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PHARMACOGNOSTICAL STUDIES ON THE LEAVES OF "*ODINA WODIER* ROXB"

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Key Words

***O**dina wodier*, Macroscopy, Microscopy, Physicochemical parameters.

ABSTRACT

In the present study, an attempt was made to investigate pharmacognostical studies on the leaves of *Odina wodier* Roxb (Anacardiaceae). The macroscopical studies have been carried out on the leaves. The Characters of transverse section of leaf include of thick midrib and thin lamina along with broad adaxial and abaxial cone and mucilage cavity in 100µm in diameter. In lamina contains dense accumulation of tannin. Druses types of crystals are present in the midrib region with parenchymatous cells. In powder microscopy it contains cicatrix, anomocytic stomata in the abaxial epidermis. The fibers have thick lignified walls with circular pits. Rosette cells are present in the peltate epidermal scales etc. Physicochemical parameters such as total ash value, sulphated ash value and water-soluble ash and extractive value were determined. These can serve in qualifying and differentiating the plant.

INTRODUCTION

The plant *Odina Wodier*Roxb., (Syn. *Lannea coromandelica*) is a moderate sized or large deciduous tree, with thick soft branchlets belonging to the family Anacardiaceae. This tree occurs in hotter parts of India. Decoction of bark is used as astringent, in cases of atonic dyspepsia and general debility. It is also used as a gargle in aphthous conditions of the mouth and also for tooth ache and as a lotion for skin eruptions. Fresh juice of the bark is used to sore of eyes and obstinate ulcer. Powdered bark mixed with neem oil is an application for chronic ulcers and skin diseases and also used as a paste for leprous ulcers. Gum of the tree made into an ointment with coconut milk or into liniment with brandy is a good application to sprains and bruises. Internally, gum is given in asthma and as acordial to women during lactation. Leaves boiled in oil are also applied to sprains and bruises, to local swellings and pains of the body. For rheumatism a paste of the leaves mixed with black pepper is a useful application.

As there is no scientific data on *Odina Wodier*leaves, here in the present study plant was taken for macroscopical, microscopical studies and quantitative evaluations were also carried out. In microscopical studies, anatomical sections, powder drug analysis and maceration of leaf were carried out. In quantitative evaluations, moisture content, alcohol soluble extractive value, water soluble extractive value, total ash value and sulphated ash values were carried out for crude dried powdered drug.

Taxonomy

Kingdom: Plantae
Phylum : Magnoliophyta
Class : Spermatophyte
Order : Sapindales
Family : Anacardiaceae
Genus : *Odina*
Species : *O.wodierroxb*

Vernacular names

- **Kannada :** Godda, Gumpina, Kuratige, Udimara
- **Sanskrit :** Jhingini
- **Hindi :** Mohin
- **Telugu :** Appriyada, Ajasrngi, Gumphini
- **Manipuri :** Aaman
- **Marathi :** Moi, Shemat, Shimati, Shinti
- **Oriya :** Indramai, Moi
- **Konkani :** Moi
- **Tamil :** Oti
- **Malayalam :** Otiyan-maram
- **Bengali :** Jiola
- **Coorgi :** Goddana-mara
- **Assamese :** Jia
- **Gujarati :** Mavedi

***Odina wodier*roxb** is a small deciduous tree, it grows up to 14m tall, in region with high sunlight. Branchlets are minutely covered with starry hairs. Leaves are alternatively arranged, imparipinnate, opposite, ovate, acute tip, entire margin covered by velvet hair, these are usually contains 5-7 leaflets. Flowers are unisexual, green in colour, it contains 4 broad ovate sepals, about 1mm long. Flowering in the months between February and April. Petals are 4 in number. 2 mm long, oblong, greenish yellow colour with stamens. They turn into yellow at the time of falling. Fruits as drupes, 3-5 loculed, dull red to pink in colour. The season is between May to July.

MATERIALS AND METHODS:

Collection of plant material: The fresh plant leaves were collected in the month of October from the Chamundeswari hills, Mysore, India. It was duly identified by the forest revenue officer Ms. Vinutha DRFO (Deputy Range forest officer) and authentified by Botanist Dr. Gurukar Mathew, HOD Department of Botany, Bharathi College. After collection the leaves was washed thoroughly with running tap water, cut into small pieces and shade dried. The dried material was then pulverized separately into coarse powder by a mechanical grinder. The voucher specimen was preserved in laboratory for further reference.

