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## *Cissampelos owariensis*: Experimental review

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### **Abstract**

Innovation on new therapeutic agents from natural sources with possible low or absence of toxicity to human is presently ongoing. *Cissampelos owariensis* (commonly called velvet leaf) is a medicinal plant that originated from Sierra Leone east to Uganda and south to Angola, Zambia and Mozambique. Ethno-medicinally, an infusion of the bitter rhizome, leaves or stems of *Cissampelos owariensis* is used in the treatment of numerous diseases including; gastrointestinal disorders (diarrhoea, dysentery, colic, intestinal worms), urogenital problems, infertility, abscesses, ulcers, snake bite, headache, among others. It contains tannins, flavonoids, alkaloids and saponins. Two compounds, namely 2Hcyclopropa[a]naphthalene-2, 5-dione, 1, 1a, 3, 4, 6, 7, 7a, 7b-octahydro-1, 1, 7a, 7b-tetramethyl, and 1, 2-benzenedicarboxylic acid, di-octyl ester had been isolated and identified from it. Reported Pharmacological activities assessed in this present review include; anti-diabetic and anti-microbial activity. However, more experimental studies are required to augment the limited available literatures and also to substantiate the folkloric claim on *Cissampelos owariensis*.

**Keywords:** *Cissampelos owariensis*, ethno-medicine, antimicrobial, anti-diabetic, Phytochemicals.

### **1. Introduction**

Herbal medicines are becoming very popular in the developing countries because of the shift from synthetic drugs to natural remedies. This is probably due to the perceived beneficial and lower side-effect profile of natural products that are extracted from plants [1]. An herbal medicine is one that contains materials as a finished product and may include whole plant parts or other plant materials [2]. Information on the use of medicinal plants has been obtained from herbalists, herb sellers and indigenous people of Africa over many years [3]. Ethnopharmacology, which implies a careful documentation of traditional knowledge about biologically active agents employed by man, has contributed immensely to drug discovery since the 19<sup>th</sup> century [4-5]. Several reviews had been documented on traditionally used plants such as; *Magnifara indica* [6], *Capsicum* [7], *Citrullus lanatus* [8]; *Vernonia amygdalina* [9], *Telfairia occidentalis* [10], among others. This present review is a collection of current information regarding the ethnobotany, phytochemistry and pharmacological and antimicrobial activities of *Cissampelos owariensis*.

### **2. *Cissampelos owariensis***

#### **2.1 Description**



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**Fig 1:** *Cissampelos owariensis*

*Cissampelos* is a medicinal plant belonging to the plantae kingdom, tracheophyta phylum, magnoliopsida class, ranunculales order, *Cissampelos* genus and *Cissampelos owariensis* species [11].

It is a dioecious liana, with rhizome; stem and branchlets with spreading hairs. Leaves arranged spirally, simple, peltate; stipules absent; petiole 4–16 cm long, inserted 1–2 cm from the base of the blade; blade broadly ovate to circular, sometimes broadly triangular, 6–12 cm in diameter, base rounded to almost cordate, apex obtuse and mucronate, papery, variably hairy, palmately 5–7-veined. Inflorescence an axillary, umbel-like cyme, solitary or clustered; male inflorescence arranged in a false raceme up to 40 cm long, female inflorescence arranged in a false raceme up to 35 cm long; peduncle 0.5–3 cm long, hairy; bracts rounded or kidney-shaped, up to 4 cm in diameter, enlarging in fruit, whitish, hairy. Fruit an obovoid drupe 4–6 mm × 4–5 mm, hairy, red when ripe, stone woody with warty ribs, 1-seeded [12].

*Cissampelos owariensis* originated from Sierra Leone east to Uganda and south to Angola, Zambia and Mozambique. It occurs in low land and riverine forest, also in secondary forest, and it is often also common in clearings, orchards, fields and hedges, especially in moist soils up to 900 m altitude. Flowering occurs towards the end of the dry season and the beginning of the rainy season, and fruits mature during the dry season from January to May in Benin.

*Cissampelos owariensis* is only propagated by seed. It is sometimes found as a medicinal plant in home gardens, mainly in coastal regions [13].

## 2.2 Common names

It is commonly called velvet leaf in. In Ghana, it is called *AKAN-ASANTE* akuraso = mouse's ear; referring to the shape of the leaf. Other vernacular names include; Liane amère, liane corde, liane serpent (Fr). Kishiki cha buga, mkasisi cha mkiwa, mlagalaga (Sw) [11].

