CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187

Available online at: http://www.iajps.com *Review Article*

A REVIEW ON PHYTOCHEMICAL AND PHARMACOLOGICAL ASPECTS OF CISSUS QUADRANGULARIS LINN.

Mrs. Aparna.P*[1], Dr. Rakesh Kumar Jat[2], Dr. Subash Chandran M.P[3], Mrs. Remya S.B[4]

Institute of Pharmacy Shri Jagdish Prasad Jhabarmal Tibrewala University, Vidyanagari, Jhunjhunu, Rajasthan — 333001.

Article Received: March 2022 **Accepted:** March 2022 **Published:** April 2022

Abstract:

Cissus quadrangularis L. is a succulent plant of family Vitaceae. It is commonly found in tropical and subtropical xeric wood. It is a fleshy, cactus-like liana widely used as a common food item in India. Several distinct chemicals and nutraceuticals derived from plants are important drugs currently used in one or more countries in the world. It is a rich source of calcium, carotene, glycoside and alkaloids it can be used as a nutritional food. It has wide numbers of phytochemical constituents, which are isolated from the stem powder which possesses activities like anti-arthritis, anti-inflammatory, anti-tumour, gastro protective, antioxidant, antimicrobial and various other important medicinal properties. The plant is prescribed in the ancient Ayurvedic literature as a general tonic and analgesic, with specific bone fracture healing properties. The plant to be useful in helminthiasis, anorexia, dyspepsia, colic, flatulence, skin diseases, leprosy, haemorrhage, epilepsy, convulsion, haemoptysis, tumours, chronic ulcers, swellings.

Keywords: *Cissus quadrangularis, Vitaceae, Nutritional food, Medicinal plant, carotene*

Corresponding Author:

Mrs. Aparna.P,

Research Scholar,

Institute Of Pharmacy Shri Jagdish Prasad Jhabarmal Tibrewala University, Vidyanagari, Jhunjhunu, Rajasthan — 333001

E-mail: paparnanair@gmail.com

QR code

Please cite this article in press Aparna.P et al, ***A Review On Phytochemical And Pharmacological Aspects Of Cissus Quadrangularis Linn..,*** *Indo Am. J. P. Sci, 2022; 09(04)*

INTRODUCTION:

Cissus quadrangularis L. is commonly known as Asthisamhari. It is a succulent plant of family Vitaceae commonly found throughout the hotter parts of India. It can be cultivated in plains coastal areas, jungles and wastelands up to 500m elevation. Plant is propagated using cuttings. Plant flowers in the month of June-December. It is commonly used for bone health and weight loss. It is also used for conditions such as diabetes, high cholesterol, haemorrhoids, and many others, Plant material occurs as pieces of varying lengths; stem quadrangular, 4-winged, internodes 4-15cm long and 1-2cm thick. The surface is smooth, glabrous, buff coloured with greenish tinge, angular portion reddish-brown; no taste and odour. Leaves are simple 2.5-5cm long, broadly ovate or reniform, sometimes 3-7 lobed, denticulate, glabrous, cordate, rounded, truncate or cuneate at the base; petioles 6-12mm long; stipules small broadly ovate, obtuse[1]. Flowers are in shortly peduncle cymes with spreading umbellate branches. Calyx is cup shaped, truncate or very obscurely lobed. Petals are 4, ovate-oblong, short, stout. Berry is obovoid or globose, scarcely 6mm, long apiculate, red when ripe, 1- (very rarely 2) seeded. The whole plant including all parts such as stems, leaves, roots are documented to possess medicinal properties in ethnobotanical surveys conducted by ethnobotanists in traditional system of medicine.

The leaf is opposed by a tendril (modified inflorescence developing from displaced bud) that attaches to support by twining or by forming adhesive discs; nodes usually swollen. The flowers are 4 or 5-merous, petals forming a cap that falls off when the flower opens; fruit a berry; seeds 4, with prominent cordlike raphe extending to a chalazas knot[2].

Botanical Name : Cissus Quadrangularis Linn
Family : Vitaceae
Species : quadrangularis Linn. (Veldt-grape) Stems and branches acutely winged.

