

**PHYTOPHARMACOGOSTICAL STUDIES ON ROOT BARK OF *OROXYLUM INDICUM*, VENT****Maitreyi Zaveri<sup>a</sup> and Sunita Jain<sup>b</sup>**

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**\*Email: [khandharmaitreyi@gmail.com](mailto:khandharmaitreyi@gmail.com)****ABSTRACT**

The root bark of *Oroxylum indicum*, vent (Syonakh) belonging to family *Bignoniaceae*, are reported to have a great medicinal value. Pharmacognostical evaluation including examination of morphological and microscopical characters, determination of quality control parameters such as ash values, extractive values, moisture content, foreign matter, and microbial contamination were carried out. Phytochemical screening including qualitative chemical examinations was also carried out. Hence, the present attempt was undertaken to investigate the Phytopharmacognostical studies of root bark of *Oroxylum indicum*. The study revealed the presence of cork, cortex with stone cells and acicular crystals of calcium oxalate, phloem region associated with medullary rays, which contained phloem parenchyma and stone cells. Phytochemical screening of the plant showed the presence of phytoconstituents like flavonoids, alkaloids and anthraquinone.

**Keywords:** *Oroxylum indicum*, macroscopic characters, microscopic characters, physicochemical studies, phytochemical studies.

**INTRODUCTION**

*Oroxylum indicum*, belonging to genus *Oroxylum*, family *Bignoniaceae*, tribe *Oroxyleae*, commonly known as Syonakh, is found to be growing throughout the India is selected for the present study. This plant is used as an astringent, carminative, diuretic, stomachic, aphrodisiac and has high potential for stimulating digestion, curing fevers, coughs and preventing other respiratory disorders<sup>1</sup>. *Oroxylum indicum*, is used as one of the important ingredient in most commonly used Ayurvedic preparation, named as "Dasamula". It is also used in other Ayurvedic formulation such as Amartarista, Dantyadyarista, Narayana Taila, Dhanawantara Ghrita, Brahma Rasayana, Chyavanaprasa Awalwha, etc.<sup>2</sup> The plant is reported to possess anti-inflammatory, diuretic, anti-arthritis, antifungal and antibacterial activity<sup>3</sup>. The stem bark and leaves of this plant is reported to contain flavonoids namely, chrysin, oroxylin-A, scutellarin, baicalein<sup>4,5</sup>. Seeds of this plant are reported to contain ellagic acid<sup>6</sup>. In traditional system of medicine the root bark, stem bark, leaves, fruits, and seeds are valued for their medicinal properties but major medicinal properties are attributed to the root bark. The root bark is not evaluated both pharmacognostically and phytochemically. Therefore, the present study was undertaken to evaluate the Phytopharmacognosy of root bark of *Oroxylum indicum*.

**MATERIALS AND METHODS**

Fresh root bark of *Oroxylum indicum* was collected from Van-Aushadhi Ektrikaran Udyan, Ahwa Township, Dang forest, Gujarat, India in the month of January. The authentication of the plant was established and voucher specimen (404) deposited in the Department of Pharmacognosy and Phytochemistry, L. M. College of

Pharmacy, Ahmedabad, India. The root bark was dried under sun light, powdered (500 g, 60 mesh size  $\approx 250 \mu\text{m}$ ) it and then used for present work. For microscopical studies free hand section of the root bark were taken, cleared with chloral hydrate solution and studied. The lignified elements were visualized by staining the section with a drop of hydrochloric acid and phloroglucinol in the cut sections and in the powder drug. Macerates were prepared by the Schulz maceration method<sup>7</sup>. Photomicrographs were shot for histological observation (Labomed). Powder of dried root bark was used<sup>8</sup> for chemical analysis. Physicochemical studies and phytochemical screening<sup>9-13</sup> of the drug were carried out by using standard methods.

**RESULTS AND DISCUSSION**

Any medicinal plant requires detailed study prior to its use because, the therapeutic efficacy is absolutely dependent on the quality of the plant material used. The original and basic approach towards Pharmacognosy includes study of morphological system, study of the cell structures and organization and study of tissue system, which still holds a key in the identification of the correct species of the plant and also to help us to differentiate between closely related species of the same genus. It is also first step to standardize a drug, which is the need of the day. A detailed pharmacognostical investigation of the root bark of the plant the *Oroxylum indicum*, was carried out to establish its correct pharmacognostical identity through morphological and microscopical methods.

*Oroxylum indicum* is a small, to medium sized, glabrous tree / shrub with branched at top, throughout the greater part of India. Leaves are large up to 1 – 5 m long, pinnate, bipinnate or tripinnate, leaflets are ovate or elliptic.



