



PHARMACOGNOSTIC AND PHYTOCHEMICAL EVALUATION OF *BERGENIA CILIATA* RHIZOME

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ABSTRACT

Bergenia ciliata belongs to family saxifragaceae. The genus *Bergenia* comprises of about 6 species. *Bergenia* species distributed in South and East Asia and European countries. In India these plants grow at high altitudes in the Himalayas usually in rocky areas and on cliffs. The current study was carried out to provide requisite Pharmacognostic and Phytochemical details about the plant. Pharmacognostic investigation of air dried coarsely powdered rhizomes was carried out to determine its morphological as well as microscopical profile. Phytochemical investigation of aqueous extracts shows the presence of flavonoids, tannins, amino acids and proteins whereas the ethanolic extracts shows the presents of glycosides, flavonoids, amino acids, steroids, tannins and phenolic compounds. The physicochemical parameters of rhizomes are Total ash- 4.1±0.2 % , Acid insoluble ash- 2.0±0.2 % , Water-soluble ash- 2.3±0.2 % , Sulfated ash- 5.8 % , Water soluble extractive - 19.5±1.5 % , Alcohol soluble extractive - 17±1.0 % , Petroleum ether soluble extractive - 6±0.7 % , Moisture content - 3.2±2.0 % . The result of the present study can be useful in setting some diagnostic indices for the identification and preparation of monograph of the plant.

Key words: Pharmacognostic, *Bergenia ciliata*, Phytochemical.

INTRODUCTION

It is perennial herb upto 50 cm tall, succulent, distributed in temperate Himalayan region (from Kashmir to Nepal) from 2000-2700 m. very common rocks in and around the Murree area [1]. Leaves variable coarsely hairy, sparsely hairy to glabrous, leaf apex obtusely pointed, alternate and exstipulate or with stipules adnate to the base of the petiole, or opposite and exstipulate. Flowers are usually hermaphrodite; sepals, petals and stamens symmetrically regular pinkish white. Calyx usually 5-merous, more or less adnate to the ovary; lobes imbricate or valvate. Petals 5 or 4 (rarely 0), usually perigynous, often small imbricate or valvate. Stamens inserted with the petals, equaling or double their number, rarely indefinite. Ovary of 2 or 3-5 united carpel's, usually 2 or 3-5 celled with axile placentas, occasionally 1-celled with parietal placentas, ovules numerous, anatropous, erect or pendulous; styles as many as the carpels, free or more or less connate, stigma capitate, or lateral and subcapitate. Fruit capsular or baccate. Seeds usually numerous, usually albuminous. Rhizomes 4.2-12.3 cm long and 1.2-2.0 cm in diameter [2-6].

Bergenia ligulata root, rhizome, and whole plant are used for kidney and bladder stones, urinary problems [7-8]. Rhizome is the main part or source of drug. It is light, cool, bitter, have useful effect in cough and cold [9] flowers are also consume as a form of pickled. With honey *Bergenia ligulata* is applied to gums in teething of children to allay irritation. *Bergenia ligulata* has been reported to exhibit various pharmacological activities and thus has several traditional uses. It is used as an antidiabetic, antipyretic, and as a tonic [10]. Ethanobotanical study of upper siran velly in Pakistan show that *Bergenia ligulata* used as diuretic, hepatoprotective. Alcoholic extracts of *Bergenia ligulata* showed diuretic, anticancer, cardiovascular, antiscorbutic, antiprotozoal, antilithiatic property.

MATERIAL AND METHODS

The rhizomes of plant *Bergenia ciliata* were collected from S.G. Phyto Pharma Kolhapur and authenticated in our Pharmacognosy Department and a voucher specimen of Ph-13 is preserved. Air dried

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coarsely powdered plant material was extracted with water for 48 hrs by maceration and with ethanol (95%) using Soxhlet apparatus for 4-5 hrs. Both the extracts were concentrated and used for the phytochemical studies.