Experimental procedure:

Morphology and Microscopy: The Macroscopical examination and Microscopical evaluation for the fresh leaf is performed. Leaf sections were cleared using Chloral hydrate solution and the staining was done using Phloroglucinol and concentric Hydrochloric acid solution. A detailed study on the microscopical characters was done. As well as the dried leaf powder was evaluated for its powder characteristics like adaxial epidermal tissue, fiber, stomata, etc. using the same procedure.

Physicochemical parameters: The leaves were dried at room temperature for 8 -10 days, properly ground and the powder is passed through sieve no. 80. It was evaluated for Physicochemical tests like moisture content, ash values, extractive values according to the procedures given in the Indian Pharmacopoeia.

RESULT AND DISCUSSION:

Morphology: Leaves occur imparipinnate to alternatively arranged branchlets. The leaf is bilateral, which is a dark green colour on upper surface and pale green colour on lower surface. (Figure.1). Dried ones appear dark green on both surfaces. Fresh leaf was smooth without any hair and trichomes. They measure about 5-10 cm long and 3-6 cm wide with an entire margin and a prominent apex. Dried leaf powder is pale green colour and bitter in taste. It has its characteristic odour.

Transverse section: The transverse section preparation of the leaf was studied under the microscope and the following inclusions were recorded

Midrib: In cross sectional view, the leaf shows thick midrib and thin lamina. The midrib has thick and broad adaxial cone and broad semicircular abaxial part [figure.2]. The midrib is 1mm in vertical plane and 1mm in horizontal plane. The epidermal cells are small and thick walled. The palisade tissues extend in horizontal trans current layer up to the lateral part of the ad axial cone[figure.2.1] The central and outer ground tissues include wide, angular and thin walled parenchyma cells. These wide circular cavities filled with mucilage. The mucilage cavity is lined with rectangular parenchyma cells. The ad axial part of the vascular segment appears as separate unit from the abaxial unit. The

adaxial part of the vascular segment is thick short block, comprising lower xylem elements and upper phloem units. The xylem elements are in short parallel vertical rows. Phloem is thick layer of sieve elements which stain dark. Several mucilage cavities occur in the phloem zone adaxial vascular segment. The abaxial vascular unit is in the form of wide deep cup shaped. The unit is divided into small segments with narrow gaps in between the segments. [Figure.2.2]. Xylems in the lower vascular cup occur in several long parallel lines all along the inner region of cup. The xylem elements angular, narrow and thick walled. Phloem occurs on the outer part of the xylem in dark thick masses. In this phloem region also occur the mucilage cavities [figure.2.2]

Mucilage cavity: The mucilage cavity is 100µm in diameter. The cavities are located in the central outer zones as well as the phloem zones. The vascular system consists of several segments of xylem and phloem arranged widening [figure.3]

Lateral vein: The lateral vein is thick and prominent. It is slightly raised on the adaxial side and more prominently projecting on the abaxial side. It is 320µm thick. The adaxial epidermis of the vein consists of small, vertically ablong cells. The abaxial epidermis includes small papillate thick walled cells. The vascular bundle is large and occupies the entire area of the lateral view. It consists of upper part of diffusely distributed xylem elements and lower region of phloem elements and wide circular mucilage cavities. [figure.4]

Lamina: The lamina is uniformly thick with even surface. The adaxial epidermis of lamina has large thick walled vertically conical cells with dense accumulation of tannin. The abaxial epidermal cells are small, thin walled and squarish. The mesophyll tissue differentiated into adaxial single band of cylindrical palisade cells and abaxial part with small lobed spongy parenchyma cells, which are loosely arranged forming wide air chambers. [figure.5]

Leaf margin: The marginal part of the lamina is slightly curved down. It is as thick as the lamina. The structure is also as in the lamina. The marginal part has thick cuticle. The palisade tissues and spongy parenchyma tissues are less distinct. Small vascular strands with secretory cavity are present in the vascular strands. The leaf margin is 170µm, thick. [figure.6]

Crystals: Calcium oxalate crystals are fairly commenced in the leaf, especially in ground cells of the midrib [figure.7]. The crystals are druses. The druses are diffuse in distribution. The cell containing the druse is normal in size and shape. However, in palisade parenchyma cells the druse is located in wide, circular specialized cavity called crystal idioblast [figure.7.1]. The crystal is 20µm in diameter the crystal is a spherical body with spiny surface

Powder microscopic study: The powder preparation of the plant was studied under the microscope and the following inclusions were recorded.

