

PHARMACOGNOSTIC STUDIES ON THE LEAF OF *CASSIA SOPHERA* LINN.

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ABSTRACT

The macroscopic and microscopic studies of the leaves of *Cassia sophora* Linn. are made. Unicellular pointed-head trichomes present throughout the margin of the leaves, rosette crystals of calcium oxalate and rubiaceous stomata present throughout the leaves are the chief diagnostic characters.

The plants belonging to this genus are considered very important from the therapeutic point of view as most of them contain emodin (Trioxymethyl-anthraquinone) and chrysophanic acid, the latter is a very good remedy for ring worms, psoriasis, syphilis and other types of skin diseases (Biswas, 1950; Gupta, 1908; Kirtikar & Basu, 1935; Nadkarni, 1954). The most important plant of this genus is *Cassia angustifolia* Vahl the leaves of which are known in commerce as Indian senna or Tinnevely senna and which are exported from India in large quantities to different foreign countries, a major portion of which goes to London market (Dutta & Mukerji, 1952). Like senna, *Cassia sophora* Linn. though very common and easily available is also an important medicinal plant of our country. As pharmacognostic details of the plant are lacking, the pharmacognostic studies on the leaves have been taken up in order to identify the leaves easily and properly when they are found either in a powdered condition or mixed up with other leaves of this type.

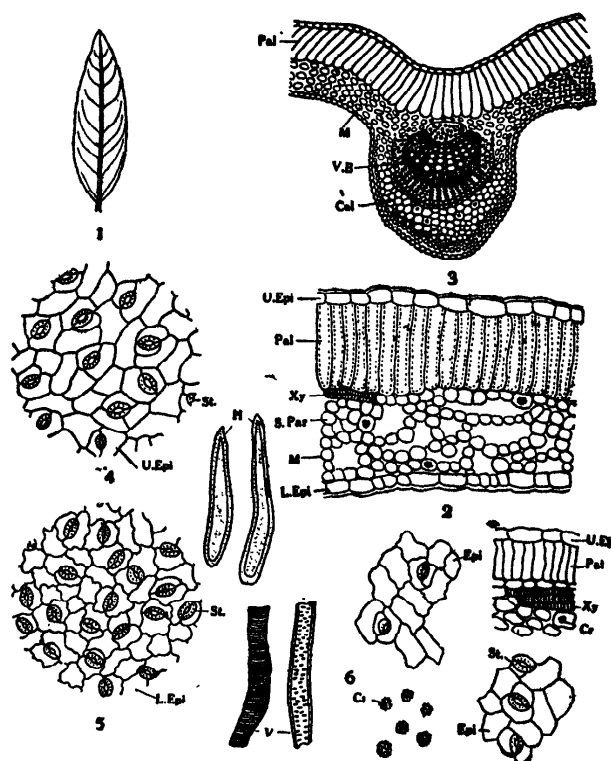
Cassia sophora Linn. is a diffuse shrub with yellow flowers 1.3-3.4 m high. Leaves 18-23 cm long; rachis grooved, glabrous or nearly so, with a solitary conical gland near the base. Leaflets 6-12 pairs, acute or acuminate mostly 2.5-7.5 cm long, cuneate at the base. Flowers in short axillary and terminal panicles. Pods 7.5-10 cm long, slightly falcate, somewhat turgid, transversely septate between the seeds. Seeds 30-40, broadly ovoid, compressed, dark brown (Biswas, 1950; Duthie, 1960; Gamble, 1957; Haines, 1961).

Distribution : The plant is found throughout India and in most tropical countries. It is very common in wastelands, on roadsides and in the border of the jungles (Duthie, 1960; Gamble, 1957; Haines, 1961).

The plant is known in vernacular Beng.: *Kal-kashunda*; Hind.: *Kasunda*, *Banar*; Sans.: *Kasamarda*; Tam.: *Ponnavirai*, *Nalai*; Tel.: *Kasamardakamu*; Eng.: *Senna sophora*.

Parts used: Leaves, seeds, root, root-bark and stem-bark (Dymock *et al.*, 1893; Kirtikar & Basu, 1935; Nadkarni, 1954).

Macroscopic characters : The leaflets are usually 6-10 pairs, each leaflet measuring 2.5-7.5 cm in length and 1.3-2 cm in breadth, glaucous, lanceolate, acute or acuminate; upper surface deep green while the lower surface is much lighter. Apparently the leaflets are glabrous.



Figs. 1-6.

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|---|---|-----|
| 1. Leaflet of <i>Cassia sophora</i> Linn. | × | 1 |
| 2. Transverse section of the leaflet | × | 117 |
| 3. Transverse section of the leaflet through the midrib | × | 117 |
| 4. Upper epidermis in surface view | × | 117 |
| 5. Lower epidermis in surface view | × | 117 |
| 6. Elements from powdered leaflet | × | 117 |

Col. = Collenchyma; Cr. = Crystals; Epi. = Epidermis; L. Epi. = Lower epidermis; U. Epi. = Upper epidermis; H. = Hairs; M. = Mesophyll; Pal. = Palisade; S. Par. = Spongy parenchyma; St. = Stomata; V. = Vessels; V. B. = Vascular bundles; Xy = Xylem.

