A Synthesis and Review of Medicinal Uses, Phytochemistry and Pharmacological Properties of *Cissampelos mucronata* A. Rich. (Menispermaceae)

Alfred Maroyi*

Department of Botany, University of Fort Hare, Private Bag X1314, Alice 5700, South Africa

Abstract: *Cissampelos mucronata* A. Rich. is a perennial climber widely used as traditional medicine in tropical Africa. This study is aimed at providing a critical review of medicinal uses, phytochemical and pharmacological properties of *C. mucronata*. Documented information on medicinal uses, phytochemical and pharmacological properties of *C. mucronata* was collected from several online sources such as Scopus, Google Scholar, PubMed and Science Direct, and pre-electronic sources such as book chapters, books, journal articles and scientific publications obtained from the University library. The articles published between 1962 and 2020 were used in this study. This study revealed that leaves, rhizome, roots and stems, and whole plant parts of *C. mucronata* are mainly used as traditional medicines for sexually transmitted infections, fever, swellings, headache, respiratory problems, snakebite, malaria, pregnancy problems and gastrointestinal problems. Phytochemical compounds identified from the species include alkaloids, anthraquinones, flavonoids, glycosides, phenolics, reducing sugars, resin, saponins, steroids, tannins and triterpenes. Pharmacological research revealed that *C. mucronata* extracts and alkaloids isolated from the species have antibacterial, anti-mycobacterial, antifungal, antimalarial, antityrosine kinase p56 inhibitory, anti-ulcer, anti-androgenic, anti-steroidogenic, enzyme tyrosine kinase p56 inhibitory, hypoglycemic, larvicidal, molluscicidal, sedative, tocolytic, uterine relaxant and cytotoxicity activities. There is need for extensive toxicological evaluations of crude extracts and compounds isolated from the species since *C. mucronata* contains potentially toxic compounds.

Keywords: *Cissampelos mucronata*, indigenous knowledge, Menispermaceae, traditional medicine.

INTRODUCTION

*Cissampelos mucronata* A. Rich. is a shrubby climber with a woody rootstock belonging to the Menispermaceae family which is commonly referred to as monkey vine or curare family. The generic name “*Cissampelos*” is derived from two Greek words “kissos” and “ampelos” which mean “climber” and “vine”, respectively [1]. The specific name “*mucronata*” is a Latin word which means “each leaf has a single short hair or bristle at its tip” [1]. The English common name are “hairy heartleaf” and “heart-leaved vine”. Synonyms associated with *C. mucronata* include *C. apiculata* Hochst., *C. aristolochiifolia* Fenzi, *C. comata* Miers, *C. macrostachya* Klootsch, *C. pareira* L. var. *mucronata* (A. Rich.) Engl., *C. senensis* Klootsch, *C. vogelii* Miers and *C. zairensis* Miers [2]. *Cissampelos mucronata* has twining shoots growing up to 4 metres in height [1]. The leaves are oval in shape with a cordate base, velvety and dark green in colour with a bristle at the tip. Female and male flowers are axillary or in false racemes and borne on the same plant. Fruits are green, turning bright red when ripe and held in pubescent leaf-like bracts. *Cissampelos mucronata* is common and widespread in tropical Africa, distributed from Senegal east to Ethiopia and south to South Africa [3]. *Cissampelos mucronata* has been recorded in open habitats, deciduous bushland, grassland, burnt veld, often on termite mounts and rock outcrops, in riverine forests and swamps at altitude ranging from 15 m to 1850 m above sea level [2].