Fibre: the long, narrow, somewhat wavy fibers with tapering ends were observed occasionally in the powder [figure.8]. The fiber has thick lignified walls and circular simple pits. The fibre is 900µm long, 15µm thick.

Epidermal peeling of the lamina: small fragments of adaxial epidermis are often seen in the powder. The epidermal cells are polyhedral, thick-walled and Apo-stomachic (without stomata) [figure.8.1]. The anticlinal walls of the epidermal cells are thick and smooth.

Peltate epidermal scales: The circular thin and membranous plates are common on the adaxial epidermis. The plates consist of 5 or 6 wide triangular cells united together forming thin plates. The scale has a short, thin and central stalk cell with which the scale is attached with a small circular epidermal cell of the lamina. In surface view the scale appears rose-like; the individual cells are called rosettlee cells and epidermal cell into which the stalk cell of the scale is buried is called cicatrix. The scale is 50µm in diameter. [figure.9, 9.1]

Crystals: Druse types of calcium oxalate crystals are common in the leaf cells. They are random in distributions. [figure.10]

Stomata on the abaxial epidermis: The

abaxial epidermis consists of larger, rectangular, straight and thick cells. These are stomata on the abaxial epidermis. The stomata are broadly elliptical and are 35x40µm in size. The stomata are anomocytic type and do not have distinct subsidiary cells. Some of the stomata are narrowly elliptical with stomata pore. These stomatal pores are actinocytic type having 5 or 6 radiating subsidiary cells. **[**figure.11]

Physicochemical parameters: The results were reported in table.1&2. The moisture content of the drug (8.40%) is not high thus it would discourage bacterial, fungal or yeast growth, as the general requirement for moisture content in crude drug should not exceed 14%. Equally important in the evaluation of crude drugs is the total ash values. The total ash is particularly important in the evaluation of purity of crude drugs, i.e. the presence or absence of foreign inorganic matter such as Metallic salts and/or silica. The alcohol and water extractive value was found to be 6.4% and 18.4% respectively. Since the water extractive value was greater than that of alcohol, it means that water is a suitable extractive solvent than alcohol in the extraction of the leaf powder of *odina wodier*. The alcohol and water-soluble extractives were indicators of the total solvent soluble component.

Figure: 1: Macroscopical characters of *Odina wodier Roxb*. Leaf

Table 1: Showing results for Quantitative evaluation of the leaf of Odina Wodier.

Evaluation parameters(%w/w)	Leaf (% w/w)
Moisture content	8.40
Ash value Total ash	8
Water soluble ash value	10
Sulphated ash value	13

Table 2: Extractive values of leaves of odina wodier.

Evaluation parameters(%w/v)	Leaf (% w/v)
Alcohol soluble extractive value	6.4%w/v
Water soluble extractive value	18.4%w/v

Transverse section of leaf of Odina wodier Roxb:

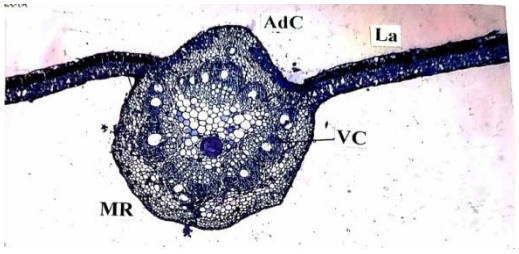


Figure:2: TS of leaf through midrib
MR: Midrib, Adc: Adaxial cone, La: Lamina, Vc: Vascular crystals

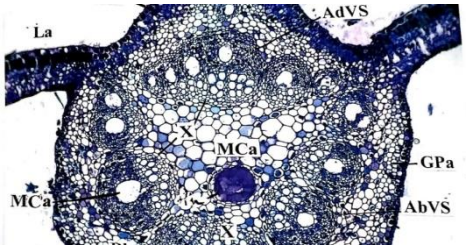


Figure: 2.1: TS of midrib
PM: Palisade mesophyll, Mca: Mucilage cavity, AdVs: Adaxial vascular strands, Gpa: Ground parenchyma, X: Xylem.

