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Research Article

Pharmacognosy of Flower -*Barleria Prionitis* L.

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ABSTRACT
Barleria prionitis L. belongs to family Acanthaceae. In ayurvedic system of medicine it is known as Kuranta, Kuranda and Sahachara. It is also known as Vajradanti. The root, stem, leaves are mainly used as medicines. The flowers too have therapeutic value in curing dental problems, fever, etc. The use of flower is less known hence it was felt necessary to investigate this plant part. Pharmacognosy is the first step in deciding the status of a plant organ as a crude medicine. Hence comprehensive Pharmacognostic study of *Barleria prionitis* L. flower was done. In the present study various aspects of pharmacognosy like macroscopy, microscopy, histochemical analysis, powder study, preliminary phytochemical screening, fluorescence analysis, and physicochemical constants were laid down. The diagnostic characters of the flower is presence of druse crystals, glandular and non-glandular trichomes, oil globules, chlorenchyma cells etc. Physicochemical study revealed total ash (8%), acid insoluble ash (1.8%), water soluble ash (2 %), water soluble extractive value (3.5%), alcohol soluble extractive value (1.08%) and chloroform soluble extractive value (0.24 %).

Keywords: Pharmacognosy, *Barleria prionitis,* flower

INTRODUCTION

The world rely on herbal medicines to treat various ailments. The effect of Western medicines is not satisfactory and has adverse drug reactions. Hence, there is search for herbal medicines. Many of the herbals lack strong scientific evidences hence study of this drug is very important. Pharmacognosy is the first step towards the identity of crude drugs. For the present investigation *Barleria prionitis* L. Flower is given due importance. As this plant is well known in Ayurveda for its medicaments. The use of root and leaves are more prominent than the flowers.

Brleria prionitis L. is a shrub. It is known by several names like Kuranta, Kurantaka, Sahachara & Shaiariya. "Vajradanti" is also the common name of the plant because of its anti-dentalgia property[1]. The plant belongs to the family Acanthaceae[2]. The flower is used in treating catarrhal affections of children, glandular swellings, boils, fever, toothache, inflammation and gastrointestinal disorders[3, 4]. Analgesic activity of the flower is also reported[5, 6]. It is also used internally for treatment of migraine, internal abscesses, oedema, urethral discharges and obesity [7, 8]. In order to lay down the pharmacopoeial parameters for the said plant parts the current study is put forth.

MATERIAL AND METHODS

The flower samples were collected from Gorai creek, Mumbai. The sample was authenticated for its botanical identity and voucher specimen has been deposited in Botany Research Laboratory of Mithibai College. The fresh mature flowers were used for macroscopic, microscopic and histochemical studies. Remaining flowers were dried and ground to powder. Before drying the androecium and gynoecium were separated from every flower.

Macroscopic study was performed for various parameters [9, 10]. For microscopic inspection hand cut transverse sections of flowers (bracteole, calyx and corolla) were taken and made permanent with suitable stains [11, 12]. The histochemical analysis for the cell contents were performed using various reagents [13]. In powder study, the drug was treated with aqueous solution of chloral hydrate and mounted in 50% glycerin for microscopic studies [14]. The fluorescence response of powdered drugs exposed to U.V. radiations was studied using the standard procedure [15, 16]. For physicochemical analysis, determination of ash values and extractive values were done [17, 18]. In qualitative phytochemical screening, a known quantity of dried powder was extracted with water, alcohol and chloroform. These extracts were tested for different constituents [19].

