



Pharmacognostical and Phytochemical Screening of *Bauhinia variegata* Linn leaves.

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ABSTRACT

Pharmacognostical characters of the leaves of *Bauhinia variegata* Linn was studied which showed the presence of thin walled epidermis, parenchymatous cells, abundant solitary calcium oxalate crystals, vascular bundles and multicellular covering trichomes. Leaf constant viz., stomatal index -5.27, vein islet number - 8.3, vein termination - 6.6, palisade ratio -7.6 were also studied. Physicochemical parameter such as total ash - 8 % w/w, water soluble ash value-2 % w/w, acid insoluble ash value - 6 % w/w, alcohol extractive value- 8 % w/w, water soluble extractive value -18.4 % w/w and loss on drying - 7 % w/w were also determined. Phytochemical screening showed the presence of steroids, saponins, flavonoids, alkaloids and tannins.

Keywords: *Bauhinia variegata* Linn, Pharmacognostical, Kanchanar, macroscopical, microscopical, phytochemical screening.

INTRODUCTION

Bauhinia variegata Linn (leguminosae), is known as Kanchanar in Hindi, is a medium sized tree abundant in Sub-Himalayan tract extending eastwards to Assam, Eastern, Central and South India (The Ayurvedic Pharmacopoeia, 2001). The various parts of the plants viz., leaves, flower buds, flower, stem, stem bark, seeds and roots are used in fever, as tonic, astringent, diarrhoea, dysentery, hemorrhoids, piles, edema, laxative, anthelmintic, antileprotic, in skin diseases, wound healing, antioitrogenic, antitumor, in obesity, stomatitis, antidote for snake poisoning, dyspepsia, flatulence and as carminative (Mali et al., 2007). The chemical constituents isolated so far from the plant are β -sitosterol, lupeol, kaempferol-3-glucoside, tannins (Wealth of India, 1998), carbohydrates, amides, reducing sugars, vitamin C, crude protein, fibers (Sharma et al., 1966), calcium, phosphorus (Sharma et al., 1968), quercetin, rutin, quercitrin, apigenin, apigenin-7-O-glucoside (Spilkova et al., 1992), heptatriacontan-12,13-diol and dotetracont-15-en-9-ol (Singh et al., 2006). A thorough survey of literature indicates that there is a no work done on the pharmacognosy of the drug. The present study is therefore undertaken to study the pharmacognostical and phytochemical screening of *Bauhinia variegata* Linn leaves which could be used as one of the parameter for the standardization of the crude drug.

MATERIAL AND METHODS

CHEMICAL: All the chemicals and solvents used in experiment were of analytical grade.

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Materials

Bauhinia variegata leaves were obtained from Regional Research Institute, Bangalore and authenticated by Dr Shiddamallyya.N (authentication reference no. RRI/BNG/SMP/Drug Authentication/2007-08/15 dated 09/05/2007). Voucher specimen is deposited in the Department of Pharmacognosy, The Oxford College of Pharmacy, Bangalore.

The samples after removal of soil and adhering material was dried at room temperature for 5-6 days powdered to 60 # and were used for the powder study. Free hand transverse section of fresh leaf were taken. Leaf constant such as stomatal index, palisade ratio, vein-islet and vein termination number were also determined. Physicochemical parameters such as ash values (total ash, acid insoluble ash, water soluble ash); extractive values (alcohol and water soluble extractive values) and loss on drying were determined (Indian Pharmacopoeia, 1996).

Preliminary Phytochemical screening:

The coarse powder of leaves of *Bauhinia variegata* (25 g) was subjected to successive extraction with different solvents in their increasing order of polarity from petroleum ether (60-80°C), chloroform, methanol and water. The extracts were concentrated and subjected to various chemical tests to detect the presence of different phytoconstituents (Khandelwal, 2003).