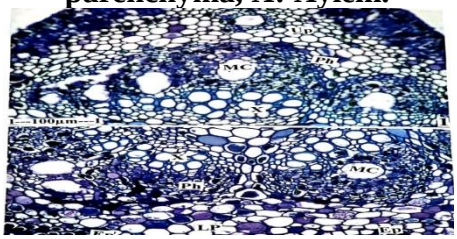


Figure: 2.2: Midrib upper and lower part
EP: Epidermis, LP: Lower part, Ph: Phloem, Up: Upper part.

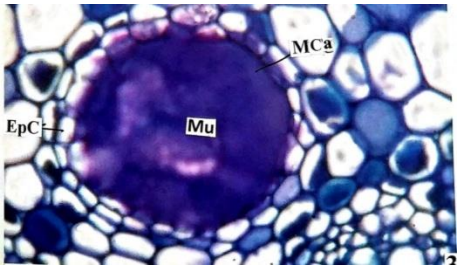


Figure: 3: Mucilage canals 40X
Epc: Epithelial cells

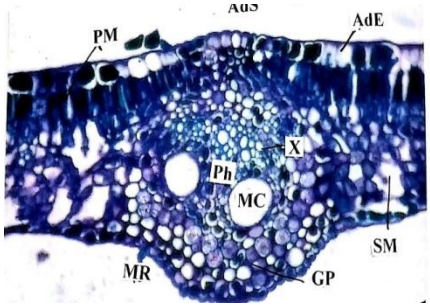


Figure: 4: TS of lateral vein
MR: Midrib, Gp: Ground parenchyma, SM: Spongy mesophyll, Ade: Adaxial epidermis.

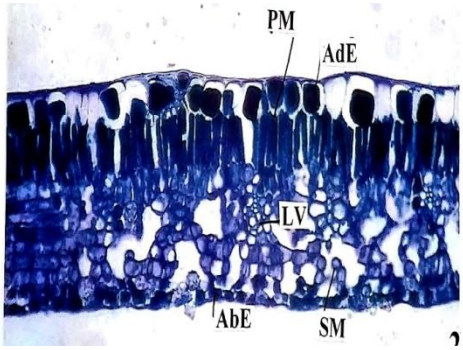


Figure:5: TS of lamina
PM: Palisade mesophyll, SM: Spongy mesophyll, Abe: Abaxial epidermis.

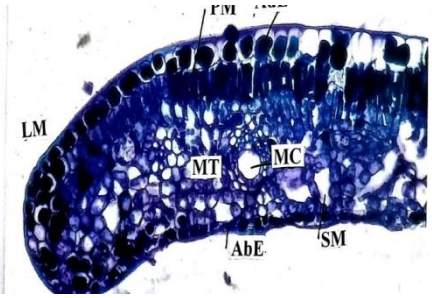


Figure: 6: TS of leaf margin
MT: Mesophyll tissue, MC: Mucilage cavity, PM: Palisade mesophyll, LM: Leaf margin,

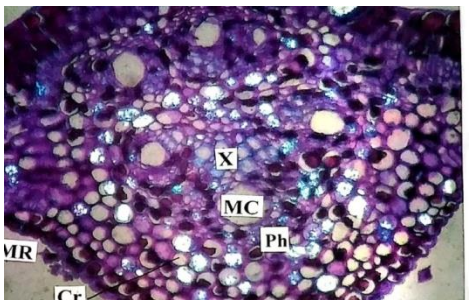


Figure:7: Crystals 20X
Ph: Phloem, MC: Mucilage cavity, MR: Midrib, X: Xylem

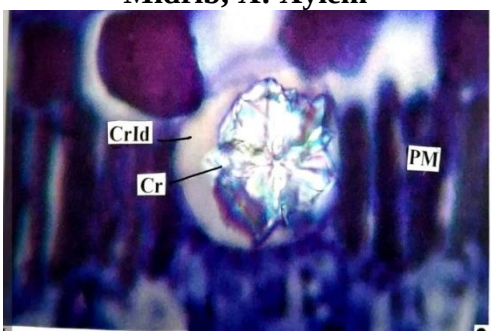


Figure :7.1: Single crystals 40X
Cr: Crystals, PM: Palisade mesophyll
Powder microscopy:

Figure: 8: Fibre

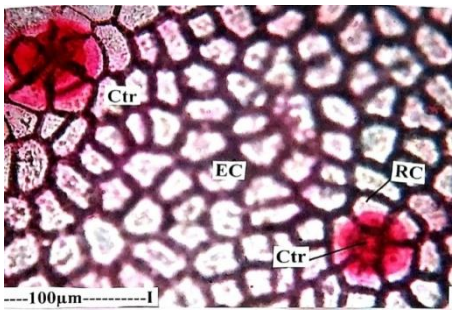


Figure: 8.1: Cicatrix 20X
Ctr: Cicatrix, EC: Epidermal cells.

