INTRODUCTION

Cissampelos pareira Linn. Belongs to the family Menispermaceae is a sub-erect or climbing herb, known as ambastha or laghupatha in Indian traditional medicine. There are 37 plant species summarized under this botanical name. All these species are found in all over the world but only one species is found in India. It is found in tropical and subtropical parts of India. This plant is a climbing shrub with green leaves, orange to red drupe berries. Its aerial parts contain number of secondary plant metabolites like flavonoids, alkaloids, tannins, volatile oils, glycosides. Our data describes phytochemical investigation and healthcare properties of Cissampelos pareira.

**Keywords**: Cissampelos pareira, Menispermaceae, Ice vine, Cissampelos, Velvetleaf.

**Phytochemical Review**

Two novel tropolosiquinoline alkaloids, Pareirubrines A and B, had been isolated as antileukemic substances from Cissampelos pareira, together with the same skeleton alkaloids, grandirubrine and isomierubrine. Their structures were elucidated by nuclear magnetic resonance (NMR) studies, and their solid state tautomeric forms were examined by X-ray crystallographic analysis. Cissampelosine was reported from C. pareira which was later on shortened as pelosine. Pelsonine was an amorphous white alkaloid, studied in association with an indifferent body, Deyamittin. Cissamine and cicleanine have been reported from the roots. Root was also reported to contain l-curine. Root bark was reported to contain menisminone, pareirine and hayatinine. Chemical investigation on the roots from Kashmir, reported 0.33 % of alkaloids, mainly hayatine and bebeerines, 0.2 % essential oils, 3.4 % fixed oils and a sterol. Tetrandrine has been reported from the roots of C. pareira growing in Thailand. Dicentrine, dihydrodicitrinine, cicleanine, insularine and isochondrodendrine have been reported from roots of the plant growing in Ghana. Cissampelos pareira contains a number of alkaloids, especially bisbenzylisoquinoline alkaloids. The rhizomes contain hayatine, hayatidine, d-4”-o-methylbebeerine, L-bebeerine,
isochoondrodendrine, dicontrine, dehydrodicontrine, insularine. The rhizomes and leaves contain cycloalpine while cissampareine has been isolated from the whole plant\(^6,12,13\). A Chalcone dimer named Cissampeloflavone was isolated and was identified by spectroscopic techniques. It was proved to be 2-(4-hydroxy-3-methoxyphenyl)-7-(4-methoxyphenyl)-6-(2-hydroxy-4,6-dimethoxybenzoyl)-furano [3,2 g]benzopyran-4-one. The compound has good activity against Trypanosoma cruzi and T. brucei rhodesiense and has a low toxicity to the human KB cell line\(^14\). Aerial parts of the plant contains Polyphenolic compounds flavonoids and tannins\(^3\). Thirteen sapogenins were isolated and identified from \textit{C. Arvensis}\(^6\). Flavonoid glycosides were obtained the leaves: Kaempferol3-mono- glycosides and Quercetin 3-mono or di-glycosides\(^17\).

**Ethnobotanical Uses**
In the traditional folk medicine the extracts of roots were used against a lot of ailments. They had a bitter taste and possess diuretic, purgative and antiperiodic properties. Furthermore they were judged to be good against dyspepsia, diarrhoea, dropsy, cough, urinary difficulties like cystitis, dysentery, asthma and heart diseases\(^18\). In the simplest cases leaves were good as an antiseptic against inflammation and can be put on wounds in order to heal sores\(^8\). Kaempferol3-mono glycosides and Quercetin 3-mono or di-glycosides\(^17\).

**Biological Review**
Although this plant has been widely used in various symptoms and diseases, however few pharmacological studies have been reported.

**Anti-diarrhoeal activity**
The antidiarrhoeal activity of the Ethanolic extract of \textit{Cissampelos pareira} roots was assessed on experimental animals. The hydroethanolic extract (25-100 mg dry extract kg (-1) body mass, p.o.) exhibited a dose dependent decrease in the total number of faecal droppings (control 65, reduced to 26-46) and 29-2-60.0% inhibition in castor oil-induced diarrhoea. Further, \textit{C. pareira} produced a significant (p < 0.01) and dose dependent reduction in intestinal fluids accumulation (26.0-59.0%). The extract showed a greater inhibitory effect on the concentration of Na\(^+\) (20.0 and 34.5%) than on the concentration of K\(^+\) (6.7 and 9.4%)\(^27\).

**Anti-protozoal effect**
A chalcone-flavone dimer has been isolated from the aerial parts of \textit{Cissampelos pareira} L. which has been assigned the trivial name Cissampeloflavone. The compound has good activity against Trypanosoma cruzi and T. brucei rhodesiense and has a low toxicity to the human KB cell line\(^6\).

