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PHARMACOGNOSTICAL, PHYSICO-CHEMICAL AND PRELIMINARY PHYTOCHEMICAL ANALYSIS OF THE STEM AND LEAVES OF *CIPADESSA BACCIFERA (ROTH)MIQ*

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ABSTRACT

In the present study, the pharmacognostical investigations such as microscopy and powder microscopy of the stem and leaves of *Cipadessa baccifera* (Meliaceae), along with physico-chemical constants such as ash value, extractive value, loss on drying was carried out. Preliminary phytochemical screening was also performed for identifying various classes of phytoconstituent present in the plant. The extracts obtained after performing successive solvent extraction were investigated for the presence of various classes of secondary metabolites. Therapeutically important constituents such as phyosterols, poly phenolic compounds and flavonoids were found to bepresent.

KEYWORDS*: Cipadessa baccifera, Pharmacognostical, Physico-chemical, Qualitative chemical tests*.

INTRODUCTION

Cipadessa baccifera (Meliaceae), chiefly known as *Pulippanchedi* is a potent medicinalplant, particularly used by the region of UttraKhand (India) for snake bite and liver diseases. The plant is distributed throughout the of UttraKhand, especially inthe dense forest of region.[1] The tribal people of Uttrakhand employ the stems and leaves of the plant for preparing decoctions and pastes. The decoction is used for treatment ofjaundice whereas the paste is used for applying at the site of snake bite.[2] However there isno recorded data were available for microscopical evaluation, physicochemical parameters and preliminary phytochemical screening which contribute to pharmacognostical standardization. Hence the present study aims to assess the standards required for the quality control of the stem and leaves of *Cipadessa baccifera.*

Botanical description

Cipadessa baccifera is a Shrub of 2-3 m tall. Young branches are grayish brown in colour, ribbed, and are

covered with yellow velvet like hairs and grayish white lenticels. The branchlets are tomentose. Leaves are found to be odd-pinnate with leaflets of 3-5 pairs which are opposite, 3-7 x 2-3.5 cm of length and breadth, narrowly oblong to ovate. The base is acute or rounded, margins are found to be irregularly dentate towards apex. The apex is acuminate and the petiolule is up to 8 mm long. Flowers are white in colour, with a diameter of 3-4 mm. Flower stalks are found to be 1-1.5 mm long. Panicles are axillary and corymboseand peduncle is up to 7 cm long. Calyx-lobes are 1 mm long, spreading, triangular and pubescent. Flower petals are 3.5-4 mm long, white or yellow, linear to oblong-elliptic. Flowerstalks are 1-1.5 mm long. Sepal cup is somewhat short, yellow velvety in outside. Sepals are broadly triangular. Ovary 5-6 which are angular, ovules 2 per cell is present. Stigma is turbinate. Fruit is purple to black, globose, 4-5 mm in diameter.[1]

MATERIAL AND METHODS

Anatomical studies

The collected samples were cut and left in formaldehyde acetic acid (FAA) solution for minimum of 24 hours. The specimens were dehydrated with series of tertiary butyl alcohol (TBA) and ethanol mixtures.[3] The specimens were transferred to pure paraffin wax and they were cast into paraffin blocks. The paraffin embedded specimens were sectioned with the help of rotary microtome. The thickness of the sections was 10-12µm. Dewaxing of the sections was by customary procedure.[4] The sections were stained with toluidine blue 0.25% at the pH of 4.7, since toluidine blue is a polychromatic stain.[5,6]

Powder microscopy

The material was immersed in Jeffrey's Maceration fluid Maceration fluid. When materials become soft, they are washed thoroughly for three or four times in distilled water. The material was then mounted in a drop of water on a slide along with a drop of dilute (0.5%) safranin. After draining the stained water, a drop of dilute glycerine was added to the powder and is closed with a cover slip. The slide was observed under Polarized light Microscope.[7, 8]

Physico-chemical constants

Physico chemical constants such as ash values, extractive value and loss on drying were carried out.[9, 10, 11, 12]

Preliminary phytochemical screeningPreparation of extracts

The powdered and dried stem and leaves of *Cipadessa baccifera* were subjected to successivesolvent extraction using organic solvents with increasing order of polarities like petroleum ether, benzene, chloroform, acetone, ethyl alcohol and water. The solvent was removed by distillation and concentrated. The resultant extracts were utilized for preliminary phytochemical investigation.

Qualitative chemical examination

The extracts obtained as above were then subjected to qualitative chemical tests for the identification of various classes of plant constituents.

