

## Phytochemical Extraction and Analysis of Medicinally Important Plant *Cissus quadrangularis* L. (Hadjod)

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### ABSTRACT

*Cissus quadrangularis* L. (Hadjod) belongs to Vitaceae family is an indigenous medicinal plant of India. It has been prescribed in ancient Ayurvedic texts by Bhava Prakash and Chakra Dutta as a general tonic especially for the fractured patient. The stem of *Cissus quadrangularis* L. is also reputed in Ayurveda as alterative, anthelmintic, dyspeptic, digestive, tonic, analgesic in eye and ear diseases, in the treatment of irregular menstruation and asthma, and in complaints of the back and spine. The plant extracts also exhibit cardio tonic property. In present study there are various tests which reveal the presence of Alkaloids, Carbohydrates, Glycosides, Tannins – phenolic compounds, Protein and amino acids, Gum and mucilage, Flavones and flavonoids, Saponins, Steroids and sterols, in the various types of extract as Petroleum ether extract, Chloroform extract, Ethyl Acetate Extract, n-Butanol. Preliminary qualitative chemical tests of extracts were found positive results for Phytosterol, flavonoids and triterpenoids in Ethyl acetate fraction, Hydro alcoholic fraction was positive to carbohydrate, tannin and amino acid and vitamin C. Flavonoids and triterpenoids are the active constituents in stem of *Cissus quadrangularis* L. and may be responsible for its pharmacological activities. The results of the study could be useful in setting some diagnostic indices for the identification and preparation of a monograph of the plant.

**Key words:** *Cissus quadrangularis* L., flavones, fluorescence, saponins, alkaloids.

### INTRODUCTION

Nature has provided a complete storehouse of remedies to cure all ailments of mankind. This is where, nature provides us drugs in the form of herbs, plants and algae's to cure the incurable diseases without any toxic effect. *Cissus quadrangularis* L. (Hadjod) belongs to vitaceae family is an indigenous medicinal plant of India. The use of this plant by the common folk for promoting fracture healing process is an old practice. It has been prescribed in ancient Ayurvedic texts by Bhava Prakash and Chakra Dutta as a general tonic especially for the fractured patient. Since then it has been in extensive use by bone setters both for external application and as an internal medicine to be taken with milk. The stem of *Cissus quadrangularis*

L. is also reputed in Ayurveda as alterative, anthelmintic, dyspeptic, digestive, tonic, analgesic in eye and ear diseases, in the treatment of irregular menstruation and asthma, and in complaints of the back and spine. Scientific studies have revealed the *Cissus* extract to possess cardiogenic and androgenic property.<sup>1</sup> The plant extracts also exhibit cardiogenic property.<sup>2</sup> The *Cissus quadrangularis* Linn. Has been recognized as a rich source of carotenoids, triterpenoids and ascorbic acid and is proved to have potential for medical effects, including "Gastro protective activity" in conjunction with NSAID therapy and in "Lipid metabolism and oxidative stress". The *Cissus quadrangularis* L. plant contains high amount of vitamin C, Carotene A, anabolic steroidal substances and calcium. Stem contains two asymmetric tetra cyclic triterpenoids;

Onocer-7-ene-3b-21a diol & Onocer-7ene 3a, 2,1 diol.2, 3, 4The present research focuses on the extraction as well as evaluation of the different phytochemical present in this.

## MATERIAL AND METHODS

### Collection of the plant

The plant was collected from MFP park (SANJEEVANI) Barkheda Pathani, Bhopal India.

### Drying and size reduction

After identification and authentication stems were subjected to drying in normal environmental condition under shade with some change in temperature in oven. The dried stems were powdered by pulverization and were stored in air tight container

Fluorescence Characteristic of the Different Extracts of the Stems of *Cissus quadrangularis L.*

The fluorescence characteristic of different extracts was studied by observing them under

UV Light at 365nm. The tests and observations are recorded in the table below.