Distribution

The plant is found throughout the hotter parts of India alongside hedges, neighbouring countries like Pakistan, Bangladesh, Shrilanka and Malaysia. It can be cultivated in plains coastal areas, jungles and wastelands up to 500m elevation. Plant is propagated using cuttings[3].

Vernacular names

Classical name : Asthisamhari
Sanskrit names: Asthisamhari, Vajravalli, Asthishrinkhala, Asthisamhara, Kandavalli, Vajrangi, Asthisamyojaka
Hindi : Hadjod, Hadjora, Hadsankari, Hadsarihari, Kandvel
Gujarati : Hadsankal, Hadsand, Chodhari
Tamil : Pirantai, Vajjravalli
Telugu : Nalleru, Nulleratiga, Vajravalli
Urdu : Hrajora, Hadsankal
Oriya : Hadabhanga
Beng : Har, Harbhanga, Hasjora, Horjora
English : Edible stemmed wine, Bonesetter, Adamant creeper
Kannada : Mangarahalli
Malayalam : Peranta, Cannalamparanta

Powder characteristics

The powder colour is brown; shows fragments of vessels, fibres, parenchymatous cells and few rosette crystals of calcium oxalate, starch grains and idioblasts containing raphides and isolated acicular crystals of calcium oxalate[4].

Phytochemistry

Phytochemical studies on methanol extract revealed the presence of triterpenes including α- and β-amyrins, β-sitosterol, ketosteroids, phenols, tannins, carotene and vitamin C.Seven alicyclic lipids constituents have also been reported from Cissus quadrangularis[5]. Several unsymmetric tetracyclic triterpenoids such as d-amyrin, onocer-7-ene-3a, 21b-diol, d-amyrone and 3,3',4,4'-tetra hydroxy biphenyl, 3,3',4,4'-tetrahydroxybiphenyl have been isolated from plant and were quantitatively determined by HPTLC and HPLC methods in samples collected from five different geographic zones of India. Several other constituents such as flavonoids quercetin and kaempferol, and stilbene derivatives, quadrangularis A,B,C and many others e.g. resveratrol, piceatanon, pallidol, perthenocissi and phyto sterols have been isolated from plant. Stem extract contains a high percentage of calcium ions and phosphorus, both essential for bone growth [6].

Traditional uses

The roots and stems are most useful for healing of fracture of the bones. The stem is given internally and applied topically in broken bones, used in complaints of the back and spine. A paste of stem is useful for muscular pains [7].The plant has been documented in Ayurveda for the treatment of osteoarthritis, rheumatoid arthritis and osteoporosis. The stem juice of plant is used to treat scurvy, menstrual disorders, otorrhoea and epistaxis. The use of sap with tamarind has been reported in East Africa for the treatment of gonorrhoea. The herb is fed to cattle to induce flow of milk. The ash of plant is useful as a substitute for baking powder. A paste of stem is given in asthma,

burns and wounds, bites of poisonous insects and for saddle sores of horses and camels. Decoction of shoots with dry ginger and black pepper is given for body pain the infusion of plant is anthelmintic. Leaves and young shoots are powerful alternatives, dried and powdered; they are administering in certain bowel infections connected with indigestion [8]. The plant is useful in helminthiasis, anorexia, dyspepsia, colic, flatulence, skin diseases, leprosy, haemorrhage, epilepsy, convulsion, haemoptysis, tumours, chronic ulcers, swellings. The stout fleshy quadrangular stem is traditionally used for treatment of gastritis constipation, eye diseases, piles and anaemia. The stem boiled in limewater it forms a preserve useful as a stomachic; The Rong's of east Africa apply the pounded stem to wounds.

Pharmacological uses

In addition to the the folk and traditional uses of the plant It has been investigated scientifically in animal model to validate the potential of the plant in cure of variety of ailments [9].

Antioxidant and free radical scavenging activity:

Methanol extract of Cissus quadrangularis exhibits strong antioxidant and free radical scavenging activity in vitro and in vivo systems mainly due to the presence of β-carotene [10].

Anti-microbial and antibacterial activity:

Methanol extract (90%) and dichloromethane extract of stems possess antibacterial activity against S. aureus, E. coli, and P. aeruginosa and mutagenicity against Salmonella microsome [11].