RESULTS AND DISCUSSION

Transverse section of stem

The stem showed fairly thick secondary tissues. However, no periderm was observed. The thin epidermis was distinct and intact. The cells were oblong with a thick cuticle. The parenchymatous cells were found to be tangentially elliptical with radial walls and less compact. The vascular cylinder has thick radial segments of secondary xylem; the segments were separated from each other by parenchymatous vascular (xylem) rays. Secondary xylem has thick-walled narrow fibres and wide, angular, thin-walled radial multiple vessels. The Pith was extensive, and parenchymatous.

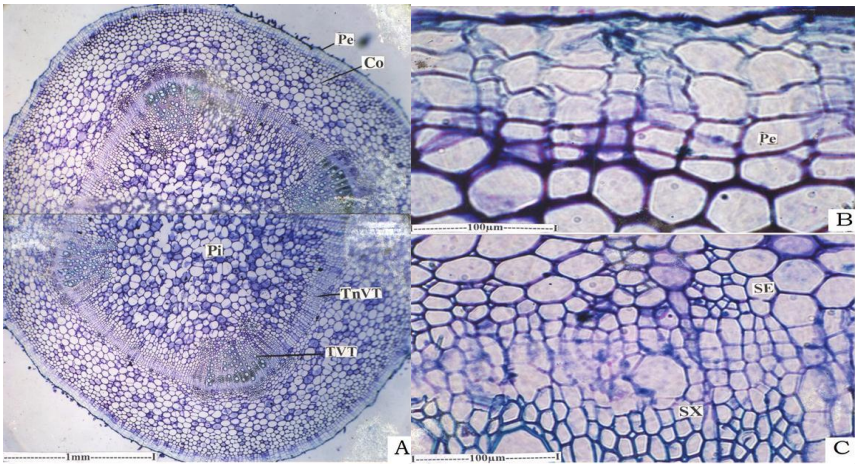


Fig. 1: Transverse section of the stem of *Cipadessa baccifera.*

(Co: Cortex; Pe: Periderm; Pi: Pith; TnVT: Thin portion of the vascular tissue; TVT: Thick portion of the vascular tissue. Pe: Periderm; SE: Sieve Elements; SX: Secondary Xylem).

Transverse section of leaf

Lamina: The epidermis was reasonably thick with spindle-shaped thin-walled cells. The mesophyll tissue consists of two layers of palisade cells; the upper layers of cells were wide and lower layer narrow and short. The spongy mesophyll tissue consisted of five or six layers of lobed loosely arranged cells.

Midrib

It consisted of a thin epidermal layer of squarish cells and homogeneous circular or angular compact, thinly walled ground tissue. It has scattered xylem elements and a thin band of phloem. The lateral bundle was circular, and the xylem elements were angular and thick- walled; the elements were in clusters; the phloem was in small

nests.

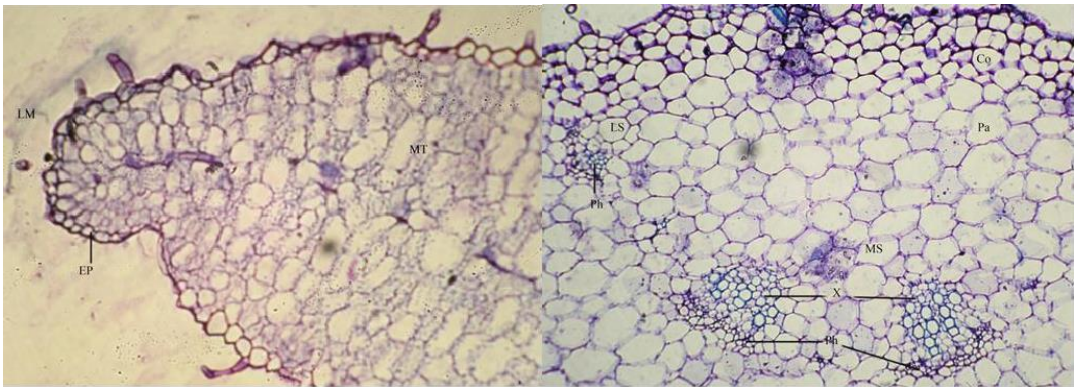
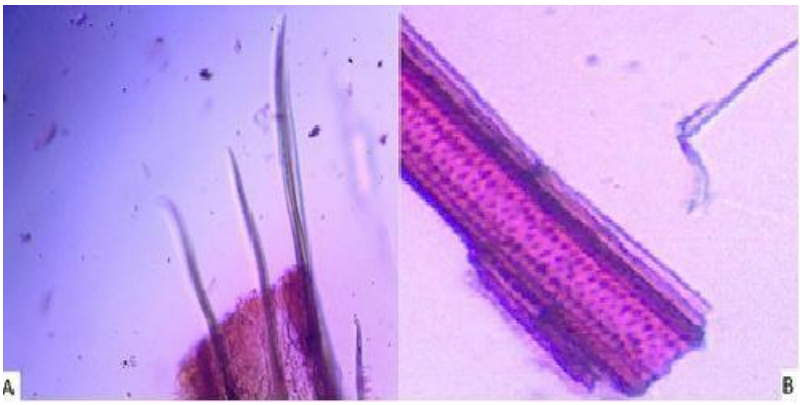


