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**A REVIEW UPDATE ON PLANT *CISSUS QUADRANGULARIS L.*****Sandip G Buddhadev¹, Mrs. Sheetal S. Buddhadev²**

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ABSTRACT:

Cissus quadrangularis L. one of the most important plant, though almost all of its parts are used in traditional systems of medicines seeds, stem, roots and shoots are the most important parts which are used medicinally. The article reveals that wide numbers of phytochemical constituents have been isolated from the plant which possesses activities like anti-inflammatory, anti-tumor, gastro protective, antioxidant, antimicrobial and various other important medicinal properties. The stem juice of plant is used in menstrual disorders, epistaxis and leaves is used against bowel infections. The current review deals with the enormous amount of updated information of scientific research and reports available in different aspects of this plant involving phytochemical and pharmacology. This review also includes reports on taxonomy, morphology, monographs, distribution, tissue culture and traditional medicinal uses of the plant.

Keyword: *Cissus quadrangularis L.*, Folklore uses, Pharmacological activities, Phytochemistry, Traditional uses, *Vitis quadrangularis*

INTRODUCTION

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Plants are the major resources of medicines. Recently there has been a tremendous increase in the use of plant based health products in developed countries resulting in an exponential growth of herbal products globally. According to the WHO more than 80% of the world's population relies on traditional herbal medicine for their primary health care.¹ Plants continue to serve as possible sources for new drugs and chemicals

derived from various parts of plants.² However, due to over population, urbanization and continuous exploitation of these herbal reserves, the natural resources along with their related traditional knowledge are depleting day by day.³

One of the many plants which are being evaluated for their therapeutic efficacies is *Cissus quadrangularis* which is commonly known as Edible Stemmed Vine (English). It is an annual or perennial herb, entire leaves, buff colored with greenish ting and requires warm tropical climate and propagated by stem cuttings in months of June and July. Although it has many medicinal properties, it is particularly used to reduce body weight, anthelmintic, muscular pains, asthma, broken bones, antiulcer, anti hemorrhoidal, antimicrobial etc.,

AIMS AND OBJECTIVES

A systematic review was conducted with an objective to search and explore the phytochemical properties, pharmacological activities and traditional uses of the plant *Cissus quadrangularis L.*

COLLECTION OF DATA

For the collection of data various Ayurvedic journals, books and the electronic database has been used.

ECOLOGY

Found throughout the hotter parts of India alongside hedges, neighboring 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.⁴

TAXONOMY

Kingdom Plantae –Plants

Sub kingdom Tracheobionta Vascular plants

Super division Spermatophyta -Seed plants

Division Magnoliophyta-Flowering plants

Class Magnoliopsida -Dicotyledons

Subclass -Rosidae

Order -Rhamnales

Family -

Vitaceae – Grape family Virginia creeper; usually lianas with alternate leaves, often palmately lobed or compound, sometimes pinnate. 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.

Genus *Cissus* L. – TreebineTrees with

simple, entire leaves. Stems and branches are acutely angled or winged. Flowers are disposed in terminal panicles, small and polygamous. Calyx is short, entire and deciduous. Petals are 4-5, imbricate. Stamens are as many as the petals, with only 1 functional stamen. Ovary is unilocular, with a solitary ovule; style is filiform. Fruit is a large succulent drupe.

Species -*Cissus quadrangularis L.*

PART USED

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.

VERNACULAR NAMES

Cissus quadrangularis (CQ) which is succulent perennial climber, scattered all over India particularly in tropical regions, usually called as 'Asthisamdhani' *Asthisamhari, Vajravalli, Asthishrinkhala, Asthisamhara, Kandavalli, Vajrangi, Asthisamyojaka* in Sanskrit, *Kandvel* in Marathi, *Haddjor* in Punjabi, *Hadbhanga* in Oria, *Vedhari* in Gujrati, *Perandai* in Tamil, *Nalleru* in Telugu and *Veldgrap* in Indian languages and in English it is called as Edible-stemmed Vine.

