

Original Article

ASSESSMENT OF PHARMACOGNOSTICAL CHARACTERS OF THE FRUIT OF STEREOSPERMUM COLAIS BUCH

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ABSTRACT

Objective: To study detailed pharmacognostic profile of fruit of *Stereospermum colais*.

Methods: Micro and macroscopic characters of fresh and dried fruit samples were analyzed. Physicochemical studies were done by using WHO recommended parameters and fluorescent behavior of the fruit sample were also tested.

Results: The fruits are long follicles, arising from a node. The follicles have white warty spots on the surface. Dried fruits break open releasing numerous seeds with hairs. TS of fruit shows a layer of epicarp covered with thick cuticle, underneath this lies 2-4 rows of parenchymatous cells containing pigment, followed by wide mesocarp embedded with rounded or arc-shaped vascular bundles, pericyclic non-lignified fibers, mucilage cells and Endocarp is leathery with 5-6 rows of longitudinal and 5-6 rows of tangential stone cells.

Conclusions: The results of the study can serve as a valuable source of information and provide suitable standards for identification of this plant material in future investigations and applications.

Keywords: *Stereospermum colais*, Fruit, Seed, Microscopy, Macroscopy, Pharmacognosy, Xylem, Phloem, Physicochemical.

INTRODUCTION

Stereospermum colais (Buch.-Ham.ex Dillw.) is commonly known as Trumpet flower tree in English and Padri in Hindi, belonging to the family of Bignoniaceae. It is found in moist regions of India, Flowers and fruits during March-July. In spite of its many uses (diarrhoea, cough, asthma, hiccough, bleedings, hyperacidity, vomiting, fever, general debility, rheumatism, malarial fever, wounds, burning sensation, heart disease), the antidiabetic, antiperoxidative and radical scavenging activities of this species have not been assessed, and its chemical composition is scarcely known. The present research suggests the use of this plant as a therapeutic agent to treat the diabetes, heart disease & various other diseases. The leaves of *stereospermum colais* was investigated well previously by other workers for phytochemistry and pharmacological activity. But quite a few references are available regarding the phytochemicals present in other part of the plant. Hence the objective of the present investigation is to evaluate various pharmacognostical parameters such as macroscopic, microscopy, physicochemical, fluorescence and phytochemical studies of the plant.

MATERIALS AND METHODS

Stereospermum colais plant was collected from the Patnur ghat, Nanded district (MS), India in the month of July. The plant was identified by Dr. Arvind S Dhabe, Department of botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (MS), India.

Pharmacognostical study

Fresh fruits and seeds were taken for morphological and histological studies. Coarse powder (60 #) was used to study microscopical characters, physicochemical parameters and phytochemical investigation. For the microscopical studies, transverse sections of fruits and seeds was prepared and stained as per standard procedure [1-3]. The powder microscopy was performed according to the method of Khandelwal[3].

Physicochemical and phytochemical analysis

Physicochemical values such as percentage of ash values and extractive values were determined according to the well established official method and procedure [4, 5]. Preliminary screening was carried out using the standard procedure described by Khandelwal [3].

Fluorescence analysis

Powdered fruit material was treated with various chemical reagents and exposed to visible, ultraviolet light (Short UV) to study their fluorescence behavior [6, 7].

RESULTS

Macroscopic characteristics

Fruits

The fruits are long follicles, arising from a node. The follicles have white warty spots on the surface. Dried fruits break open releasing numerous seeds with hairs (Figure 1a).



Fig. 1a: Dried fruit showing morphology

Seeds

Seeds are linear oblong, dorsiventrally concavo-convex, 20-24 mm in length, 2-2.5 mm wide and 1.5-2 mm in thickness, margin getting

incurved towards concave surface, in the center of concave surface lies a yellowish white line of raphe running throughout the length, a scar left by removal of pappus is seen at the narrower end of the seed at the base of which lies hilum and micropyle; colour light brown. Seeds are linear oblong in shape with longitudinally folded cotyledons and a short radical at the apex, encircled by narrow endosperm and testa (Figure 1b and Figure 1c).



