

**PHARMACOGNOSTICAL EVALUATION OF STEM OF *CISSUS REPANDA* VAHL,
A FOLK MEDICINE**

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Received: 19-07-2010; Revised: 24-08-2010; Accepted: 18-09-2010

ABSTRACT

Cissus repanda Vahl. (Family Vitaceae), commonly known in Hindi as 'Panivel', is a large climber distributed all over India and also occasionally cultivated in garden. The crushed or powder of stem is prescribed by tribal people and vidyas of Orissa, Gujarat, Andhra Pradesh and some parts of Karnataka for its healing properties in case of bone fractures, cuts and wounds. In spite of its reputation in these ailments it has not yet been investigated scientifically hence it was thought worth to study it in detail. The present paper highlights the pharmacognostical and phytochemical details and their role in laying down standardization and pharmacopoeial parameters. The fluorescence analysis of stem powder, physicochemical parameters like moisture content, total ash, acid insoluble ash, alcohol soluble extractive value and water soluble extractive values are taken. The diagnostic characters are mucilage, calcium oxalate rosette and acicular crystals, starch grains, tannin content cell, annular and scalariform vessels and fibres. Preliminary organic analysis revealed alkaloids, tannins, calcium, and mucilage.

KEY WORDS: *Cissus repanda*, Pharmacognosy, Physicochemical analysis.

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INTRODUCTION

Traditional knowledge of plants is responsible for most of the medicine and food used in modern society. The exploration of traditional knowledge for cures to common diseases is attractive, but also overwhelming. *Cissus repanda* Vahl.(Vitaceae) commonly known in Hindi as 'Panivel' is an important medicinal plant distributed from Kuman to Arunachal Pradesh, Tripura, Assam, Bihar, Orissa, Madhya Pradesh, and Western Ghats region up to 1350 m¹.

The medicinal potential of *C repanda* has been known to traditional system and widely used in folk medicine. The use of the plant, plant extracts, and pure compounds isolated from natural sources has always provided a foundation for modern pharmaceutical compounds². Traditionally *C repanda* stem powder made into paste and is used for cuts, wounds and bone fractures^{3,4}.

It is a large climber, with soft, very porous wood with corky bark. The stem yields potable water on cutting thus the name Panivel. Leaves simple, broadly ovate, 12-20 cm diameter, repeatedly toothed, and tomatoes beneath less above, base deeply cordate, petiole 15-20 cm long, stipules oblong, tendril dichotomous opposite to leaf. Inflorescence lax, umbellate branched. Flower bractate, bracteolate, actinomorphic, bisexual, tetramerous, hypogynous flowers reddish brown in colour. Calyx, sepals 4 fused and valvate aestivation. Corolla, petals 4 free and valvate aestivation. Androecium stamens 4, opposite to the petals arise from the base of the disc, basified. Gynaecium ovary 2 celled, with many ovules in each cell, ovary superior, style subulate, and stigma small. Fruit one seeded fleshy berry⁵. (Plate 1- 1.1, 1.2)

MATERIALS AND METHODS

Collection

Fresh specimens of *C repanda* Vahl. were collected from natural habitat from Orissa, Karnataka and Deharadun. The collected samples were identified, authenticated using various floras. The verified specimen was preserved in the departmental herbarium museum vide no. 6001/ 2009 for future reference.

The stems are separated from root and leaves, cut in to small pieces and shade dried, some portion of collected stem kept aside for physicochemical analysis coarsely powdered drug was used for powder analysis and isolation of various vascular elements. The rest of the sample was kept in preservation solution (FAA).

PHARMACOGNOSTIC EVALUATION

Organoleptic evaluation

Various sensory parameters of the plant material, such as size, shape, colour, odour, and taste of the stem were recorded^{6,7,8}.

Microscopic evaluation

The microscopic evaluation is essential for powders of the Crude drugs which consists of the fragments of cells in the form of recognizable tissues. Another important aspect of microscopic evaluation is the study of transverse section of stem studied by using camera lucida. These constants are of diagnostic significance and are used for the authentication of stem drugs or for the detection of their adulterants. Various diagnostic characters of stem and its powder of *C repanda* were studied by microscopic analysis with and without staining by taking microphotographs using Carl Zeiss binocular microscope.

Physical evaluation

In physical evaluation, moisture content, ash values viz., total ash, acid insoluble ash, and extractive values viz., alcohol soluble extractive value, water soluble extractive values were determined. The ash value represents the inorganic salts present in the drug. Extracts obtained by exhausting crude drugs are indicative of approximate measures of certain chemical compounds they contain, the diversity in chemical nature and properties of contents of drug. The determinations were performed in triplicate and results are expressed as mean \pm SD. The percentage w/w values were calculated with reference to the air-dried drug^{6,7,8,9}.