RESULTS

Macroscopic study of flower: The inflorescence is spikelet type. The flowers are sessile, zygomorphic, bisexual and hypogynous. The bracts are foliaceous, 1.5-4.5cm oblong, acute bristle tipped, nearly glabrous. Bracteoles is 1 cm long, narrowly, spinous bristle tipped. Calyx, two partite, mucronate, ovate-oblong, 1 cm wide. Corolla is 3 -4cm long, pubescent outside, glabrous

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inside, 2 lipped, upper lip long or more, 4 lobed, lobes oblong obovate rounded; lower lip- oblong, ovate rounded, entire, tube 1 cm long. Androecium, 2 fertile and 2 staminode, filament of fertile stamens extrose, staminode introse, filament hairy and glandular, pubscent and yellow, anthers extrose. Gynoecium consists of long and linear, stigma. (Figs: 1, 2)

Fig 1: Habit

Fig 2: L.S. of flower

Organoleptic study: The colour of the bracteole and calyx is green while the corolla is golden yellow. The flower shows characteristic odour and taste.

Microscopic study of flower:

T.S. of flower passing through bracteole:

The internal structure of bracts is similar to the T.S. of leaf. It shows –

T.S. of bracteole passing through lamina.

Outer epidermis: It is single layered compactly arranged rectangular cells covered with thick cuticle and interrupted with glandular small stalked trichomes. The head of the trichome is globular. The epidermal cells also shows the presence of calcium oxalate crystals (druse crystals) at intervals.

Middle region: The middle region is similar to the mesophyll region of lamina. It is composed of single layered elongated palisade cells of different size. The palisade cells are longer and sometimes two layered near to the midrib region on both the sides. The palisade region is in continuity with compactly arranged spongy tissues. The middle region also shows poorly developed vascular bundle.

Inner epidermis: It is concurrent with the upper epidermis but shows absence of trichomes. (Fig.4)

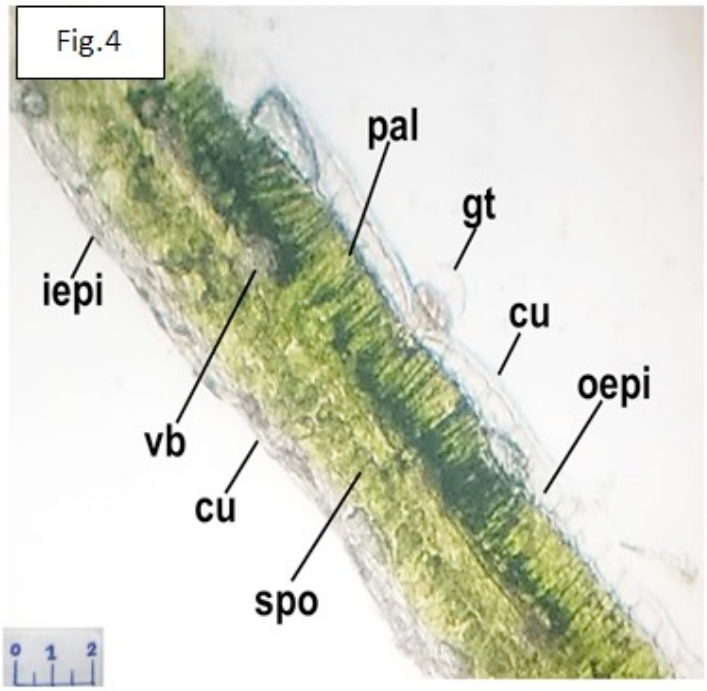

Fig 4: T.S. of flower passing through the lamina of bracteole x 100

T.S. of bracteole passing through midrib.

Outer epidermis: it is single layered compactly arranged rectangular cells covered with thick cuticle. It is devoid of trichomes. The epidermal cells close to the lamina also shows the presence of large calcium oxalate crystals (druse crystals) at intervals.

Middle region: The epidermal cells are followed by 4 - 5 layered collenchyma cells. This region is continued with thin layered polygonal parenchymatous cells. The cells are filled with starch grains. A single omega shaped vascular bundle is present within the parenchymatous region. The vascular bundle consists of xylem towards the outer side and phloem towards the inner side.

