SJIF Impact Factor (2023): 8.574| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 8 | Issue: 11 | November 2023 - Peer Reviewed Journal

A MINI-REVIEW ON *Musanga cecropioides* R. Br. ex Tedlie

Goddidit Esiro Enoyoze[1*], MacDonald Idu[2]
[1]*Department of Biological Science, Plant Biology and Biotechnology Unit, Edo State University, Uzairue, Edo State, Nigeria.*
[2]*Department of Plant Biology and Biotechnology, University of Benin, Benin City, PMB 1154, Edo State, Nigeria.*

Correspondence

Article DOI: https://doi.org/10.36713/epra14944
DOI No: 10.36713/epra14944

ABSTRACT
Musanga cecropioides R. Br. ex Tedlie (family Urticaceae) is a tree distributed across some parts of Africa including Nigeria. Ethnomedicinal surveys of Musanga cecropioides implicate that its various parts are used in the management of several health conditions asides the numerous uses reported ethnobotanically. This review was thus aimed at assessing the extent of work done on Musanga cecropioides parts scientifically in order to identify the gaps that exist in literature. The review revealed the widespread application of Musanga cecropioides parts in the management of cough, diabetes and several other illnesses with little or no scientific work carried out to validate such claims.

KEYWORDS: *Musanga cecropioides, ethnobotany, ethnomedicine, characteristics and properties.*

INTRODUCTION

Traditionally, the use of plants to treat and manage illnesses, diseases, wounds and general wellness dates as far as man begun to dominate the earth as over 90% of traditional medicine recipes and remedies have been known to contain medicinal plants (Sofowora et al., 2013). In Africa, over 80% of the population depends on the use of medicinal plants in meeting their health care needs (Mahomoodally, 2013). This practice has evolved over the years with knowledge acquired from the use of plants, passed on from generation to generation, with some of this knowledge being lost (Oyeyemi et al., 2019). Man's reliance on plants for health care needs has transcended from being an age long tradition in Africa, into being a major influencer of modern medicine globally. The emergence of modern drug development and discovery depends greatly on indigenous knowledge of the use of medicinal plants (Yuan et al., 2016; Oyeyemi et al., 2019). The retrieval of these indigenous knowledge has been made possible by collective efforts of ethnobotanists, anthropologists, botanists, indigenes of communities, traditional medicine practitioners, academic researchers and other individuals or professionals. Ethnobotanical and ethnomedicinal surveys reports reveal that hundreds of thousands of plant species are used in traditional medicine systems, however, only limited number of plant species have been explored for their phyto-constituents and pharmacological properties in order to elucidate the safety and efficacy of such remedies (Yuan et al. 2016;). This review is aimed at bringing together information on the ethnomedicinal uses of *Musanga cecropioides* available in literature and also scientific works carried out on the different parts of the plant with the purpose of identifying scientific gaps that might exist in the investigation of the different parts of the plant. The data generated in this review was gathered from textbooks, plant database websites, and journal articles.

Taxonomic Classification

Musanga cecropioides R.Br. ex Tedlie is commonly known as Umbrella tree or African corkwood in English, Parasolier or bois bouchon in French, Oghohen in Bini. *Musanga cecropioides* belongs to the family Urticaceae (Global Biodiversity Information Facility GBIF, 2017). *Musanga cecropioides* may be taxonomically classified as follows:
Kingdom: Plantae
Phylum: Tracheophyta
Class: Magnoliopsida
Order: Rosales

SJIF Impact Factor (2023): 8.574| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 8 | Issue: 11 | November 2023 - Peer Reviewed Journal

Family: Urticaceae
Genus: *Musanga*
Species: *cecropioides*

Musanga cecropioides is reported to have originated from the Democratic Republic of Congo and is also native to Angola, Cameroon, Cote d' Voire, Ethiopia, Ghana, Liberia, Sierra Leon, Sudan, Togo, Uganda and Nigeria (Burkill, 1985). It has been introduced in Madagascar (Todou and Meikeu Kamdem, 2011). *Musanga cecropioides* are usually fast growing pioneer species of secondary forests (Letouzey, 1985; Sonké, 1998; Betti, 2004). Figure 1 shows the distribution of *Musanga cecropioides* in Africa.