Flowers are many large, purple and fleshy with perfect five stamens. Fruits are Capsule, large, flat, sword shaped, up to 90 cm x 9 cm valves woody. Seeds are many, flat, thin with broad silvery wing. Flowering starts in the cold season, from January to March and fruits are developed in April to July (Figure - 1).

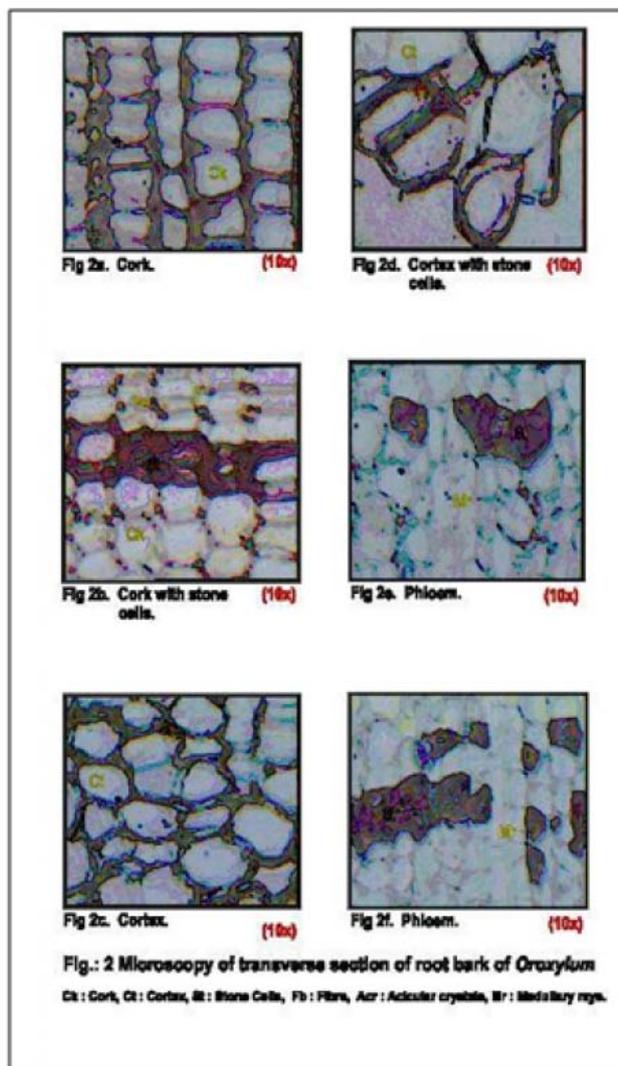


**Figure 1:** *Oroxyllum indicum*

Macroscopical observation of the plant was done according to size, shape, surface and fracture with a naked eye which provided a great deal of information about the drug material under consideration. Organoleptic characters of the powder of root bark of *Oroxyllum indicum* showed a pale yellowish brown coarse powder with astringent, mucilaginous and slightly bitter taste, without any characteristic odour. But, the macroscopical and organoleptic characters of the root bark of *Oroxyllum indicum* were usually not sufficient to enable the drug to be identified. Therefore, authentication of root bark of *Oroxyllum indicum* was further confirmed by the microscopical studies of the plant material, which consists in an investigation of the natural distribution and relationship between various tissues and tissue components comprising the organ under study.

The microscopy studies were carried out to authenticate the root bark of *Oroxyllum indicum*. The root bark in transverse section showed cork, cortex, phloem and medullary rays. Cork consist of about 30 to 35 layers of tangentially running, polyhedral cells with the fragments of groups of tangentially running rectangular to oval, thick wall pitted stone cells lying underneath the cork cells. The outermost cork layer was consisting of about 15 to 20 rows of lignified cells and rest of them inner cork layer was non-lignified. Cortex was wide. It was made up of thin walled parenchymatous cells. In the cortex stone cells and abundant lignified sclerides isolated or fairly in large groups showing a considerable variation in size and shape, walls of most of them were moderately thickened, striated and pitted. The abundant acicular crystals of