**Antileukemic activity**
Two novel tropoloisoquinoline alkaloids, Pareirubrin B and A\(^22\), have been isolated as antileukemic substances from \textit{Cissampelos pareira} , together with the same skeleton alkaloids, grandrubrine and isomerubrine. These alkaloids shows effect as antileukemic agent\(^10\).

**Curariform activity:**
An alkaldoid \textit{haayatin methochloride} from \textit{C. Pareira} shows curare like activity\(^23,24,25\).

**Anti-inflammatory activity**
50% Ethanolic extract of \textit{Cissampelos pareira} roots (CPE) in acute, subacute and chronic models of inflammation was assessed in rats by administration of dose (200, 400 mg/kg) exhibited significant anti-inflammatory activity. In acute inflammation as produced by carrageenin 59.55% and 64.04%, by histamine 15.38% and 30.77%, by 5-hydroxytryptamine 17.78% and 31.11% and by prostaglandin E(2)-induced hind paw edema 19.23% and 30.77% protection was observed. While in subacute anti-inflammatory models using formaldehyde-induced hind paw edema (after 1.5 h) 38.36% and 47.95% and in chronic anti-inflammatory model using cotton pellet granuloma 15.02% and 19.19% protection from inflammation was observed\(^26\).

**Anti-fertility activity**
Methanolic leaf extract, when administered orally, altered the estrous cycle pattern in female mice, prolonged the length of estrous cycle with significant increase in the duration of diestrus stage and reduced significantly the number of litters in albino mice. The analysis of the principal hormones involved in estrous cycle regulation showed that the plant extract altered gonadotropin release (LH, FSH and prolactin) and estradiol secretion. The results indicated the antifertility effect of \textit{Cissampelos pareira} leaf extract (7.3 g/kg) in female albino mice\(^27\).

**Antihelmintic activity**
The extract of \textit{Cissampelos pareira} not only demonstrated parasitism, but also caused death of worms especially at higher concentration of 50 mg/ml in shorter time as compared to reference drug Piperazine citrate. The standard drug Piperazine citrate shows paralysis at 18.50 min and death at 60.29 min at 15 mg/ml concentration. The two concentrations (50, 100 mg/ml) of this plant show good antihelmintic activity as compared to standard drug\(^28\).

**Antinoceiceptive and Antiarthritic activity**
A 50% aqueous Ethanolic extract of \textit{Cissampelos pareira} roots at the dose levels of 100-400mg/kg once daily for 3 days exhibited significant (P<0.001) resistance against mechanical pain after 30 min. In algosy meter induced pain in mice. Further \textit{Cissampelos pareira} showed the dose dependent significant protective effect against arthritis\(^27\).

**Anti ulcer activity:**
A flavonoid Quercetin, isolated from \textit{C. pareira}, showed significant antulcer property against 100% ethanol- (P < 0.05), aspirin- (P < 0.001), cold-restraint stress- (P < 0.01) and pylorus ligation- (P < 0.001) induced acute gastric ulcers in rats at dose of 25–100 mg/kg\(^8\).

**Anti-oxidant activity:**
\textit{C. Pareira} extract was found to significantly scavenge superoxide, hydrogen peroxide, hydroxyl radicals, and nitric oxide at a dose regimen of 50 to 400 \mu g/kg in vitro. \textit{C. pareira} extract also inhibited hydroxyl radical-induced oxidation of proteins in vitro. \textit{C. pareira} extract exhibit a potent protective activity in an acute oxidative tissue injury animal model: benzo (a) pyreneinduced gastric toxicity in mice in vivo\(^31\).

**Anti-hemorrhagic effects**
To establish the antihemorrhagic activity of aqueous extract from leaves of \textit{C. pareira}, the skin of mice was injected with a mixture of extract and venom, and it as found that extract produced a total inhibition of this activity\(^22\).

**Hepatoprotective activity**
In vitro hepatoprotective activity of the extract was evaluated at 20, 40, 60, 80 and 100 \mu g/ml concentration against CCl\(_4\) (1%) induced toxicity in freshly isolated rat hepatocytes Administration of hydroalcoholic extract of \textit{Cissampelos pareira} roots and standard drug Silymarin in rats showed significant hepatoprotective action against CCl\(_4\) induced Hepatotoxicity. Elevated serum marker enzymes of AST, ALT, ALP and serum bilirubin were significantly reduced to
near normal level in extract treated rats. Lipid per oxidation level was decreased significantly at 100, 200, 400 mg/kg doses treatment groups. In case of antioxidant enzymes SOD, catalase levels were increased significantly after 200, 400 mg/kg doses, similarly it increased the enzyme levels of GST, GPx, and GSH. 200, 400 mg/kg decreased cholesterol level, and increased triglyceride level.