The *Cissampelos* L. species are widely used as sources of traditional medicines in tropical Africa [3-5]. The leaves and roots of *C. mucronata* are sold as traditional medicines in informal herbal medicine markets in Benin, Malawi and Mozambique [6-8]. *Cissampelos mucronata* is also commonly planted in home gardens as a medicinal plant in some countries in the tropical Africa [3]. The rhizomes of *C. mucronata* are traditionally used in the preparation of arrow poison [3] and fish poison while the leaves of the species are cooked as leafy vegetables in Botswana [1]. *Cissampelos mucronata* is also included in two monographs focusing on poisonous plants, “mind-altering and poisonous plants of the world” and “poisonous plants of South Africa” [10,11]. In these two monographs, Van Wyk *et al.* [10] and Wink and Van Wyk [11] provide basic information about the poisonous ingredients, the pharmacological effects and associated symptoms of human and animal poisoning as a result of ingesting documented plant species. It is, therefore, within this context that this review was undertaken, aimed at reviewing the ethnomedicinal...
### Table 1: Medicinal uses of *Cissampelos mucronata*

<table>
<thead>
<tr>
<th>Disease</th>
<th>Plant part</th>
<th>Country</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal pain</td>
<td>Roots</td>
<td>Ethiopia, Tanzania and Zimbabwe</td>
<td>[12-16]</td>
</tr>
<tr>
<td>Anaemia</td>
<td>Leaves</td>
<td>Ethiopia</td>
<td>[17]</td>
</tr>
<tr>
<td>Arthritis</td>
<td>Leaves, stems and roots</td>
<td>Nigeria</td>
<td>[18]</td>
</tr>
<tr>
<td>Backache</td>
<td>Leaves and roots</td>
<td>South Africa, Uganda and Zimbabwe</td>
<td>[12,19-21]</td>
</tr>
<tr>
<td>Bilharzia</td>
<td>Roots</td>
<td>Benin, South Africa and Zimbabwe</td>
<td>[12,19,21-23]</td>
</tr>
<tr>
<td>Bleeding gums</td>
<td>Leaves and roots</td>
<td>Zambia</td>
<td>[24]</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Roots</td>
<td>Angola</td>
<td>[25]</td>
</tr>
<tr>
<td>Cancer</td>
<td>Roots</td>
<td>Ghana and Nigeria</td>
<td>[26,27]</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>Leaves</td>
<td>Angola</td>
<td>[28]</td>
</tr>
<tr>
<td>Erectile dysfunction</td>
<td>Leaves</td>
<td>Angola</td>
<td>[28]</td>
</tr>
<tr>
<td>Fever</td>
<td>Rhizome and roots</td>
<td>Eswatini, Nigeria, South Africa and Tanzania</td>
<td>[13,18,19,21,29]</td>
</tr>
<tr>
<td>Gastro-intestinal problems (diarrhoea, digestive problems, dysentery, indigestion and stomach ache)</td>
<td>Leaves and roots</td>
<td>Benin, Ethiopia, Gambia, Guinea-Bissau, Malawi, Mozambique, Nigeria, South Africa, Tanzania, Uganda, Zambia and Zimbabwe</td>
<td>[12-14,18-21,23,30-42]</td>
</tr>
<tr>
<td>Haemorrhoids</td>
<td>Leaves and roots</td>
<td>Angola and Benin</td>
<td>[8,25]</td>
</tr>
<tr>
<td>Headache</td>
<td>Roots</td>
<td>Angola, Nigeria, South Africa, Tanzania and Uganda</td>
<td>[13,19,21,28,43,44]</td>
</tr>
<tr>
<td>Hernia</td>
<td>Roots</td>
<td>Tanzania</td>
<td>[13]</td>
</tr>
<tr>
<td>Heart problems</td>
<td>Roots</td>
<td>Ethiopia</td>