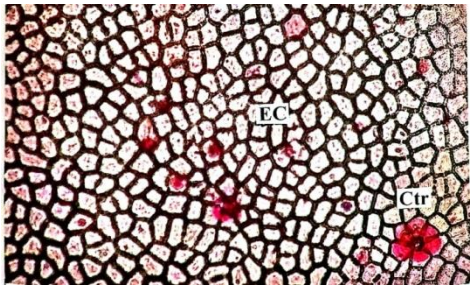


Figure: 9: Adaxial epidermis 40X
EC: Epidermal cells, RC: Rosette cells

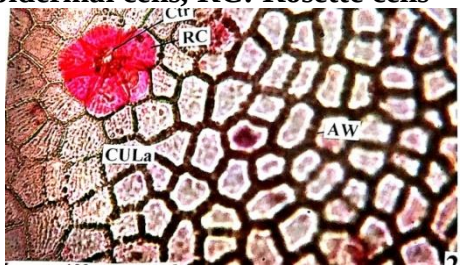


Figure: 9.1: Adaxial epidermises 20X
Aw: Anticlinal wall, RC: Rosette cells

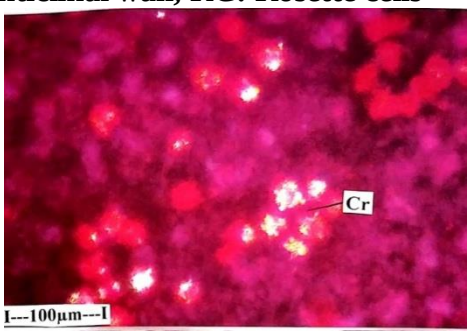


Figure: 10: leaf crystals 20X

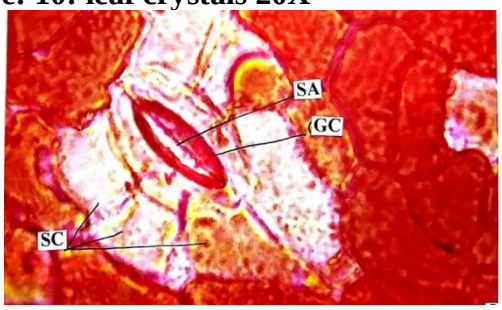
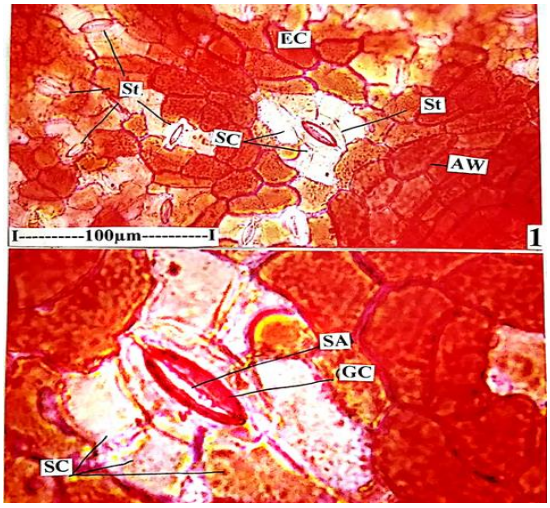


Figure: 11: Stomata 40X



Aw: Anticlinal wall, EC: Epidermal cell, GC: Guard cell, SC: Subsidiary cell, St: Stomata, SA: Stomatal aperture

CONCLUSION:

Standardization of a crude drug is the current topic of interest so as to set a distinctive identity and quality of a crude drug. Most of the standard parameters were revealed based on the microscopy and physicochemical constants of a plant. Before the plant enters into Pharmacopoeia its standards should be established. So, to ensure the quality of the crude drug the standardization is utmost important so will be the medication including it. In the present work attempts to establish the pharmacognostical standards for the same like macroscopical and microscopical features, physicochemical constants were done and hope this would help enrich the Ayurvedic medicine and to potentiate the effective use of folklore medicinal practices. These standards might initiate the scientists who are keen and sincere to investigate the traditional claims of plant drugs.

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