Fig. 2: Transverse section of the leaf of *Cipadessa baccifera.*

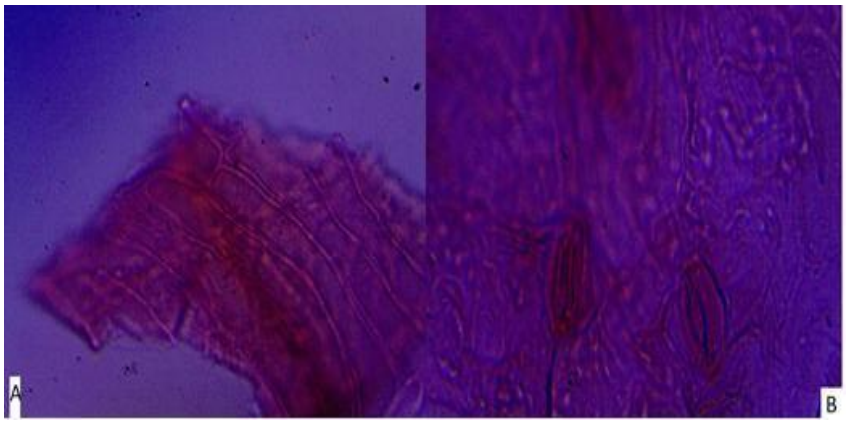
(Lamina: MT: Mesophyll tissue; Ep: Epidermis; Midrib LS: Lateral vascular strands; MS: Median vascular strands; CO: Cortex; Pa: Parenchyma; Ph: phloem; X: Xylem).

Powder Microscopy

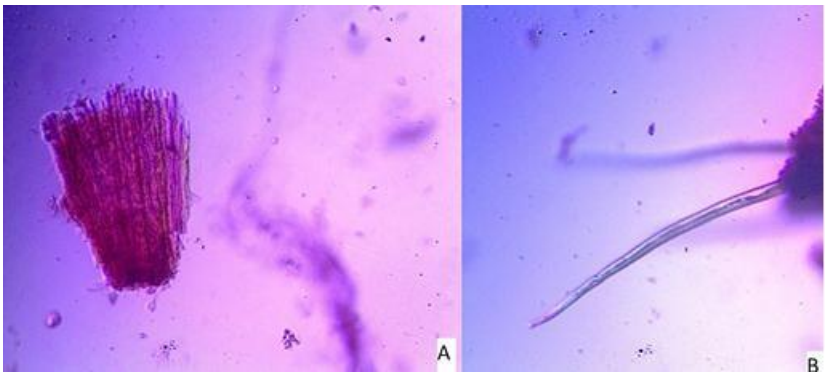
The powder microscopy of the stem and leaves of Cipadessa baccifera revealed the presence of epidermal peeling, xylem vessel, unicellular covering trichomes, paracytic stomata, ray parenchyma cells and ray vessels.



A. Epidermal peeling; B. Xylem vessel



A. Ray parenchyma cells B. Paracytic stomata



A. Ray vessel B. Unicellular covering trichome

Fig. 3: Powder microscopy of the leaf and stem of *Cipadessa baccifera.*

Preliminary phytochemical screening

50 g of dried coarse powder of stem and leaves of *Cipadessa baccifera* was extractedsuccessively in soxhlet with petroleum ether, benzene, chloroform, acetone, alcohol andwater and percentage was calculated (Table 1). Preliminary phytochemical studies carried outon the extract showed the presence of phytosterols, fixed oil and fat, flavonoids, tannins, phenolic compounds, carbohydrates, glycosides, amino acids and mucilages. The study revealed that the phytosterols are present in petroleum ether and benzene soluble parts, flavonoids in acetone, alcohol and water soluble parts, phenolic compounds in acetone,alcohol and water soluble parts while carbohydrates, mucilages, glycosides and amino acids is only in water soluble part (Table 2).

Physicochemical Constants

The percentage of total ash, acid insoluble ash, water soluble ash, sulphated ash, nitrated ash and carbonated ash were estimated and the results are presented in Table 3. The extractive values (Table 4) are of great importance for the quality control of crude drugs. The results showed that water soluble extractive of *Cipadessa baccifera* determined by hot extraction is more. Moisture content of the drug was found to be 1.8% w/w.

