

PHARMACOGNOSTICAL, PHYTOCHEMICAL AND ANTIOXIDANT STUDIES ON
LEAVES OF *CISSUS QUADRANGULARIS* LINNPavithra T.*¹, Parvathi H. B., Rakshitha Y. C., Impana C. S., Senthil Kumar G. P.

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ABSTRACT

In the present study, an attempt was made to investigate Pharmacognostical, Phytochemical & Antioxidant studies on the leaves of *Cissus Quadrangularis* (Vitaceae). This is mainly used for promoting the fracture healing process. It was performed by generally accepted laboratory technique for qualitative determination. The transverse section mid rib of leaf shows the presence of cortex, vascular bundles, epidermis and mucilaginous gland. In powder microscopy shows the presence of fibers, mucilage, xylem vessels and lignified cells. Physicochemical parameters such as total ash value, acid insoluble ash value and water-soluble ash and extractive value were determined. These can serve in qualifying and differentiating the plant. In Phytochemical analysis observed that alkaloids, flavonoids, tannins, steroids were present more in Methanolic extract and were lesser amount in ethyl acetate extract, petroleum ether extract and chloroform extracts. To ascertain the medicinal properties of the plant and also to assess its anti-oxidant potential of Methanolic leaf extract of *Cissus quadrangularis*. The results revealed that Methanolic extract is mainly composed of oxygenated hydrocarbons and predominantly phenolic hydrocarbons. This different active Phytochemical may be responsible for wide range of activities, which may help in the protection against incurable diseases. The future *In-vivo* investigation should be carried out to confirm the activity in animal models.

KEYWORDS: *Cissus quadrangularis* linn, Pharmacognostical, Phytochemical screening and *in-vitro* antioxidant.

INTRODUCTION

Cissus quadrangularis Linn is a indigenous medicinal plant, grown in India. Medicinal plants have been used as traditional treatment for numerous human diseases for thousands of years and in many part of the world.

Cissus quadrangularis reaches a height of 1.5m and has quadrangular sectioned branches with internodes 8-10cm long and 1.2-1.5cm wide. Along each angle is a leathery edge. Toothed trilobe leaves 2-5cm wide appear at the nodes. Each has a tendril emerging from the opposite side of node. Racemes of small white, yellowish or greenish flower, globular berries are red when ripe.

It is suitable for growing in light(sandy), medium(loamy) and heavy(clay)soils, prefers well drained soil and can grow in nutritionally poor soil. Suitable P^H acid, neutral and basic soil and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

Taxonomy

Kingdom: Plantae
Phylum : Tracheophytes
Class : Angiosperms

Order : Vitales
Family : Vitaceae
Genus : Cissus
Species : *Cissusquadrangularis*



Cissus quadrangularis L is a common perennial climber.

Which is one of the most frequently used indigenous medicinal plant in India. It is commonly known as mangaravalli, veldt grape, devil's backbone, adamant creeper, asthisamharaka and pirandai.

Vernacular names

Kannada: edible – stemmed vine, bone setter, adamant creeper

English: hadjod, kandvel

Hindi: vajravalli

Sanskrit: vedhari

Gujrati: perandai

Tamil: nalleru

Telegu: hadsankal

Leaves of *cissus quadrangularis* has been reported to contain active constituents² like triterpenes including α and β amylins, β sitosterol, phenol, tannins, carotene, vitamin c, resveratrol, quercitrin, piceatanon, pallidol and phytosterols. Stem extract contains a high percentage of calcium ions and phosphorus both essential for bone growth.

The plant has been documented in Ayurveda, an alternative system of medicines in india for its medicinal uses³ in gout, syphilis, venereal diseases, piles, tumors, haemorrhoids, and peptic ulcers. It is also used as thermogenic, laxative, anthelmintic and carminative. It is useful in helminthiasis, anorexia, skin diseases, leprosy, chronic ulcer and convulsions. The shoots are useful in colonopathy, scurvy, asthma, burns and wounds. Powdered roots as well as the stem paste are very specific for bone fracture. Leaves and young shoots are powerful alternatives for bowel affections and act as a antimicrobial biological activity of *cissus quadrangularis* include hypotensive, diuretic, analgesic, anti-inflammatory, antiulcer and cardiotoxic.