## 2.3 Medicinal Uses

An infusion of the bitter rhizome, leaves or stems of *Cissampelos owariensis* is used to cure gastrointestinal complaints such as diarrhoea, dysentery, colic, and intestinal worms.

Different parts of the plant are used in the treatment of menstrual problems, venereal diseases and infertility. It is used to induce contraction of the uterus to start labor and also to cause abortion. Leaves and rhizomes or their ash are widely used in various forms to treat abscesses, ulcers and scabies [14]. In Nigeria leaf sap is used as nose or eye drops to cure headache. In Congo a decoction of stems mixed with the

leaves of other plants is used as a wash to treat wounds. In south-eastern Tanzania grated rhizome is applied to snake bites. The aerial parts are used to treat amnesia and psychoses and in the preparation of health tonics. A decoction of crushed leaves is used in veterinary medicine to treat diarrhoea. In Nigeria the rhizome is sometimes used in the preparation of arrow poison [12, 14].

## 3. Bioactivities

### 3.1 Chemical constituents and anti-tuberculosis activity

Extractives from the root of *Cissampelos owariensis*, were screened for antimicrobial activity against *Staphylococcus aureus*, *Streptococcus pyogenes*, *Escherichia coli*, *Salmonella typhi*, *Pseudomonas aeruginosa*, and *Candida albicans*. The crude methanol extract was found to be active against the test organisms except *S. pyogenes* and *P. aeruginosa*. The crude extract as well as the polar neutral fraction and the aqueous residue also showed very promising activity against three strains of *Mycobacterium tuberculosis* pathogens that are of commercial significance, at about 3000 µg/ml. Chromatographic separation of the hexane-soluble fraction of the crude methanol extract gave two partially pure extractives which on gas chromatography/mass spectrometry (GC/MS) analysis and comparison with Library computer data led to the identification of two compounds, namely 2Hcyclopropa[a]naphthalene-2,5-dione,1,1a, 3, 4, 6, 7, 7a, 7b-octahydro-1, 1, 7a, 7b-tetramethyl, and 1,2-benzenedicarboxylic acid, di-octyl ester [15].

### 3.2 Isolation and Characterization of Bis (2 – Methoxyethyl) Phthalate and Hexahydro-1 3 – Dimethyl – 4 – Phenyl – 1h – Azepine 4 – Carboxylic Acid from the Root of *Cissampelos Owariensis* (P. Beauv)

The dried, pulverized root (1 kg) was extracted with 95% ethanol (2dm<sup>3</sup>), for six hours using a soxhlet extractor. The extract was evaporated to dryness in rotatory evaporator to give 15 g residue. This was followed by Column chromatography over silica gel. The root of *Cissampelos owariensis* yielded two new additional compounds. These compounds identified on the basis of spectroscopic analysis were bis (2-methoxy ethyl) phthalate and hexa hydro-1, 3-dimethyl 4-phenyl-1H-azepine-4-carboxylic acid [16].

### 3.3 Anti-diabetic property and phytochemical composition

Phytochemical composition, acute toxicity, blood glucose lowering effect and improvement of body weight gain of *Cissampelos owariensis* (lungwort) was investigated in alloxan monohydrate (150 mg/kg weight) induced diabetic rats and compared with that of a patent drug (glibenclamide, 100 mg/kg). Preliminary phytochemical screening of the ethanol leaf extract of *C. owariensis* revealed the presence of tannins, flavonoids, alkaloids and saponins. The median lethal dose (LD<sub>50</sub>) in rats was 2154 mg/kg body weight (b.wt). Rats were administered *C. owariensis* extract at dose rate of 100 and 200 mg/kg b.wt orally for 14 days, respectively. Blood glucose concentration and body weight was measured by Accu Chek Glucometre test kit and electronic balance. The data were compared statistically by using analysis of variance (ANOVA). The herbal preparation of *C. owariensis* significantly ( $P < 0.05$ ) increased body weight gain and decreased blood glucose when compared with patent drug. The study supports the traditional usage of *C. owariensis* in the treatment of diabetes [17].

#### 4. Conclusion and Future Directions

*Cissampelos owariensis* has many medicinal uses as claimed ethno-pharmacologically. Due to the few available Pharmacological studies on *Cissampelos owariensis*, additional research on its possible anti-inflammatory, analgesic, aphrodisiac, hepatoprotective, anti-oxidants, hypo/hyperlipidemic, antidiarrhoeal/laxative, tocolytic/oxytoxic, hypotensive, anti-ulcerogenic, anti-malarial properties is warranted in other to ensure its sustainable use.

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