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Pharmacognostical studies on the leaves of *Cassia obtusifolia* Linn.

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ABSTRACT

Cassia obtusifolia Linn. (Family: Caesalpinnaceae) is commonly known as "Takla" or "Chakunda" in India, also used as vegetable and cultivated throughout in India, Sri - Lanka and many tropical countries. In Indian traditional system of medicine (Ayurveda) the plant is used as digestible, laxative, diuretic, stomachic, antipyretic, improves the appetite, biliousness, blood diseases, burning sensation, leprosy, bronchitis, piles and leucorrhoea. There were no pharmacognostical reports of this plant, specifically to determine the anatomical and other physicochemical standards required for its quality control. The findings of the current study can be useful to progress and surge further scientific investigation on the leaves of this species. The present study aims at developing a standardized profile of leaves of Cassia obtusifolia Linn. which would be of immense use to identify and establish the authenticity of the plant Cassia obtusifolia Linn.

Keywords: *Cassia obtusifolia* Linn., Caesalpinnaceae, Microscopy, Pharmacognosy,

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INTRODUCTION

Indian sub-continent is endowed with numerous flora and fauna, which are used for the treatment of various ailments because of their medicinal properties. In spite of spectacular advancements in modern medicine, sizable rural populations of India depend and rely on traditional medicines made from plants and animals [1]. Last decade mark the uprising of branch as the quest for biologically active compounds from natural source had increased its pace. Higher plants have played a vital role as a source of therapeutic agents.

Cassia obtusifolia Linn. (Family: Caesalpinnaceae) is commonly known as "Takla" or "Chakunda" in India, also used as vegetable and cultivated throughout in India, Sri - Lanka and many tropical countries. In Indian traditional system of medicine (Ayurveda) the plant is used as digestible, laxative, diuretic, stomachic, antipyretic, improves the appetite, biliousness, blood diseases, burning sensation, leprosy, bronchitis, piles and leucorrhoea [2].

However, there are no reports on the pharmacognostical studies of the plant. Hence, the present work is an attempt in this direction and includes morphological and physical evaluation, determination of physico-chemical constants and preliminary phytochemical screening of different extracts of *Cassia obtusifolia* Linn.

MATERIALS AND METHODS

Plant material:
The leaves of the plant *Cassia obtusifolia* Linn. (Caesalpiniaceae), was collected from fields of Sant Tukaram Nagar, Pimpri, Pune, Maharashtra, India. It was identified and authenticated by Botanical Survey of India, Pune under

voucher specimen number SMK –1. The shade dried leaves were further size reduced and stored until further use in an air tight container. Fresh plant material was obtained for the microscopical evaluation.

Chemicals and instruments:
All the chemicals used were of laboratory grade. Compound microscope, watch glass, glass slides, cover slips, and other common glasswares were used in this experiment. Photographs were taken with using Nikon Labphot 2 Microscopic Unit, and trinocular microscope. Various solvents used mainly petroleum ether, ethanol (95%),and reagents used for staining different sections like phluoroglucinol, iodine solution, safranin, and acetic acid were procured from CDH, Mumbai, India.

Macroscopic and microscopic analysis
The Macroscopic and microscopic of the plant was studied according to the methods of Evans, the cross sections were prepared and stained with phluoroglucinol, iodine solution, safranin, and acetic acid. The microscopic analysis of powder was studied [3] [4] [5].

Physico- chemical analysis
Air dried plant material was used for the quantitative determination of ash and extractive values according to standard procedure of Indian Pharmacopoeia, 1996 [6] [7] and WHO/QCMMPM, 1992 [8] [9]. Fluorescence analysis of the extract(s) was carried out according to standard procedure [10] [11]. Powdered leaf was subjected to analysis under ultra violet light after treatment with various reagents and chemicals like sulphuric acid, nitric acid, dilute hydrochloric acid and sodium hydroxide.

Preliminary phytochemical screening
Preliminary phytochemical evaluation was carried out by using standard procedure [12] [13].