Collection of plant material

The fresh plant leaves were collected in the month of June- July from the near place, Bharathinagara, India. It was duly identified & authenticated by Botanist Dr. Mahesh H M. HOD Department of botany, Bharathi College, Bharathinagara, Mandya. After collection the leaves was washed thoroughly with running tap water, cut into small pieces and shade dried. The dried material was then pulverized separately into coarse powder by a mechanical grinder. The voucher specimen was preserved in laboratory for further referenc.

MATERIALS AND METHODS

Morphology and Microscopy: The Macroscopical examination and Microscopical evaluation for the fresh leaf is performed. Leaf sections were cleared using Chloral hydrate solution and the staining was done using Phloroglucinol and concentrated Hydrochloric acid solution. A detailed study on the microscopical characters was done. As well as the dried leaf powder

was evaluated for its powder characteristics using the same procedure.

Physicochemical parameters: The leaves were dried at room temperature for 8 -10 days, properly ground and the powder is passed through sieve no. 80. It was evaluated for Physicochemical tests like moisture content, ash values, extractive values according to the procedures given in the Indian Pharmacopoeia.

Preliminary phytochemical screening: The leaves of *cissus quadrangularis* was washed thoroughly and dried. The dried powder undergoes the successive solvent extraction with petroleum ether, ethyl acetate, chloroform and methanol. Chemical test for various extracts were carried out according to standard procedure.

TLC studies on extract: The concentrated plant sample was applied to the marked origin on TLC plate by using capillary tube. The plate was placed in a chamber saturated with mobile solvent. Before it reaches the upper edges of the plate, it was removed from the chamber, dried and then located with iodine vapor. Some spots were observed.

Antioxidant Activity

Hydrogen peroxide Scavenging Assay

The Hydrogen peroxide-scavenging activity, The extract (20,40,60,80 and 100 μ g/ml)/standard (ascorbic acid- 20-100 μ g/ml) different concentrations were dissolved in 3.4 ml of 0.1M phosphate buffer (pH 7.4) and mixed with 0.6ml of 40 mM solution of hydrogen peroxide. The reaction mixture was incubated for 19 minutes and absorbance was measured at 230 nm for each concentration, a separate blank sample was used for background subtractions.

Percentage inhibition = $[(A_{\text{control}} - A_{\text{test}} / \text{stanard}) / A_{\text{control}}] 100.$

RESULTS AND DISCUSSION

Organoleptic parameters

Color: green

Odour: pungent

Taste: astringent

Texture: rough

Transverse section: **The transverse section of leaf along the midrib shows the presence of layered epidermis, cortex, vascular bundles, mucilagenous gland and parenchymatous cells.**

TS OF LEAF OF CISSUS QUADRANGULARIS



Powder microscopy: Powdered leaves of *Cissus quadrangularis* shows the presence of fibers, mucilage, xylem vessels and lignified cell



Lignified cell

Xylem vessel

Fibers

Gum and Mucilage

Physicochemical parameters: The result of proximate analysis of crude powder of *Cissus quadrangularis* leaf showed in table.

Physicochemical parameters	Average value % w/w
Total Ash	7.2
Acid insoluble ash	1.12
Water soluble ash	3.4
Loss on drying	11.2
Alcohol soluble extractive value	12.86%
Water soluble extractive value	13.64%
Ether soluble extractive value	11.24%

Phytochemical screening: Preliminary Phytochemical analysis showed the presence of important secondary metabolites like alkaloids, carbohydrates, steroids, flavonoids, phenols, and triterpenes.