Inner epidermis: It is similar to outer epidermis. Above the inner epidermis is present 2 -3 layered collenchymatous cells. Prominent druse crystals are also observed within this epidermal cells. (Fig, 3)

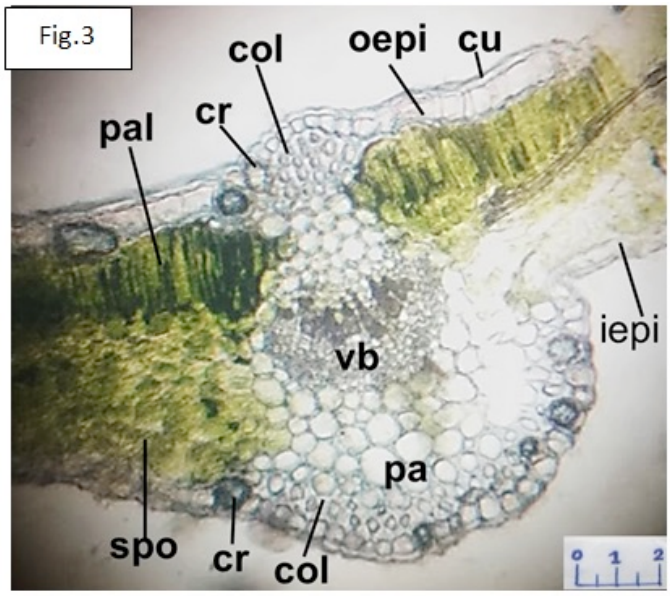

Fig 3: T.S. of flower passing through the midrib of bracteole x 100

T.S. of flower passing through Calyx:

Outer epidermis: it is single layered compactly arranged rectangular cells covered with thick cuticle and interrupted with glandular small stalked trichomes.

Middle region: It consists of 4 -5 layers of compactly arranged chlorenchyma cells. It is followed by 2 -3 layers of polygonal compactly arranged parenchymatous cells. The parenchyma cells are filled with oil globules. Vascular bundles interrupts this region. Xylem towards the outer side and phloem towards the inner side. These layers are continued with 2 layers of collenchyma cells.

Inner epidermis: is similar to outer epidermis but lacks the glandular trichomes. (Fig. 5)

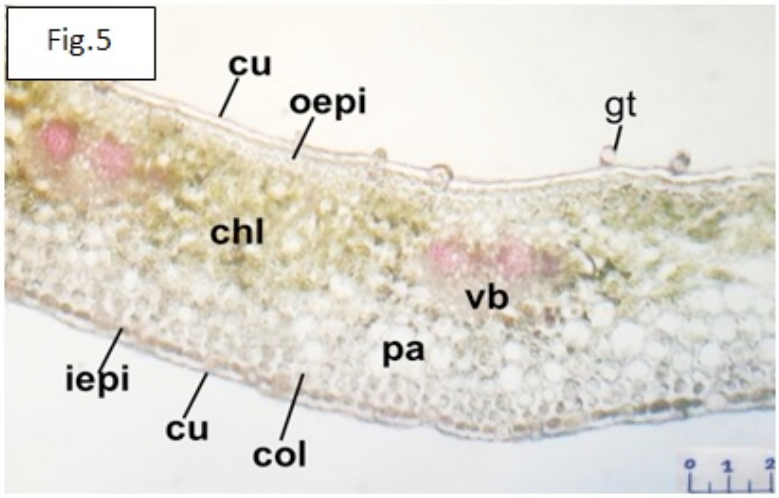

Figure 5: T.S. of flower passing through calyx x 100

T.S. of flower passing through corolla:

Outer epidermis: It consists of compactly arranged rectangular epidermal cells covered with cuticle. The

outer epidermis is interrupted with unicellular, uniserriate and multiserriate trichomes. It also possess glandular trichomes at intervals. The glandular trichomes has long stalk and a small globular head. The amount of trichomes are more towards the claw of the petals compared to the limb.

Middle region: The epidermis is followed by a single layer of compactly arranged cells filled with pigments. It is continued with 4 -5 layered compactly arranged parenchymatous cells, the cells are elongated and filled with oil globules. This region shows vascular bundles. Vascular bundle shows xylem at the periphery and phloem towards inner side.