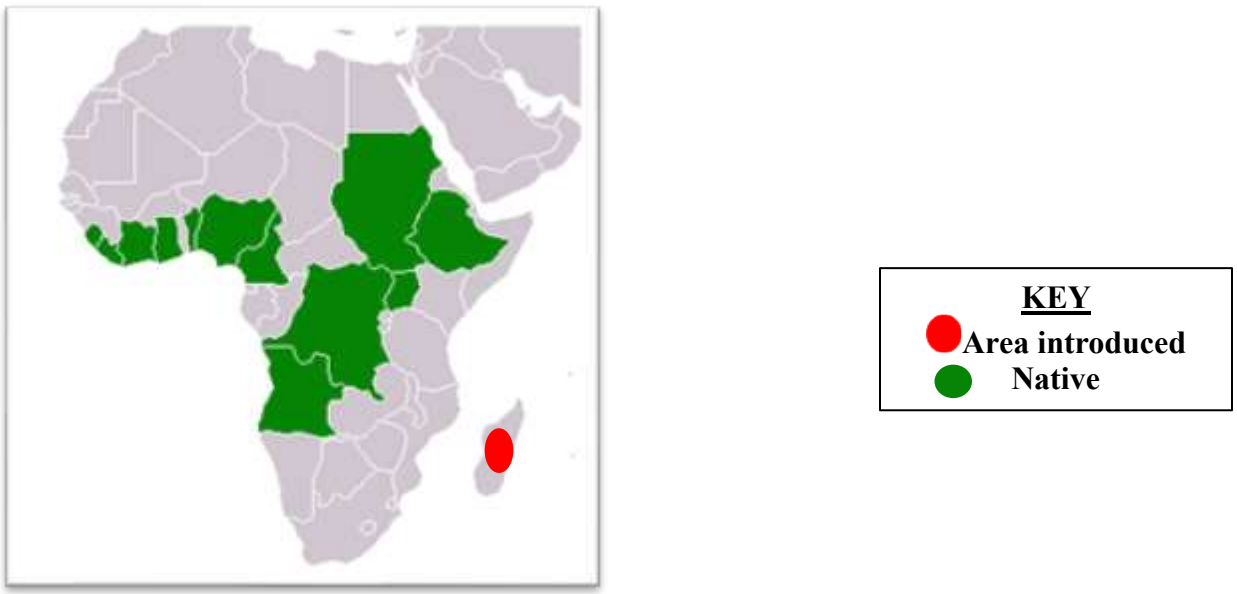

Figure 1: Map of Africa showing the distribution of *Musanga cecropioides* (Plantspedia, 2017)

Botanical Description of *Musanga cecropioides*

Musanga cecropioides is a deciduous, dioecious tree which grows up to the height of 30 m. The trunk is often branchless for up to 15 m of its height with a diameter of about 120 cm, usually with well-developed stilt roots. The leaf is digitately divided into 12-18 spreading segments which are entire, narrow and shortly acuminate and cuneate at the apex and base respectively with petiole of about 110 cm in length. The stipules are hairy and large (7–30 cm long), fused and completely embracing the stem. Flowers unisexual, sessile or with short pedicel. Fruit is yellowish green and succulent (Kadiri and Ajayi, 2009).

Uses of *Musanga cecropioides*

Musanga cecropioides is a pioneer specie and with good forest regeneration properties. It is used as a shade or ornamental tree. The wood and bark are used in construction of some house hold furniture and furniture materials like particle boards and plywood, utensils, sporting goods, rope, paper, crates, musical instruments, toys, fishing equipment and industrial insulation while the boles are made into palm-wine bowls and thin split boards. The wood ash is used in soap making and as vegetable salt. The bark can also be in palm wine preparation as an intoxicant and the stem sap has been used to prepare ink. Edible caterpillars are also collected from the leaves. The flowers also play an important role in pollination while the fruit may be edible and serves as food for some animals (Astaras et al., 2008; Orwa et al., 2009; Todou and Meikeu Kamdem, 2011; Essien et al., 2012).

Ethno Medicinal Uses

Musanga cecropioides is an important medicinal plant as most of its parts are used in traditional medicine in Nigeria, Cameroun and other countries in Africa. The stipules are used to stimulate menstrual flow, induce childbirth, to treat stomach related issues, hiccough and wounds. The leaves are used to manage hypertension, gonorrhoea, cough and in the preparation of vaginal wash to manage painful menstruation (Bouquet, 1969; Burkill, 1985; Ayinde et al., 2003; Orwa et al., 2009; Todou and Meikeu Kamdem, 2011).

