JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Phytochemical Investigation of Tannins in Cissus pallida Leaves

Dr.SUDHA PARIMALA[1],AYESHA BEGUM[2],BHUKYA NAGARAJU[2]

[1,2]Department of Pharmacognosy, RBVRR Women's College Of Pharmacy, Barkatpura,Hyderabad, Telangana, India-500027.

Department of Pharmaceutics, Vijaya College Of Pharmacy, Munganoor,Rangareddy (DT), Telangana, India-505151.

Address for Correspondence:

Nagaraju B., M.Pharmacy,

Department of pharmaceutics,

VIJAYA COLLEGE OF PHARMACY

Munganoor, Ranga ReddyD.t), T.S. India

Abstract:

Medicinal plants have been used for centuries in traditional systems of medicine for the treatment of various diseases. However, scientific validation and phytochemical characterization are essential to ensure their efficacy and safety. The present study aimed to investigate the phytochemical profile of Cissus pallida leaves, with a particular focus on tannin content. Specimens were collected from the Nallamala forest region (Kurnool, Nellore), authenticated by a taxonomist, and subjected to successive solvent extraction using petroleum ether, chloroform, and methanol. Preliminary phytochemical screening revealed the presence of steroids, alkaloids, flavonoids, tannins, and phenolics in varying amounts. Thin-layer chromatography (TLC) confirmed the presence of tannins exclusively in the methanolic extract. Quantitative estimation indicated that the leaves contain 3.14% w/w total tannins. These results suggest that Cissus pallida leaves may be a valuable source of tannins, which are known for their antioxidant, antimicrobial, and anti-inflammatory properties.

Key words: TLC,steroids, alkaloids, flavonoids, tannins, and phenolics.

INTRODUCTION:

Medicinal plants constitute a rich source of bioactive compounds with significant pharmacological potential. In India, the use of medicinal plants is deeply rooted in Ayurveda, an ancient healthcare system. However, due to deforestation, urbanization, and lack of awareness, many valuable medicinal herbs are becoming rare, and their traditional knowledge is being lost.

Cissus pallida, belonging to the family Vitaceae, is a lesser-studied plant known locally for its therapeutic applications. Literature reports suggest that members of the Cissus genus possess anti-inflammatory, antimicrobial, and antioxidant activities. The present study was undertaken to scientifically evaluate the phytochemical profile of Cissus pallida leaves, focusing on the qualitative and quantitative analysis of tannins.Medicinal plants have been used for centuries in traditional systems of medicine for the treatment of various diseases. However, scientific validation and phytochemical characterization are essential to ensure their efficacy and safety. The present study aimed to investigate the phytochemical profile of Cissus pallida leaves, with a particular focus on tannin content. Specimens were collected from the Nallamala forest region (Kurnool, Nellore), authenticated by a taxonomist, and subjected to successive solvent extraction using petroleum ether, chloroform, and methanol. Preliminary phytochemical screening revealed the presence of steroids, alkaloids, flavonoids, tannins, and phenolics in varying amounts. Thin-layer chromatography (TLC) confirmed the presence of tannins exclusively in the methanolic extract. Quantitative estimation indicated that the leaves contain 3.14% w/w total tannins. These results suggest that Cissus pallida leaves may be a valuable source of tannins, which are known for their antioxidant, antimicrobial, and anti-inflammatory properties.

As of now, by carrying out a systematic literature study, it was evident that India presented about 8000 medicinal plant species from different alternative systems of medicine. In terms of numbers, around 700 medicinal plant species are reported from Ayurveda, 600 species are reported from Sidhha, 600 species of plants are reported from Amchi, 700 medicinal plant species are reported from Unani, 67 medicinal plant species are reported from Rigveda, 81 medicinal plant species are reported from Yajurveda.The present review study is designed by considering the rich tradition of India's medicinal plants. The study has a prime focus to introduce one of the important plants of Ayurveda, named *Cissus quadrangularis*, which is popularly called 'Had-Jod' or 'Asthisamharaka'. The article makes an effort to present detailed phytochemicals and the pharmacological potential of the plant, with superficial information about traditional claims and future perspectives related to the plant.

Plant Description

Habitat

Cissus quadrangularis is a common plant in the arid habitat of tropical and subtropical regions and is very often found in coastal and lowland areas. The plant is very well known in Africa and India for its medicinal uses. In India and the subcontinent of India such as Pakistan and Bangladesh, the Cissus plant can be found in thickets, open forests, scrub jungles, along forest borders, on riverbanks, and wastelands at low and medium elevations .

Synonyms

This aggressively growing plant is identified by several international names and regional names; some important international names of *Cissus quadrangularis* are Veldt grape, adamant creeper, cactus vine, kangaroo vine, stemmed vine, veldt grape, and winged tree bine, and the Indian regional names are Had-Joad, Asthisamharaka, Pirandai, and Hadsankal .

Botanical Description

The plant is a perennial herbaceous climber comprising a thick quadrangular stem along with other aerial components such as tendrils, leaves, inflorescence, flowers, and fruits.

Materials and Methods

Collection and Authentication

Fresh leaves of Cissus pallida were collected from the Nallamala forest region, Kurnool and Nellore districts, Andhra Pradesh, India. The plant was authenticated by Dr. Madhav Chetty, Taxonomist, Sri Venkateswara University, Tirupati.

Preparation of Extracts

The collected leaves were washed, air-dried, and ground into fine powder. Successive solvent extraction was carried out using petroleum ether, chloroform, and methanol.