Inner epidermis: is similar to outer epidermis and covered with thicker cuticle. Above the inner epidermis it shows a single layers of pigmented cells. The trichomes are absent in this epidermal region. (Figs: 6,7)

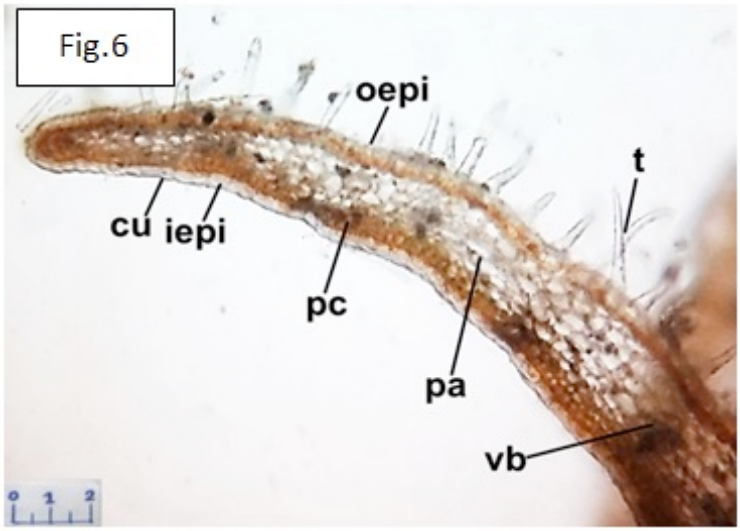

Figure 6: T.S. of flower passing through corolla x 100

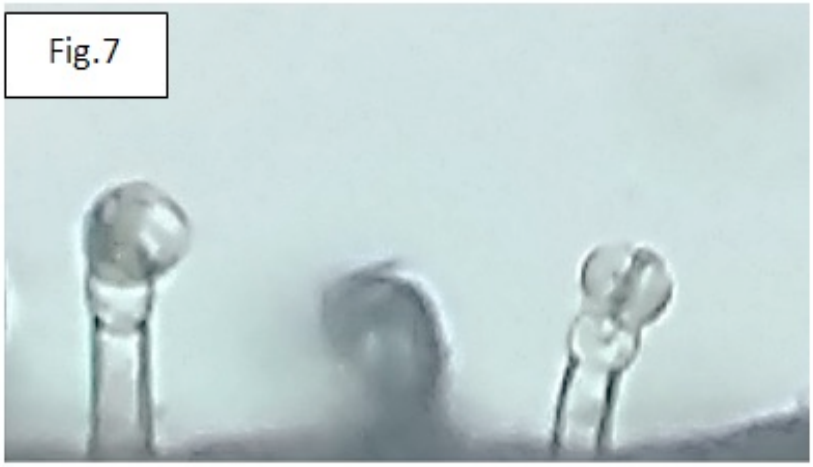

Fig 7: Glandular trichomes x450

Histochemical analysis: The flower sections were stained with various reagents. The results obtained are given in table 1.

Table 1: Histochemical Analysis of *Barleria prionitis* L. flowers

Sr. No.	Plant constituent Tests	Observations
1	Test for starch	Present
2	Test for Lipids	Present
3	Test for Proteins	Present
4	Test for Tannins	Absent
5	Test for Alkaloids	Present
6	Test for Saponins	Present
7	Test for Glucosides	Present
8	Test for Mucilage	Absent
9	Test for Calcium oxalate crystals	Present

Powder study of flowers:
The flower powder is light green to yellowish in colour, coarse in texture. It has a characteristic odour and taste. Microscopically the powder shows presence of palisade cells, spongy tissues, druse crystals, oil globules, starch grains, unicellular uniserriate and multiserriate non glandular trichomes, glandular trichomes with short stalk and globular head as well as long staked glandular trichomes. Collenchyma cells, parenchyma cells, annular vessels, pigmented cells. (Fig. 8)

