ABSTRACT
The bark of *Alstonia scholaris* R. Br. (Apocynaceae) locally known as ‘Saptaparna’ is reported to have anticancer, anti-helminthic, anti-diarrhoeal, anti-asthmatic, anti-malarial etc., activities. The present work represents the study carried out for quality control of herbal drugs which comprises of macroscopy, microscopy, powder characters and histochemical study of stem bark of *A. Scholaris* R. Br. Result showed the stem bark was dark grey to brown in colour without any odour and bitter in taste. Microscopy revealed the presence of cork, cambium, phloem, medullary rays and stone cells. Powder microscopy of the sample drug exhibited the occurrence of cork cells, stone cells, prismatic crystals, starch grains, phloem, fibers etc. The presence of starch grains, prismatic crystals, stone cells and fibers were also showed by histochemical study. The present study on pharmacognostical investigation of *A. scholaris* R. Br. bark will be helpful in developing standards for quality, purity and sample identification of this plant.

KEYWORDS: *Alstonia scholaris* R. Br., Saptaparna, Stem Bark, Macroscopy, Microscopy, Histochemical study.

INTRODUCTION
Pharmacognosy has become one of the pillars in areas like pharmacy, medicine, natural product chemistry and many others allowing scientists to recognize the importance of plants as sources of medicines. This approach has initiated active research programs either to isolate new lead compounds or to produce standardized extracts.[1] For this it is very necessary to evaluate various qualitative and quantitative parameters, which may be helpful in setting standards for particular medicinal plant/parts of the plant. With the help of these standards one can easily identify and characterize an individual drug, which may play a major role in maintaining quality and purity of...
that particular drug and its formulation and prevent it from being adulterated by drug of same or other genius having low potency.[2]

The present study deals with the standardization of one such medicinal plant Saptaparna-Alstonia scholaris R. Br. is an important medicinal plant in folklore medicine. The plant belongs to family Apocynaceae and is native to India. It grows throughout India, in deciduous and evergreen forests and in plains. Juice of leaves and tincture of the bark acts as a powerful galactogogue and also used in cases of snake bite. Milky juice of the plant is applied on wounds and ulcers. The bark is bitter, acrid, astringent, digestive, laxative, thermo genic, antipyretic, galactogogue, cardiotonic and tonic. It is useful in abdominal disorders, fevers, leprosy, skin diseases, chronic and foul ulcers, asthma, bronchitis and helminthiasis.[3] The bark extract induces the cellular immune response at low doses and inhibited the delayed type of hypersensitivity reaction at high doses.[4] The methanolic extract of this plant exhibits pronounced anti plasmodial activity.[5] The alkaloid fraction of A. scholaris was found to have potential anticancer agent.[6] It’s bark extract showed chemo preventive potential against skin tumor genesis in swiss albino mice.[7] Ethanolic extracts of A. scholaris possess powerful in-vitro antioxidant activity.[8]

Barks from trees and shrubs constitute an important source of drugs used in Indian System of Medicine. Just after collection and on drying, morphologically or organoleptically several barks resemble each other in many respects and may exhibit few minor variations in their size, shape, outer and inner surface, colour, mode of fracture, odour, tastes, etc. However, microscopical characters performs the major parts and assists us greatly for the correct identity. Hence, an attempt has been made to ensure properties of Saptaparna (Alstonia scholaris R. Br.) stem-bark through pharmacognostical study.

MATERIALS & METHODS

Collection of Sample

Bark of Alstonia scholaris R. Br. was collected from the periphery Gujarat state by Pharmacy department of IPGT & RA, GAU, Jamnagar. Further the authenticity of the sample was confirmed by the experts of Gujarat Ayurved University and by comparing their characters mentioned in various floras.

Preservation

The drug was thoroughly washed with running water and cut into small pieces and preserved in the solution containing [Formalin: Glacial Acetic Acid: Ethanol 70 % in 5: 5: 90]. While some pieces were dried on sun and powdered for studying its powder microscopy.
Preparation of illustrations
The section were taken by free hand and their photo graphs were taken by using Canon digital camera attached to Zeiss microscope and powder characters were drawn with the help of Camera Lucida lying at the Pharmacognosy department of I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar.

Macroscopic & organoleptic evaluation
The characters were studied systematically as per the methods described in the text books of pharmacognosy. The specimen were observed as such with naked eyes or with the help of dissecting microscope. Various parameters of the plant material, such as size, shape, colour, odour and taste of the stem bark were also recorded.

Microscopic evaluation
Thin free-hand sections of the stem bark were made and washed with chloral hydrate solution. The stain was made with phloroglucinol and conc. HCl solution. Diagnostic characters in TS and powder of stem bark of *A. scholaris* R. Br. was studied with and without staining. Microphotographs were taken using Carl Zeiss binocular microscope.