**Memory enhancing activity**

The effects of Cissampelos pareira on learning and memory in mice. Elevated plus maze and passive avoidance paradigm were employed to test learning and memory. Three doses (100, 200 and 400 mg/kg, p.o.) of hydroalcoholic extract were administered for 7 successive days in separate group of animals. The dose of 400-mg/kg p.o. of extract significantly improved learning and memory of mice. Furthermore, this dose significantly reversed the amnesia induced by scopolamine (0.4 mg/kg, p.o.) and ageing induced amnesia.

**Antihyperglycaemic activity**

Antihyperglycaemic activity was studied on rats. The rats of group 1 are served as control. These animals received orally 1% CMC only. The animals of groups 2 to 4 received 2000 mg/kg b.w of methanolic extract of Cissampelos pareira roots.

**Cardioprotective effect**

Cissampelos pareira root extract on isoproterenol-induced cardiac dysfunction in rats. Male albino Wistar rats were randomly divided into eight groups and received either normal saline (0.5 ml/kg, intraperitoneal), isoproterenol (5 mg/kg, intraperitoneal), C. pareira (100 and 200 mg/kg, by gavage, respectively) alone, amloidipine (9 mg/kg, by gavage) alone, C. pareira (100 and 200 mg/kg, respectively) + isoproterenol and amloidipine (9 mg/kg) + isoproterenol, once a day for 30 days, respectively. Isoproterenol-induced cardiac dysfunction was characterized by a significant (P<0.001) increase in the heart weight/body weight ratio, serum calcineurin, nitric oxide, lactate dehydrogenase, and thiobarbituric acid reactive substance levels, as well as a significant decrease in serum-reduced glutathione, cardiac glutathione peroxidase, glutathione reductase, and glutathione-S transferase levels, which were significantly (P < 0.05 and P < 0.01) improved by C. pareira treatment.

**Immunomodulatory activity**

The effect of plant extract was tested on humoral and cell-mediated immunity by measuring haemagglutination antibody titre and DTH response respectively. The effect was tested at four different dose levels ranging from 25 to 100 mg/kg. Results obtained during present investigation showed significant (p<0.01) reduction in antibody production in response to SRBCs at doses 25 and 50 mg/kg. With further increase in dose AFCP had no suppressive effect on antibody production and values obtained were more or less equal to control animals.

**Antidengue activity**

Extract of Cissampelos pareira have antidengue activity. A bioassay guided fractionation approach for plant material leading to identification of active extracts and fraction is provided. Process including preparing different extracts of Cissampelos pareira, subjecting extracts for bioactivity (primary screening- conventional plaque reduction neutralization test (PRNT/assay, secondary screening-modified plaque reduction neutralization test (PRNT) assay and tertiary screening- virus titer reduction assay. Active extracts were further subjected to fractionation by one or more of solvents and each fraction was evaluated for bioactivity.

**Diuretic activity**

The animals were divided into eight groups of six animals each. Animals were fasted overnight with water ad libitum and subjected to pharmacological studies. Before treatment, all animals received physiological saline (0.9% NaCl) at an oral dose of 25 ml/kg body weight (BW). The first group served as the control and the second group was treated with an oral dose of 20 mg/kg BW of furosemide. Third and fourth groups were treated with an oral dose of 100 mg/kg and 200mg/kg BW of methanolic extract of Cissampelos pareira respectively.

**Antiplasmodial activity**

Antiplasmodial activities of extracts of Cissampelos pareira are reported first time. Most active extracts were from Cissampelos pareira (menispermaceae) with 5.8 μg/ml. The extracts were tested against chloroquine sensitive (NF54) and resistant (ENT30) P. falciparum strains in vitro using hypoxanthine assay.

**Anti-tumour activity**

The extract (primarily proteins and polysaccharides) inhibited tumor growth in a dose dependent fashion when administered orally. At the highest dose tested, 200 mg/kg/day, tumor growth was inhibited by roughly seventy percent. Subcutaneous or intraperitoneal administration at 50 mg/kg/day also inhibited tumor growth by over seventy percent.

**Evaluation of toxicity**

Toxicity of C. arvensis in mice had been investigated many years ago. It is mildly toxic to some grazing animals. However, grazing has been used in the past as an attempt to control the weed. The amount of field bindweed that can be safely eaten by sheep, cattle, and goats is not known. It is reported to cause distress in hogs that eat it.

**CONCLUSION**

Cissampelos pareira is a potential herb belongs to the family Menispermaceae. Number of species is available throughout the world but only one species is available in India. From this review it is concluded that Cissampelos pareira have potential medicinal activity and can be used in the treatment of various diseases. By going through literature review, various pharmacological activities of this plant has been familiarized and it is also found that plant contains a wide range of phytoconstituents which needs to be explored more and more. So that the single constituent related activity can be performed.

**REFERENCES**


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