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## PHARMACOGNOSTIC AND PHYTOCHEMICAL EVALUATION OF LEAVES OF *GARDENIA RESINIFERA* ROTH.

S. S. Hindole<sup>\*1</sup>, Kusum Akki<sup>2</sup>, M. S. Attar<sup>3</sup>, S. R. Suryawanshi<sup>3</sup>, N. S. Shaikh<sup>3</sup> and S. G. Zingade<sup>3</sup>

Department of Pharmacognosy and Phytochemistry<sup>1</sup>, Channabasweshwar Pharmacy College<sup>3</sup>, Latur - 413512, Maharashtra, India.

Department of Pharmacognosy and Phytochemistry<sup>2</sup>, KLE's College of Pharmacy, Hubli - 580031, Karnataka, India.

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### Correspondence to Author:

Mr. Sunil Sadashiv Hindole

Head of Department,  
Department of Pharmacognosy,  
Channabasweshwar College of  
Pharmacy, Latur - 413512,  
Maharashtra, India.

E-mail: sunil.pharmalink@gmail.com

**ABSTRACT:** *Gardenia resinifera* Roth. is a medicinal plant belonging to family Rubiaceae. It is an important traditional medicinal plant employed in various indigenous system of medicine against several diseases. The current communication provides pharmacognostic, physicochemical and phytochemical investigation carried out on the leaves of *Gardenia resinifera* Roth. Which are useful in setting some diagnostic indices for the identification and preparation of a monograph of the plant.

**INTRODUCTION:** Gardenias are members of the madder, or Rubiaceae family. Gardenias are most prevalent in China, Japan, tropical regions of Southeast Asia and the Pacific islands, South Africa and India. Today there are over 200 different species of *Gardenia* mostly hybrid in existence throughout the world. *Gardenia resinifera* Roth. is commonly known as dikamali which belongs to the family Rubiaceae. It is a large glabrous shrub or small tree attaining a height upto 6-7.5 m high and found in different Hills and Ghati areas of India.

Different parts of this plant contains different phytoconstituents which are used to increase appetite, used as astringent, used to relieve pain of bronchitis, in vomiting, liver disorders<sup>1</sup> constipation, and in cutaneous diseases<sup>2, 3, 4, 5, 6</sup>.

### MATERIALS AND METHODS:

**Collection and Authentication:** The Fresh leaves of *Gardenia resinifera* Roth. were collected from the local areas of Hubli-Dharwad district, Karnataka, India in June 2010 and authenticated by Dr. B. D. Huddar, Head of the Department of Botany, Shri Kadasiddheshwar Arts College and H. S. Kotambari Science Institute, Vidyanagar, Hubli, and Karnataka, India.

**Extraction:** The leaves of *Gardenia resinifera* Roth. were washed under tap water and dried in air under shade at room temperature and converted to coarse powder and stored in airtight container.

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For physicochemical investigation 50 g of dried powder was successively extracted with different solvents such as petroleum ether, chloroform, ethyl acetate and ethanol in increasing order of polarity using Soxhlet apparatus. The extracts were concentrated under reduced pressure using rotary flash evaporator and the residues were dried in desiccator over sodium sulphite. After drying, the respective extracts were weighed and percentage yield was determined and stored in airtight container<sup>9, 14, 15, 16</sup>.

### Pharmacognostic Studies:

**Macroscopic Characteristics:** For morphological observations fresh leaves (approx. 6-20 cm in length) were used. And organoleptic features viz. color, odour, taste, shape, sizes were observed and evaluated botanically<sup>7</sup>.

**Microscopic Characteristics:** The free hand section of leaf was taken and stained by safranin for lignified cells and Sudan red for oil cells and then mounted in glycerine and observed under low power<sup>8, 9</sup> and powder microscopy was also carried

out and their specific diagnostic characters were recorded<sup>10</sup>.

**Physico-Chemical Parameters:** The physico-chemical parameters were like total ash value, loss on drying, water soluble ash, acid insoluble ash, petroleum ether, alcohol and water soluble extractive value etc were determined as per who guidelines<sup>11, 12</sup>.

**Phytochemical Analysis:** The qualitative phytochemical tests were carried out on all the extracts of *Gardenia resinifera* Roth. leaves to detect the presence of various Phytoconstituents<sup>7, 8, 13, 14</sup>.

### RESULTS:

**Macroscopic Characteristics:** Macroscopically, the leaf was simple in composition, opposite, elliptic-oblong, entire, midrib distinct on both surfaces, leathery texture, wavy margin, narrowed leaf base, with acuminate apex, innately reticulate venation, the average leaf size was 06 to 20 cm (length) and 2.5 to 7.5 cm (width). The fresh leaf was green in colour **Fig. 1**.