Extract	Colour	Consistency	% Yield (w/w)
Petroleum Ether	Greenish black	Sticky mass	1.76%
Chloroform	Green	Sticky mass	0.20%
Methanol	Brownish black	Sticky mass	6.94%

Preliminary Phytochemical Screening

Phytochemical	Petroleum Ether	Chloroform	Methanol
Steroids	+	-	-
Tannins & Phenolics	-	-	+
Flavonoids	-	-	+
Alkaloids	-	+	-

Identification of Tannins by TLC

Tannins were identified exclusively in the methanolic extract of Cissus pallida leaves. TLC was performed on silica gel plates using the solvent system: Hexane : Ether : Acetic acid (6.4 : 3.46 : 0.09). The developed plates were sprayed with 2% vanillin in HCl reagent.

Spot No.	Rf Value	Colour after spraying	Inference
1	0.50	Greenish yellow	Tannin compound
2	0.40	Reddish orange	Tannin compound

Tannin Detection:

The study would confirm the presence of tannins in Cissus pallida leave through phytochemical analysis methods like the ferric chloride test.

Other Phytochemicals:

The investigation would also likely identify other phytoconstituents, including alkaloids, flavonoids, and phenols, which are often found alongside tannins.

Biological Activities:

The conclusion would discuss potential biological activities associated with the identified tannins and other phytochemicals. This could include antioxidant, anti-inflammatory, or other properties relevant to medicinal or other applications.

Potential Applications:

The study would explore potential applications based on the findings. For instance, the tannins could be considered for use in the leather tanning industry or as a source of natural antioxidants or anti-inflammatories.

Quantitative Estimation of Tannins

Total tannin content was estimated using the Folin–Ciocalteu method, expressed as % w/w of dry leaf powder. The average of triplicate determinations indicated 3.14% w/w tannins.

Flowchart of Tannin Identification Process

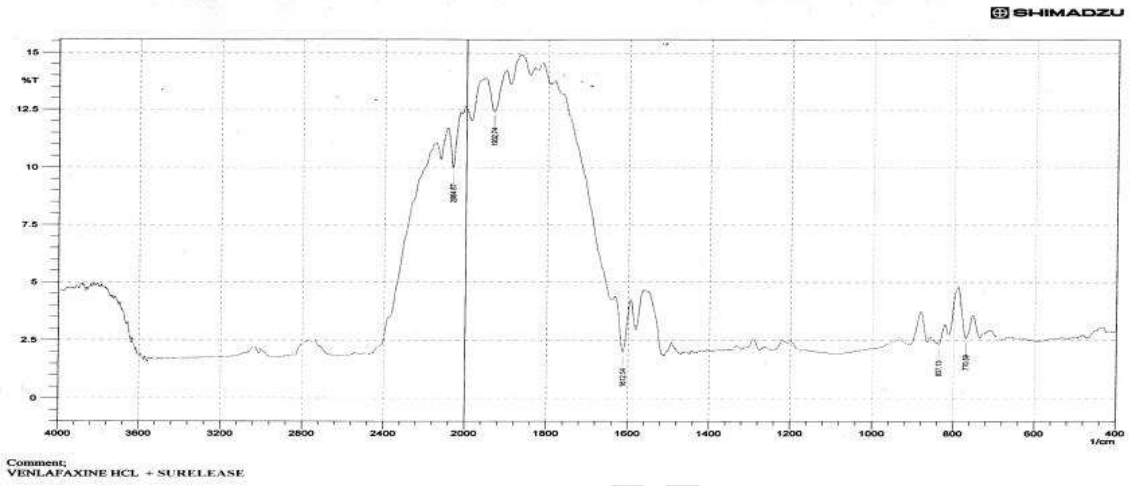
Collection of Cissus pallida leaves → Washing, air-drying, and grinding → Successive solvent extraction (Petroleum ether → Chloroform → Methanol) → Methanolic extract selected → Thin Layer Chromatography (TLC) (Solvent system: Hexane : Ether : Acetic acid, 6.4 : 3.46 : 0.09) → Spraying with 2% vanillin in HCl → Observation of spots (Rf 0.50, greenish yellow & Rf 0.40, reddish orange) → Confirmation of tannins.

Results and Discussion

The phytochemical screening revealed the presence of multiple classes of secondary metabolites in Cissus pallida, including steroids, alkaloids, flavonoids, tannins, and phenolics. Among these, tannins were detected only in the methanolic extract. TLC analysis confirmed two distinct tannin compounds, as evidenced by their specific Rf values and colour reactions with 2% vanillin in HCl.The quantitative estimation showed a significant tannin content of 3.14% w/w, suggesting that Cissus pallida leaves could be a rich source of tannins. Tannins are known to possess antioxidant, antimicrobial, and anti-inflammatory properties, making them valuable in pharmaceutical and nutraceutical applications.A phytochemical investigation of Cissus pallida leaves reveals the presence of tannins, along with other phytochemicals like alkaloids, glycosides, flavonoids, steroids, and polyphenols. The study typically involves extracting the plant material with solvents like ethanol and methanol, followed by qualitative tests to identify the presence of these compounds.

IR Spectra of sample

S.NO	Bond	Rang(cm^{-1})	Peak(cm^{-1})
1	C-C(aro)	2850-3000	Multiple peak
2	C=C(aro)	1650-1690	1765.47
3	C-C(aro)	800-1500	1547
4	C=C(S)	1620-1680	1607



Conclusion

The present study demonstrated that Cissus pallida leaves are a potential source of tannins, with a quantified content of 3.14% w/w. The TLC profile revealed two distinct tannin components in the methanolic extract. These findings provide a scientific basis for the traditional use of the plant and suggest its potential application in the development of herbal formulations. Further studies on the isolation, structural elucidation, and bioactivity evaluation of tannins from Cissus pallida are warranted.