Fig. 1b: Seeds with pappus



Fig. 1c: Seeds without pappus

Microscopical characteristics

Fruits

TS of fruit shows a layer of epicarp covered with thick cuticle, underneath this lies 2-4 rows of parenchymatous cells containing pigment, followed by wide mesocarp embedded with rounded or arc-shaped vascular bundles, pericyclic non-lignified fibers, mucilage cells and Endocarp is leathery with 5-6 rows of longitudinal and 5-6 rows of tangential stone cells (Figure 2a-2e).

Seeds

TS of the seed is oval, shows centrally located large coiled cotyledons occupying the major area of the section, encircled by narrow endosperm and papiplose testa. Detailed TS shows yellowish brown outermost testa characterized by irregularly running papilla and single layer of epidermis composed of lignified stone cells, followed by 10-15 layer of parenchymatous cells, the innermost testa of 2-4 rows of tangentially running narrow compressed cells lies underneath this, cells of endosperm. Cotyledon consisting of upper and lower epidermis enclosing 5-6 rows of

mesophyll, embedded with aleurone grains, fixed oil globules and calcium oxalate crystals of rosette and prism type (Figure 3a-3e).

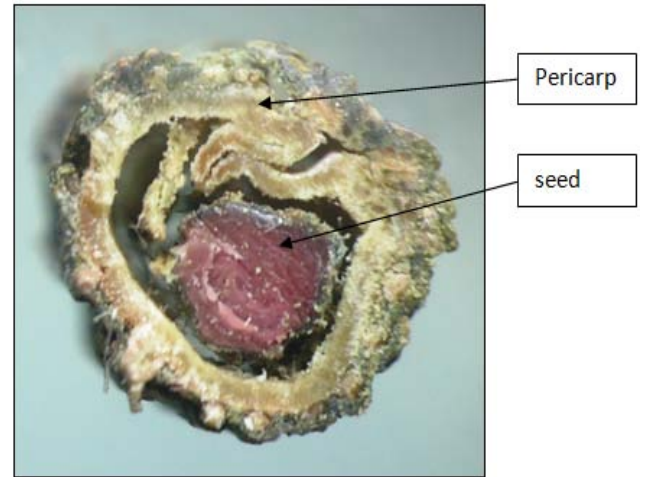


Fig. 2a: Diagrammatic T.S. of fruit with seed inside

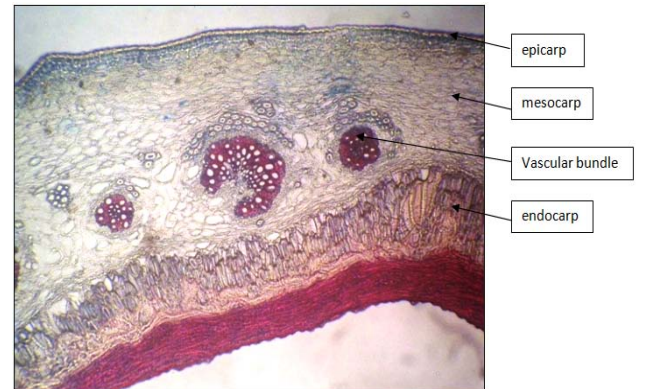


Fig. 2b: T.S. of part of pericarp

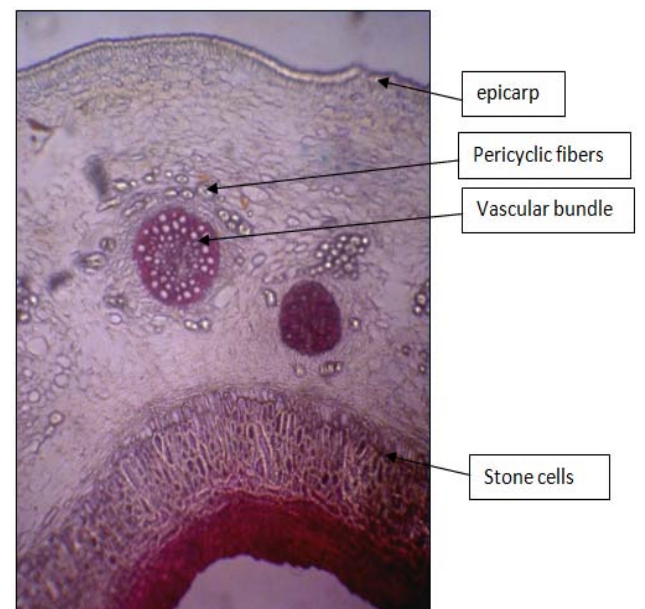


Fig. 2c: T.S. of part of pericarp

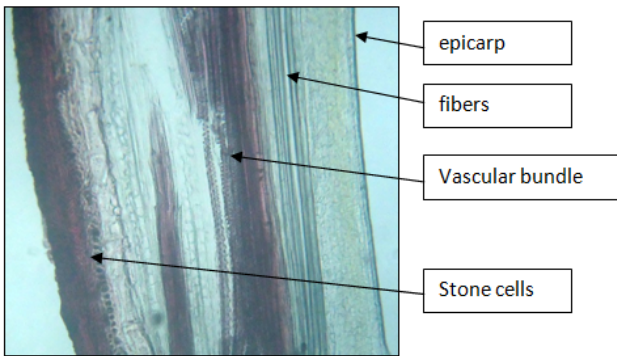


Fig. 2d: L.S. of pericarp

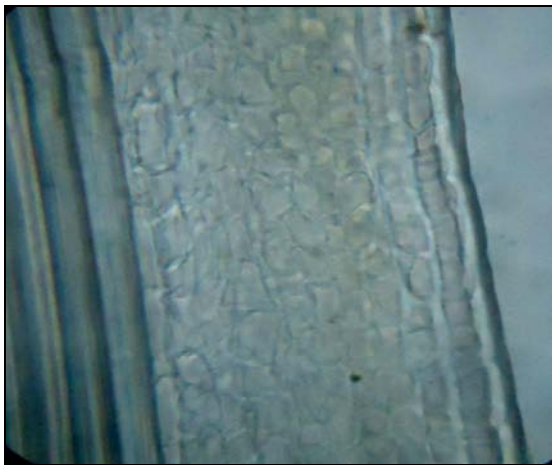


Fig. 2e: Part of pericarp in LS showing non-lignified pericyclic fibers

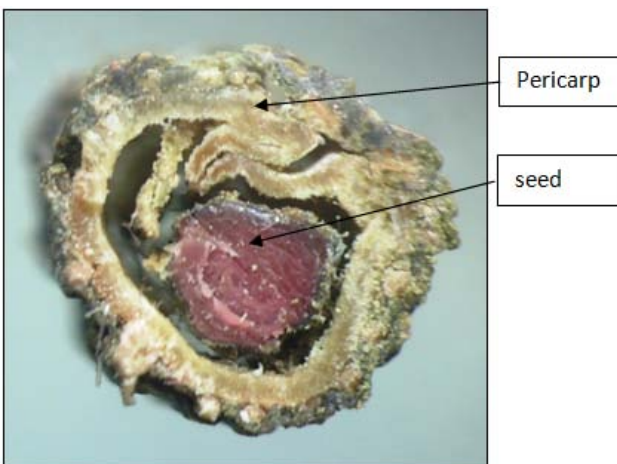


Fig. 3: Diagrammatic T.S. of fruit with seed inside

Powder microscopic characteristics

Fruit

The powder plant material is greenish in color, showing fragments of parenchyma, palisade cells, and fragments of epidermal cells, Powder characteristics showing Part of endocarp showing stone cells Figure 4a-4b.