### Extraction

The dried powdered plant material is generally used for extraction. The fresh plant parts when used are homogenized or macerated with a solvent such as alcohol or water. Several plant constituents including chlorophyll and resins are generally interfering in the isolation process. The precise mode of extraction naturally depends on the texture and water content of the plant material. A water immiscible solvent such as petroleum ether is used for the separation of alkaloids and quinines. Extraction itself may be performed by repeated maceration with agitation percolation or by continuous extraction by soxhlet extraction.

### Extraction by fractionation

Procedure is explained in detail with the help of fig.1.

### Petroleum Ether (60°\_ 80°)

Extract ~about 1.5 kg of shade dried

powder of stems of *Cissus quadrangularis L.* was extracted with petroleum ether (60°- 80°) for 24 hrs by Using soxhlet apparatus. After completion of extraction the solvent was removed under reduced pressure and the extractive was determined.<sup>5</sup>

### Methanolic Extract

The marc left after petroleum ether extraction was dried and extracted with methanol for 24hrs. After completion of extraction, the solvent was removed under reduced pressure and the extractive value was determined. The crude methanol extract, after removal of the solvent, was dissolved in 10% sulfuric acid solution and partitioned with chloroform, ethyl acetate and n-butanol successively to give chloroform, Ethyl acetate, n-Butanol and water soluble fractions respectively.

Different extracts obtained from the above extraction processes and this extract were analyzed for different phyto constituents present in these by the method of qualitative phytochemical analysis. The following chemical tests were carried out and the results were tabulated. In this test for carbohydrate, alkaloids, glycosides, gums and mucilage, proteins and amino acids, tannins and saponins, phenolic compounds, steroids and sterols, triterpenoids, were carried out result are displaced in table2.

### Phytochemical investigation

Preliminary phytochemical screening of *Cissus quadrangularis L.*

Test for carbohydrates, gums and mucilage, proteins and amino acids, alkaloids, glycosides, phytosterols, carbohydrate, flavonoids, tannin and phenolic compounds, steroids and sterol, saponins were carried out, Results are displaced in table 2

Air dried powdered whole plant of *Cissus quadrangularis Linn.* Was exhaustively extracted with various solvents like n-hexane, chloroform, ethyl acetate, ethanol and methanol using soxhlet apparatus. Aqueous extract was obtained by maceration. These extracts were dried and dissolved in water. The dissolution was facilitated by sufficient quantity of Dimethyl sulph-oxide (DMSO). As the principal active constituents of the plant are

saponins, phytosterols and phenolic compounds, which are polar in nature, so extracted best in the solvent of the highest polarity along with other polar constituents.

## RESULTS AND DISCUSSION

The petroleum ether extract, methanol extract, chloroform extract, ethyl acetate extract and n-Butanol extract were tested to the UV Light at 365nm to study the fluorescence characteristic of the *Cissus quadrangularis* L. the showed no fluorescence with pet ether extract and methanol extract and ethyl acetate extract, but we have observed the light orange colour with chloroform extract and light yellowish orange with n-Butanol Extract.

