

Preliminary Pharmacognostic Evaluations and Phytochemical Studies on Leaves of *Bauhinia Racemosa* (Sonapatti)

Nazmi Khan, Milind Pande* and KK Jha

Teerthankar Mahaveer College of Pharmacy, Teerthankar Mahaveer University, India

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*Corresponding author:

Milind Pande

Professor

Teerthankar Mahaveer College of Pharmacy

Teerthankar Mahaveer University

India

E-mail: milindpandey2006@rediffmail.com

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Abstract

The leaves of *Bauhinia Racemosa* (Sonapatti) are reported to have great medicinal value. Also known as Kachnar & Mountain ebony belongs to family Caesalpiniaceae. Pharmacognostic evaluation including examinations of morphological and microscopic characters, ash value, powder analysis, phytochemical screenings with help of TLC and extractive values were carried out. The objective of this work was to provide some additional parameters to test the *Bauhinia racemosa* leaf so as to determine the identity and quality.

Keywords: Sonapatti; Beedi leaf; *Bauhinia Racemosa*; Pharmacognostic evaluation; Phytoconstituents.

Introduction

Bauhinia racemosa commonly known as the Beedi leaf tree is a rare medicinal species of flowering shrub with religious significance. It is a small crooked tree with drooping branches that grows 3–5 meters (10–16 ft) tall and flowers between February and May. It is native to tropical Southeast Asia.

Religious significance

Vijaydashami and Dussehra: In Maharashtrian families it is customary to exchange leaves of the Apta tree on the Hindu festive day of Dussehra (Figure 1). An act known as exchanging gold-pointing to the special significance of the plant on that particular day. This is also why the tree is often referred to as Sonapatti (literal translation: leaves of gold) in Hindi national language of India.



Figure 1. Leaves of Apta tree.

The leaves are used in the production of beedi, a thin Indian cigarette. The plant *Bauhinia racemosa* Lam. belongs to the Caesalpiniaceae Family. It is popularly known as Sittacha (Tamil) and occurs frequently in India, Ceylon, China, and Timor. The stem bark of the plant is an astringent and is used in the treatment of headache, fever, skin diseases, tumors, blood diseases, dysentery, and diarrhea [1].

Chemical constituents such as β -sitosterol and β -amyryn [2] probably responsible for the popular use of the plant were isolated from the stem bark of this plant. Beside these compounds, at least five flavonols (kaempferol and quercetin) and two coumarins (scopoletin and scopolin) were also isolated from the leaves of the plant [3]. Stilbene (resveratrol) was isolated from the heartwood of *Bauhinia racemosa* [4].

Pharmacological studies of the plant have revealed that the ethanol extract of *Bauhinia racemosa* leaves shows analgesic, antipyretic, anti-inflammatory, and antispasmodic activities [5], as well as antimicrobial activity [6]. The fresh flower buds of the plant showed antiulcer activity [7]. Cytotoxicity against CA-9 KB in cell culture, as well as hypotensive and hypothermic activities has been reported from the hydro alcoholic extract of *Bauhinia Racemosa* [8]. Previous results from laboratory have also demonstrated the antioxidant and hepatoprotective effects [9], as well as the antitumor and antioxidant status of *Bauhinia racemosa* against Ehrlich ascites carcinoma in Swiss albino mice [10].

Material and Methods

Collection of plant material

The leaves of *Bauhinia racemosa* was collected in and around Rampur, UP region, were identified in Department of Pharmacy, Teerthankar Mahaveer University, Moradabad (UP). A voucher specimen (BPH 851) was deposited in the department after confirmation of authenticity from taxonomist of Hindu college, Moradabad, UP, India.

Morphological evaluation

The plant was morphologically examined for shape of leaves, apex, base, margin etc and also for organoleptic evaluations such as color, odor, taste, shape and size.

Microscopic evaluation

T.S. of boiled leaves in water was prepared and mounted in glycerin on glass slide for identification of internal structures like vascular bundles, pith, cortex and other parts using with Safranin solution.

Powder analysis

The powder drug was separately boiled with phloroglucinol (5%), alcoholic KOH (5%) & Chloral hydrate solution (5%) and separately mounted in glycerin to determine the presence of lignified cells, calcium oxalate crystals and starch grains as a part of quantitative microscopy. The common structures present in all three slides reported as final powder analysis.

Proximate analysis

Exactly 1 gm of drug powder material was used for total ash value determination by keeping in Muffle Furnace at

400°C temperature. The powder drug was used to determine total ash, water soluble ash, acid insoluble ash, loss on drying and moisture content was also determined. Same ash was used for determination of water soluble and acid insoluble ash using standard procedures.

Successive solvent extraction

Extractive values by successive solvent extraction method were determined [11]. The powder of dried leaves was subjected to continuous soxhlet extraction with various organic solvents such as petroleum ether (60-80), chloroform, benzene, methanol and ethanol respectively [12].