Preliminary Phytochemical Screening

The stem powder was subjected to successive extraction in a soxhlet apparatus using petroleum ether (60-80°C), chloroform, ethyl acetate, methanol and water for 8 hrs and the extracts were evaporated to dryness. The dried extracts were weighed, and percentage yields were calculated. The extracts were used for preliminary phytochemical screening with a battery of chemical tests viz., Dragendorff's Mayer's, Hager's and Wagner's tests for alkaloids; ferric chloride, lead acetate, potassium dichromate and dilute iodine tests for tannins and phenolics; foam test for saponin glycosides¹⁰.

RESULTS AND DISCUSSION

The stem is rounded, elongated, straight, comparatively though woody, fibrous, light brown to dark brown with old dried tendrils at the node region. Thick section of stem is mostly circular with crenate border. Outer brown, internally yellowish-orange in colour, slightly aromatic in odour, sharp mucilage and itching in throat in taste. **(Plate.1 - 1.3, 1.4)**

The Transverse section of stem is more or less circular in shape and shows following microscopical characters. The outer most layer of the stem consists of 8-10 layers of thick walled tangentially elongated brownish coloured cork cells. The cortex zone consists of few layered of parenchyma cells which consists number of calcium oxalate rosette and acicular crystals, simple oval to pear shaped starch grains, reddish brown tannin content cells, large mucilage content cells are present. Pericycle is 5-7 layers of lignified sclerenchymatous cells forming arch like patches. The vascular bundles are open and collateral about 20 to 30 and arranged circular towards large pith. Phloem appears like caps over the metaxylem. Xylem wedge shaped patches separated by multiseriate medullary rays. Metaxylem towards peripheral region and the protoxylem towards pith region, xylem surrounded by xylem parenchyma and xylem fibres. Thin walled elongated parenchymatous cells forms multiseriate medullary rays filled with starch grains, some acicular crystals. Pith occupies the central part of stem section consists of parenchyma cells loaded with starch grains. **(Plate 2- 2.1, 2.2, 2.3, 2.4)**

The organoleptic studies shows that the powder is light brown in colour, sharp mucilaginous and itching in throat in taste and slightly aromatic in odour.

The diagnostic microscopical characters are noted down and are listed below. Cork in surface view, calcium oxalate rosette and acicular crystals, simple oval to pear shaped starch grains, Tannin content cells, lignified parenchyma, simple fibres, scalariform and annular vessels. **(Plate 3- A to H)**

The various physical parameters of stem and stem powder viz., moisture content, ash values viz., total ash, acid insoluble ash, water soluble ash, and extractive values viz., alcohol soluble extractive value, water soluble extractive values were determined. **(Table 1)**

The transverse section and its powder microscopy results are unique to the plants and are required in its standardization.

Preliminary Phytochemical Evaluation

The methanol extracts of the powdered stem of *C repanda* showed the presence of alkaloids, glycosides. Aqueous extract showed the presence of alkaloids, saponin, tannin and phenolics, calcium, glycosides. These secondary plant metabolites are known to possess various pharmacological effects and might be responsible for the various actions exerted by *C repanda*. Colour reaction of powdered drug with different reagents and their florescence analysis¹¹ were studied and recorded in **(Table 2)**.

The Thin Layer Chromatography¹² revealed that methanol extraction the Rf values under U.V. radiation in short U.V. 254 nm components having double bond (unstauration) presents 8 different components are separated using silica gel Cf 254 nm as stationary phase and mobile phase. Out of separated compounds, 4 are suspective to long U.V. 366 nm. Hence short U.V. range is suitable to detect more separated compounds.

T.L.C. plate observed after spray the reagent Dragendorff's (mainly used to detect alkaloid) shows one spot at Rf 0.45. (Table 3)

C repanda stem and its powder paste is used in the treatment of bone fractures and cuts and wounds conditions. The standardization of a crud drug is an integral part of establishing its correct identity. Before any crude drug can be included in herbal pharmacopoeia, pharmacognostic parameters and standards must be established. The results of the present investigations could serve as a basis for proper identification, collection and investigation of the plant. The macro and micro-morphological features of stem described, distinguishes it from other members of the genera. The phytochemical evaluation revealed the presence of various secondary plant metabolites which have been claimed to be responsible for various pharmacological activities.

CONCLUSION

The pharmacognostic, phytochemical parameters, which are being reported for the first time, could be useful in the identification and standardization of a crud drug. The data produced in the present investigation is also helpful in the preparation of the crud drug's monograph and inclusion in various pharmacopoeias.

ACKNOWLEDGMENT

The authors are thankful to the authorities of IPGT&RA, and Gujarat Ayurved University for providing facilities to carry out the research work.

