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### “INVESTIGATION OF ETHNOPHARMACOLOGICAL CHARACTERISTICS OF CISSAMPELOS PAREIRA”

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**Introduction-**The most important climbing plant in the Menispermaceae family is Cissampelos Pareira. It was used as a traditional medical method in the past to cure a variety of ailments such as ulcers, wounds, fevers, asthma attacks, cholera, diarrhea, inflammation, snakebites, malaria, and rabies. It was also advised for the purifying of blood.

**Aim and objective:** This review's goal is to enlighten readers on the phytochemistry, chromatographic and spectroscopic analyses, pharmacology, toxicity, and other aspects of Cissampelos pareira, as well as potential areas for further investigation. This knowledge provides the way for the discovery of future plant-based drugs. Cissampelos Pareira literature is gathered via online databases as scifinder, Web of Science, PubMed, and Google Scholar. published books were searched for details about this plant. Our study focuses on Cissampelos Pareira and employs botany, chemistry, and phytochemistry. There were 54 plant compounds found, including fatty acids, iso-quinoline alkaloids, flavonoids, and flavonoid glycosides.

**Method-** Cissampelos pareira crude extract exhibits various pharmacological activities, including antipyretic, antiulcer, antidiabetic, anti-inflammatory, anticancer, antifertility, antioxidant, and immune-dilator properties. The chemical fingerprinting of Cissampelos pareira, using various techniques like HPTLC, HPLC, UPLC, LC-MS, and GC-MS, revealed the presence of alkaloids, fatty acids, and flavonoid glycosides.

**Result-** A review of the literature reveals this plant's considerable advancements in phytochemistry and pharmacology, emphasizing its therapeutic promise. Modern analysis has helped to clarify several traditional applications, but further research is needed to confirm the relationship between certain phytoconstituents and pharmacological actions. There is some information about toxicological testing and pharmacological investigations.

**Summary and conclusion-** Most pharmacological studies on Cissampelos pareira have partial data and incomplete toxicological screening. Pre-clinical and clinical pharmacology research should be addressed in the future, with clinical trials conducted after determining a drug's safety, effectiveness, and mechanism of action.

**Keywords-** Cissampelos Pareira, immune-dilator, anti-fertility, anti-asthmatic, anti-inflammatory, Menispermaceae

**Introduction-** The World Health Organization (WHO) estimates that 80% of the global population currently uses herbal drugs for primary healthcare purposes.[1] *Cissampelos Pareira*, initially discovered in Latin America, can be found throughout the tropics.[2] In Indian traditional medicine, it is referred to as Laghu Patha.[3] It is a dioecious climbing plant that is a member of the *Cocculus* family *Menispermaceae*. [4]



**Plant (*Cissampelos pareira* Linn.)**



**Fig.1  
Patha**

**Fig.2 Patha Root**

This plant is a climbing herb that grows back every year and has small flowers that are greenish-yellow in color.[5] There are 37 plant species of this genus distributed globally. Out of these only one occurrence takes place in India.[6] A highly varied, tall, slender, separate-sexed, long-lasting vine that exists in abundant numbers throughout tropical and subtropical regions of India such as Himachal Pradesh, Chota Nagpur, Bihar, West Bengal, Punjab, Rajasthan, predominantly in the eastern region of the Aravalli Mountains. Marathwada, Konkan, Deccan, and Tamil Nadu are other regions with this vine to be found, all of which have hilly forests.[7] The word "pareira" is derived from the Portuguese word for a wild vine's roots, emphasizing how it resembles ivy in terms of growth and clusters of fruit that look like grapes. [8,9] *Abuta*, also known as *Cissampelos Pareira* in South America's rainforests, is a herb used for treating urinary issues, fever, and skin infections.[10]