Preliminary phytochemical studies

After concentration and drying of each extract in vacuum desiccator identification of phytoconstituents was carried out using thin layer chromatography method by different detecting reagent [13].

Results and Discussion

The morphological studies revealed the shape of leaves of *Bauhinia racemosa* Lam. occurs in entire condition with secondary and tertiary leaves attached. The shape of the leaf is more or less cylindrical, slightly tapering with branching on all sides. Colour dull greenish with rough surface.

In transverse section of midrib of leaves of *Bauhinia racemosa* Lam showed that epidermis is made up of thin walled, rectangular cells. Epidermis is followed by 3-4 layers of collenchymatous tissues which are arranged compactly and this is followed by parenchymatous cells which are thin walled and 3-4 layered. Some of the cells show abundant solitary calcium oxalate crystals. 4-5 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 bundles are present in the cortical tissue near the wings (Figure 2).

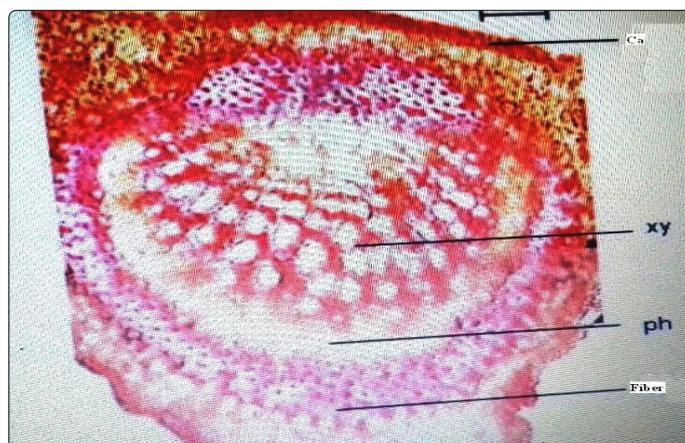


Figure 2. T.S of *Bauhinia Racemosa* leaf.

Powder analysis of leaves of *Bauhinia racemosa* Lam showed that 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 (Figure 3).

Successive solvent extraction values in various organic solvent were observed as petroleum ether 4.27%, benzene 5.30%, chloroform 4.30%, acetone 4.50%, and methanol 6.80% as shown in table 1.

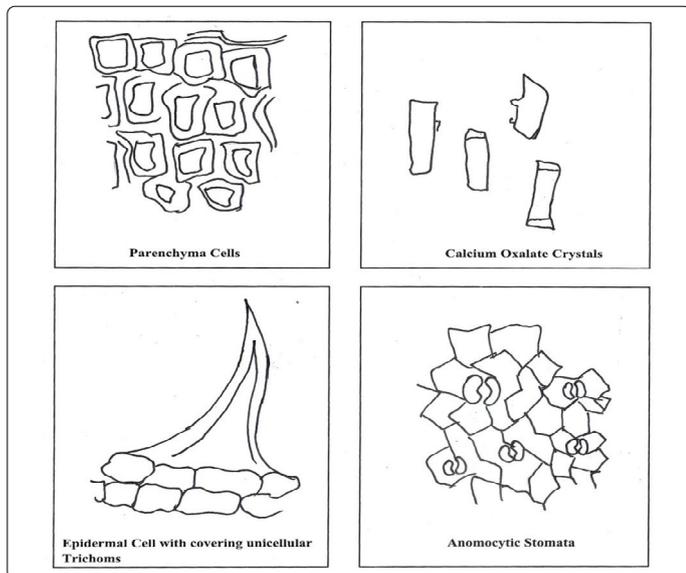


Figure 3. Powder analysis of *Bauhinia racemosa* leaf.

Table 1. Successive solvent extraction of leaf of *Bauhinia racemosa*.

Solvents Used	Colour & Consistency	Average extractive values in % w/w on dry weight basis
Petroleum Ether 40-60	Blackish brown sticky mass	4.27
Benzene	Blackish green sticky mass	5.3
Chloroform	Brownish green sticky mass	4.3
Acetone	Brownish dry mass	4.5
Methanol	Greenish viscous mass	6.8
Ethanol	Light greenish oily mass	3.1

The preliminary phytochemical studies with help of thin layer chromatography method revealed that presence of flavonoids in petroleum ether, benzene and chloroform extract was prominent. In all extracts alkaloid presence not found. The drug showed essential oil presence in petroleum ether and ethanol extract only. We found that anthrones were present in petroleum ether, benzene and chloroform extract. But coumarin was found only in petroleum ether extract. Prominent spots for saponin were found in petroleum ether, chloroform and methanol extract.

Table 2. Thin layer chromatography scheme used to detect various extracts of leaves of *Bauhinia racemosa*.