<td>[45]</td>
</tr>
<tr>
<td>Jaundice</td>
<td>Leaves</td>
<td>Ethiopia and Nigeria</td>
<td>[17,18]</td>
</tr>
<tr>
<td>Kidney problems</td>
<td>Roots</td>
<td>Ethiopia</td>
<td>[45]</td>
</tr>
<tr>
<td>Liver diseases</td>
<td>Whole plant</td>
<td>Rwanda</td>
<td>[46]</td>
</tr>
<tr>
<td>Malaria</td>
<td>Leaves, roots and whole plants</td>
<td>Benin, Democratic Republic of Congo (DRC), Kenya, Nigeria, Senegal, Tanzania, Uganda and Zimbabwe</td>
<td>[23,47-56]</td>
</tr>
<tr>
<td>Menstrual problems</td>
<td>Roots</td>
<td>Ethiopia, South Africa and Zimbabwe</td>
<td>[12,19,21,57,58]</td>
</tr>
<tr>
<td>Nausea</td>
<td>Roots</td>
<td>Tanzania</td>
<td>[13]</td>
</tr>
<tr>
<td>Obesity</td>
<td>Leaves, stems and roots</td>
<td>Nigeria</td>
<td>[18]</td>
</tr>
<tr>
<td>Pain (head, neck and muscle)</td>
<td>Roots</td>
<td>Namibia and South Africa</td>
<td>[19,21,32,59]</td>
</tr>
<tr>
<td>Pregnancy problems (abortifacient, expel placenta, induce labour, infertility, postpartum bleeding, prevention of miscarriage, sexual stimulation and uterine pain)</td>
<td>Leaves and roots</td>
<td>Angola, Ethiopia, Guinea-Bissau, Nigeria, Senegal, South Africa, Tanzania, Uganda, Zambia and Zimbabwe</td>
<td>[12,13,19,21,24,28,32,36,37,39,57-63]</td>
</tr>
<tr>
<td>Respiratory problems (asthma, cough, lung problems and sore throat)</td>
<td>Leaves, rhizome, roots and stems</td>
<td>Angola, Nigeria, South Africa, Togo and Zimbabwe</td>
<td>[3,12,18,19,28,36]</td>
</tr>
<tr>
<td>Sexually transmitted infections (chancroid, syphilis and venereal diseases)</td>
<td>Leaves and whole plant</td>
<td>Malawi, Nigeria, Zambia and Zimbabwe</td>
<td>[12,64-66]</td>
</tr>
<tr>
<td>Skin diseases (chicken pox and measles)</td>
<td>Leaves</td>
<td>Nigeria</td>
<td>[44]</td>
</tr>
<tr>
<td>Disease</td>
<td>Plant part</td>
<td>Country</td>
<td>Reference</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Snakebite</td>
<td>Roots</td>
<td>Ethiopia, Nigeria, South Africa, Tanzania and Uganda</td>
<td>[13,14,18,19,20,32,67]</td>
</tr>
<tr>
<td>Sore eyes</td>
<td>Leaves</td>
<td>Zimbabwe</td>
<td>[12,19]</td>
</tr>
<tr>
<td>Swellings</td>
<td>Leaves and roots</td>
<td>DRC, Ethiopia, Tanzania, Uganda and Zimbabwe</td>
<td>[12,13,20,68,69]</td>
</tr>
<tr>
<td>Tonic</td>
<td>Roots</td>
<td>South Africa</td>
<td>[70]</td>
</tr>
<tr>
<td>Ulcers</td>
<td>Leaves</td>
<td>Nigeria</td>
<td>[34,61]</td>
</tr>
<tr>
<td>Yellow fever</td>
<td>Leaves and roots</td>
<td>Uganda</td>
<td>[71]</td>
</tr>
<tr>
<td>Worms</td>
<td>Leaves and roots</td>
<td>Tanzania and Uganda</td>
<td>[13,43]</td>
</tr>
<tr>
<td>Wounds</td>
<td>Roots</td>
<td>Benin and South Africa</td>
<td>[19,23,36]</td>
</tr>
<tr>
<td>Ethnoveterinary medicine (amoebiasis, expel placenta, heartwater, helminthosis and rabies)</td>
<td>Leaves and roots</td>
<td>Ethiopia and Tanzania</td>
<td>[67,72-75]</td>
</tr>
</tbody>
</table>

uses, phytochemical and pharmacological properties of *C. mucronata* so as to provide baseline data required in evaluating the therapeutic potential of the species.