#### Botanical classification of *Cissampelos pareira* Linn <sup>5</sup>

- 1) Kingdom: Plantae
- 2) Family: Menispermaceae
- 3) Class: Magnoliopsida
- 4) Order: Ranunculales
- 5) Kingdom: Plantae
- 6) Phylum: Tracheophyte
- 7) Genus: *Cissampelos* L.
- 8) Species: *pareira*

**Common name of *Cissampelos pareira* Linn<sup>5,6,7,8</sup>**

English	Velvetleaf
Hindi	Patha, Pathi, Padh, Purain pathi
Gujarati	Karendhiu, Laghupadovel
Konkani	Paadavela
Kannada	Kodupalli, Pariraaberu
Malayalam	Kattuvalli, Malathangi
Marathi	Pahadvela, Pahadmul
Punjabi	Batbel, Batindupath, Katori, Pilihari, Tikari, Parbik
Bihar	Bandarkanawa,
Kashmiri	Butterbail, Pariki
Oriya	Akarnamini, Okanabindhu
Tamil	Appatta, Panmushtie, Pomushtie, Vata
Telugu	Adavibankateega, Visaboddi, Patha
Tulu	Paadarande, Thipale

**Ayurvedic Properties: (The Ayurvedic Pharmacopeia of India)**

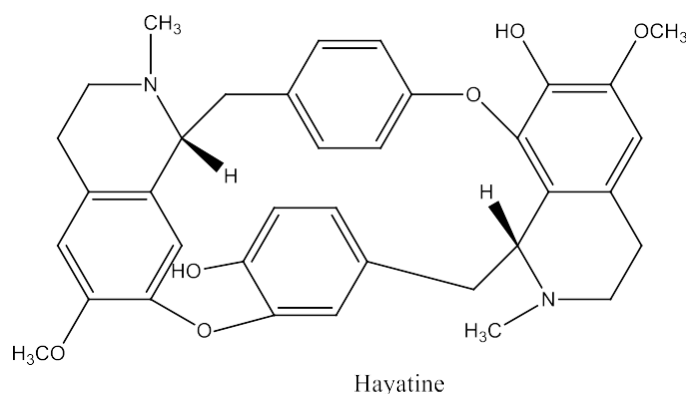
Rasa	Tikta
Guna	Laughu, Tikshna
Veery	Ushna
Vipaka	Katu
Dosshagnata	Tridosham aka
Karma	Vrana ropana, Vishaghna, Kushthaghna, Deepana

For thousands of years, people have employed the medicinal herb *Cissampelos pareira* to treat a wide range of illnesses, such as cancer, gastrointestinal toxicity, diarrhea, and pain. Additionally, it has been used in the prevention of cardiovascular toxicity, diabetes, and sores, as well as in the protection of the liver. [9] The roots of this plant have been used by South American people for centuries to help with all sorts of women's issues, like cramps, bleeding in the uterus after giving birth, preventing miscarriage, and helping with labor and delivery because of its powerful muscle relaxant properties.[10,11] Curare is a type of arrow poison from South America that was originally used to suffocate prey in hunting.[12,13] It's a powerful neuromuscular blocker that blocks nerve signals, relaxes muscles, and replaces tubocurarine, making it more effective and less toxic.[14,15] *Cissampelos Pareira* is responsible for a lot of its health benefits, like providing antioxidants and anti-inflammatory properties.[16,17] The root has emmenagogue, diuretic,

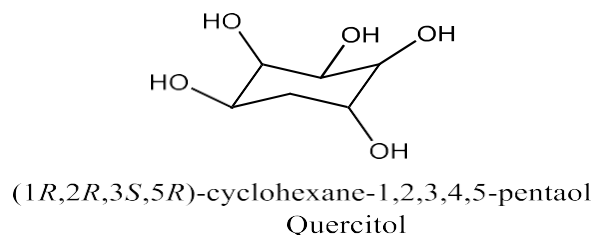
stomachic, analgesic, moderate tonic, and astringent effects. They are usually recommended for conditions including calicular nephritis, prolapsus uteri, cough, dyspepsia, dropsy, cystitis, hemorrhages, and menorrhagia in the urinogenital system. [18,19] Gram-positive bacteria are far more resistant to the root antibacterial effects than gram-negative ones.[20]