A decoction of inflorescence is used to ease labour (Todou and Meikeu Kamdem, 2011). The stem bark decoctions are also useful in the treatment of cough, hypertension, constipation, labour pain, schizophrenia, diabetes, anthelmintic, tuberculosis (in polyherbal formulations), skin diseases and toothache. The bark is used to correct and treat stiffness, lumbago, fever, jaundice, chest pains,

SJIF Impact Factor (2023): 8.574| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 8 | Issue: 11 | November 2023 - Peer Reviewed Journal

diarrhoea, gastrointestinal disorders and liver diseases (Ayitey-Smith, 1989; Orwa et al., 2009; Adeneye, 2009; Todou and Meikeu Kamdem, 2011; Mabeku et al., 2011).

Stem sap is used to stimulate breast milk production and to ease menstrual cramps (Orwa et al., 2009; Todou and Meikeu Kamdem, 2011). The root bark and kolanut are eaten together to cure cough. Root decoction or infusion is used as anthelmintic (Gill, 1992; Adeneye, 2009; Orwa et al., 2009). Root sap is used to manage and cure diarrhoea, gonorrhoea, vaginal candidiasis, pulmonary complaints, treatment of upper respiratory tract infection (cough), trypanosomiasis, treatment of dirty wounds and skin diseases, otitis, rheumatism, epilepsy, oedema, and in childbirth. It is also used to cure conjunctivitis, headache and as a laxative (Idu et al., 2009; Todou and Meikeu Kamdem, 2011; Isaac, 2012; Uwah et al., 2013). Dike et al., 2012 reported that *Musanga cecropioides* is used to treat malaria, leprosy, as anticonvulsant and anthelmintic, but the various parts used were not specified.

Scientific Studies - Pharmacological reports

Some scientific studies have been carried out on different parts of *Musanga cecropioides*. Ayinde et al. (2006) reported the positive oxytocic effect of *Musanga cecropioides* stem bark aqueous extract, while the uterotonic effect of the leaves was observed by Kamanyi et al. (1992).

The positive hypotensive activity of the crude stem sap, aqueous leaf extract and aqueous stem bark extract have been reported (Kamanyi et al., 1996; Dongmo et al., 1996; Adeneye et al., 2006b; Senjobi et al., 2012; Ajagbonna et al., 2015). Mabeku et al. (2011) reported the antimicrobial activities of different extracts of the stem bark while Uwah et al. (2013) reported the antimicrobial activity of the crude root sap.

Ethanol leaf extract have shown anti-inflammatory activity (Sowemimo et al., 2015) while analgesic activity have been reported with both aqueous and ethanol leaf extracts (Aziba and Gbile, 2000; Senjobi et al., 2012; Sowemimo et al., 2015). Anti-hyperglycemic activity of water, ethanol, water-ethanol extracts of *Musanga cecropioides* stem bark was also recorded (Adeneye et al., 2007; Nyunai et al. 2016). *Musanga cecropioides* crude stem sap was also reported to increase urinary output and sodium excretion in a diuretic study using normotensive Sprague Dawely rats (Ajagbonna et al., 2015). The aqueous extract of the leaves revealed vasodilatory activities (Kamanyi et al.,1991; Aziba, 2005), while the aqueous extract of the stem bark revealed hepatoprotective activities (Adeneye, 2009).

To elucidate the safety of the plant, toxicity studies were carried out on the crude stem sap (Ajagbonna et al., 2015) and aqueous extract of the stem bark (Adeneye et al., 2006a), with no mortality reported in both studies. While Kadiri and Ajayi (2009) carried out anatomical studies on the leaf and petiole of *Musanga cecropioides*.

Microbial and physicochemical studies of *Musanga cecropioides* crude root sap was done by Isaac (2012), in an attempt to determine the portability of the sap used locally in Akwa Ibom state. The study revealed the presence of minerals and heavy metals in acceptable limits and also three pathogenic microorganisms which could be gotten rid of by boiling.

The antioxidant activity of *Musanga cecropioides* leaves and stem bark was investigated using the DPPH radical scavenging assay, the result revealed antioxidant activity comparable to vitamin C which was used as the standard drug (Tchouya and Nantia, 2015; Nyunai et al. 2016).

In reporting the scientific studies carried out on the various parts of *Musanga cecropioides* to elucidate the pharmacological activities of the plant, there is an observed gap as several of the ethnomedicinal uses reported have not yet been validated scientifically.