Anti-ulcer activity:

Methanol extract showed significant antiulcer activity in experimentally induced ulcer in rat model by decreasing gastric secretions and by enhancing glycoprotein levels. Methanol extract produce healing effect on aspirin induced gastric mucosal damage in rats through its antioxidative mechanism. Triterpenoids and βsitosterol present in methanol extract possess anti-lipid peroxidating effect and thus prevent gastric damage [12].

Analgesic, anti-inflammatory and stimulatory activity:

Methanol extract possess analgesic, anti-inflammatory and venotonic effects associated with haemorrhoids, anti-inflammatory activity is due to flavonoids especially luteolin and by β-sitosterol. β-sitosterol present in methanol extract has ability to reduce the enzymes MPO indicating a reduction of neutrophils influx in the inflamed tissue. Calcium oxalate, carotene, tetraterpenoids, βsitosterol, amyrin and anabolic ketosteroids, which are responsible for acceleration of healing and possess anti-inflammatory and analgesic activity. Ethanol extract exhibit protective effect on neutrophils mediated tissue injury induced by aspirin in rats [13].

Antimicrobial activity:

The alcoholic extract of aerial part was found to possess antiprotozoal activity against Entamoeba histolytica. Alcoholic extract of the stem showed activity against E. coli. Methanol and dichloromethane extract of whole plant were screened for in vitro anti-plasmodial activity [14].

Bone healing activity:

Paste of alcoholic extract of the plant was locally as well as intramuscularly facilitates rapid healing of fracture in albino rats. Ethanol extract (95%) enhances the development of cortical bone and trabeculae in foetal femur, which may be related to rich content of calcium, phosphorous and Phyto estrogenic steroids and shown to influence early regeneration and quick mineralization of bone fracture healing process. Ethanol extract (95%) of whole plant possess antiosteoporosis activity in ovariectomized rat model of osteoporosis at two different dose levels of 500 and 750 mg per kg per weight [15, 16].

Miscellaneous activity:

Acetone and dichloromethane extract of the plant possess proteolytic activity against cysteine protease. Extract of the plant have wound healing activity and molluscidal activity. The extract of plant exhibits cardiotonic and androgenic property [17] .

Toxicology:

The Cissus quadrangularis extract does not produce any toxic effect on oral administration (1mg/Kg daily for 10 days) in mice, rats and guinea pigs. However, on intravenous administration, the animals developed convulsions and died in five minutes. The MLD worked out to be 15.5 mg/Kg in guinea pigs. Toxicological evaluation of the plant revealed that the drug is safe even at higher dose for a prolonged duration of treatment [18].

Side Effects & Safety

When taken by mouth: Cissus quadrangularis is POSSIBLY SAFE when taken by mouth for up to 10 weeks. Cissus quadrangularis can cause side effects such as headache, intestinal gas, dry mouth, diarrhoea, and insomnia. There is not enough information to know how often these side effects might occur. The

long-term safety of Cissus quadrangularis is not known [19]

Special Precautions & Warnings:
Pregnancy and breast-feeding: There aren't enough reliable information to know if Cissus quadrangularis is safe to use when pregnant or breast-feeding. Stay on the safe side and avoid use[20].

Diabetes: Cissus quadrangularis might lower blood sugar. Taking Cissus quadrangularis along with medications for diabetes might lower blood sugar too much. Watch for signs of low blood sugar (hypoglycaemia) and monitor your blood sugar levels closely if you have diabetes and use Cissus quadrangularis [21].

Surgery: Cissus quadrangularis might lower blood sugar and could interfere with blood sugar control during and after surgical procedures. Stop using Cissus quadrangularis at least 2 weeks before a scheduled surgery [22].