### Phytochemical review

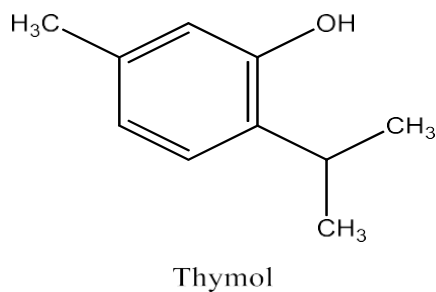
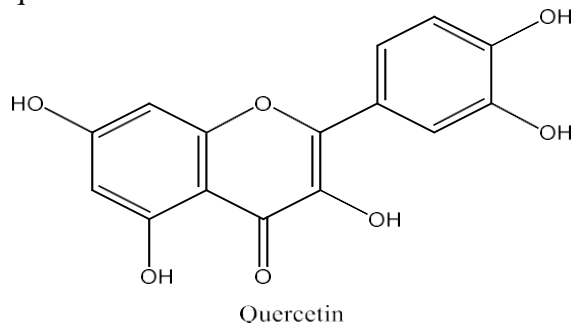
An assortment of phytochemicals known as is quinoline alkaloids may be found in *Cissampelos pareira*. There have been 38 alkaloids detected in the plant, including tetrandrine, a significant alkaloid with powerful pharmacological effects. [21-24] The roots contain protoberberine 2 alkaloids. In *Cissampelos pareira*, a variety of additional active Phyto alkaloids, including hayatine, as well as certain non-nitrogenous substances, quercitol were also discovered. [25-29] The primary constituent of the plant is found to be cyclanoline, a non-phenolic tetra hydroisoquinoline chromophore. [30-34] Among the plant's various chemical components are a number of additional alkaloids, including pelosine, seepeerine, bebeerine, cisalpine (also known as bebeerine), hayatine, hayatinin, 1-curine, and d-isochondrodendrine.



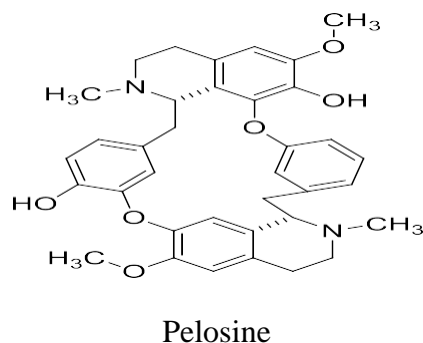
The plant contains a variety of water-soluble alkaloids, including menismin iodine (I iodine), cissamin chloride (Cissamin chloride and Pareirine), cissamine chloride (Cissamine Chloride and Cissampareine), d-Quercitol (D-Quercitol), sterol (Sterol), cycle amine (Cycle Amine) and hayatinin (Hayatinin (4-O-methyl Bebeerine) (++)-4-O-Methyl Bebeerine). Other minor alkaloids include tetrandrine (Tetrandrine), dehydrodicentrine (Dehydrodicentrine), dicentrine (Dicentrine), insularine and bis benzyl isoenzyl (BisBenzyl Isotquinoline) alkaloids (Isochondodendrine, DL-Curine Dimethiodide, Daijisong). [35-39]