Microscopic characters: Transverse section of the leaflet shows the presence of cuticle on the

upper epidermis. The upper epidermal cells are either oval or elliptic or barrel-shaped and measure $15.2\mu-76\mu \times 15.2\mu-22.8\mu$ in T.S. Next to the upper epidermal cells is a layer of palisade cells which are filled up with chloroplasts. The palisade cells are radially elongated and are arranged in a row. The palisade cells measure $76\mu-114\mu \times 11.4\mu-15.2\mu$ in T.S. The lower epidermal cells are more or less same shape as those of the upper ones. In between the palisade cells and lower epidermal cells there are several layers of loosely arranged spongy parenchymatous cells known as mesophyll. Rosette crystals of calcium oxalate are found scattered in these cells. The parenchymatous cells measure $11.4\mu-38\mu \times 11.4\mu-26.6\mu$ in T.S. In the upper region of these cells nearing the palisade cells lie the vascular elements. The vessels show annular, spiral and reticulate thickenings. The upper epidermal cells are more or less straight walled while, the walls of the lower epidermal cells are much wavy. Stomata rubiaceous and are present in large numbers in the lower epidermis as compared to those present in the upper epidermis. Portions of leaflets from apex, middle and base were cut and cleared with chloral hydrate solution for the study of the vein-islet and vein-termination numbers. The results of this study are noted in Table given. Unicellular pointed head trichomes are found throughout the margin of the leaf when leaf portions are examined under the microscope. The trichomes are not found in any other part of the leaf surface. The trichomes measure $121.6\mu-254.6\mu$ in length. Small peelings are also made from the upper as well as lower surface of the leaves in order to study the palisade ratio, number of stomata and number of epidermal cells present per square mm of the leaf surface and stomatal indices were also noted. The results of these studies are tabulated in the Table. Transverse section through the midrib shows bicollateral vascular bundles which are found almost in the middle of the midrib. Both above and below the group of bundles occur arc of thick-walled lignified pericyclic fibres. Between the pericyclic fibrous layer and the lower epidermal layer several layers of collenchymatous cells are found, some of which are filled up with rosette crystals of calcium oxalate while others contain starch grains. The collenchymatous cells measure $11.4\mu-30.4\mu \times 11.4\mu-34.2\mu$ in T.S. Similarly parenchymatous cells are also found between the upper arc of pericyclic fibres and the palisade layer. These cells also contain rosette crystals of calcium oxalate and starch grains.

Powder : The leaflets were dried and made powder in No. 60 B.S. sieve. The powder is greyish green in colour while the odour is somewhat pungent. Small portion of the powder was cleared in chloral hydrate solution for the study of the diag-

nostic elements. The powder when examined under the microscope is characterised by the presence of small fragments of leaflet showing epidermal cells and palisade cells with a few spongy parenchyma, vascular elements either isolated or in small groups, epidermal cells with stomata, isolated pointed head trichomes and rosette crystals of calcium oxalate.

Chemical constituents: The leaves contain emodin and chrysophanic acid. They also contain cathartin (Nadkarni, 1954).

Uses : The plant is used in medicine by Ayurvedic practitioners as well as Hakims. According to Sanskrit writers the plant is known as *Kaphamarda* as it gives relief to persons attacked with cold. Equal quantity of the seeds of *Cassia sophora*, *Raphanus sativus* and Sulphur mixed together with water and applied to sores and scabies gives magic relief (Biswas, 1950). According to Ayurvedic practitioners of Madras the juice of the leaves, when taken internally cures gonorrhoea and if applied externally cures syphilis (Kirtikar & Basu, 1935). The juice of the leaves pasted with sandal-wood is a very good remedy for killing intestinal worms. Infusion of the fresh leaves is a useful injection in gonorrhoea in the subacute stage. In rheumatic and inflammatory fever the infusion of the leaves is highly beneficial (Nadkarni, 1954). In cases of jaundice it is prescribed with sugar (Sen-Gupta, 1926). The leaves are cathartic in action (Dymock et al., 1893. Sen Gupta, 1926).

TABLE
STUDY OF THE LEAF CONSTANTS
CASSIA SOPHERA

	E	S	S.I.	V.I.	VI.T.	P.R.
a	300	50	14			6
b	277	48	15			7
c	285	56	16			8
d	445	115	20			
e	405	101	20			
f	421	117	21			
g				19	16	
h				18	13	
i				17	19	

a, b, c, = upper apex, middle and base ; d, e, f = lower apex, middle and base ; g, h, i = apex, middle and base ; E & S = no. of epidermal cells and stomata per sq. mm of leaf surface ; S.I. = stomatal index ; V.I. and VI.T. = vein-islet and vein-let termination nos. per sq. mm of leaf surface ; P.R. = palisade ratio.

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