SI No	Chemical test	PE	EA	CE	ME
1	Alkaloids	+	+	+	+
2	Carbohydrates	-	-	-	+
3	Glycosides	-	+	+	-
4	Tannins and phenolic compound	+	+	+	+
5	Protein and amino acid	+	+	+	+
6	Saponins	+	+	-	+
7	Flavanoids	-	+	+	+
8	Gum and mucilage	+	-	-	+

TLC STUDIES: The TLC of leaves extract of petroleum ether, ethyl acetate, chloroform and methanol showed the yellow spot of different intensity and R_f is calculated.

Plant extract	Stationary phase	Mobile phase	Number of spot	R _f value
Petroleum ether	Silica gel G	Hexane: Ethyl acetate (0.5:0.4)	1	0.76
Chloroform	Silica gel G	Hexane: Ethyl acetate (0.5:0.4)	2	0.58,0.66
Ethyl acetate	Silica gel G	Toluene: ethyl acetate (1:0.5)	1	0.72
Methanol	Silica gel G	Benzene: ethanol (9:1)	1	0.66



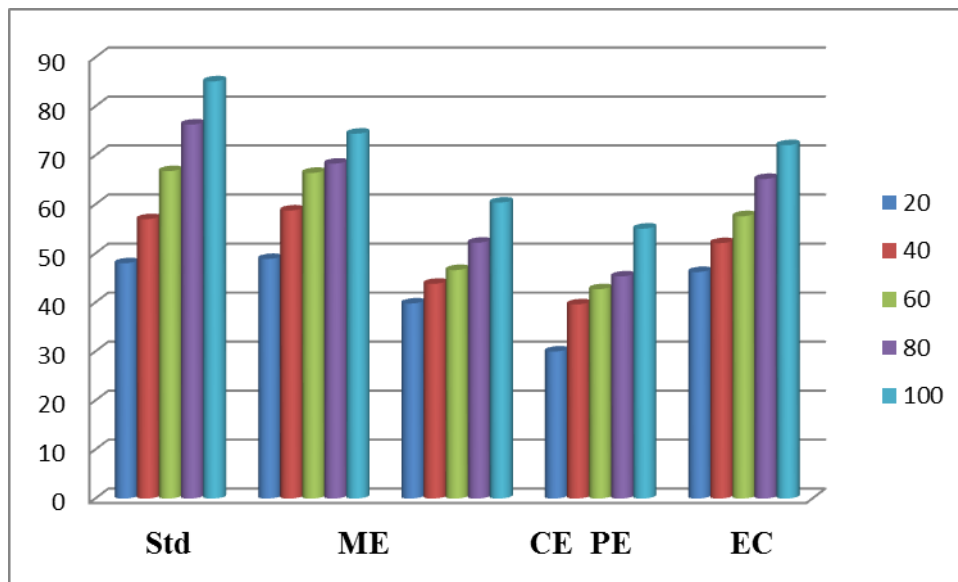
TLC of leaves extract

Anti OXIDANT Activity

Determination of antioxidant activity of selected plant extracts by Hydrogen peroxide scavenging method

The scavenging ability of petroleum ether, chloroform and methanol extracts of *cissus quadrangularis*.

Hydrogen peroxide scavenging assay is shown in graph. The percentages of inhibitions were increased with increasing concentrations of the extracts.



CONCLUSION

In preliminary phyto chemical studies of *cissus quadrangularis* indicates the presence of alkaloids, Phytosterols, triterpenoids, Saponins, phenolic compounds and flavonoids were found more in methanolic extract compare to other extracts. The overall antioxidant activity of these extracts might be attributed to its flavonoids, phenolic and other phytochemical constituents. These could be a source of natural

antioxidant that could have greater importance or slowing oxidative stress related to degenerative diseases. Further research work to be carried out to isolate bioactive molecules responsible for their activity and to investigate and screen the compounds to evaluate other biological activities.

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