Solvent system used	Detection Reagent	Observation	Inference	P	B	C	A	M	E
Ethylacetate: Methanol:Water (75.5:13.5:10)	KOH	Red. (Vis) Yellow	Anthraquinone Anthrone	+	+	+	-	-	-
	Vanillin sulphuric acid	Red/yellow/brown/blue-green	Bitter principle	-	-	-	-	-	-
	Dragendorffs reagent	Orange Red (vis)	Alkaloid	-	-	-	-	-	-
	NP/PEG and UV	Yellow/green/orange	Flavonoid	+	+	+	-	-	-
	VS reagent	Blue (vis)	Saponin	+	-	+	-	+	-
Toluene:ethyl acetate (93: 7)	VS reagent	Red/yellow/brown/blue-green	Essential oil	+	-	-	-	-	+
	Hcl/Acetic acid	Blue brown	Valepotriate	-	-	-	-	-	-
	NH3/KOH	Light Blue brown	Coumarin	+	-	-	-	-	-

P: Petroleum ether; B: Benzene; C: Chloroform; A: Acetone; M: Methanol; E: Ethanol.

The proximate analysis revealed that total ash 23%, water soluble ash 10.50%, acid insoluble ash 1.5%, loss on drying 0.16%, moisture content 2%, values were observed (Table 3).

Table 3. Proximate analysis of leaf of *Bauhinia racemosa*.

S.No	Parameters	Values obtained w/w on dry weight basis
1	Ash value	23%
2	Water soluble ash	10.5%
3	Acid Insoluble ash	1.5%
4	Loss on drying	0.16%
5	Moisture content	2.0%

Conclusion

Bauhinia racemosa, commonly known as the Sonapatti leaf tree is no doubt that used as potent medicinal plant in India & World most evolved species. The plant makes the unique traits make as perfect remedy for survival in some important disease or disorders. These leaves are proud family of plant that will continue to grow, flourish and be respected by humans due to religious importance also as Lord Rama kept his weapons on it before going to forest for 14 years in Hindu mythological treaty Ramayana. More research should be done with latest technology to help learn to effectively

treat the negative side effects of anti-tumor activity.

Present study reveals some microscopic, physico-chemical parameters along with extractive values for authentication purpose. As these parameters vary due to atmospheric conditions but still we found them in between range of official standards given in authority's books.

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References

- Rahman MA, Akhtar J. A new linoleyl arabinopyranoside from the bark of *Bauhinia racemosa* Lam and a new flavonoidal glycoside from the leaves of *Cordia dichotoma* Linn. *Nat Prod Res.* 2016; 30(20): 2265-2273. doi: 10.1080/14786419.2016.1163694
- Chopra RN, Nayer SL, Chopra IC. Glossary of Indian Medicinal plants. Council of Scientific & Industrial Research. 1956.
- Khandelwal KR. Practical Pharmacognosy, techniques and experiments. 12th edition. Nirali Prakashan. 2004: 151.

4. Sharanabasappam GK, Santosh MK, Shaila D, Seetharam YN, Sanjeevarao I. Phytochemical Studies on *Bauhinia racemosa* Lam. *Bauhinia purpurea* Linn. and *Hardwickia binata* Roxb. *J Chem.* 2007; 4(1): 21-31. doi: 10.1155/2007/874721
5. Kokate CK, Purohit AP, Gokhale SB. *Pharmacognosy*. 31st edition. Nirali Prakashan. 2005; 810.
6. Cechinel Filho V. Chemical composition and biological potential of plants from the genus *Bauhinia*. *Phytother Res.* 2009; 23(10): 1347-1354. doi: 10.1002/ptr.2756
7. Akhtar AH, Ahmad KU. Anti-ulcerogenic evaluation of the methanol extract of some indigenous medicinal plants of Pakistan in aspirin ulcerated rats. *J Ethnopharmacol.* 1995; 46(1): 1-6.
8. Dhar ML, Dhar MM, Dhawan BN, Mehrotra BN, Ray C. Screening of Indian plants for biological activity. *Indian J Exp Biol.* 1968; 6(4): 232-247.
9. Bhavar G, Bhalke RD, Lodha Ketan R, Karmase Bhakti C, Londhe Chetan G. Phytochemical investigation and *in vitro* anthelmintic activity of *Bauhinia racemosa* Linn (Leguminaceae). *Pharmacologyonline.* 2009; 1: 300-303.
10. Gupta M, Mazumder UK, Kumar RS, Kumar TS. Antitumor activity and antioxidant role of *Bauhinia racemosa* against Ehrlich ascites carcinoma in Swiss albino mice. *Acta Pharmacol Sin.* 2004; 25(8): 1070-1076.
11. Anonymous. *Indian Pharmacopoeia*. New Delhi, Govt. of India, Controller of Publication. Volume II, 3rd edition, Ministry of Health and Family Welfare. 1985: 310.
12. Kokate CK. *Practical Pharmacognosy*. Vallabh Prakashan: 4th edition. New Delhi. 1994: 115-117, 123-125.
13. Wagner H, Bladt S, Zgainski FM. *Plant Drug Analysis*. Versa Berlin Publisher, 1989: 194, 291, 304.