



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2019; 8(5): 1404-1407  
Received: 28-07-2019  
Accepted: 30-08-2019

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## Pharmacognostical study on leaf of *Dalbergia melanoxylo* guill and perry

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### Abstract

In the present work, pharmacognostical studies are carried out on leaf of *Dalbergia melanoxylo* Guill & Perry to investigate its medicinal properties. The study consists of macroscopic and microscopic characters of the leaf drug. Determination of leaf constants, physico-chemical parameters like total ash, acid soluble ash, and percentage extractive of crude drug have been obtained. Fluorescence analysis of the leaves was carried. Preliminary phytochemical screening of Methanolic extract of crude drug will be studied for different phytochemicals. By establishing the quality parameters, it can be a better used plant for further research and pharmacological analysis.

**Keywords:** Macroscopic, microscopic characters, phytochemical, pharmacognostic

### Introduction

*Dalbergia melanoxylo* Guill & Perry is the only liana belonging to the Genus *Dalbergia* L.f. It is commonly known as African Blackwood. It is native to seasonally dry regions of Africa from Senegal east to Eritrea and south to the Transval in South Africa [1, 2]. In Maharashtra, *D. melanoxylo* Guill & Perry is distributed in Pune (Ganeshkhind), Kolhapur & Dapoli [3]. It is a small liana 2 – 3m high with branches more or less armed with stout spines. Bark white. Leaves 1 – 12 cm long; stipules very caducous. Leaflets 9 – 15, thinly subcoriaceous, 15 -20 by 6 -15 mm, obtuse emarginated, glabrous above and nearly so beneath; petioles 1.5mm long. Flowers are numerous, in axillary panicles about equalling the leaves; pedicels 1 -2 mm long; bracts and bracteoles minute with papilionaceous type of corolla [3]. Ethanobotanically, the plant has been used to cure various diseases like fever, dysentery [4].

### Materials and Methods

#### Collection of plant materials

The plant material was collected from the University of Pune Campus, Ganeshkhind Road (Pune) in the month of January, and authenticated by Botanical Survey of India, Western Circle, Pune. The green leaves were washed with tap water and shade dried. The dried leaves were crushed and grinded to powder. The powder sample was further stored in an airtight polythene bags protected from sunlight for further use.

#### Macroscopical and Microscopical evaluation

The leaf drug was examined macroscopically which include size, shape, color, taste, surface characters, odour etc. Leaf area was measured using graph. Free hand section of leaves were taken, stained by saffranin and light green and mounted in 50% glycerine [5]. Observations are done under compound microscope (10X and 45 X).

Leaf constants as stomatal number, stomatal index, vein islet number, veinlet termination were determined by observing slides under microscope and using Camera lucida for obtaining numeric value [6]

#### Histochemical and Qualitative estimation of Phytoconstituents

For Histochemical and Phytochemical analysis, free hand cut sections of the leaf of *Dalbergia melanoxylo* Guill and Perry were taken and tested with respective reagents for the detection and localization of phyto constituents such as starch, proteins, tannins, fats, sugars, saponins, alkaloids, and glycosides [6, 7]

The physicochemical properties of these plants consists of percentage extractive and ash analysis, qualitative tests for presence of starch, proteins, tannins, saponins, reducing sugars, anthroquinones, alkaloids, glycosides and fluorescence analysis of powder in UV light were also observed [5, 7].

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### Determination of Foaming Index

Certain plant materials contain saponins that can cause persistent foam when an aqueous decoction is shaken. The foaming ability of an aqueous decoction of plant materials and their extracts is measured in terms of a foaming index <sup>[9]</sup>.

### Determination of Swelling Index

Many medicinal plant materials are of specific therapeutic or pharmaceutical utility because of their swelling properties, especially gums and those containing an appreciable amount of mucilage, pectin or hemicellulose. The swelling index is the volume in ml taken up by the swelling of 1gm of plant material under specified conditions. Its determination is based on the addition of water or a swelling agent as specified in the test procedure for each individual plant material. Using a glass stoppered measuring cylinder, the material is shaken repeatedly for 1 hour and then allowed to stand for a required period of time. The volume of the mixture (in ml) is then read. The mixing of whole plant material with the swelling agent is easy to achieve but the fine form requires vigorous shaking at specified intervals to ensure even distribution of the material in the swelling agent <sup>[9, 10]</sup>. The qualitative estimation of phyto constituents was followed by Thin Layer Chromatography <sup>[8, 11]</sup>

## Results

**Table 1:** Determination of leaf constants of leaves of *Dalbergia melanoxylon* Guill & Perry

Sr. No.	Leaf Constans	Readings
1.	Stomatal Number	
	a. Upper epidermis	5.2
	b. Lower epidermis	8.3
2.	Stomatal index	36.2
3.	Vein-islet number	16 – 18 mm <sup>2</sup>
4.	Vein termination number	12 – 13 mm <sup>2</sup>

**Table 2:** Histochemical Tests of leaves of *Dalbergia melanoxylon* Guill & Perry

Sr. No	Test	Reagent	Leaf
1.	Starch	I <sub>2</sub> KI	+
2.	Tannins	10% of aq. FeCl <sub>3</sub>	+
3.	Protein	Millions reagent	+
4.	Saponins	CMC. H <sub>2</sub> SO <sub>4</sub>	+
5.	Alkaloids	Mayer's reagent	-
		Wagner's reagent	+
		Dragendorff's reagent	+
		Hagers reagent	+