Phytochemistry

Phytochemicals are biologically active compounds available in the various parts of plants and show therapeutic effects against a number of diseases including asthma, arthritis, cancer and diabetes (Saxena *et al*., 2013; Banu and Cathrine, 2015). The beneficial physiological and therapeutic effects of plant materials typically results from the combinations of the phytochemicals present in the plant. Several phytochemical compounds have been identified in different plants, some of which are broadly grouped as alkaloids, tannins, saponins, flavonoids, phenols and terpenoids. In elucidating the efficacy of medicinal plants, it is expedient to identify the phytochemicals present in the plant materials. The phytochemicals identified in *Musanga cecropioides* parts are given below.

1. **Stem bark:** alkaloids, phenolic compounds, catechic tanins, flavonoids (or bioflavonoids), triterpenes, sterols, coumarins, tannins (gallic), free and bound anthraquinone, saponin and cardiac glycosides have been identified in methanol, water/ethanol, ethanol and water extracts (Adeneye et al., 2006a; Kadiri and Ajayi, 2009; Mabeku et al., 2011; Tchouya and Nantia, 2015; Nyunai et al., 2016).

SJIF Impact Factor (2023): 8.574| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 8 | Issue: 11 | November 2023 - Peer Reviewed Journal

3,4-dihydroxybenzoic (Protocatechuic acid) and 3,4-dihydroxybenzaldehyde acid (Protocatechualdehyde) have also been isolated from phenols present in the stem bark of *Musanga cecropioides* (Ayinde et al., 2007). While methyl kalaate (Kalaic acid), methyl oleanolate, methyl ursolate and 1, 2, methyl pomolate have been isolated from saponin present in the stem bark of *Musanga cecropioides* (Lontsi et al., 1998a).

2. **Adventitious root sap:** total oxalate, soluble oxalate, tannin, saponin have been identified in crude adventitious root sap of *Musanga cecropioides* (Uwah et al., 2013).

3. **Stem sap**: Alkaloids, tannins, cardiac glycosides, flavonoids, anthraquinones, phlobatannins, anthocyanosides, saponins, cyanogenic glycosides and reducing sugar have been identified in the crude stem sap of *Musanga cecropioides* (Ajagbonna et al., 2015).

4. **Leaves**: coumarins, flavonoids, phenols, triterpenes, tannins (gallic), alkaloids, free and bound anthraquinone, saponin and cardiac glycosides have been identified in water/ethanol and ethanol extracts of *Musanga cecropioides* leaves (Kadiri and Ajayi, 2009; Tchouya and Nantia, 2015).

5. **Root**: 2α.11α-diacetoxy-3β, 19α-dihydroxyurs-12-en-28-oic acid, methyl tormentate, methyl 2-acetyltormentate 28-glucosyl tormentate, methyl pomolate, methyl musangicate, euscaphate, Musancropic acids A and B and cecropiacic acid, have been isolated from triterpene found present in the root of *Musanga cecropioides* (Lontsi et al., 1991a; Lontsi et al., 1991b; Lontsi et al., 1992; Lontsi et al., 1998b).

Mineral Elements Present

Minerals elements are inorganic substances required by the body in small amounts for a variety of functions. They are components of enzyme systems and are essential for nervous system function. The body requires different amounts of each mineral and imbalance or deficiency of these elements have been linked to metabolic abnormalities and diseases. Plants are known sources of the mineral elements, it is also important to determine the concentration of heavy metals

The studies on the elemental composition of *Musanga cecropioides* root sap indicated the present of important mineral elements (Calcium, Phosphorus, Magnesium, Potassium, Sodium, Zinc, Iron, Copper and Manganese) in appreciable quantities and also the low concentration of toxic heavy metals such as Cadmium, Lead, Nickel, Mercury, Cromium, Vanadium (Isaac, 2012; Uwah et al., 2013). However, the other parts of *Musanga cecropioides* need to be evaluated for mineral element composition.

Further Research Areas Recommended by Previous Authors

Several recommendations have been made by few researchers with regards to exploring the pharmacological potentials of *Musanga cecropioides*. Pharmacological activities recommended for further research include antioxidant activities, hypoglycemic activity, hepatoprotective principle, adrenergic and analgesic effects (Aziba and Gbile, 2000; Adeneye, 2009; Senjobi et al., 2012; Nyunai et al., 2016). To better ascertain the phytochemicals responsible for each pharmacological activity, the need for isolation, identification and purification of phytochemical compounds have suggested (Adeneye, 2009; Senjobi et al., 2012; Nyunai et al., 2016). Also. Adeneye et al. (2006b) further suggested that studies are carried out on the phytochemical and elemental constituents of the stem bark as well as the toxicity.