RESULTS AND DISCUSSION

Pharmacognostical characteristics of the leaf:

Macroscopical characteristics (Fig. No. 1):

The shape of *Bauhinia variegata* leaves is linear-lanceolate with entire margin, broad and rounded and bilobed apex, smooth and glabrous surface, running parallel venation, length varying from 10-13 cm and breadth is broader than long, cleft 1/4 to 1/3 of the way down into two obtuse lobes, green when fresh and brown when it dry, weak odor and slightly bitter in taste.

Transverse section (T.S.) of the leaf

Petiole: It shows (Fig. No. 2a & 2b) single layered epidermis covered



Fig. No. 1: Macroscopic characteristics of *Bauhinia variegata*

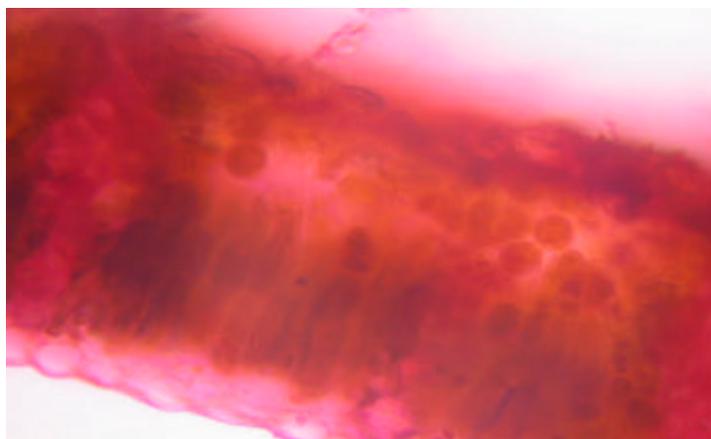


Fig. No. 3: Transverse section of Lamina of *Bauhinia variegata*



Fig. No. 2b: Transverse section of Petiole of *Bauhinia variegata* (enlarged)

EP
COR
SCL
VB
ACVB

Table no. 1: Physicochemical parameters of *Bauhinia variegata*.

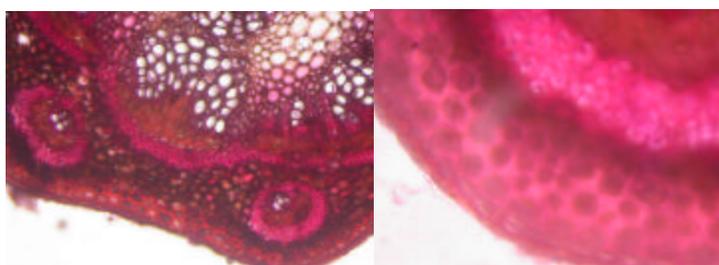
Sl.No.	Physical parameters	Constant value
1	Alcohol soluble extractive value	8 % w/w
2	Water soluble extractive value	18.4 % w/w
3	Loss on drying	7 % w/w
4	Total ash	8 % w/w
5	Water soluble ash	2 % w/w
6	Acid insoluble ash	6 % w/w

Table no. 2: Leaf constants of *Bauhinia variegata*

Leaf	Stomatal index	Palisade ratio	Vein-islet No.	Vein termination No.
<i>Bauhinia variegata</i>	5.27	7.6	8.3	6.6

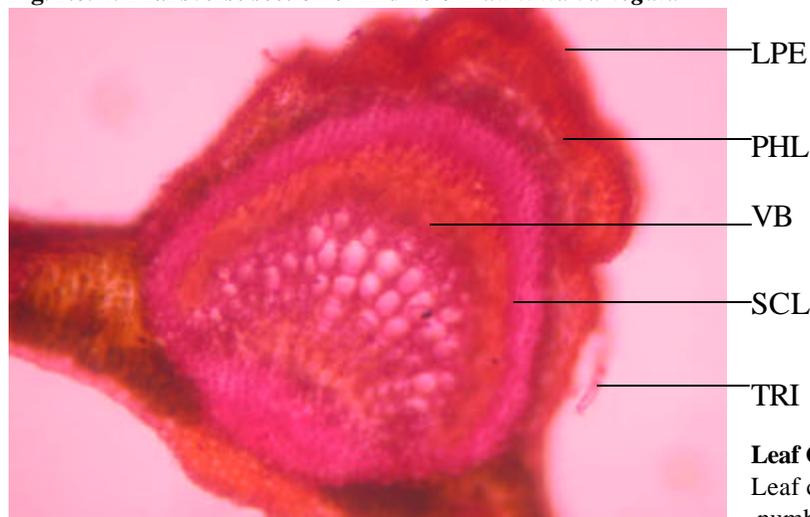
Table no. 3: Phytoconstituents of different extracts of *Bauhinia variegata*.