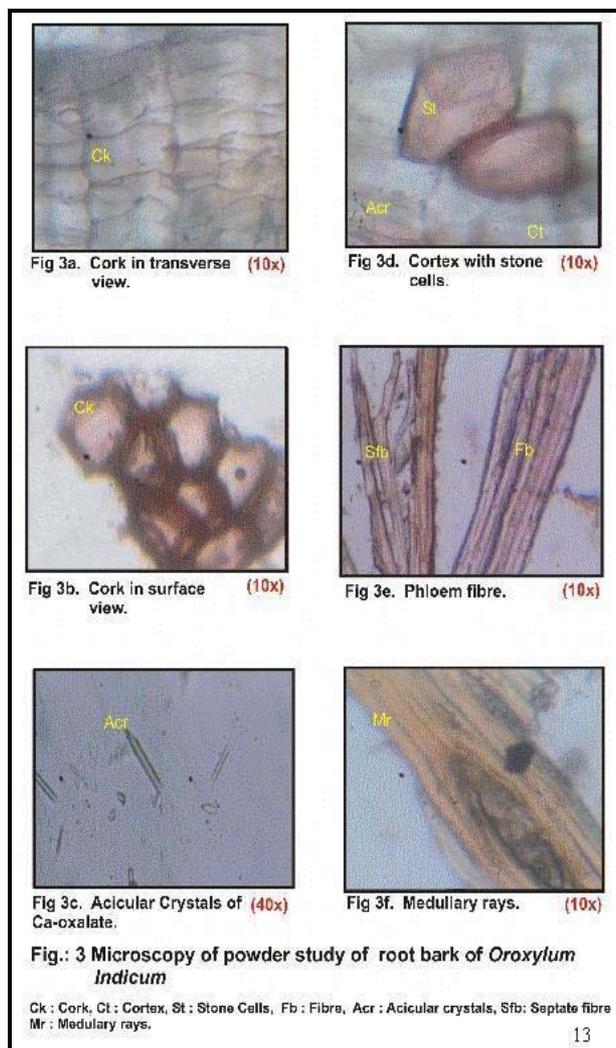
calcium oxalate scattered as such in parenchymatous cells of cortex. Phloem forms the major part of the bark and was composed of broad radial strips separated by medullary rays. Phloem consists of about 25 to 30 layered, thin walled radially arranged phloem parenchyma cells showing narrow tangential segments of sclerenchyma. The phloem region was traversed by medullary rays, which are bi-seriate to tetra-seriate and made up of thin walled cells (Figure - 2).



Therefore, the histological preparations give information about the deposition of tissues as they occur actually in the form of structural blocks but analysis of the drug in the powder state provides knowledge regarding the individual structural units themselves. Since, the elements were constant for a particular organ, the analysis of powder always yield definite information about their presence.

Cork in surface view, was lignified and polygonal to hexagonal in shape. The fragments of multilayered cork in transverse view, showed lignified layers of tangentially running cells and parenchymatous cortex. Cortex in transverse view showed cortical parenchyma showing stone cells, lignified sclerides and acicular crystals of calcium oxalate. A part of phloem in tangential section showed medullary rays associated with phloem

parenchyma and phloem fibres. Fragments of isolated or groups of lignified fibres, very thick walled with somewhat uneven lumen, occasional fibres were septate and with oblique pits while others were distinct with transversely running pits. Stone cells and lignified sclereids, isolated or in large groups showing a considerable variation in size and shape, the wall of most of them were moderately thickened and pitted. Acicular crystals of calcium oxalate scattered as such in the cortex (Figure - 3).



Transverse section and powder study of root bark of *Oroxylum indicum* confirms authenticity of the plant as per previous reports. Thus, the macroscopy and the microscopy study in the present investigation revealed the authenticity of the root bark of *Oroxylum indicum*.

After authentication of suitable plant material, next step was to do a routine quality control tests for the assessment of the plant material. It has been mentioned that the study of a crude drug of natural origin is useful only to the extent that it contains some active principles, which are pharmacologically significant, and therefore, unless these principles definitely identified, the real value of a crude material cannot be justified. The root bark of *Oroxylum indicum* was evaluated for phytochemical parameters such as ash content, extractive values in

various solvents, moisture content, foreign matter, and microbial contamination were reported in Table - 1.

Preliminary phytochemical screening of the plant showed the presence of phyto-constituents like flavonoids, alkaloids and anthraquinone were presented in Table - 2.

**Table 1:** Quality control parameters

Parameters	% w/w
Total ash	13.70
Acid insoluble ash	6.97
Water insoluble ash	10.33
Alcohol soluble extractive values	6.9
Water soluble extractive values	64.2
Petroleum ether soluble extractive values	1.5
Chloroform soluble extractive values	2.2
Foreign matter	0.8
Moisture content	5.4
Loss on drying	5.0
Microbial contamination	0.2

**Table 2:** Test for presence of various phytoconstituents

Phytoconstituents	Results
Alkaloids	(- ve)
Flavanoids	(+ ve)
Tannins	(- ve)
Anthraquinone	(+ ve)
Carbohydrates	(- ve)
Saponins	(- ve)

## CONCLUSION

The root bark was evaluated for pharmacognostical parameters such as macroscopy, microscopy, ash values, extractive values, loss on drying, etc. Transverse section and powder study of root bark of *Oroxylum indicum* confirms authenticity of the plant as per previous reports. Preliminary phytochemical screening indicated that the root bark of *Oroxylum indicum* was rich in flavonoids. The pharmacognostical and phytochemical studies carried out on the root bark of *Oroxylum indicum*, used in the traditional system of medicine for will be of immense use in carrying out further research of its use medicinal plant.

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