Chemicals and Instruments

Microscope, glass slides, cover slips, watch glass and other common glassware were the basic apparatus and instruments used for the study. Reagents viz. phloroglucinol, glycerin, HCl, iodine solution, chloral hydrate, safranin and sodium hydroxide etc were used.

Pharmacognostic Studies

Morphological Evaluation

In the morphological evaluation various organoleptic characters such as color, odour, taste, size & shape were determined. The macroscopic features of the rhizome of *Bergenia ciliata* were determined using the methods of Dr. C.K. Kokate [11].

Microscopical Evaluation

T.S. of *Bergenia ciliata* Rhizome

T.S. of rhizome of *Bergenia ciliata* was taken, then stained with Phloroglucinol and Conc. HCl, mounted with glycerin and observed under a compound microscope for identification of internal structures like cork, cortex, medullary rays, xylem, phloem [12] etc.

Powder microscopy

Powder microscopy was carried out to determine cork cells, fibers, starch grains, xylem vessels, according to the methods out-lined by Khandelwal KR [13] and Iyengar MA [14].

Phytochemical investigation

The physicochemical Parameters

The physicochemical constant such as percentage of total ash, acid-insoluble ash, water soluble ash, water soluble extractives, alcohol soluble extractives, petroleum ether soluble extractives and loss on drying were calculated as per the WHO guidelines [15].

Qualitative chemical identification tests:

The qualitative chemical tests for both the aqueous and ethanolic extracts were carried out as described by Harborne [16], Trease and Evans [17]. Various secondary metabolites such as Flavonoids, Tannins, Amino acids and Proteins were observed in aq. extracts while ethanolic extract of rhizome showed the presence of Glycosides, Tannins, Flavonoids, Amino acids, Steroids, Carbohydrates and Phenolic compounds.

RESULT AND DISCUSSION

Morphological features of plant *Bergenia ciliata* shows that rhizomes are 4.2-12.3 cm long and 1.2-2.0 cm in diameter, surface is rough, yellowish brown in color, with characteristic odour and bitter in taste. T.S. of the rhizome revealed the presence of cork, cortex and ground tissues. Cork cells are further divided into outer cork and inner cork. Cortex contains parenchymatous cells which contains starch grains and ground tissues shows presence of xylem, phloem and medullary ray. Powder microscopic examination of the rhizome revealed the presence of starch granules, cork cells, parenchyma cells, xylem vessels, and fibers.

The observations of the phytochemical study of *Bergenia ciliata* are as follows

Table 1. Morphological Characters of Rhizomes of *Bergenia ciliata*

S. No.	Features	Observation
1	Color	Yellowish brown
2	Odour	Characteristic and slight
3	Shape	Barrel shaped
4	Size	4.2-12.3 cm long and 1.2-2.0 cm in diameter
5	Fracture	Short & fibrous
6	Texture	Rough
7	Taste	Bitter

Table 2. Phytochemicals present in the various extracts of *Bergenia ciliata* rhizome

S. No.	Phytoconstituents	Aq. extracts	Ethanolic extract
1	Alkaloids	-	-
2	Glycosides	-	+
3	Carbohydrates	-	+
4	Flavonoids	+	+
5	Tannins	+	+
6	Steroids	-	+
7	Amino acids	+	+
8	Saponins	-	-
9	Proteins	+	-
10	Phenolic compound	-	+

+ = Present, - = Absent

Table 3. Physicochemical parameters of *Bergenia ciliata*

S. No.	Parameter	Determined value (%W/W)
1	Total ash	4.1±0.2 %
2	Acid insoluble ash	2.0±0.2 %
3	water-soluble ash	2.3±0.2 %
4	sulfated ash	5.3 %
5	Water soluble extractive	19.5±1.5 %
6	Alcohol soluble extractive	17±1.0 %
7	Petroleum ether soluble extractive	6±0.7 %
8	Moisture content	3.2±2.0 %