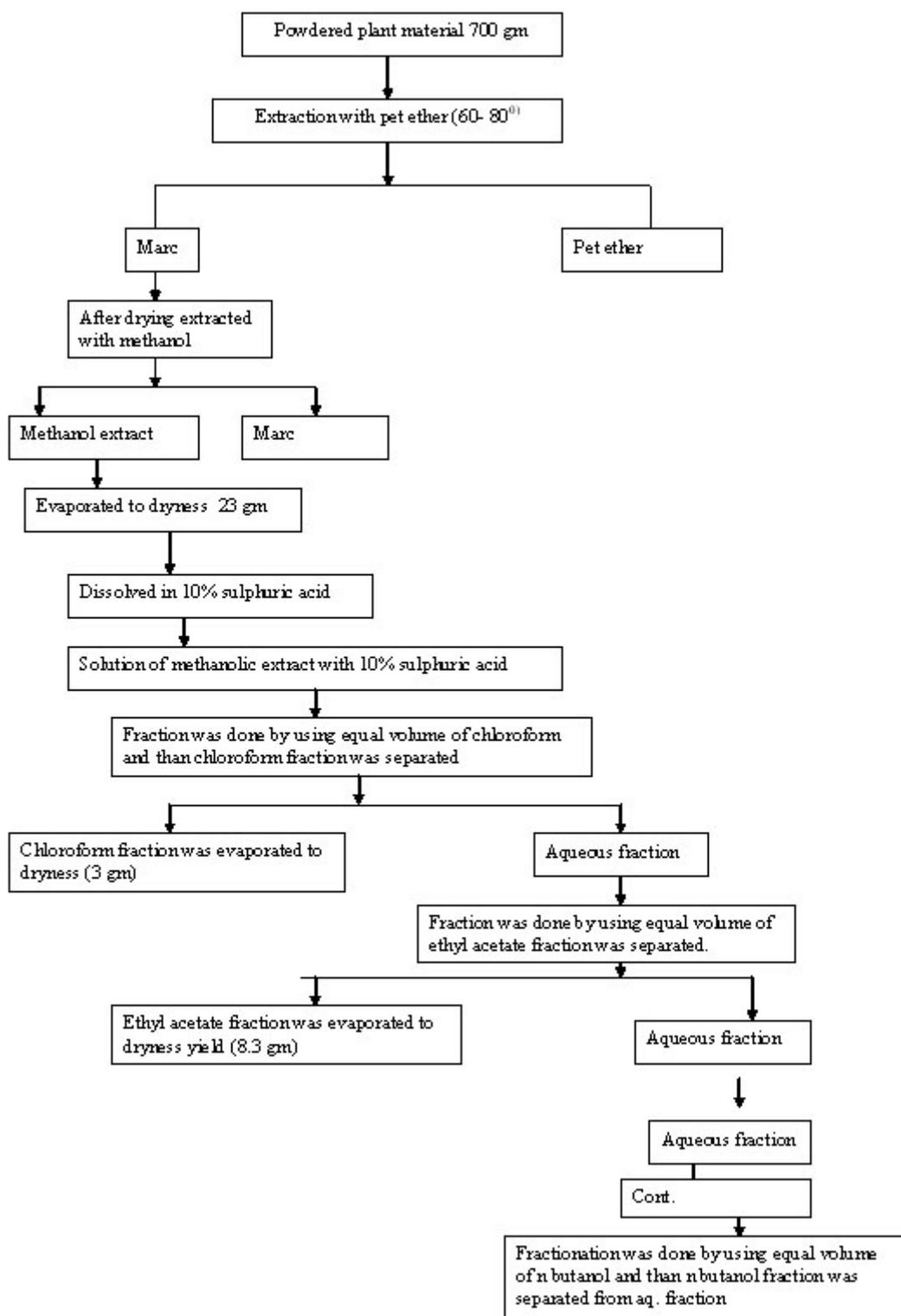
The quantitative chemical test reveals the absence of carbohydrate; very less amount of gum and mucilage, alkaloids were reported in pet ether, alcohol and ethyl acetate, but it is not reported in Butanol extract. Protein and amino acids are found in all different types of extract, flavonoids, and flavones were reported absent in pet ether extract. Tannin & phenolic compounds were not reported in ethyl acetate extract, saponins were found in pet ether extract. The active constituents like phytosterols, flavonoids and triterpenoids of stem of *Cissus quadrangularis* are responsible for pharmacological activities. The aim of the specific targeting is to enhance the efficiency of drug delivery and at the same time to reduce the toxicity and side effects. A number of novel drug delivery systems have emerged encompassing various routes of administration, to achieve controlled and targeted drug delivery.