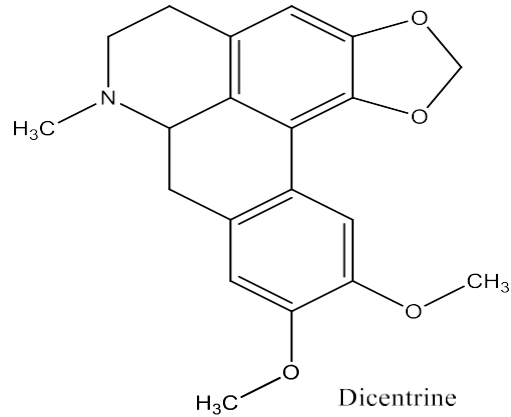


This plant is composed of two major alkaloids: pareitropone, which is a derivative of pariphyllin, and grandirubrin, which is derived from the same family of alkaloids as pareira. Additionally, a new alkaloid, norimelutein, has been identified as a potential cytotoxic agent with therapeutic potential [40-44] Pectin and a small number of neutral sugars have been isolated from leaves of the genus *Cissampelos* Pareira. The majority of the uronic acid content (70–75%) is galacturonic acid.[45] *Cissampelos* pareira has also been identified as a source of eicosanic acid (a saturated fatty acid), as well as the widely-recognized flavonoid 2(3(4)-dihydroxy-3,5(6)-trihydroxy-4(4H)CHEMEN-4-one), or quercetin.



Pelosine is an amorphous alkaloid belonging to the bisbenzylis-quinoline family, which was first identified as being structurally related to hayatine. It was isolated from the roots of the plant *C. pareiro*.[47] *Cissampelos* Pareira's roots have been found to contain a bunch of different compounds, like isomycobutyric acid, dehydroidicentrin, dicentrin, and insularin.[48] The dimer of chalcone flavon found in the aerial components of *C. Pareira* is known as *Cissampelophlavone*.[49]





### Pharmacology

#### Traditional uses

- 1) Alleviate joint pain & wound healing
- 2) Reduce fever
- 3) Purifies blood
- 4) Treat cramps & muscle spasms
- 5) Snake bite
- 6) Treating parasitic infection
- 7) As an appetizer
- 8) Use in malaria



Fruit



Root



LEAVES

#### Pharmacological effects

- 1) Anti-inflammatory
- 2) Antipyretic
- 3) Hepatoprotective
- 4) Antispasmodic
- 5) Anti-venom
- 6) Antiparasitic
- 7) Immunomodulator
- 8) Anti-plasmodial

Fig.3 Pharmacology of *Cissampelos pareira* including its traditional uses and pharmacological effects

### **Anti-inflammatory activity**

A study in mice and rats demonstrated that the polyherbal formulation of *Cissampelos Pareira*, in combination with the extracts of *Pongamia Pinnata* (L. Pierre) and *Vitex Negundo* L., was effective in reducing the oedema caused by carrageenan in the hind paws by 0.16 ml at a dose of 600 milligrams per kilogram (mg/kg). The same study also demonstrated the anti-inflammatory efficacy of ethanolic root extracts of the same plant at concentrations of 100 milligrams per kg (mg/kg) in both acute and subacute rat models, as well as analgesic efficacy in both abdominal writhes and hot plates (400 milligrams/kg).[51] Methylenedioxyamine (Methanol) extract demonstrated comparable anti-inflammatory properties to those of lorazepam, lorazepam, lirazepam, and lirazepam. [52]

### **Antioxidant activity**

The ethanol extract of *C. pareira* roots exhibited significant antioxidant activity, according to the 1,1-diphenyl-2-picrylhydrazyl test. It was shown to significantly scavenge superoxide, hydrogen peroxide, hydroxyl radicals, and nitric oxide at a dose range of 50 to 400 g/kg in vitro. *C. pareira* extract exhibits significant protective effects in an animal model of acute oxidative tissue damage: Benzo(a) pyrene in vivo produced gastric poisoning in mice.[53]

### **Cardioprotective effect**

An ethanolic extract of the roots of *C. pareira* reduced the ventricular dysfunction brought on by isoproterenol; this effect may have been brought on by an increase in the activity of the antioxidant enzyme calcineurin and the production of free radicals.[54]

### **Anti-diabetic activity**

The leaves of *C. pareira* were used to make an aqueous extract that had anti-diabetic effects. Extract from *Cissampelos pareira* at body weights of 250 mg and 500 mg was utilized. given to male albino mice over the course of 14 days. In this study, blood sugar levels and body weight were periodically recorded. Other biochemical markers, such as the quantity of hepatic glycogen, were also discovered.[55]