**Medicinal Uses**

The leaves, rhizome, roots and stems and whole plant parts of *C. mucronata* are mainly used as traditional medicines for sexually transmitted infections, fever, swellings, headache, respiratory problems, snakebite, malaria, pregnancy problems and gastrointestinal problems (Table 1, Figure 1). Other medicinal applications reported in two countries and supported by at least two literature reports include the use of leaves, rhizome, roots and stems and whole plant parts of *C. mucronata* against abdominal pain, backache, bilharzia, cancer, haemorrhoids, jaundice, menstrual problems, pain, worms, wounds and as ethnoveterinary medicine (Table 1).

**Phytochemistry**

Ferreira *et al.* [76] identified a bisbenzylisooquinoline alkaloid, l-isochondodendrine from the roots of *C. mucronata*. De Wet [77] identified the alkaloids cycleanine, dicentrine, salutaridine, reticuline and pronuciferine from the leaves and rhizomes of *C. mucronata*. Other phytochemical compounds identified from the aerial parts, leaves and roots of *C. mucronata* include anthraquinones, carbohydrates, flavonoids, glycerine, glycosides, phenolics, reducing sugars, resin, saponins, sterols, steroids, tannins and

![Figure 1: Medicinal applications of *Cissampelos mucronata* derived from literature records.](image-url)
triterpenes [62, 78-86]. Some of the identified phytochemical compounds may be responsible for the biological activities associated with the species.

**Pharmacological Properties**

The following pharmacological activities have been documented from the aerial parts, leaves, rhizome, roots and root bark extracts of *C. mucronata* and alkaloids isolated from the species: antibacterial [23, 34, 81, 87, 88], anti-mycobacterial [86], antifungal [88], antiplasmodial [47, 58, 82, 89-92], antitrypanosomal [90], anti-ulcer [34, 80, 93] anti-androgenic and anti-steroidogenic [62], enzyme tyrosine kinase p56 inhibitory [90], hypoglycemic [83], larvicidal [88], molluscicidal [94], sedative [78], tocolytic [95-98], uterine relaxant [79], cytotoxicity [23, 89, 99] and toxicity [34, 88, 93, 98] activities.

**Antibacterial Activities**

Taniguchi et al. [87] evaluated the antibacterial activities of the crude extracts of *C. mucronata* leaves at a concentration of 100.0 µg/ml against *Bacillus subtilis* and *Escherichia coli*. The extract caused complete growth inhibition of *Bacillus subtilis* but no activities against *Escherichia coli* were observed [87]. Akah and Nwafor [34] evaluated the antibacterial activities of methanolic extracts of *C. mucronata* leaves against *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumonia* and *Pseudomonas aeruginosa* using the agar disc diffusion method. The extract exhibited activities against tested pathogens with the MIC value of >500 mg/L [23].

**Antimycobacterial Activities**

Aska et al. [86] evaluated the anti-mycobacterial activities of methanol extracts of *C. mucronata* roots against *Mycobacterium bovis* using broth micro-dilution method with rifampicin as a positive control. The extract exhibited activities with the MIC value of 5.0 mg/ml [86].

**Antifungal Activities**

Nondo et al. [88] evaluated the antifungal activities of dichloromethane and ethanol extracts of the roots and aerial parts of *C. mucronata* against *Candida albicans* and *Cryptococcus neoformans* using the microdilution method. The extracts exhibited activities against the tested pathogens with the MIC values ranging from 0.2 mg/mL to >25.0 mg/mL [88].

