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PHARMACOGNOSTIC AND PHYTOCHEMICAL EVALUATION OF *CORDIA MACLEODII* (HOOK. F & THOMSON)

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ABSTRACT

Cordia macleodii known as Dahiman in Hindi is an important medicinal plant belonging to family-Boragenaceae. It is a promising drug used commonly as snake poison and also useful in, jaundice, leprosy, skin diseases, ear diseases and anti bacterial agents. Its stem bark, fruit and leaf are being used in the Indian System of Medicine and preparation of the Ayurvedic compound formulations *viz.* Shleshmataka panak, Durvadya taila, Banapsikadi Kashaya. The present paper deals with pharmacognostic study of stem bark and leaf which mainly included pharmacognostic investigation, HPTLC finger printing, fluorescence, phyto-chemical analysis and physico-chemical tests. Leaf physicochemical parameters average value of loss on drying at 105oC 5.22%, water soluble extractive value12.56%, alcohol soluble extractive value 4.17%, total ash value 13.68%, acid insoluble ash value3.12%, stem bark physicochemical parameters average value of loss on drying at 105oC 8.40%, water soluble extractive value 24.93%., alcohol soluble extractive value 7.01%, total ash value 17.07%, acid insoluble ash value 5.86%, phytochemicals mainly alkaloids, carbohydrate, flavanoid, saponin, tannin and resin present in the stem bark and alkaloid, resin, tannin present in the leaf. These parameters can be used for quality evaluation of single drug and for manufacturing authentic polyherbal medicines with correct identity.

KEYWORDS: *Cordia macleodii,* Pharmacognostic investigation, Phyto-chemical analysis, Physicochemical analysis, HPTLC fingerprints.

INTRODUCTION

Cordia macleodii. (family- Boragenaceae) known as Dahiman tree is an important medicinal plant. 8-12 meter tall, stem bark grey or brown in colour, rough with shallow longitudinal furrows and wrinlles, Leaves alternate-subopposite, simple, 8-12X6-8 cm, ovate in out line with entire or wavy-distantly toothed margins. Flowers white, about 4mm across, polygamous in lax pedunculate axillary and terminal cymes. Fruit a globose pinkish drupe of 1-1.5 cm in diam, with viscid, transparent pulp, endocarp hard with a single seed. It is widely distributed in the moist and dry deciduous forest up to 1200 meters in peninsular India, mostly from Chota Nagpur to Tamil Nadu. It is also found about human habitations.The tree is distributed in Sri Lanka, Myanmar, China, Maley peninsula and Archipelag.[1-2]

Since no enough record on the pharmacognostical works on the leaf and stem bark of this drug plant. The same has been attempted. The present paper deal with mainly pharmacognostic investigation of the leaf along with other important, fluorescence study, Physico - chemical parameters such as loss on drying at 1050C, total ash value, acid in soluble ash value, water soluble ash value, alcohol soluble extractive values and water soluble extractive value. Important phyto-chemical tests and thin layer chromatographic findings from the standardization point of view. These data will be helpful in identification, quality control and pharmacognostic studies of the drugs.

MATERIALS AND METHODS

Authentic samples were collected from Chitrakoot (Bagdara ghati) forest. The pharmacognostical parameters were determined according to the methods detailed in the Ayurvedic Pharmacopoeia of India.[3-5] Organoleptic characters and particle size of the both samples were recorded. Quantitative analysis for loss on drying at 105^{o}C, ethanol soluble extractive value, water soluble extractive value, total ash value, acid insoluble ash values and water soluble ash values were carried out in triplicate in two different samples of Dahiman leaf and stem bark curna. Preliminary phytochemical analysis and HPTLC finger printing profile were also determined in the two different samples of leaf and stem bark. For microscopic analysis preparing two slides, one in water, stained with iodine and mounted in glycerin and second one in Chloral hydrate mounted with glycerin. Preliminary phytochemical tests were carried out on ethanolic and water extract for the presence\absence of phyto-constituents like alkaloid, flavanoid, tannin, resin, carbohydrate, protein and

saponin.[6-8] The fluorescence response of powdered drugs exposed to UV radition (254 nm and 366nm wavelength) was studies using the standard procedure.[9]

For HPTLC, the powdered leaves and stem bark 5 gm of each sample was extracted with 100 ml of ethanol and methanol overnight, filtered and concentrated. It was applied by spotting extracted sample on pre-coated silica-gel aluminium plate 60 F254 (5x10 cm with 0.2 mm layer thickness Merk Germany) using Camag Linomat -5 sample applicator and a 100 µl Hamilton syringe. The samples, in the form of bands of length 6 mm, were spotted 15 mm from the bottom, 15 mm from left margin the plate and 10 mm part. Plates were developed using mobile phase (for both leaf and stem bark) consisting of Toluene: Ethyl acetate (7:3 v\v). Linear ascending development was carried out in 10x10cm twin through glass chamber equilibrated with mobile phase. The optimized chamber saturation time for mobile phase was 30 min. at room temperature. The length of chromatogram run was 10 cm. 20 ml of the mobile phase. Subsequent to the development, TLC plates was dried with the help of Hot Air Oven. The peak area for samples and standard were recorded with Camera photo documentation system Camag Reprostar 3. Visualization of spot was made before and after derivatization (with 5% methanolic –sulphuric acid reagent) at 254nm, 366nm and day light with Win cat software and Rf values noted.[10-12]

RESULTS AND DISCUSSION

Microscopic and powder microscopic Characters

Dahiman leaves powder taste is bitter, odour, astringent, and green colour, stem bark powder taste not characteristics, odour astringent and brown in colour.