Table 1: Extractive values of various extracts of *C. baccifera* prepared by Successive solvent extraction.

SI. No.	Solvent	Colour and Consistency	Extractive value (% w/w)
1	Petroleum ether	Greenish black, Sticky; semisolid	1.662
2	Benzene	Greenish black, Non sticky; solid	1.1322
3	Chloroform	Greenish black Non sticky; solid; glassy	0.9428
4	Acetone	Brownish black Sticky; semisolid	0.9146

5	Ethyl alcohol	Brownish black Sticky; semisolid	4.0088
6	Chloroform water	Dark brownish Sticky; solid	4.9894

Table 2: Qualitative preliminary phytochemical screening of various extracts of *C. baccifera.*

Sl. No	Test	Pet. ether	Benzene	$CHCl_3$	Acetone	Et.OH	Water
1	Alkaloids	-	-	-	-	-	-
2	Carbohydrates & glycosides	-	-	-	-	-	+
3	Phytosterols	+	+	-	-	-	-
4	Fixed oils &Fat	+	+	-	-	-	-
5	Saponins	-	-	-	-	-	-
6	Tannins & Phenolic compounds	-	-	-	+	+	+
7	Aminoacids	-	-	-	-	-	+
9	Gums &mucilages	-	-	-	-	-	+
10	Flavonoids	-	-	-	+	+	+

(+ present - absent)

Table 3: Ash values of *C.baccifera.*

Sl. No	Parameter	Values in % (w/w)
1	Total ash	14.6
2	Acid insoluble ash	4.6
3	Water soluble ash	5.5
4	Sulphated ash	17.2
5	Nitrated ash	9.2
6	Carbonated ash	8.8

Table 4: Extractive values of *C.baccifera.*

Sl. No	Parameter	Values in % (w/w)
1	Water soluble extractive value (hot percolation)	11.122
2	Alcohol soluble extractive value (cold maceration)	3.968
3	Water soluble extractive value (cold maceration)	9.648

CONCLUSION

Recently, plants play an essential role as the most important source of drug discovery,regardless of the classification of herbs, shrubs or trees, and are essential in the treatment of various forms of the disease. *Cipadessa baccifera* is a herb that is used to treat various diseases by tribal people of UttraKhand. The parameters investigated through the present study canbe useful for identifying, validating, preserving the quality, purity and efficacy of the medication to preserve it, and helping researchers in future studies.

REFERENCES

1. Sasidharan, N. Biodiversity Documentation for UttraKhand. Part 6: Flowering Plants. KFRI Handbook No. 17. UttraKhand Forest Research Institute, Peechi, Thrissur, UttraKhand, India, 2004;89.

2. Ayyanar M, Ignacimuthu S: Traditional Knowledge of Kani tribals in Kouthalai ofTirunelveli hills, Tamil Nadu, India. Journal of Ethnopharmacology, 2005; 102: 246-255.
3. Sass, J.E., "Elements of Botanical microtechnique", McGraw Hill Book Co, New York,1940; 222.
4. Johansen, D. A. Plant Microtechnique. Mc Graw Hill Book Co; New York, 1940; 523.
5. O'Brien, T. P., Feder, N., and Mc Cull, M. E. Polychromatic Staining of Plant Cell walls by toluidine blue-O. Protoplasma, 1964; 59: 364-373.
6. Mahadevan, A. and Sridhar, R. Methods in Physiological Plant Pathology. 4th Edn.Sivakami Publication, Chennai, Tamil Nadu, 1996; 182.
7. Brain, K. R., and Turner, T. D. The Practical Evaluation of Phytopharmaceuticals, Wright-Scientechnica, *Bristol*, 1975; 36-45.
8. Kokate, C. K. "Practical Pharmacognosy", Vasllabh Prakashan, New Delhi, 1st ed., 1986**;**15-30.
9. Harborne JB. Phytochemical Methods: A Guide to Modern Technique of Plant Analysis Chapman and Hall Ltd., London, 1973; 49-188.
10. O. O. Debiyi and F. A. Sofowora, "Pytochemical screening of medical plants," Iloyidia, 1978; 3: 234–246.
11. T. S. Roopashree, R. Dang, R. H. S. Rani, and C. Narendra, "Antibacterial activity of antipsoriatic herbs: *Cassia tora, Momordica charantia* and *Calendula officinalis*," International Journal Applied Research in Natural Products, 2008; 1(3): 20–28.
12. A. Sofowora, Phytochemical Screening of Medicinal Plants and Traditional Medicine in Africa, Spectrum Books Ltd, Ibadan, Nigeria, 1993.