Tests	Pet-ether	Chloroform	Methanol	Water
1.Tannins	-	-	+	-
2.Alkaloids	-	+	-	-
3.Steroids	+	+	-	-
4. Glycosides	-	-	+	+
Cardiac	-	-	-	-
Anthraquinone	-	-	-	+
Saponin	-	-	+	-
Flavonoids	-	-	+	-
Coumarin	-	-	-	-
5.Sugars	-	+	+	+



1. PORTION ENLARGED (VBS, SCL, ACVB, EPI), 2. PORTION ENLARGED SHOWING VASCULAR BUNDLE 3. LOWER PORTION ENLARGED (SCL, COL, EP, CU)

Fig. No. 4: Transverse section of midrib of *Bauhinia variegata*



LPE

PHL

VB

SCL

TRI

Leaf Constants

Leaf constant such as stomatal index, palisade ratio, vein islet number, vein termination number were determined and are given in the Table no.2.

Preliminary phytochemical screening:

Phytochemical screening shows the presence of saponins, steroids, flavonoids, alkaloids, tannins, sugars and is given in the Table no. 3.

In the present study, Pharmacognostical characters of the leaves of *Bauhinia variegata* were studied including physicochemical parameters and leaf constants. The preliminary qualitative analysis of various extracts (petroleum ether, chloroform, methanol and water) for phytoconstituents showed that it contains steroids, saponins, flavonoids, alkaloids, sugars and tannins. The data obtained from the pharmacognostical, preliminary screening and physicochemical parameters of *Bauhinia variegata* Linn can therefore be used as one of the tool for standardization of the crude drug.

LPE- Lower epidermis, PHL- Phloem, VB- Vascular bundle, SCL- Sclerenchyma, TRI- Trichome

with thin cuticle. Epidermis is made up of thin walled, rectangular cells. Epidermis is followed by 2-3 layers of collenchymatous tissues which are arranged compactly and this is followed by parenchymatous cells which are thin walled and 2-4 layered. Some of the cells show abundant solitary calcium oxalate crystals. 2-5 layers of band of sclerenchymatous tissues are present prominently above the vascular bundle. Vascular bundles are prominent; xylem and phloem are well developed. Two small accessory vascular bundle are present in the cortical tissue near the wings.

Lamina: It shows (Fig. No. 3) well developed upper and lower epidermis covered by thin cuticle and made up of thin walled rectangular Cells. Palisade tissue is 2 layered, cells are columnar and sponge tissues, are loosely arranged and each and each nerve of the leaf shows well developed vascular bundle with xylem and phloem. In the mesophyll tissue vascular bundle of the veins are vertically transparent and vascular bundle are usually accompanied by sclerenchyma.

Midrib: It shows (Fig. No. 4) upper and lower epidermis with well developed thin cuticle. Both the epidermal cells are rectangular. Epidermis is followed by 2-3 layers of collenchymatous tissue and 2-4 layers of thin walled parenchymatous cells. Almost all cells are loaded with abundant solitary crystals of calcium oxalate and clustered crystals. Vascular bundle surrounded by sclerenchymatous tissue. Vascular bundle are shield shaped and well developed.

Powder microscopy

The powder microscopy of *B. variegata* leaves showed the presence of parenchyma cells with calcium oxalate crystals, vessels with helical to spiral thickenings, abundant crystals which are solitary and prism shaped, epidermal cells with anomocytic stomata.

Physico chemical parameters:

Physicochemical parameters includes extractive value, ash value and loss on drying were determined and are given in the Table no.1.

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