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Table 1: physicochemical parameters stem powder of *C repanda*

| Parameters | Value % w/w |
|----------------------------------|----------------|
| Moisture content | 10.75 |
| Total ash | 11.40 |
| Acid insoluble ash | 16.11 |
| Alcohol soluble extractive value | 5.10 |
| Water soluble extractive value | 7.79 |
| p ^H | 5.75 |

Table 2: Fluorescence analysis of stem powder of *C repanda*

| Treatment | Visible Light | U.V. Light | |
|------------------|-----------------|-------------|-------------|
| | | 254nm | 366nm |
| Powder as such | Light Brown | Light Brown | Light Brown |
| In Methanol | Dark Brown | Green | Brown |
| In Methanol NaOH | Brown | Green | Light Brown |
| In Ethanol | Very Dark Brown | Light Green | Light Brown |
| In Ethanol NaOH | Brown | Green | Light Brown |
| In Dilute HCl | Light Brown | Green | Light Brown |

Table 3: chromatography result of *C repanda* methanolic extract.

| Rf 254 nm | Rf 366 nm | After spraying Dragendorff's reagent |
|--------------|--------------|--|
| 0.05 | 0.05 | 0.45 |
| 0.45 | 0.45 | |
| 0.50 | 0.92 | |
| 0.56 | 0.96 | |
| 0.69 | | |
| 0.81 | | |
| 0.92 | | |
| 0.96 | | |

Plate - 1



1.1

Cissus repanda - Plant with Flowers and Fruits



1.2

Cissus repanda - Climber with Tendril



1.3

Stem with persistent Forked Tendril



1.4

Thick section with wavy bark, central pith

Plate 2

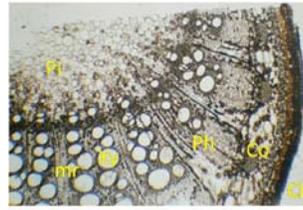


Plate 2.1

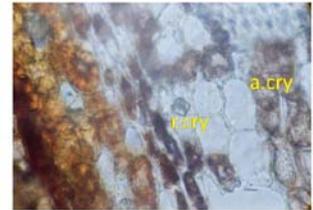


Plate 2.2

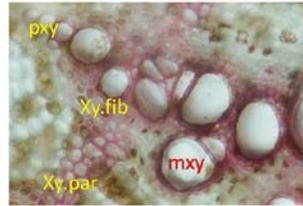


Plate 2.3



Plate 2.4

Plate 2.1 Ck – cork; Co- cortex; Ph- Phloem; Xy-xylem; mr – medullary rays; Pi – Pith; Plate 2.2 r.cry – Rosette crystal; a.cry – acicular crystals; Plate 2.3 mxy – metaxylem; pxy – protoxylem; xy.fib – xylem fibre; xy.par – xylem parenchyma; Plate 2.4 scl – sclerenchyma

Plate 3

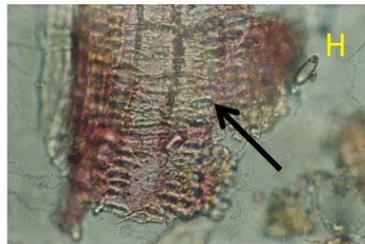
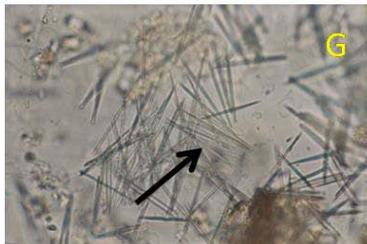
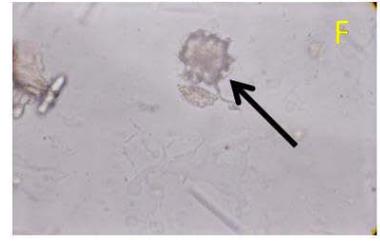
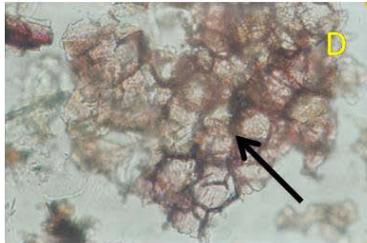
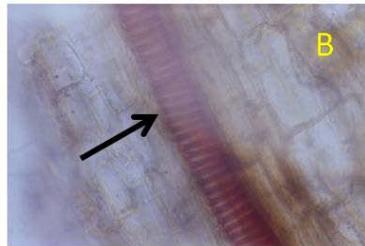
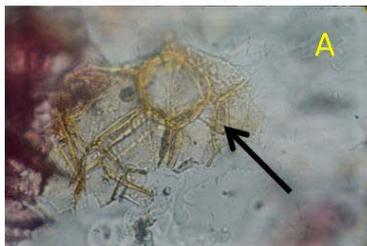


Plate 3 : A – Cork; B- Annular vessels; C – Starch grains; D -Lignified Parenchyma; E – Fibre; F – Rosette Crystals; G – Acicular crystal; H – Scleriform vessels

Source of support: Nil, Conflict of interest: None Declared