The contributions of identified authors have been summarized in this review article, however, there seems to be a dire need for more studies to be carried out on this plant. For example, none of the reported ethnomedicinal uses of the flowers, stipules, fruit and root have been investigated in other to determine the efficacy. Bioactive components of some parts reportedly used ethnomedicinally have also not been investigated. It is recommended that future studies should target exploring the wound healing, antimicrobial, antiviral, antidiabetic, antitussive, anti-asthmatic, antidiarrheal, anthelmintic, antimalarial and anticonvulsant properties of *Musanga cecropioides* parts. The toxicity profile of the plant should also be well documented. Detailed phytochemical studies and nutrient profiling should also be carried out using modern techniques such as Gas chromatography-mass spectroscopy and High Performance Liquid Chromatography.

CONCLUSION

Musanga cecropioides is a plant species of immense phytomedicinal and economic potential, however, most of the ethnomedicinal claims outlined in various publications have not been scientifically validated. This review focused on exploring what has been done on this valuable plant and exposing the gaps in scientific evaluation of the plant that needs to be filled. Subsequent research works would be targeted at validating the ethnomedicinal claims associated with this plant.

SJIF Impact Factor (2023): 8.574| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 8 | Issue: 11 | November 2023 - Peer Reviewed Journal

REFERENCES

1. *Adeneye AA (2009). Protective activity of the stem bark aqueous extract of Musanga cecropioides in carbon tetrachloride- and acetaminophen induced acute hepatotoxicity in rats. African Journal of Traditional, Complementary and Alternative Medicines, 6(2):131-138.*
2. *Adeneye AA, Ajagbonna OP, Adeleke TI, Bello SO (2006a). Preliminary toxicity and phytochemical studies of the stem bark aqueous extract of Musanga cecropioides in rats. Journal of Ethnopharmacology, 105(3):374–379*
3. *Adeneye AA, Ajagbonna OP, Ayodele OW (2007). The hypoglycemic and antidiabetic activities of the stem bark aqueous and alcohol extracts of Musanga cecropioides in normal and alloxan-induced diabetic rats. Fitoterapia, 78:502-550.*
4. *Adeneye AA, Ajagbonna OP, Mojiminiyi FBO, Odigie IP, Etarrh RR, Ojobor PD, Adeneye AK (2006b). The hypotensive mechanisms for the aqueous extract of Musanga cecropioides stem bark in rats. Journal of Ethnopharmacology, 106(2):203–207.*
5. *Ajagbonna OP, Adeniran LA, Idowu OO (2015). Diuretic effects of aqueous crude extract of Musanga cecropioides in normotensive sprague dawely rat. Journal of Biology, Agriculture and Healthcare, 5(13):47-53.*
6. *Astaras C, Muhlenberg M, Waltert M (2008). Note on Drill (Mandrillus Leucophaeus) Ecology and Conservation Status in Korup National Park, Southwest Cameroon. American Journal of Primatology, 70:306-310.*
7. *Ayinde BA, Omogbai EKI, Onwukaeme DN (2003). Pharmacognostic Characteristics and Hypotensive Effect of the Stem Bark of Musanga cecropioides R. Br. (Moraceae). West African Journal of Pharmacology and Drug Research, 19(1&2):37-41.*
8. *Ayinde BA, Onwukaeme DN, Nworgu ZAM (2006). Oxytocic effects of the water extract of Musanga cecropioides R. Brown (Moraceae) stem bark. African Journal of Biotechnology, 5(14):1350-1354.*
9. *Ayinde BA, Onwukaemea DN, Omogbai EK (2007). Isolation and characterization of two phenolic compounds from the stem bark of Musanga cecropioides R. Brown (Moraceae). Acta Poloniae Pharmaceutica –Drug Research, 64(2):183-185*