Histochemical Test
Histochemical tests were performed to detect the kinds of cell wall like lignin, primary metabolites like starch grains, ergastic substances like crystals of calcium oxalate and calcium carbonate, etc. present in the sample.

RESULT & DISCUSSIONS

Macroscopic & Organoleptic characters
Pieces are curved or flat or occasionally quilled, measuring 8 – 12cm in length, 5 - 8cm broad and 5 – 15mm in thickness, externally uneven, transversely and longitudinally fissured, marked with numerous patches of whitish to silver coloured lenticels; surface internally smooth, longitudinally striated; fracture outer hard and short, inner granular; fractured surface shows narrow cork and wide phloem zone traversed by latex canals; colour externally dark grey – brown, internally brownish buff – dark grey, young bark is somewhat paler; odour not characteristic; taste is bitter and slightly astringent. (Fig. 1)
Microscopic evaluation:

**Diagrammatic section:** Diagrammatic TS of bark shows outer wide multi layered cork, lying underneath the cortex and a very large region of inner phloem traversed with laticiferous canals. **Cortex:** Detailed TS shows 80 – 100 rows of narrow, rectangular, thin to thick walled, yellow to brown coloured **cork cells** at places thick walled with different lumen **stone cells** are seen, within the cork a well-defined, thin walled, broadly rectangular, narrow cells or phellogen or **cork cambium**; phelloderm or **secondary cortex** is thin walled, nearly cubical to rectangular, many layered, traversed with cubical to oblong, groups of stone cells varies in size and with different kind of lumen, sometimes with pits; **phloem** is very wide, parenchymatous, the cells being discontinuous because of parallel arrangement of uni to biserrate, rectangular, thin walled **medullary rays**, radially elongated in the portion nearer the wood but becomes broad towards the distal ends, laticiferous canals traversed throughout the phloem region; prismatic crystals of calcium oxalate and simple, spherical **starch grains** scattered throughout the section. (Fig. 2)
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FIGURE 2 – MICROSCOPIC CHARACTERS OF *A. SCHOLARIS* R. Br. STEM BARK

**Powder microscopy**

A light brown powder with fine texture and without any characteristic odour having bitter taste has following distinguished microscopical characters:

1. The abundant groups of stone cells of various sizes, shapes and thickness with distinct radiating pits and striations. 2. Plenty of sclereids with highly thickened and striated walls with various sizes and shapes. 3. The abundant prismatic crystals of calcium oxalate scattered as such and embedded in parenchymatous cells of phelloderm, phloem and stone cells. 4. The fragments of parenchymatous tissue and tangentially- longitudinally cut medullary rays of phloem, embedded with lactiferous canals which at places show bulging enlargements and are filled with granular contents. 5. The fragments of cork in surface view and in sectional view; in surface view the cells are thick walled, hexagonal to pentagonal in shape while in sectional view, the cells are thick walled, rectangular to squarish in shape, often with lignified and pitted walls. 6. The fragments of beaded hexagonal to elongated, lignified parenchymatous cells of the phloem. 7. Simple, spherical to oval, starch grains scattered as such and embedded in the parenchymatous cells. 8. Thick walled, striated, non lignified fibres occasionally present tin the young bark only. (Fig. 3)
TABLE NO. 1 - COMPARATIVE STATEMENT OF STEM BARK AND ITS POWDER

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<tbody>
<tr>
<td>1.</td>
<td>Taste</td>
<td>Astringent &amp; Bitter</td>
<td>Bitter</td>
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<tr>
<td>2.</td>
<td>Color</td>
<td>Grayish brown (Ext.)</td>
<td>Light brown</td>
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<td></td>
<td></td>
<td>Creamiest white (Int.)</td>
<td></td>
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<tr>
<td>3.</td>
<td>Odor</td>
<td>Not characteristic</td>
<td>Not characteristic</td>
</tr>
<tr>
<td>4.</td>
<td>Surface</td>
<td>Rough &amp; Uneven (Ext.)</td>
<td>Texture – fine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smooth (Int.)</td>
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Histochemical characters

1. Test for Starch grains:
Mount a section of sample in water, add a drop of Iodine, blue colour shows the presence of starch grains.

2. Test for Crystals of Calcium oxalate:
They are insoluble in glycerin and phenolic reagents but soluble in most acids commonly used hydrochloric acid. By adding 2 - 3 drops of hydrochloric acid crystals of calcium oxalate gets dissolved.

3. Test for fibres and stone cells:
Fibres of Sclerenchyma and stone cells gives pink to red colour when stain with Phloroglucinol and HCl.

CONCLUSION
Standardization of herbal drugs is a topic of great concern because of the great variability derived from heterogeneous sources. *Alstonia scholaris* R. Br. is a plant with large medicinal advantages and it’s stem bark plays a major role in these medicinal properties. Thus the present study will provide referential information for correct identification and standardization of this plant material through pharmacognostical study as basic tool for identification.

REFERENCES


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