needs. *Kirkia acuminata* has socio-economic contributions to the people's lives in both rural and urban communities such that effort should be made to conserve and preserve it from the dangers of over-exploitation and subsequent extinction. It is hoped that further research will be undertaken to explore some of the aspects discussed in this study. Future research should be aimed at providing a more comprehensive and detailed information on this species which is important to the livelihoods of local communities.

## Acknowledgements

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**Conflict of interest:** The author declares that there is no conflict of interest regarding the publication of this paper.

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