**Table 3:** Phytochemical Tests of leaves of *Dalbergia melanoxylon* Guill & Perry

Sr. No.	Phytoconstituent	Reagent	Leaf
A	Water Extract		
1.	Starch	I <sub>2</sub> KI	-
2.	Tannins	Ag. FeCl <sub>3</sub>	+
3.	Saponins	Conc. H <sub>2</sub> SO <sub>4</sub>	+
4.	Proteins	Millon's reagent	+
5.	Anthroquinones	NH <sub>4</sub> OH + C <sub>6</sub> H <sub>6</sub>	-
6.	Reducing Sugars	Benedicts	+
B.	Alcohol Extracts		
1.	Alkaloids	Mayer's reagent	+
		Dragendorff's reagent	-
		Wagner's reagent	+
		Hagers reagent	-
2.	Glycosides	Benzene solution	+
3.	Flavonoids	Conc. HCl + Mg turning	+

**Table 4:** Treatment with various solvents to leaves of *Dalbergia melanoxylon* Guill & Perry for Fluorescence analysis.

Sr. No.	Treatments	Short	Day	Long
1.	Powder as such	Yellow green	Faint green	Black
2.	50% H <sub>2</sub> SO <sub>4</sub>	Yellow green	Faint green	Black
3.	50% HNO <sub>3</sub>	Bluish green	Brown	Black
4.	5% KOH	Dark green	Brown	Black
5.	CH <sub>3</sub> OH	Yellow green	Brown	Black
6.	1N HCL	Yellow green	Faint green	Black
7.	1N Methanolic NaOH	Yellow green	Brown	Black
8.	C <sub>2</sub> H <sub>5</sub> OH	Green	Yellow green	Black
9.	1N Ethanolic NaOH	Dark green	Dark green	Black
10.	Acetone	Yellow green	Green	Black

**Table 5:** Percentage extractive values of leaves of *Dalbergia melanoxylon* Guill & Perry

Sr. No	Solution	Percentage Extractive Values
1.	Distilled Water	1.024% w/w
2.	Chloroform	0.667% w/w
3.	Methanol	10.39% w/w
4.	Absolute alcohol	2.26% w/w
5.	Petroleum ether	1.22% w/w
6.	Acetone	1.09% w/w

**Table 6:** Foaming index of leaves of *Dalbergia melanoxylon* Guill & Perry

Sr. No.	No. of test tube with samples	Sample content in ml	Foaming index observed
1.	1	1	0.1
2.	2	2	0.3
3.	3	3	0.5
4.	4	4	0.5
5.	5	5	0.3
6.	6	6	0.3
7.	7	7	0.2
8.	8	8	0.3
9.	9	9	0.2
10.	10	10	0.1

**Table 7:** Swelling index of leaves of *Dalbergia melanoxylon* Guill & Perry

Sr. No.	Duration	Sample 1	Sample 2	Sample 3
1.	Before	7	4	4.5
2.	After	28	26	14

**Table 8:** Total Ash and Acid insoluble ash of leaves of *Dalbergia melanoxylon* Guill & Perry

Sr. No.	Organ	Total Ash	Acid-insoluble Ash
1.	Leaf	3.2% w/w	1.47% w/w

## Conclusion

In the pharmacognostic study of *Dalbergia melanoxylon* the micro and macroscopic characters will be helpful in determining correct taxonomic identification of the the plant. The physic-chemical parameters including the total and acid insoluble ash is found to be 3.3w/w and 1.47 w/w respectively. The foaming index of *Dalbergia melanoxylon* is found to be less than 100, while the swelling index of the leaf of *Dalbergia melanoxylon* is found to be 17.5 units.. The present study may be useful to supplement the information with regards to standardization and identification and in carrying out further research of the plant *Dalbergia melanoxylon* Guill and Perry.



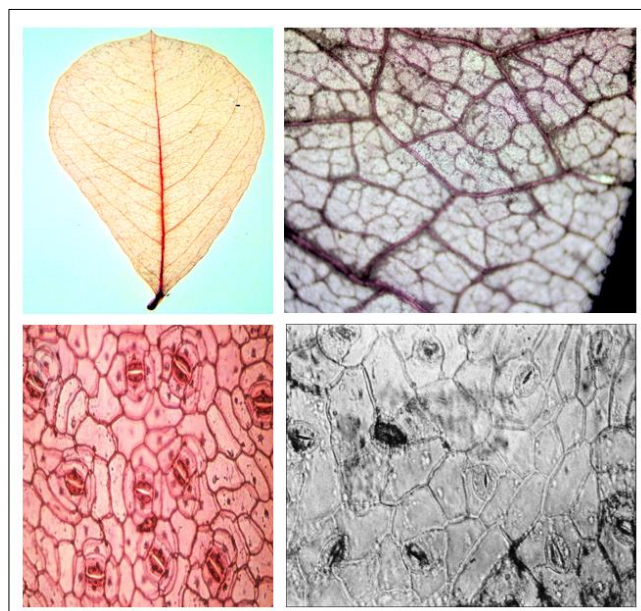
**Fig 1:** *Dalbergia* sp.



**Fig 2:** *Dalbergia* Flower



**Fig 3:** Macroscopic Evaluation



**Fig 4:** Leaf architecture and stomatal structure for quantitative study of leaf constants

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