**Antiplasmodial Activities**

Gessler et al. [47] evaluated the antimalarial activities of ethanol, petroleum ether, ethyl acetate and water fractions of *C. mucronata* roots using the G-3H-hypoxanthine incorporation assay against multidrug resistant *Plasmodium falciparum* strain K1 and the chloroquine sensitive strain NF54. The ethyl acetate fraction exhibited the best activity against *Plasmodium falciparum* strain K1 with the half maximal inhibitory concentration (IC₅₀) value of 0.4 µg/ml whilst other fractions exhibited IC₅₀ values ranging from 1.2 µg/ml to 8.0 µg/ml [47]. Tshibangu et al. [90] evaluated antiplasmodial activities of the dichloromethane and methanol extracts of *C. mucronata* roots against chloroquine sensitive (D6) and chloroquine resistant (W2) *Plasmodium falciparum* strains using the ³H-hypoxanthine incorporation assay with artesiminin as a positive control. The extract exhibited activities with the IC₅₀ values ranging from 1.1 µg/ml to 2.9 µg/ml [90]. Van Zyl et al. [91] evaluated the antimalarial activities of methanol extracts of *C. mucronata* rhizome against a chloroquine-resistant *Plasmodium falciparum* strain using the ³H-hypoxanthine incorporation assay. The extract exhibited activities at a concentration less than 5 µg/ml [91]. Muthaura et al. [92] evaluated the antiplasmodial activities of methanol extract of the leaf and root bark of *C. mucronata* against the chloroquine sensitive (D6) and resistant (W2) *Plasmodium*
falciparum using the semi-automated micro-dilution technique that measures the ability of the extracts to inhibit the incorporation of G-^3^-H-hypoxanthine into the malaria parasite. The leaf and root bark extracts exhibited activities with IC$_{50}$ values of 4.4 µg/ml and 8.8 µg/ml, respectively, against D6, and the root bark extract exhibited IC$_{50}$ value of 9.2 µg/ml against W2 [92].

Gessler et al. [89] evaluated the antimalarial activities of ethyl acetate extracts of C. mucronata leaves using a four day suppressive test in Plasmodium berghei-infected mice. The extract administered orally to the mice at 500 mg/kg body weight/day produced 58.5% suppression of parasitaemia [89]. Asssefia et al. [58] evaluated in vivo antimalarial activities of aqueous and methanol extracts of C. mucronata leaves in a four-day suppressive assay against Plasmodium berghei Anka strain in mice. An oral dose of 400 mg/kg/day, the aqueous extract of the roots exhibited the best activities and reduced parasitemia by 47.5% [58]. Katsayal and Obamiro [82] evaluated the antiplasmodial activities of the ethanol extract of the leaves of C. mucronata using suppressive, curative and prophylactic procedures in Swiss albino mice. The extract at a dose of 200.0 mg/kg/day, intraperitoneally administered in mice, inhibited the growth of Plasmodium berghei at a range from 60.0% to 73.7% when compared with the standard chloroquine at a dose of 5.0 mg/kg/day, which inhibited the growth of the parasites within the range from 89.5% to 100% [82].

Antitrypanosomal Activities

Tshibangu et al. [90] evaluated antitrypanosomal activities of the dichloromethane and methanol extracts of C. mucronata roots against Trypanosoma brucei rhodesiense and Trypanosoma cruzi using the Alamar Blue and an enzyme-linked immunosorbent assays with benznidazole as a positive control. The extracts exhibited activities against tested pathogens with the MIC values ranging from 11.0 µg/ml to >100.0 µg/ml [90].

Anti-Ulcer Activities

Akah and Nwafor [34] evaluated the anti-ulcer activities of methanol extracts of C. mucronata leaves in experimental animals. On isolated guinea pig ileum, the extract inhibited contractions caused by acetylcholine, histamine and serotonin. The extract decreased the propulsive movement of gastro-intestinal content and protected the rats from indomethacin, histamine and stress-induced ulcers [34]. Nwafor and Akah [80] evaluated the anti-ulcer activities of methanol extracts of C. mucronata leaves against indomethacin-induced ulcers in rats. At the dose of 450.0 mg/kg, the extract showed varying degrees of activities against ulcers induced by indomethacin [80]. Nwafor and Okoye [93] evaluated the anti-ulcer activities of ethanol extracts of C. mucronata roots using three models of experimental ulcer induction in rats. The extract exhibited dose-dependent activities in indomethacin, histamine and stress-induced ulcers [93].

