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Pharmacognostic evaluation of ingredient drug of *Valampuritailam: Helicteres isora* L. fruit

Siddha system of medicine was practiced thousands of years back. According to Siddha *maruthuvar* almost all plants bear medicinal properties. The medicinal properties are due to the phytochemicals found in them. Due to abundant availability these plants were used without any particular standardization process and safety precautions in the past. Nowadays due to declined herbal population and adulteration of the available species with plants devoid of concerned medicinal potential, authentication from eminent botanist is inevitable. The macro-microscopic approach of Pharmacognosy helps in resolving these authentication issues.

Andalil et al.



Pharmacognostic Evaluation of Key Ingredient of *Valampuritailam*: *Helicteres isora* L. fruit

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ABSTRACT

Introduction: *Helicteres isora* L. is commonly known as Indian screw tree is described in indigenous medicinal systems as an important medicinal plant. It is a rich source of nutrients and antioxidants having high therapeutic values. Different parts of plant are used in various traditional systems for treating various ailments. Due to the healing property of fruits it is being exploited in the preparation of *Siddha* formulation *Valampuritailam*. **Method:** The fruit samples were collected from Siddha Medicinal Plant Garden, Mettur and pharmacognostic studies like macro-microscopic studies, powder microscopy, etc. were carried out to evaluate the drug for authentication. The twisted appearance of fruit is characteristic feature of plant. The microscopic study showed presence of three distinct layers in the fruit namely epicarp, mesocarp and endocarp. The powder showed characters like stellate trichomes, prismatic crystals and endosperm cells. **Discussion:** The plant is confused in the ayurvedic descriptions with that of *Marsdinea tenassicima* W. & A. and leaves show similarity with *Grevia asiatica* Linn. But the fruits can be easily distinguished as it is having twisted appearance. The twists look like intestine which indicates its use in abdominal disorders. **Conclusion:** The present study aims the pharmacognostical characterization of fruit of *H. isorato* fulfill the authentication of the drug.

KEYWORDS *Valampuri*, Indian screw tree, Powder microscopy, Siddha formulation, Stellate trichomes.

PICTORIAL ABSTRACT



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Helicteres isora L. is one of the members of family Sterculiaceae, known as *valampuri* in Siddha literature. It is a small tree or shrub; young branches have dispersed stellate hairs with serrated leaves showing rough upper surface and pubescent inner surface. The young flowers are red and converted to blue when become old and are arranged solitary or in sparse cluster. Spirally twisted 5 carpelled fruits are the important feature of the plant with tuberculated seeds.^[1] It flowers during April to December and the fruiting season is October to June.^[2] It is distributed all over India above 1500 m of sea level and dry deciduous forests.^[3] In siddha system of

medicine, it is used to make *Valampuritailam* for all head related diseases.^[4] The tribals in Bihar, uses the fruit as amulet in neck to treat malnutrition (locally known as dubli) diseases in children.^[5] Because of the antioxidant and anti-bacterial activity^[6], it is important medicinally and shows hypolipidemic, antibacterial, antiplasmodic, cardiac antioxidant, antiperoxidative potency, brain-antioxidation potency, anticancer, antinociceptive, hepatoprotective, anti-diarrhealand wormicidal activities.^[1] Tribals of Kerala mainly in Wayanad, Malappuram, Palakkadu districts use this fruit extract because of its anti-cancer properties.^[7] The important phytochemicals isolated from the plant are flavones, triterpenoids, cucurbitacin,

phytosterols, saponins, sugars and phlobatannins^[8] 49-O-b-D-glucopyranosyl rosmarinic acid and 4,49-O-di-b-D-glucopyranosyl rosmarinic acid.^[3]