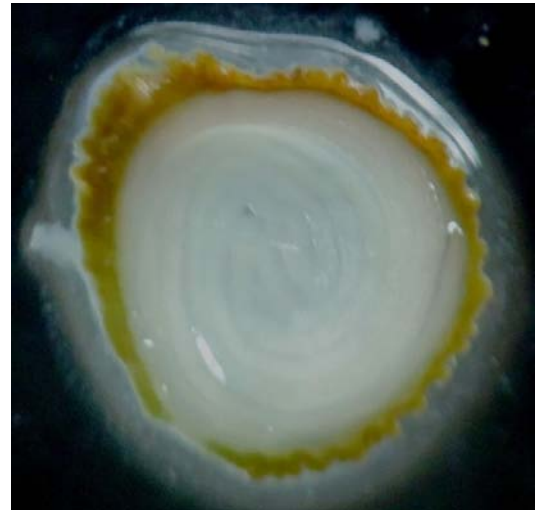


Fig. 3a: T.S. of seed showing testa and folded



Fig. 3b: Folded cotyledons of seed



Fig. 3c: T.S. of seed tests

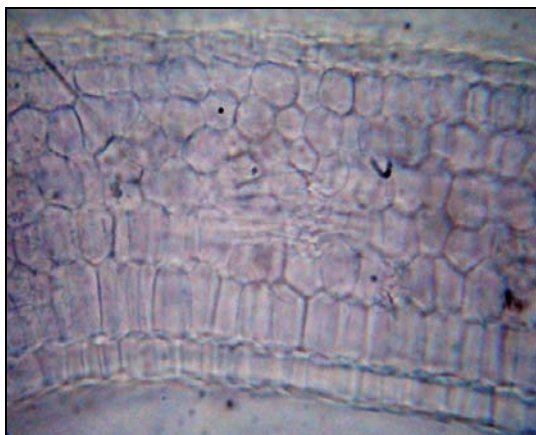


Fig. 3d: T.S. of part of seed testa

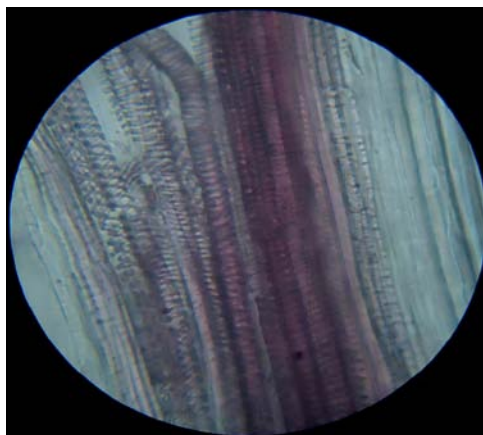


Fig. 4b: Vascular elements

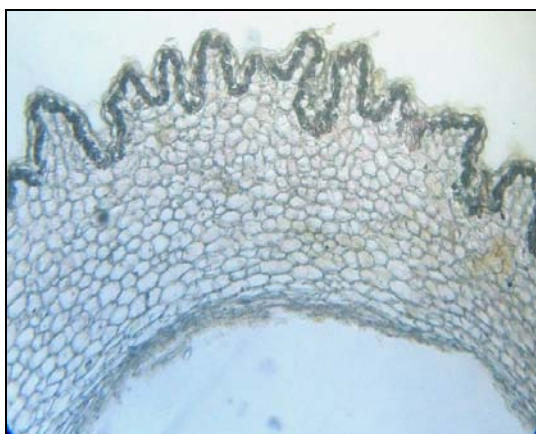


Fig. 3e: Part of cotyledon in sectional view

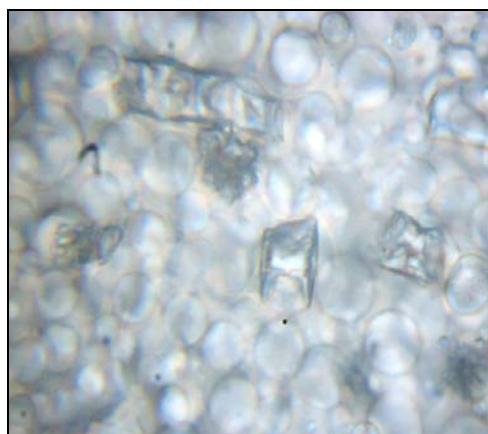


Fig. 5a: Powder characteristics showing Part of cotyledon

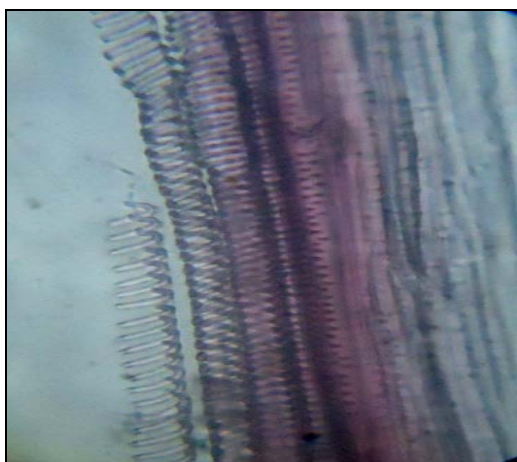


Fig. 4a: Powder characteristics showing vascular elements

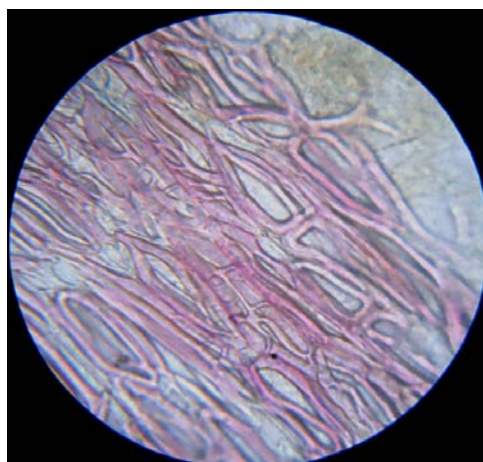


Fig. 5b: Powder characteristics showing Stone cells of testa

Table 1: Physico-chemical parameters

Physicochemical study Parameters	Result
pH (1% solution)	5.7
Loss on drying (LOD)	7.8% W/W
Ash Content	7.67% W/W
Density	0.403 g/ml
Water soluble extract	21.4% W/W
Alcohol Soluble residue	11.8% w/W

Table 2: Fluorescence analysis of fruit of *Stereospermum colais*

Fluorescent study	Long UV light	Short UV light
Powder as such	Yellow	Greenish
Powder in distilled water	Yellow	Yellowish green
Powder in Absolute alcohol	Yellowish green	Green
Powder In 10% NaOH	Green	Yellow
Powder in 10% HNO ³	Green	Green
Powder in 50% H ² SO ⁴	Green	Light Green

Seeds

The powder plant material is greenish in color, showing fragments of parenchyma, palisade cells, and fragments of epidermal cells along with stomata, Sectional view also showing calcium oxalate prism and rosette (Figure 5a).

Preliminary phytochemical screening

Preliminary phytochemical screening of leaf mainly revealed the presence of Triterpenoids, saponins, tannins and flavonoids.

Physicochemical study

Physicochemical analysis of fruit viz. foreign organic matter, loss on drying, swelling index, ash value and extractive value are presented in Table 1. The fluorescence analysis of *Stereospermum colais* fruit under day light and UV (Short, 254 nm) light is recorded in Table 2.

DISCUSSION