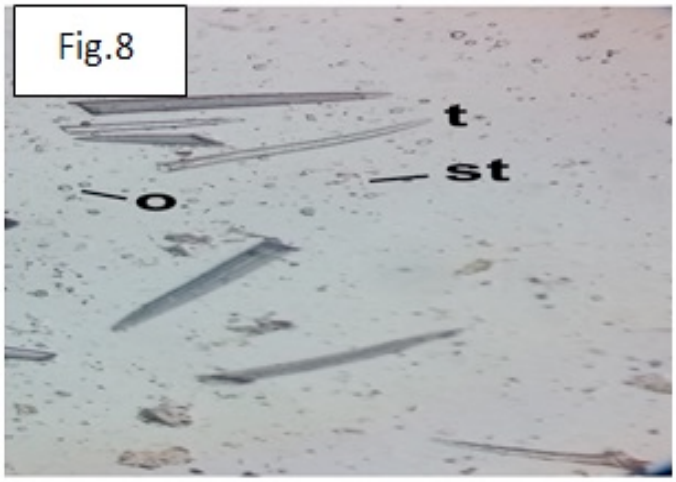

Fig 8: Powder study showing oil globules, starch grains and trichomes x 100
Abbreviation: cu – cuticle, oepi – outer epidermis, iepi – inner epidermis cr – druse crystal, pal – palisade tissue, spo – spongy tissues, col – collenchyma, pa – parenchyma, vb – vascular bundle, t – trichome, gt – glandular trichome, pc – pigmented cells. Chl – chlorenchyma cells

Physicochemical evaluation: The parameters like ash values and extractive values for the flowers are summarized in table 2.

Table 2 : Physicochemical evaluation of *Barleria prionitis* L. flowers

	Total ash	**Not more than 8%**
Ash values	Acid insoluble ash	Not more than 1.8 %
	Water soluble ash	Not more than 2%
	Ethanol	Not less than 1.08%
Extractive values	Water	Not less than 3.5 %
	Chloroform	Not less than 0.24 %

Fluorescence analysis: The flower powder was treated with various reagents and the results obtained are mentioned in table 3.

Table 3: Fluorescence analysis of *Barleria prionitis* L. flowers

Test	**i**	**ii**	**iii**	**iv**	**v**	**vi**	**vii**	**viii**	**ix**
Fluorescence	2gY	2y	2G	2yG	3G	1G	2G	3G	1G

Keys to the letters and numbers used-

Predominant colours:	Modifying colours:	Quality of colours:
G- Green	y- Yellowish	1 Very light
		2 Light
		3 Dark

Preliminary phytochemical analysis: The qualitative phytochemical analysis of flower powder reveals the presence of various primary and secondary metabolites. Table 4

Table 4 : Preliminary Phytochemical Screening of *Barleria prionitis* L. flowers

Test for phytoconstituents	**W**	**C**	**E**
Test for Starch	+	+	+
Test for Terpenoids	+	+	+
Test for Proteins	+	+	+
Test for Amino acid	+	+	+
Test for Mucilage	-	-	-
Test for Alkaloids	+	+	+

Test for Anthraquinone glycoside	+	+	+
Test for Cardiac glycoside	+	+	+
Test for Saponin	+	-	-
Test for Tannins	-	-	-
Test for Steroids	-	-	-
Test for Flavonoids	+	+	+

Key: W- water extract, C- Chloroform extract, E- Ethanol extract, + Present, - Absent

DISCUSSION

The plant *Barleria prionitis* L. is known in Ayurvedic medicine. The root and leaves are in use compared to the flower. The use of flower in curing various ailments are less known. In order to put forth the importance of flowers the current study was carried out. The Pharmacognostical parameters mainly the macroscopic and microscopic characters observed in the flowers are of great value in identification. The bracteoles of the flowers microscopically go concurrent with the leaf microscopy mentioned in the research article[20]. The physicochemical and fluorescence analysis is also useful in solving the adulteration of the drug. The qualitative histochemical and phytochemical investigation revealed the presence of various phytoconstituents in the flowers. Thus, the detailed phytochemistry and pharmacology are necessary to confirm the potency of the above said drug.

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