RESULTS AND DISCUSSION

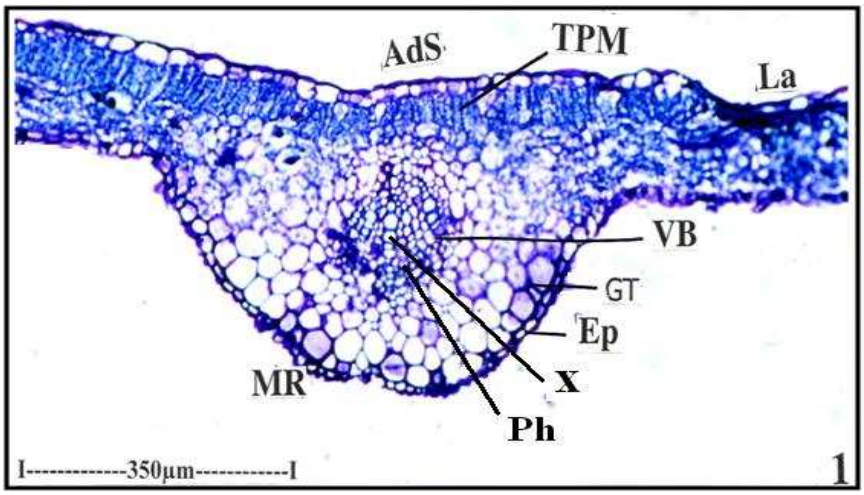
Macroscopic characters of leaves

Table 1: Macroscopic characters of leaves of *Cassia obtusifolia* Linn.

Sr. No.	Particulars	Observations
1	Colour	Green
2	Odour	No
3	Taste	Bitter
4	Length	7.5 – 10 cm.
5	Margin	Dentate/Serrate
6	Apex	Rounded
7	Base	Oblique/ Rounded
8	Surface	Membranous
9	Shape	Obovate/Oblong
10	Vein	Reticulate
11	stipules	1.3 – 2 cm, linear – subulate
12	Leaflets	three pairs
13	Main nerves	8 – 10 pairs
14	petioles	2.5mm, pubescent

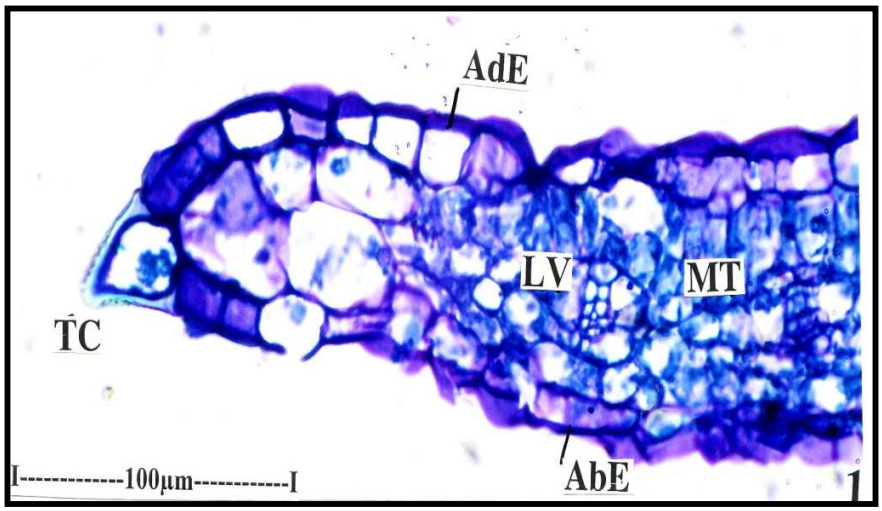
Microscopic characters of leaves
The paraffin embedded specimens were sectioned with the help of Rotary Microtone. The thickness of the sections was 10 – 12 µm. Dewaxing of the sections was by customary procedure [14].The section were stained with Toluidine blue as per the method published by O'Brien et al., 1964 [15] [16].

Fig A: T. S. of leaf through midrib with lamina



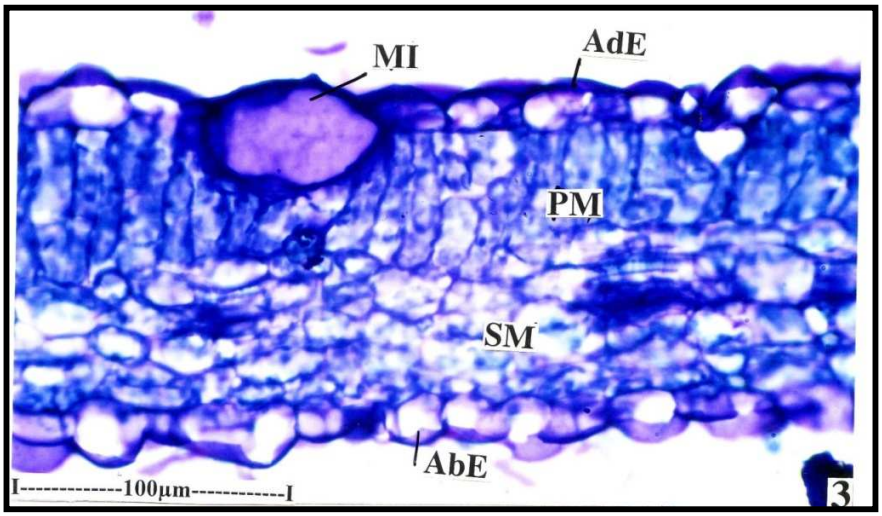
Where;
Ads – *Adaxial side*
Ep – *Epidermis*
Gt – *Ground tissue*
La – *Lamina*
MR – *Midrib*
Pa – *Parenchymatous ground tissue*
Ph – *Phloem*
TPM – *Transcurrent palisade mesophyll*
VB – *Vascular bundle*
X – *Xylem.*