CONCLUSION:

In recent years, ethnobotanical and traditional uses of natural compounds, especially of plant origin received much attention as they are well tested for their efficacy and generally believed to be safe for human use. They obviously deserve scrutiny on modern scientific lines such as phytochemical investigation, biological evaluation on experimental animal models, toxicity studies, investigation of molecular mechanism of action of isolated Phyto principles and their clinical trials. It is a best classical approach in of new lead molecules for management of various diseases. Our thorough screening of literature available on Cissus quadrangularis depicted an interesting fact that though the plant is a popular remedy for a variety of ailments and a range of formulations has been marketed, little effort have been made to verify its purity, quality and efficacy through scientific screening. In future study, the isolated principles from Cissus quadrangularis needs to be evaluated in scientific manner using specific experimental animal models and clinical trials to understand the molecular mechanism of action, in search of lead molecule from natural resources.

REFERENCES:

1. Burkill HM (2000). The useful plants of West Tropical Africa. Royal Botanical Gardens; P.34-42.
2. Sharma PC, Yelne MB, Dennis TJ(2001). Database on medicinal plants used in Ayurvedic. Vol 1, Central Council for Research in Ayurveda and Siddha; p. 43-49.
3. Asolkar LV, Kakkar KK, Chakre OJ(1992). Glossary of Indian Medicinal Plants with Active Principles Part-I (Suppl 2). CSIR; p. 206.
4. Murthy KNC, Vanitha A, Swami MM, Ravi SG (2003). Antioxidant and antimicrobial activity of Cissus quadrangularis L. Journal of Medical Food; 6: 99-105.
6. Mallika J, Shyamala Devi CS (2005). In vitro and In vivo evaluation of free radical scavenging potential of Cissus quadrangularis. African Journal of Biomedical Research; 8: 95-99.
7. Gupta MM, Verma RK (1991). Lipid constituents of Cissus quadrangular is, Photochemistry; 30: 875-78.
8. Pluenjai T, Saifah E (1986). Constituents of Cissus quadrangularis Linn. Thai. Journal of Pharmaceutical Sciences; 11: 205-11.
9. Enechi OC, Odonwodo I (2003). An assessment of the phytochemical and nutrient composition of the pulverized root of Cissus quadrangularis. Journal of Biomedical Research; 1:63-68.
10. Rastogi RP, Mehrota BN (1993). Compendium of Indian Medicinal Plants. Vol III, CSIR;. p. 173-74.
11. Paulsen BS, Sekou B, Drissa D, Anna JK, Adsersen A (2007). Antiplasmodial and GABAA benzodiazepine receptor binding activities of five plants used in traditional medicine in Mali, West Africa, Journal of Ethnophramacology; 110: 451-57.
12. Yoganarisimhan SN (2000). Medicinal plants of India. Cyber Media; p. 136-37.
13. Hope G. A literature survey of studies performed by master students at Department de Medicine Traditional (DMT) in Bamako, Mali. Department of Pharmacognosy, Oslo.
14. Anonymous.(2000) The Wealth of India: A Dictionary of Indian Raw materials and Industrial Products. Vol III, CSIR; p. 593-94.
15. Oben JE, Enyegue DM, Fomekong GI, Soukontoua YB, Agbor GA.(2007) The use of Cissus quadrangularis formulation on obesity and in management of weight loss and metabolic syndrome. Lipids in Health and Disease ; 2:24.
16. Research Guidelines for evaluating the safety and efficacy of herbal medicines.(1994) WHO Regional Office, Western Pacific. Manila
17. Anonymous.(2000) The Ayurvedic Pharmacopoeia of India. Part-I, Vol 1, 1st ed. Government of India, Ministry of Health and Family Welfare; p. 21, 22, 390.
18. Gupta MB, Nath R. Srivatsva N (1980). Anti-inflammatory and anti-pyretic activity of beta-sitosterol. Planta Medica; 39:157-63.

19. Bhutani KK, Kapoor R, Atal CK (1984). Two unsymmetric tetracyclic triterpenoids from Cissus quadrangularis. Phytochemistry; 23: 407-10.
20. Bhutani KK, Mehta M, Kaur N (2001). Determination of marker constituents from Cissus quadrangularis Linn. and their quantitation by HPTLC and HPLC. Phytochemical Analysis; 12:91-95.
21. Sen SP (1966). Studies on the active constituents of Cissus quadrangularis Wall. Current Science; 35: 317.
22. Chopra RN, Nayar SL, Chopra IC.(1956) Glossary of Indian medicinal plants. Publication and Information Directorate, CSIR; p. 66-67.