**Table 1: Fluorescence characteristic of the different extracts of the stems of *Cissus quadrangularis* L.**

Extracts	Fluorescence under UV light (365nm)
Petroleum Ether Extract (60°C-80°C)	No Fluorescence
Methanol Extract	No Fluorescence
Chloroform Extract	Light Orange
Ethyl Acetate Extract	No Fluorescence
n-Butanol Extract	Light yellowish orange

**Table 2: Preliminary phytochemical tests for identification of phytoconstituents in *Cissus quadrangularis* L.**

S. No.	Test for	Petroleum ether extract	Chloroform extract acetate extract	Ethyl extract	Butanol
1	Alkaloids	+	+	+	-
2	Carbohydrate	-	-	-	-
3	Glycosides	+	-	+	+
4	Tannin-phenolic compounds	++	++	-	++
5	Protein and amino acid	++	++	+	+
6	Gum and mucilage	+	-	-	-
7	Flavones and flavonoids	-	++	++	++
8	Saponins	+	—	++	+
9	Steroids and sterols	++	+	-	++



## REFERENCES

1. Herb collector and grower of Chhattisgarh India associated with medicinal herb *Cissus quadrangularis* L. (Hadjod).[http://botanical.com/site/column\\_/poudhia/43\\_hadjod.html](http://botanical.com/site/column_/poudhia/43_hadjod.html).
2. Rostogi, R.P. and Mehrotra, B.N., Compendium of Indian Medicinal. Plants Vol.3, CDRI Lucknow and PID, New Delhi, 173-174 (1995).
3. Aslokar, L.V., Kakkar, K.K. and Chakre, O.J., Glossary of Indian Medicinal Plants with Active Principles. CSIR Publication, 145-150 (1997).
4. Metha, M., Kaur, N. and Bhutani, K.K., Determination of Marker Constituents from *Cissus quadrangularis* L. and their quantitation by HPLC. *Phytochemical Analysis*. **12**(2): 91- (2001).
5. Shrivastava K. Anuj, Priyanka Shrivastava , B.R. Bahare. International Journal Of Pharma. Teseach And Development- Online. International Standard Serial Number: 0974-9446
6. Rao D. G..A manual of practical bio chemistry. 1<sup>st</sup> edn. Birla prakashan. Delhi 2006, p.16
7. Trease GE, Evans MC, Text book of Pharmacognosy. 12<sup>th</sup> edition. Balliere, Tindall: London. Pp. 343-383 (1983). Winter CA, Risley EA, Nuss W (1962).
8. Kokate CK, Purohit AP, Gokhale SB (2002). Textbook of pharmacognosy, Nirali prakasan: Pune. 18:1-4 p. Kumaresan PT, Saravanan A (2009). Anticonvulsant
9. Mukherjee, P.K. (2002). Quality Control of Herbal Drugs. Business Horizons Publication, first edition, 282-283. Kokate, C.K., Purohit, A.P., Gokhale, S.B. (1999). *Pharmacognosy*. Nirali Prakashan, twelfth edition, 172-173. 109-114.
10. Mahajan R., Practical Biochemistry (Lab. Manual) For Student, 1<sup>st</sup> edn, Vayu education of India 2009.
11. Nene, Y.L. And Thapliyal, P.N., (1979). Fungicide in plant disease control. Oxford and IBH publishing company, New Delhi. 415-416.
12. Dipankar, G. and Laddha, K.S., (2005). Herbal Drug Extraction: An update. *Chemical Weekly*, **2**(8): 185. Chaudhri, R.D. (1996). *Herbal Drugs Industry: A practical approach to industrial pharmacognosy*. eastern publishers, 1<sup>st</sup> edition, 373.
13. Harborne, J.B., *Phytochemical Methods*. third edition, Chapman and Hall publication, 291-293 (1998).
14. Kasture, A.V. Mahadik, K.R., Wadodkar, S.G. . *Pharmaceutical Analysis*. vol. II, Nirali Prakashan ,eleventh edition, 35-40 (2004).
15. Shirwaikar, A., Khan, S. and Malini, S., Antiosteoporotic effect of ethanol extract of *Cissus quadrangularis*. *Journal of Ethnopharmacology*. **89**(2): 245-250 (2003).
16. Rajpal V. Standardization of Botanical Testing and Extraction Methods of Medicinal herbs. Vol.1, Eastern Publishers, New Delhi, p.77 (2008).