Fig B: T.S. of the leaf margin



Where;
AbE – *Abaxial epidermis*
AdE – *Adaxial epidermis*
LV – *Lateral vein*
MT – *Mesophyll tissue*
TC – *Thick walled cell*

Fig C: T.S. of the lamina showing mucilage – idioblast



Where;
AbE – Abaxial epidermis
AdE – Adaxial epidermis
MI – Mucilage – idioblast
PM – Palisade mesophyll
SM – Spongy mesophyll

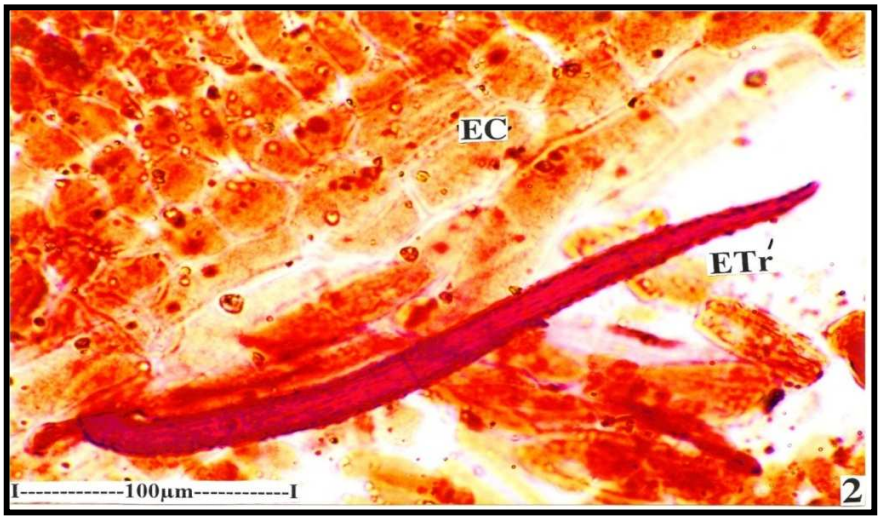
Powder microscopy

The powder microscopy of leaf was done and data mentioned below

1. Epidermal trichomes:

Unicellular, unbranched, covering – type or non - glandular type having thick lignified walls with echinate cuticle, 450 – 600 mm long and 30 mm thick

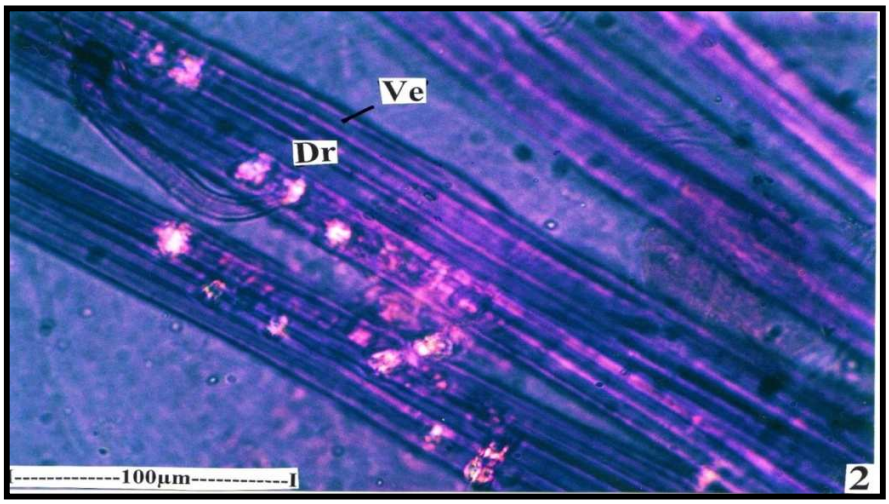
Fig D: Fragment of epidermal cells with trichomes enlarged



Where;
EC – Epidermal cells
ETr – Epidermal trichomes

2. Calcium oxalate crystal:
Sphaero crystals, diffuse in distribution and occur in the mesophyll tissue and may be the associated with veins.