POWDER CHARACTERISTICS

The color of powder is brown; shows

fragments of vessels, fibers, parenchymatous cells and few rosette crystals of calcium oxalate, starch grains and idioblasts containing raphides and isolated acicular crystals of calcium oxalate.⁵

PHYTOCHEMICAL STUDIES

Phytochemical studies on methanol extract revealed the presence of triterpenes including α - and β - amyryns, β -sitosterol, ketosteroids, phenols, tannins, carotene and vitamin C.^{6,7,8} Seven alicyclic lipids constituents have also been reported from *Cissus quadrangularis*.⁹ Several unsymmetric tetracyclic triterpenoids such as d-amyryn, onocer-7-ene-3a, 21b-diol, d-amyryne 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.^{10, 11, 12}

Several other constituents such as flavonoids quercetin and kaempferol, and^{12, 13} stilbene derivatives, quadrangularins A,B,C^{14,15,16} and many others e.g. resveratrol, piceatanon, pallidol, perthenocissi^{15,17,18} and phyto sterols¹⁹ have been isolated from plant. Stem extract contains a high percentage of calcium ions and phosphorus, both essential for bone growth.²⁰ Stem having Calcium ions and

phosphorus²¹ Calcium oxalate, 31 methyltritacontanoic acid, taraxeryl acetate, taraxerol and iso-pentadecanoic acid^{22,23} A and β -amyrins, β -sitosterol, ketosterol, phenols, tannins, vitamin, carotene²⁴ Saponins and phenol²⁵ while aerial parts having 7-Oxo-Onocer-8-ene-3 β 21 α diol^{26,27,28} root powder having Potassium, calcium, zinc, sodium, iron, lead, cadmium, copper and magnesium^{29, 30} ash of plant having Sodium, potassium, magnesium and calcium, potassium tartrate³¹ leaves having Resveratrol, piceatanon, pallidol, parthenocissus, alicyclic lipids³²

TRADITIONAL AND FOLKLORE USES

Traditionally, the roots and stems are most useful for healing of fracture of the bones. 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 herb is fed to cattle to induce flow of milk. The stout fleshy quadrangular stem is traditionally used for treatment of gastritis, constipation, eye diseases, piles and anemia.

PHARMACOLOGICAL ACTIVITIES

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.^{33, 34}

Bone healing activity

Paste of alcoholic extract of the plant was locally as well as intramuscularly facilitates rapid healing of fracture in albino rats.³⁵ Ethanol extract (95%) enhances the development of cortical bone and trabeculae in fetal femur, which may be related to rich content of calcium, phosphorous and phytoestrogenic steroids and shown to influence early regeneration and quick mineralization of bone fracture healing process.³⁶ Ethanol extract (95%) of whole plant possess antiosteoporotic activity in ovariectomized rat model of osteoporosis at two different dose levels of 500 and 750 mg per kg per weight.³⁷

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.³⁸ Triterpenoids and β -sitosterol present in methanol extract

possess anti-lipid peroxidating effect and thus prevent gastric damage.³⁹

Miscellaneous activity

Proteolytic activity against cysteine protease and molluscicidal activity has been reported.^{40, 41}

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.⁴² Toxicological evaluation of the plant revealed that the drug is safe even at higher dose for a prolonged duration of treatment.

Several study showed that the *Cissus quadrangularis* extract does not produce any toxic effect has been reported.⁴³

TISSUE CULTURE

At first the establishment of callus tissue and effect of growth regulators on enhanced sterol production in *Cissus quadrangularis L.* by using different concentration of auxin and cytokinin (BAP, IAA, NAA and 2, 4-D) has been reported.⁴⁴ But the first successful and

standard protocol has reported for *in vitro* multiplication and plantlet regeneration of *Cissus quadrangularis* from different *in vitro* grown explants (shoot tip, nodal explant and *in vivo* shoot tip) by using different hormonal concentration (Zeatin, BAP, IAA and IBA).⁴⁵

FORMULATION AND PREPARATIONS

The plant is incorporated in various formulations along with different herbs. These include *Laksadi Guggulu, Asthisamharadi Churna, Asthisamhara Taila, Dasyadi Kwatha, Darvi Kwatha* etc.⁴⁶

DISCUSSION

It is very essential to have proper documents of medicinal plants and to know their potential for the enhancement of health and hygiene through an eco-friendly system. A detailed and methodical study is required for identification, categorization and documentation of plants, which may provide a meaningful way for the upgrade of the traditional knowledge of the herbal medicinal plants. The present review reveals that the *Cissus quadrangularis* is used in treating various ailments.

CONCLUSION

This is a review paper which updates the current scenario of *Cissus*

quadrangularis L. The main aim of this paper is to search and explore the phytochemical properties, traditional uses, pharmacological activities, taxonomy, morphology, monographs, distribution, tissue culture and other folklore uses of

Cissus quadrangularis L. The present review will possibly help to bridge between traditional claims and modern therapy on *Cissus quadrangularis L.* and also pinpoints unexplored potential of it.

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