### Morphological Evaluation of *Gardenia resinifera* Roth:



**FIG. 1: GARDENIA RESINIFERA ROTH. LEAVES**

**TABLE 1: MORPHOLOGY OF THE LEAVES OF GARDENIA RESINIFERA ROTH.**

S. no.	Features	Observation
1	Color	Green
2	Taste	Pungent
3	Odour	Aromatic
4	Size	6.3-20 / 2.5-7.5 cm
5	Shape	Elliptic-oblong
6	Texture	Leathery
7	Margin	Wavy
8	Leaf base	Narrowed
9	Apex	Acuminate
10	Venation	Pinnately reticulate
11	Midrib	Distinct on both surfaces

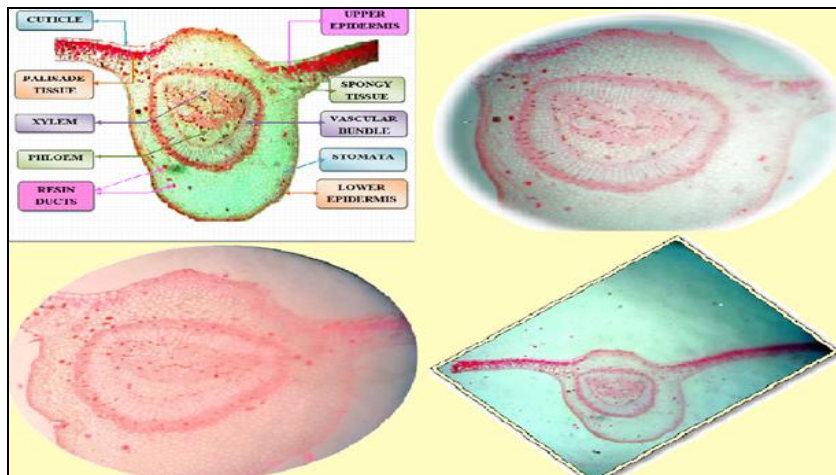
**Microscopic Characteristics:** The transverse section of *Gardenia resinifera* Roth. leaf showed

presence of upper and lower epidermis. The epidermis consists of single layered polygonal cells covered with a thick warty cuticle; some of lower and upper epidermal cells are interrupted with paracytic type of stomata and unicellular covering trichomes. Mesophyll region is differentiated into palisade cells and spongy parenchyma which contain prism type of calcium oxalate crystals. The midrib region consists of collateral type of vascular bundles and on either side of vascular bundle collenchymatous cells are present below the upper and above the lower epidermis. Xylem was lignified, phloem was non-lignified and it also contains mucilage with resin ducts.

The salient diagnostic characteristics of leaf were collateral type of vascular bundle, paracytic stomata, xylem vessels, mucilage with resin ducts and prismatic type of calcium oxalate crystals.

These characters can be used for standardization of drugs and also used for preparation of plant monographs **Fig. 2**.