Botanically identified and authenticated fruits of *Helicteres isora* were procured from Siddha Medicinal Plant Garden, Mettur. The macroscopy of the samples was documented by Nikon COOLPIX5400 digital camera. Sectioning of the fresh samples were done to reveal the anatomy of the parts and the rest were dried, powdered, passed through mesh no.60, and preserved in an air-tight covers for powder microscopy. Transverse sections of the fruits were hand cut using a 7'o clock platinum blade stained with safranin and photographed using Nikon ECLIPSE E200 trinocular microscope attached with Nikon COOLPIX5400 digital camera

under bright field light. Magnifications were indicated by the scale-bars. A pinch of the powdered fruits was mounted in glycerine after treating with 2% KOH on a clean microscopic slide. Slides were observed under Nikon ECLIPSE E200 trinocular microscope and diagnostic characters were identified, photographed and documented.^[9]

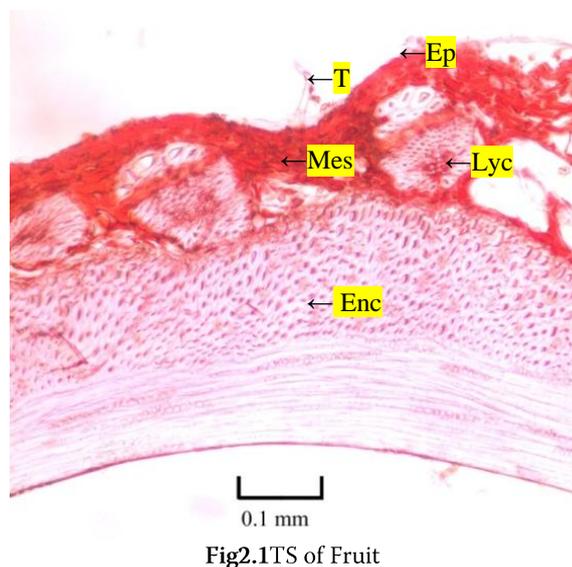
Macroscopy

The fruit of *H. isora* is greenish coloured when fresh turned to greenish brown when dried; cylindrical, pubescent with five follicles twisted spirally; 2 to 6 cm length and 2 mm to 1 cm diameter. The seeds are tuberculated (Figure 1); fruit is with characteristic odour and tastes slightly bitter.

Figure 1. Macroscopic features of *Helicteres isora* fruit



Figure 2. Microscopy of *Helicteres isora* fruit



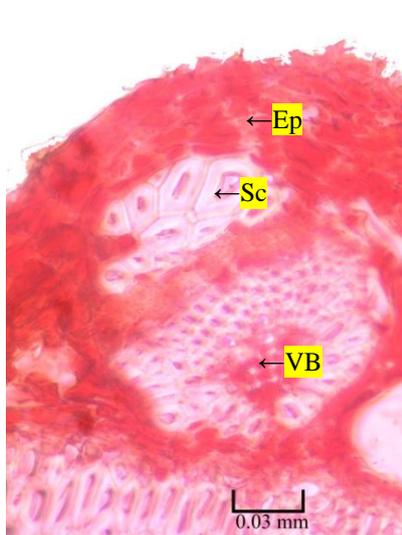


Fig 2.2 Outer region enlarged



Fig 2.3 Middle portion enlarged

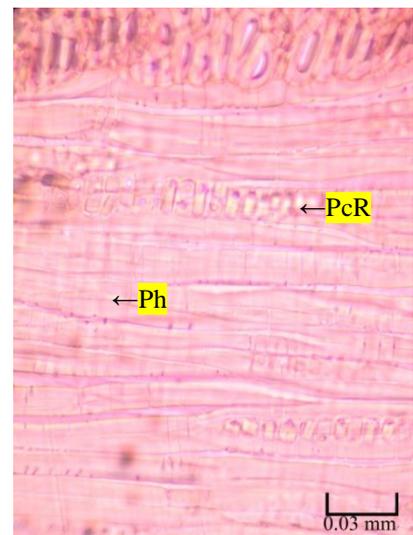


Fig 2.4 Inner region enlarged

Ep- epicarp; Enc – endocarp; Lyc – lysogenous cavity; Mes – mesocarp; PcR – prismatic crysals; Ph – phloem; Sc – stone cells; T – trichome; VB – vascular bundle.