Ethnomedically, the fruit of this plant were used by local people in the treatment of various disease conditions without standardization. The standardization of a crude drug is an integral part for establishing its correct identity. Before any crude drug can be included in an herbal pharmacopoeia, pharmacognostic parameters and standards must be established. Microscopic method is one of the simplest and cheapest methods to start with for establishing the correct identity of the source materials [8-12]. The pharmacognostic standards for fruit of *stereospermum colais* are carried out for the first time in this study. The macroscopical characters of the leaf and stem can serve as diagnostic parameters. Microscopical studies indicated the presence of epicarp covered with thick cuticle, Parenchymatous cells containing pigment, mesocarp embedded with rounded or arc-shaped vascular bundles, pericyclic non-lignified fibers, mucilage cells and Endocarp with stone cells. These studies help in the identification of the plant materials [13]. Ash values and extractive values can be used as reliable aid for detecting adulteration. These studies help in the identification of the plant materials [13]. Ash values of drug give an idea of earthy matter or the inorganic composition and other impurities present along with drug.

Extractive values are primarily useful for the determination of exhausted and adulterated drugs. Extractive values are also useful to evaluate the chemical constituents present in the crude drug and also help in estimation of specific constituents soluble in particular solvents [14, 15]. The fluorescent analysis under day light and UV light by treatment with different chemical reagents showed different color. This analysis suggests that, fruit of *stereospermum colais* probably contain active agent(s) and this provides the basis for their folkloric use as a cure for some human ailments. In conclusion, these parameters which are being reported for the first time could be useful in setting some diagnostic indices for the identification and preparation of a monograph of the *stereospermum colais* plant.

CONFLICT OF INTEREST

We declare that we have no conflict of interest.

ACKNOWLEDGEMENTS

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