Anti-Androgenic and Anti-Steroidogenic Activities

Olaolu et al. [62] evaluated the anti-androgenic and anti-steroidogenic activities of aqueous extracts of C. mucronata leaves in male albino rats. The rats administered with 1200 mg/kg body weight of extract resulted in reduced concentrations of acid phosphatase, alkaline phosphatase and total testicular protein indicating anti-androgenic and anti-steroidogenic activities [62].

Enzyme Tyrosine Kinase p56$^{lck}$ (TK) Inhibitory Activities

Tshibangu et al. [90] evaluated the enzyme tyrosine kinase p56$^{lck}$ (TK) inhibitory activities of the dichloromethane and methanol extracts of C. mucronata roots using the inhibition assay against T cell TK p56$^{lck}$. The extract exhibited activities with TK % inhibition of 71.0% to 92.0% at a concentration of 200 µg/ml [90].

Hypoglycemic Activities

Tanko et al. [83] evaluated the hypoglycemic activities of ethanol extract of the leaves of C. mucronata using the streptozocin-induced diabetic rats by intraperitoneally administering the extract at doses of 200, 400 and 800 mg/kg. The extract resulted in reduced blood glucose levels in all the doses administered, with a dose of 200 mg/kg showing the highest glycemic change of 67.0% after 24 hours of extract administration [83].

Larvicidal Activities

Nondo et al. [88] evaluated the larvicidal activities of dichloromethane and ethanol extracts of the roots and aerial parts of C. mucronata using the Culex quinquefasciatus mosquito larvae. The dichloromethane and ethanol root extracts exhibited activities with the median lethal concentration (LC$_{50}$) values of 126.1 µg/mL and 220.0 µg/mL, respectively [88].
Molluscicidal Activity

Kela et al. [94] evaluated the molluscicidal activities of aqueous and methanol extracts of C. mucronata roots against Lymnaea natalensis with copper sulphate as a positive control. The extracts exhibited weak activities at higher concentrations of the extract [94].

Sedative Activities

Akah et al. [78] evaluated the sedative activities of the ethanol root extract of C. mucronata in mice. The extract showed changes in behavioural patterns of mice, which were indicative of central nervous system depression. The extract also reduced ephedrine-induced spontaneous motor activities in rats and prolonged pentobarbital-sleeping time in the animals. The pre-treatment of rats with the extract protected 40.0% of the rats against pentylenetetrazole-induced convulsions [78].

Tocolytic Activities

Ndu et al. [96] evaluated the tocolytic activities of ethanol leaf extract of C. mucronata on the length of gestation period in pregnant albino rats with salbutamol (0.2 mg/kg/day) and 3% Tween 85 (5 ml/kg/day) as controls. The extract extended the mean gestation period relative to control values suggesting tocolytic activities [96]. Ndu et al. [97] evaluated the tocolytic activities of ethanol leaf and root extracts of C. mucronata on the onset of parturition in pregnant albino rats with salbutamol (0.2 mg/kg/day) and 3% Tween 85 (5 ml/kg/day) as controls. Both extracts delayed the onset of parturition relative to the controls suggesting tocolytic activities [97]. Similarly, Garba et al. [98] reported embryofetal activities of the methanol root extracts of C. mucronata which showed increase in resorption sites in the uterus of rats that had received 100.0 mg/kg to 300.0 mg/kg dose levels of the extract. Lampiao et al. [95] assessed the relationship between intake of aqueous extract of C. mucronata leaves and the outcome of delivery using a rat model. The administration of the extract during pregnancy resulted in early induction of labour [95].