10. *Ayitey-Smith E (1989). Prospects and scope of plant medicine in health care. Ghana Universities Press P. O. Box 4219 Accra. Page 5-6*
11. *Aziba PI (2005). Inhibitory effects of Musanga cecropioides on noradrenaline and potassium-induced contractions in rat thoracic aorta. African Journal of Biomedical Research, 8:59–61.*
12. *Aziba PI, Gbile ZO (2000). Pharmacological screening of the aqueous extract of Musanga cecropioides. Fitoterapia 71: 143-146.*
13. *Banu KS, Cathrine L (2015). General techniques involved in phytochemical analysis. International Journal of Advanced Research in Chemical Science, 2(4):25–32.*
14. *Betti JL (2004). An ethnobotanical study of medicinal plants among the Baka pygmies in the Dja biosphere reserve, Cameroon. African Study Monographs, 25(1):1-27*
15. *Bouquet A (1969) Feticheurs et Medicine traditionelles du Congo. Orstrom, Brazaviile. 150 pp.*
16. *Burkill HM (1985). The useful plants of West Tropical Africa. 2nd Edition. Volume 1, Families A-D. Royal Botanic Gardens, Kew, Richmond, United Kingdom. 960 pp.*
17. *Dike IP, Obembe OO, Adebiyi FE (2012). Ethnob-otanical survey for potential anti-malarial plants in south-western Nigeria. Journal of Ethnopharmacology, 144(3):618-626.*
18. *Dongmo AB, Kamanyi A, Bopelet M (1996). Saponins from the leaves of Musanga cecropioides (Cecropiaceae) constitute a possible source of potent hypotensive principles. Phytotherapy Research, 10:23–27.*
19. *Essien AI, Udoinim MM, Akpan GD, Effiong JO, Ofor CO (2012) Aquatic Macrophytes and Limnological Implications on Fisheries Resources: A Case Study of Obio Akpa Stream in Akwa Ibom State, Nigeria. International Journal of Water and Soil Resources Research, 3(1):15-21.*
20. *GBIF (2017). Musanga cecropioides Tedlie in Global Biodiversity Information Facility (GBIF) Backbone Taxonomy. Checklist Dataset. [Online] [Available at: https://doi.org/10.15468/39omei] [Accessed: 10/11/2017].*
21. *Gill LS (1992). Ethnomedicinal Uses of Plants in Nigeria. Uniben Press, Benin City, Nigeria. 276 pp.*
22. *Idu M, Obaruyi GO, Erhabor JO (2009). Ethnobotanical uses of plants among the Binis in the treatment of ophthalmic and ENT (Ear, Nose and Throat) ailments. Ethnobotanical Leaflets, 13:480-496.*
23. *Isaac UE (2012). Physicochemical and microbial studies of water obtained from Musanga cecropioides (African cork wood or umbrella or "Uno" tree). World Applied Sciences Journal, 19(2):287-294.*
24. *Kadiri AB, Ajayi GO (2009). Phyto-anatomical characteristics of the West African {umbrella tree} Musanga cecropioides M. smithii R. Br. (Moraceae). Indian Journal of Science and Technology, 2(7):1-5.*
25. *Kamanyi A, Bopelet M, Aloamaka CP, Obiefuna CPM, Ebeigbe AB (1991). Endothelium-dependent rat aortic relaxation to the aqueous leaf extract of Musanga cecropioides. Journal of Ethnopharmacology, 34:283-286.*
26. *Kamanyi A, Bopelet M, Lontsi D, Noamesi BK (1996). Hypotensive effects of some extracts of the leaves of Musanga cecropioides (Cecropiaceae). Studies in the cat and the rat. Phytomedicine, 2(3):209-212.*
27. *Kamanyi A, Bopelet M, Tatchum TR (1992). Contractile effect of some extracts from the leaves of Musanga cecropioides (Cecropiaceae) on uterine smooth muscle of the rat. Phytotherapy Research, 6:165–167.*
28. *Letouzey R (1985). Notice De La Carte Phytogéographique Du Cameroun Au 1/50000. Institut De La Carte Internationale De La Végétation. Toulouse-France Et IRA De Yaoundé-Cameroun.*
29. *Lontsi D, Sondengam BL, Bodo B, Martin MI (1998a). Kalaic Acid, A New Ursane-Type Saponin from Musanga cecropioides. Letters Planta Medica, 64:189-191.*

SJIF Impact Factor (2023): 8.574| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 8 | Issue: 11 | November 2023 - Peer Reviewed Journal