### **Anti-Asthmatic activity**

The aqueous portion of the ethanolic extract from the leaves of *C. pareira* has an immunomodulatory effect in several animal models of asthma. This study shows that *Cissampelos pareira*'s aqueous fraction enhances anti-inflammatory cytokine levels, lowers antigen-specific immunoglobulin production, and decreases mucus production and deposition in the airways.[56]

### **Antimicrobial activity**

An extract from the whole plant of *C. pareira* showed antifungal efficacy by completely suppressing *Saccharomyces cerevisiae* and *Aspergillus Niger* at levels of 1000 mg/mL when compared to the positive control's amphotericin B at a concentration of 3 mg/mL. Furthermore, aerial component extracts from *Cissampelos mucronata* showed effectiveness against pathogens including *Salmonella typhi*, *Staphylococcus aureus*, *Escherichia coli*, *Streptococcus faecalis*, and *Vibrio cholera*. [57]

### **Anti-ulcer activity**

The ethanolic root extract of *C. mucronata* demonstrated anti-ulcer effects in tests on histamine, indomethacin, and stress-induced ulcer models in rats. At dosages of 25–100 mg/kg, the ethanolic root extract of *C. pareira* and its constituent quercetin demonstrated protective effects against ulceration in a number of acute and chronic ulcers in rats. Additionally, the extract enhanced the ulcer index by reducing acetic acid-induced chronic ulcer perforations. [58]

### **Antileukemic activity**

Scientific evidence suggests that the tropoisoquinoline alkaloids known as pareirubins A and B, which were isolated from the plant *C. pareira*, have antileukemic characteristics. [59]

### **Antifertility activity**

The analysis of the major hormones regulating the estrous cycle showed that the plant extract altered gonadotropins' (LH, FSH, and prolactin's) release as well as estradiol's secretion. The extract's oral LD50 in mice was found to be 7.3 g/kg. [60]

### **Anti-hemorrhagic effects**

A study involving mice was conducted to determine the antihemorrhagic activity of an aqueous extract from *C. pareira* leaves. The extract completely inhibited hemorrhagic activity. However, no inhibitory activity was observed in the anti-proteolytic action, as no effect was observed on casein or biotinylated casein in a test tube or microplate. [61]

### **Ulcer protective**

Quercetin, a flavonoid isolated from *C. pareira*, has demonstrated potent anti-ulcer properties against stomach ulcers in various acute conditions. [62] The ethanol extract of *C. pareira* roots has been used in experimental settings to study various types of ulcers in rats. The extract's ability to prevent ulcers was dose-dependent. It was demonstrated that pylorus ligation (p0.01), aspirin (p0.001), cold restraint, stress, and 100% ethanol (p0.5) significantly prevented rats from developing acute stomach ulcers. Malondialdehyde, a lipid peroxidase product, significantly lowered the ulcer index in ethanol-induced ulcers while considerably increasing the defensive variables total hexose and sialic acid. [63]



## Conclusion

*Cissampelos pareira* Linn. is a plant that may have medicinal benefits and used to treat and manage a number of illnesses. It includes a variety of phytochemicals, including ones with antioxidant, anti-inflammatory, anti-cancer, anti-ulcer, anti-fertility, and anti-anxiety activities. It also has diuretic, disease-preventive, anti-hemorrhagic, anti-arrhythmic, and anti-tongue properties. Additionally, it has antibacterial and anti-bacterial qualities. *C. Pareira* is a readily accessible plant with a wide range of therapeutic benefits. Many of these applications continue to be conventional and anecdotal, despite the fact that most of its medicinal effects have been verified via laboratory tests and scientific study. Additionally, because the leaves' potential hepatoprotective capabilities have not yet been assessed, there is an urgent need for research to identify novel drugs for the treatment and management of liver illnesses.

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