Uterine Relaxant Activities

Nwafor et al. [79] evaluated the uterine relaxant activities of the ethanol extract of C. mucronata roots on non-gravid and gravid rat uterus. The extract exhibited activities by relaxing the non-gravid rat uterus in a concentration and time-dependent manner [79].

Cytotoxicity Activities

Gessler et al. [89] evaluated the cytotoxicity activities of ethyl acetate extracts of C. mucronata roots by determining the MIC by comparing microscopically the cells of the extract with the cells of the control and also by using the colorimetric cytotoxicity assay using the human cell lines KB and HT 29. The MIC values were 12.6 µg/mL and 37.0 µg/mL for H29 and KB, respectively, while the MIC value for the control chloroquine was 111 µg/mL for KB. The IC50 values for HT29 and KB were 8.5 µg/mL and 19.0 µg/mL, respectively, while the IC50 value for the control chloroquine was 58.0 µg/mL for KB [89]. De Wet et al. [99] evaluated cytotoxicity activities of crude alkaloidal extracts isolated from the rhizomes of C. mucronata using MCF7 (breast), UACC62 (melanoma) and TK10 (renal) cancer cell lines with Adriamycin and 5-fluorouracil as positive controls. The extracts exhibited weak activities with total growth inhibition (TGI) values ranging from 15.0 µg/mL to 24.0 µg/mL. The GI50 (concentration required for 50% inhibition of cell growth) values ranged from <6.3 µg/mL to 9.0 µg/mL [99]. Catteau et al. [23] evaluated cytotoxicity activities of hexane, dichloromethane, ethyl acetate and methanol extracts of aerial parts of C. mucronata against J774 and WI38 cells using tetrazolium salt MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide] colorimetric assay with camptothecin as a positive control. The extracts exhibited activities against the tested cells with the IC50 values ranging from 18.3 mg/L to 99.6 mg/L [23].

Toxicity Activities

Akah and Nwafor [34] evaluated the acute toxicity activities of methanolic extracts of C. mucronata leaves in Swiss albino mice. The extract exhibited an oral median lethal dose (LD50) value of 8.5 g/kg [34]. Nwafor and Okoye [93] evaluated the acute toxicity activities of ethanol extracts of C. mucronata roots in mice. The extract exhibited a LD50 value of 288.5 mg/kg [93]. Nondo et al. [88] evaluated the toxicity activities of dichloromethane and ethanol extracts of the roots and aerial parts of C. mucronata using the brine shrimp lethality test. The extracts exhibited activities with LC50 values ranging from 59.6 µg/ml to 143.0 µg/ml [88]. Garba et al. [98] evaluated the toxicological activities of the methanol extracts of C. mucronata roots on liver and kidney tissues of mice. Administration of 100, 200 and 300 mg/kg of the extract caused a decrease in body weight, and increase in the serum levels of alanine aminotransferase, alkaline
phosphatase, total protein and albumin. The liver and kidney tissues showed moderate lymphocytic infiltration and thrombus formation in central veins in the liver and epithelial sloughing of the proximal convoluted tubules in renal tissues. The extract showed the LD$_{50}$ value of $>2000$ mg/kg [98].

CONCLUSION

Cissampelos mucronata is a known component of the traditional arrow and fish poison [3,9-11], and there is need for detailed clinical and toxicological evaluations of crude extracts and compounds isolated from the species. Although C. mucronata is a well-known poisonous plant [10,11], there is no information on human poisoning. Therefore, the widespread use of C. mucronata in tropical Africa as traditional medicine suggests that the species is not taken at toxic dosages. But the use of C. mucronata for the treatment of human diseases and ailments should be treated with caution and rigorous toxicological and clinical studies of the leaves, rhizomes, roots, stems and compounds isolated from the species are necessary.

CONFLICT OF INTEREST

No conflict of interest is associated with this work.

REFERENCES