30. *Lontsi D, Sondengam BL, Martin MI (1998b). Cecropioic acid, a pentacyclic triterpene from Musanga cecropioides. Phytochemistry, 48(1):171-174.*
31. *Lontsi D, Sondengam BL, Martin MT, Bodo B (1991a). Musancropic acids A and B: a-ring contracted triterpenes from Musanga cecropioides. Phytochemistry, 30(7):2361-2364.*
32. *Lontsi D, Sondengam BL, Martin MT, Bodo B (1991b). Seco-ring-a-triterpenoids from the rootwood of Musanga cecropioides. Phytochemistry, 30(5):1621-1624.*
33. *Lontsi D, Sondengam BL, Martin MT, Bodo B (1992). Musangicic acid, a triterpenoid constituent of Musanga cecropioides. Phytochemistry, 31(12):4285-4288.*
34. *Mabeku LBK, Kuiate JR, Oyono EJL (2011). Screening of some plants used in the Cameroonian folk medicine for the treatment of infectious diseases. International Journal of Biology, 3(4):13-21.*
35. *Mahomoodally MF (2013). Traditional Medicines in Africa: An Appraisal of Ten Potent African Medicinal Plants. Evidence-Based Complementary and Alternative Medicine, Vol. 2013, Article ID 617459, 14 pages. DOI: https://doi.org/10.1155/2013/617459*
36. *Nyunaï N, Yaya AJG, Tabi TGN, Tchamgoue AD, Ngondé MC, Minka CSM (2016). Anti-hyperglycemic and antioxidant potential of water-ethanol extract of Musanga cecropioides stem bark. International Journal of Pharmaceutical Sciences and Drug Research; 8(1):43-49.*
37. *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)*
38. *Oyeyemi IT, Akinseye KM, Adebayo SS, Oyetunji MT, Oyeyemi OT (2019).Ethnobotanical survey of the plants used for the management of malaria in Ondo State, Nigeria. South African Journal of Botany, 124:391-401.*
39. *Plantspedia. (2017). Musanga cecropioides countries. [Online] [Available at :http://plantspedia.wikia.com/wiki/File:Musanga_cecropioides_countries.png] [Accessed: 02/03/2018].*
40. *Saxena M, Saxena J, Nema R, Singh D, Gupta A (2013). Phytochemistry of Medicinal Plants. Journal of Pharmacognosy and Phytochemistry, 1(6):168–182.*
41. *Senjobi CT, Ettu AO, Gbile ZO (2012). Pharmacological screening of Nigerian species of Musanga cecropioides R. Br. Ex. Teddlie (Moraceae) in rodents as anti-hypertensive. African Journal of Plant Science, 6(8):232-238*
42. *Sofowora A, Ogunbodede E, Onayade A (2013). The Role and Place of Medicinal Plants in the Strategies for Disease Prevention. African Journal of Traditional, Complementary and Alternative Medicines, 10(5):210–229.*
43. *Sonké B (1998). Etudes Floristiques Et Structurales Des Forêts De La Réserve De Faune Du Dja (Cameroun). Thèse Doc. Univ. Libre De Bruxelles. 267 pp.*
44. *Sowemimo A, Okwuchuku E, Samuel FM, Ayoola O, Mutiat I (2015). Musanga cecropioides leaf extract exhibits anti-inflammatory and anti-nociceptive activities in animal models. Revista Brasileira de Farmacognosia, 25:506–512.*
45. *Tchouya RF, Nantia EA. (2015). Phytochemical analysis, antioxidant evaluation and total phenolic content of the leaves and stem bark of Musanga cecropioides R.Br. Ex Tedlie (Cecropiaceae), growing in Gabon.. Journal of Pharmacognosy and Phytochemistry, 3(5):192-195.*
46. *Todou G, Meikeu Kamdem MG (2011). Musanga cecropioides R.Br. ex Tedlie. In: Lemmens, R.H.M.J., Louppe, D. and Oteng-Amoako, A. A. (Editors). Prota 7(2): Timbers/Bois D'œuvre 2. [CD-Rom]. PROTA, Wageningen, Netherlands.*
47. *Uwah AF, Otitoju O, Ndem JI, Peter AI (2013). Chemical composition and antimicrobial activities of adventitious root sap of Musanga cecropioides. Pharmaceutical Letters, 5:13–16.*
48. *Yuan H, Ma Q, Ye L, Piao G (2016). The Traditional Medicine and Modern Medicine from Natural Products. Molecules, 21:559; doi:10.3390/molecules21050559*