Fig E: Druses in the leaf powder



Where;
Dr – Druses
Ve – Vein

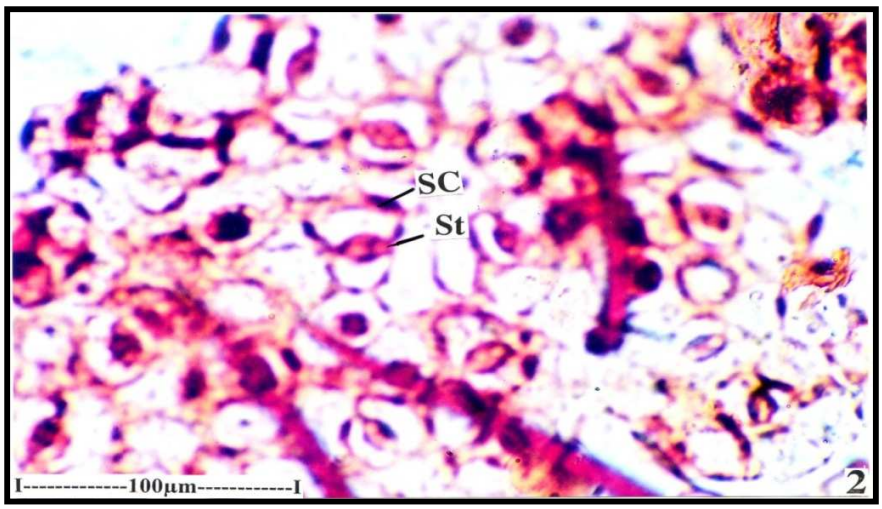
Broken xylem elements
Broken xylem elements of the veins are seen scattered in the powder. The xylem elements have spiral, annual and scalariform lateral wall thickenings.

Fig F: Trichomes and xylem elements in the leaf powder

Where,
Tr – Trichomes
XE – Xylem elements

3. Epidermal peelings:
Fragments of epidermal layer with stomata are seen into powder. The stomata are paracytic type. The epidermal cells have straight, thin walls.

Fig G: Fragments of abaxial epidermis with stomata



Where,
SC – Subsidiary cells
St – Stoma

Physiochemical analysis:

Air dried material was used for quantitative determination of phytochemical values. Total, Water soluble ash, acid insoluble ash, water soluble and alcohol soluble extractive were determined for five times as per WHO recommendations. Water soluble extractive value was found to be very high when compared to other extractable matter in the drug (Table 2).

Table 2: Physical evaluation of leaves of *Cassia obtusifolia* Linn.

Sr. No.	Parameters	Results (% w/ w)
1.	Total ash	11.00
2.	Acid-insoluble ash	02.00
3.	Water - insoluble ash	06.00
4.	Alcohol soluble extractive	08.40
5.	Water soluble extractive	41.80
6.	Moisture content (LOD)	09.70

Table 3: Preliminary phytochemical screening of two extracts of the leaves of *Cassia obtusifolia* Linn. (+ positive test, -- negative test).

Sr. No.	Test	Pet. Ether	Ethanol
1.	Alkaloids		
a)	Dragandorff Reagent	--	+
b)	Hager's Reagent	--	+
c)	Mayer's Reagent	--	+
d)	Wagner's Reagent	--	+
2.	Glycosides		
a)	Liebermann-Burchard's test	+	+
b)	Legal's test	+	+
c)	Borntrager test	+	+
3.	Saponins		
a)	Foam test	+	+
b)	Haemolysis test	+	+
4.	Flavonoids		
a)	Shinoda test	--	+

Preliminary phytochemical screening

The preliminary phytochemical test was performed on the extracts of plant of *Cassia obtusifolia* Linn. They show the presence of the alkaloids, glycosides, flavonoids, saponin, steroids triterpinoids, flavonoids, fixed oil and protein starch (Table 3).The fluorescence analysis is a tool for the determination of constituents in the plant that gives a definite idea of the chemical nature. Thus the fluorescence analysis of the powder was carried out and data is presented in the Table 4.

Table 4: Fluorescence analysis of leaf powder of *Cassia obtusifolia* Linn

Sr. No.	Treatment	Day light	U.V light
1.	Drug powder	green	Green
2.	Powder + 1N HCl	Dark yellow	Dark green
3.	Powder + 1N H_2SO_4	faint green	Dark green
4.	Powder + 1N HNO_3	Yellowish green	Green
5.	Powder + 1N NaOH	Brownish red	Dark brown

CONCLUSION

The study of Pharmacognostical features of *Cassia obtusifolia* Linn. had shown the standards which will be useful the detection of its identity and authenticity. The other study viz. physical evaluation, preliminary phytochemical test and Fluorescence analysis add to its quality control and quality assurance for proper identification.

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