Microscopy

TS of fruit shows pericarp which is clearly distinguished into outer epicarp, middle mesocarp and inner endocarpic regions. The pericarp shows a brown epicarp covered by number of stellate lignified trichomes along with stone cells and lysigenous mucilaginous cavities. The mesocarp is thick walled consisting of compactly arranged polygonal sclerenchymatous cells and vascular bundles and the endocarp is composed of fibres. The fibres are intermingled with prismatic crysals. The endosperm cells are thin walled lignified parenchyma cells which surrounds the cotyledonary region (Figure 2).

Powder microscopy

The powder is greenish brown coloured with characteristic odour and slightly bitter taste. Powder showed the characters like, cells of epicarp, stellate trichomes, fragment of mesocarp and endocarpic regions, endosperm cells, layers of

testa, stone cells from pericarp, fibres and prismatic crystals (Figure 3).

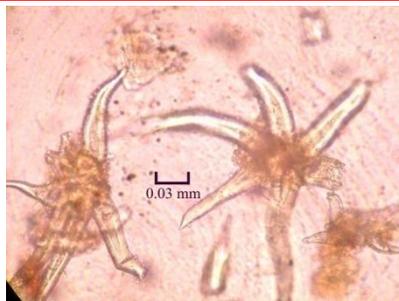
H. isora is an important constituent drug in the *Siddha* formulation *Valampuritailam*. Hence the standardization of drug is necessary to confirm the purity and identity of the drug while preparing herbal formulations. The present study enlightens the macro-microscopic and powder characteristics of *H. isora* which will support the sample identification and determination of quality of the drug. Since the genus is characterized by twisted fruits, the identification of plant samples in dried drug form is very difficult and may affect the efficacy of the drug, if the actual parts are not used.

This study will be a useful record for the standardisation and authentication of ingredient drug, fruits of *H. isora* for the preparation of *Valampuritailam*.

Figure 3. Powder microscopy of *Helicteres isora* fruit



3.1 Stellate trichomes



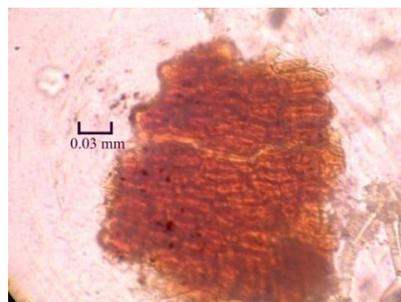
3.2 Arm of broken stellate trichome



3.3 Fragment of testa



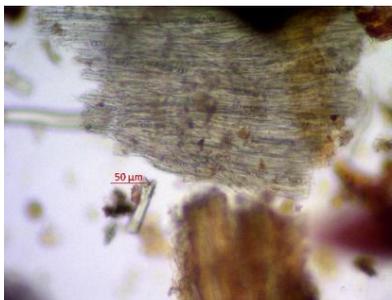
3.4 Epicarp



3.5 Mesocarp



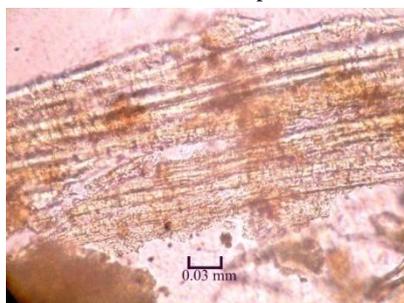
3.6 Endocarp with prismatic crystals



3.7 Lignified endosperm cells



3.8 Fibres from mesocarp



3.9 Parenchyma cells



3.10 Criss-cross fibres



3.11 Stone cells from mesocarp



CONFLICT OF INTEREST Nil

SOURCE OF SUPPORT Nil

CONTRIBUTORS Mrs. Remya did the planning and conceptualization of the work, Mrs. Rubeena M contributed towards the design and data acquisition, Dr. Divya did the anatomical studies. Mrs. Brindha and Mrs. Erni carried out the morphological study and powder microscopic studies. Manuscript analysis and editing was carried out by Dr. KN Sunil Kumar.

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