Fig. 1. Rhizome Of *Bergenia ciliata*



Fig. 2. Plant of *Bergenia ciliata*



Fig. 3. T.S. of *Bergenia ciliata* Rhizome

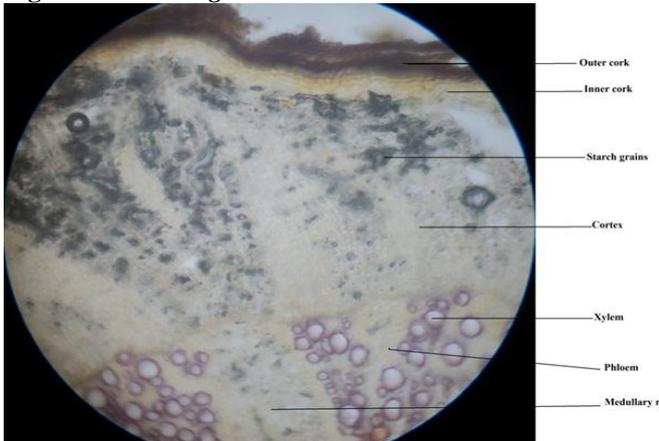


Fig. 4. Cork cells

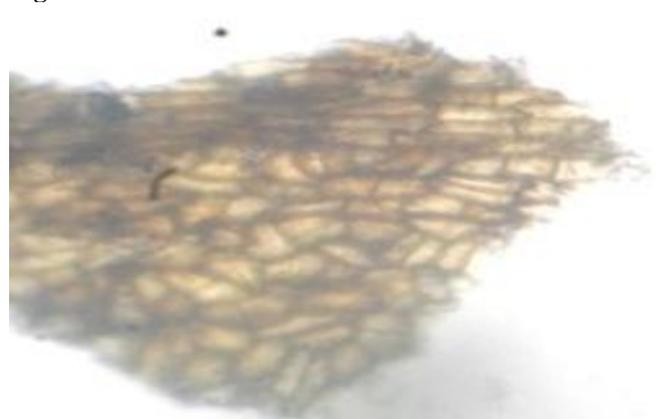


Fig. 5. Starch grains

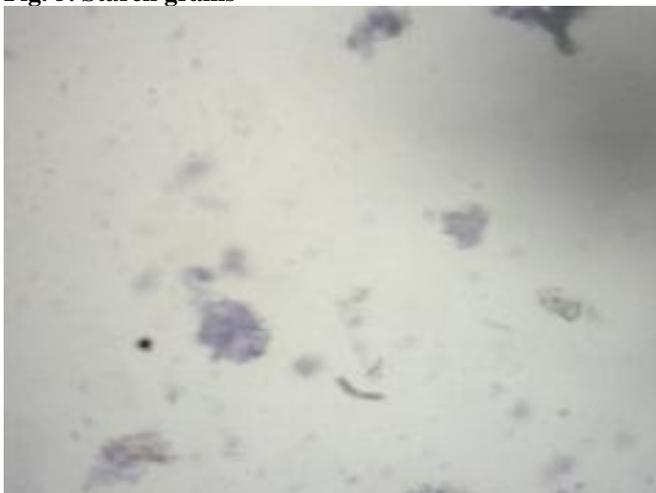


Fig. 6. Xylem Vessels



Fig. 7. Fibers



Fig. 8. Parenchyma cell



CONCLUSION

Pashanabedha is an important Ayurvedic drug, used in the Indian system of medicine. The different parts of the plant, either alone or as an ingredient in compound preparations, were claimed to be useful in the treatment of

urinary calculi, dysuria, wounds, polyuria, piles, abdominal disorders, cardiac disease, and uterine diseases. The above parameters, which are being reported for the first time, could be useful in the preparation of the herbal section of Indian Herbal Pharmacopoeia.

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