**Microscopical Evaluation of T. S. of *Gardenia resinifera* Roth. Leaves:**

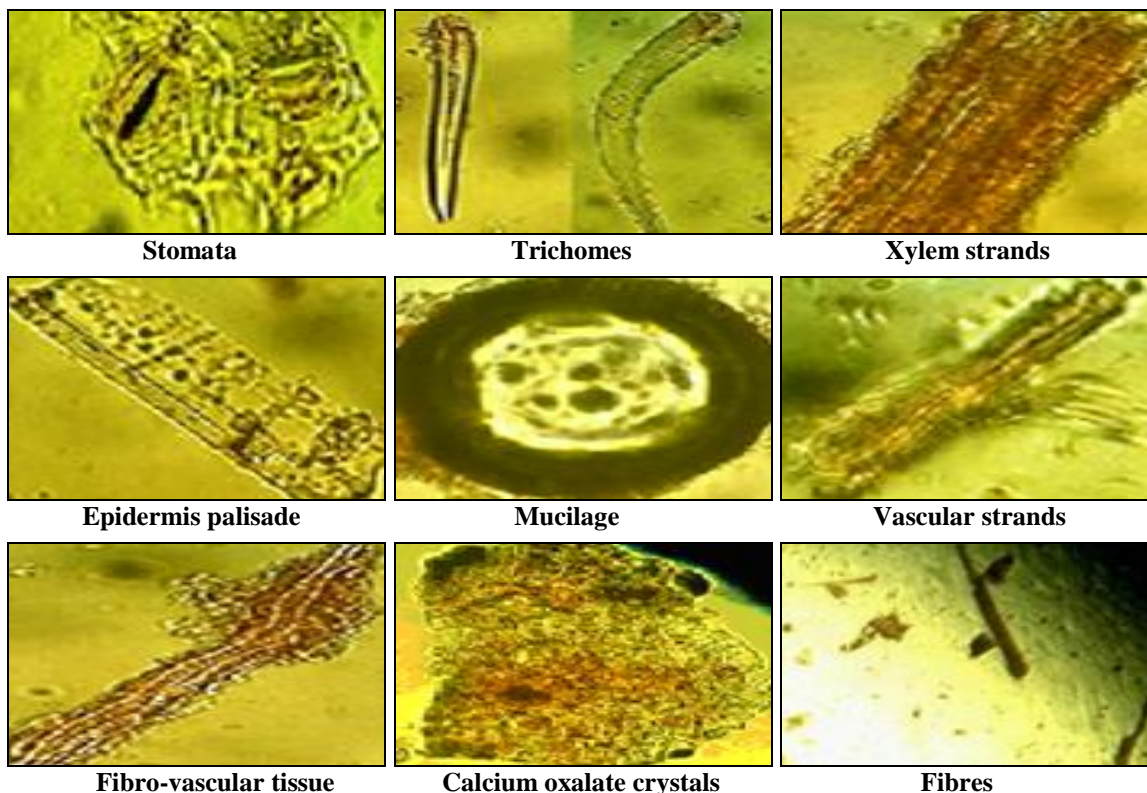


**FIG. 2: T. S. OF GARDENIA RESINIFERA ROTH. LEAVES**

**Powder Study:** The crude powder of *Gardenia resinifera* Roth. Leaf was dark green in colour with characteristic odour and pungent taste. The diagnostic features of powder were prism type of calcium oxalate crystals present on surface of

epithelial cells. In surface view, fragments of epidermis were embedded with paracytic stomata, xylem vessels with spiral thickening and mucilage were observed **Fig. 3**.

**Diagonastic Characters of Powdered Leaves of *Gardenia resinifera* Roth:**



**FIG. 3: POWDER MICROSCOPY**

**Physiochemical Investigations:** The physical constant evaluation of the drugs is an important parameter in detecting adulteration or improper handling of drugs. The moisture content of dry powder of *Gardenia resinifera* Roth. leaves was 7.28% which is not very high, hence it would discourage bacteria, fungi or yeast growth. The ash value was determined by three different forms viz., total ash, water soluble ash and acid insoluble ash. The total ash is particularly important in the evaluation of purity of drugs i.e. the presence or absence of foreign inorganic matter such as metallic salts or silica. Acid insoluble ash measures the amount of silica present, especially sand. Water soluble ash is the water soluble portion of the total ash<sup>24</sup>. The total ash of crude powder of *Gardenia resinifera* Roth. leaf was 8%; water soluble ash was 3% and acid insoluble ash was 1%. Less amount of these three parameters indicate that the inorganic matter and silica was less in *Gardenia resinifera* Roth. leaves. The extractive value of crude powder was maximum in water (18.4%) followed by alcohol (16%) and minimum was in petroleum ether (3.2%) **Table 2**.

**TABLE 2: PHYSIOCHEMICAL INVESTIGATIONS**

S. no.	Parameter	Determined value (% w/w)
<b>(A) Extractive value</b>		
1	Petroleum ether soluble Extractive value	3.2%
2	Alcohol soluble extractive value	16%
3	Water soluble extractive value	18.4%
<b>(B) Moisture content</b>		
1	Total Moisture content	7.28%
<b>(C) Ash values</b>		
1	Total ash	8%
2	Acid insoluble ash	1%
3	Water soluble ash	3%

**Phytochemical Analysis:** The results of qualitative phytochemical analysis of the crude powder extract of *Gardenia resinifera* Roth. leaves are shown in **Table 3**. Qualitative chemical examinations of various extracts revealed the presence of steroids in pet ether extract, carbohydrates in chloroform and ethanolic extracts, phenolic compounds, tannins and flavonoides in ethyl acetate and ethanolic extracts, glycosides in ethanolic extract respectively **Table 3**.

**TABLE 3: QUALITATIVE CHEMICAL ANALYSIS PERFORMED ON SUCCESSIVE EXTRACTS OF GARDENIA RESINIFERA ROTH. DRIED LEAVES**

Phyto-constituents	Pet. ether extract	CHCl <sub>3</sub> extract	Ethyl acetate extract	EtOH extract
Carbohydrates	-	+	-	+
Glycosides	-	-	-	+
Phytosterol steroids	+	-	-	-
Triterpenoids	-	-	-	-
Tannins & Phenolic group	-	-	+	+
Alkaloids	-	-	-	-
Flavonoids	-	-	+	+

EtOH = Ethanolic, P. E. = Petroleum Ether, CHCl<sub>3</sub> = Chloroform, E. A. = Ethyl acetate. + = Present, - = Absent.

**CONCLUSION:** As there is no pharmacognostic work on record of this traditionally much valued drug, the present work was taken up with a view to lay down standards, which could be useful to establish the authenticity of this medicinally useful plant. Macro and microscopically standards discussed here can be considered as identifying parameters to authenticate the drug. In the present study, we have found that most of the biologically active phytochemical were present in the ethanolic extract and crude powder of *Gardenia resinifera* Roth. leaves. The medicinal properties of *Gardenia resinifera* Roth. leaves may be due to the presence of above mentioned phytochemical. Further studies are in progress about this drug in our laboratory.

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**CONFLICT OF INTEREST:** Nil

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