Detailed TS of stem bark shows wide zone of rhytidoma containing of 8 to 12 rows of outer most dark brown coloured cells of the cork. Pholem is very wide consists of rows of tangentially running groups of thin walled fibres associated with idioblast containing prismatic crystals of calcium oxalate, alternating with vertical rows of uniseriate to triseriate medullary rays. Simple starch grains and prismatic crystals of calcium oxalate traversed throughout the parenchymatous cells of the section. Powder shows cork cells in surface view containing with prismatic crystals of calcium oxalate, groups of stone cells in various shapes and sizes, cortical parenchyma containing with starch grains, simple pitted vessels, reticulate thickening and prismatic crystals of calcium oxalate (Plate-1).

Detailed TS of leaf passing through the midrib shows a layer of upper and lower epidermis covered with cuticle, embedded with stomata, The mesophyll tissues of lamina shows a layer of palisade underneath the upper epidermis and 3 to 4 rows of spongy parenchyma embedded with pinkish contents. Powder shows abundant fragments of upper and lower epidermis in surface view embedded with anomocytic stomata, spongy parenchyma embedded with pinkish contents, upper epidermis are bigger in size than the lower epidermis, long fibres, trichomes in different shape and size, Simple pitted vessels, reticulate and spiral thickening (Plate-2).

Preliminary phytochemical and Fluorescence studies

Qualitative phyto-constituents were screened in the extracts taken in water, acetone, petroleum ether and ethyl alcohol. The screening exhibited presence of alkaloids, carbohydrate, flavanoid, saponin, tannin and resin in the stem bark and alkaloid, resin, tannin present in the leaf, The fluorescence response of powdered drugs exposed to UV radition (254 nm and 366nm wavelength) was studies and result is given in table 1.

Table-1: Fluorescence analysis of powder of Dahiman stem bark and leaf powder with various chemical reagents under UV short and long wave lengths

S. No.	Treatment	Stem bark		Leaf	
		254nm	366nm	254nm	366nm
1	Drug powder+ 50%KOH	black	Dark yellow	Dark yellow	Light yellow
2	Drug powder+ 50% HNO3	Black	yellow	yellow	Black
3	Drug powder+ 1N NaOH	yellow	black	black	yellow
4	Drug powder+ 1N HCL	Light yellow	Dark yellow	black	Light yellow
5	Drug powder+Iodine water	Grey	Dark yellow	yellow	Grey
6	Drug powder+ Conc. H2SO4	Blue	Black	Black	Light yellow
7	Drug powder+ Acetic acid	Grey	yellow	Black	black
8	Drug powder+ 50% H2SO4	black	Dark yellow	black	yellow

Physico-chemical study

Detailed study of the powder of the leaf and stem bark pertaining to physico-chemical parameters such as foreign matter, moisture content (loss on drying at 1050C), water soluble extractive value, alcohol soluble extractive value, total ash value and acid insoluble ash value have been given in (Table-2).

Table 1: Physico-chemical Analysis

Name of Test		Stem bark	Leaf
Foreign matter	2.18%		2.93%
Loss on drying (LOD)	8.40%		5.22%
Alcohol Soluble extractive	7.01%		4.17%
Water Soluble extractive	24.93%		12.56%
Total ash	17.07%		13.68%,
Acid in soluble ash	5.86%		3.12%

High Performance Thin Layer Chromatography (HPTLC)

Methanolic and Ethanolic extract of Dahiman leaf showed major spots before derivatization under 366nm Rf Values are 0.15, 0.32, 0.40, 0.60, 0.75, 0.80, 0.92 (all red) and after derivatization under 366nm Rf Values are 0.40 (pink), 0.92 (red), Methanolic and Ethanolic extract of Dahiman stem bark showed major spots under 366nm Rf Values are 0.40 (red), 0.58 (red) and after derivatization under UV light Rf Values are 0.40 (light brown), 0.56 , 0.60, 0.68, 0.78 (all brown) (Fig.1 to 4)

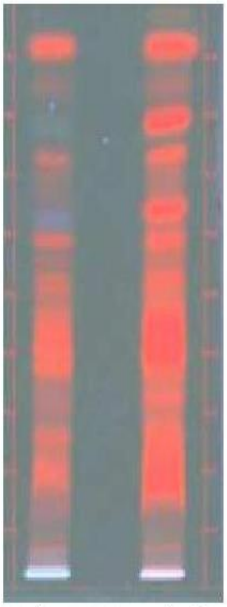

Fig..1: 366nm , leaf extract

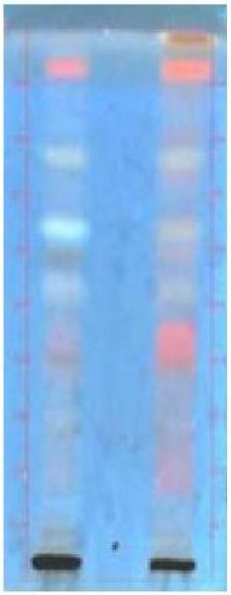

Fig..1: 366nm , leaf extract after derivatization

Fig..1: 366nm , stem bark extract

Fig..1: 366nm , stem bark extract after derivatization

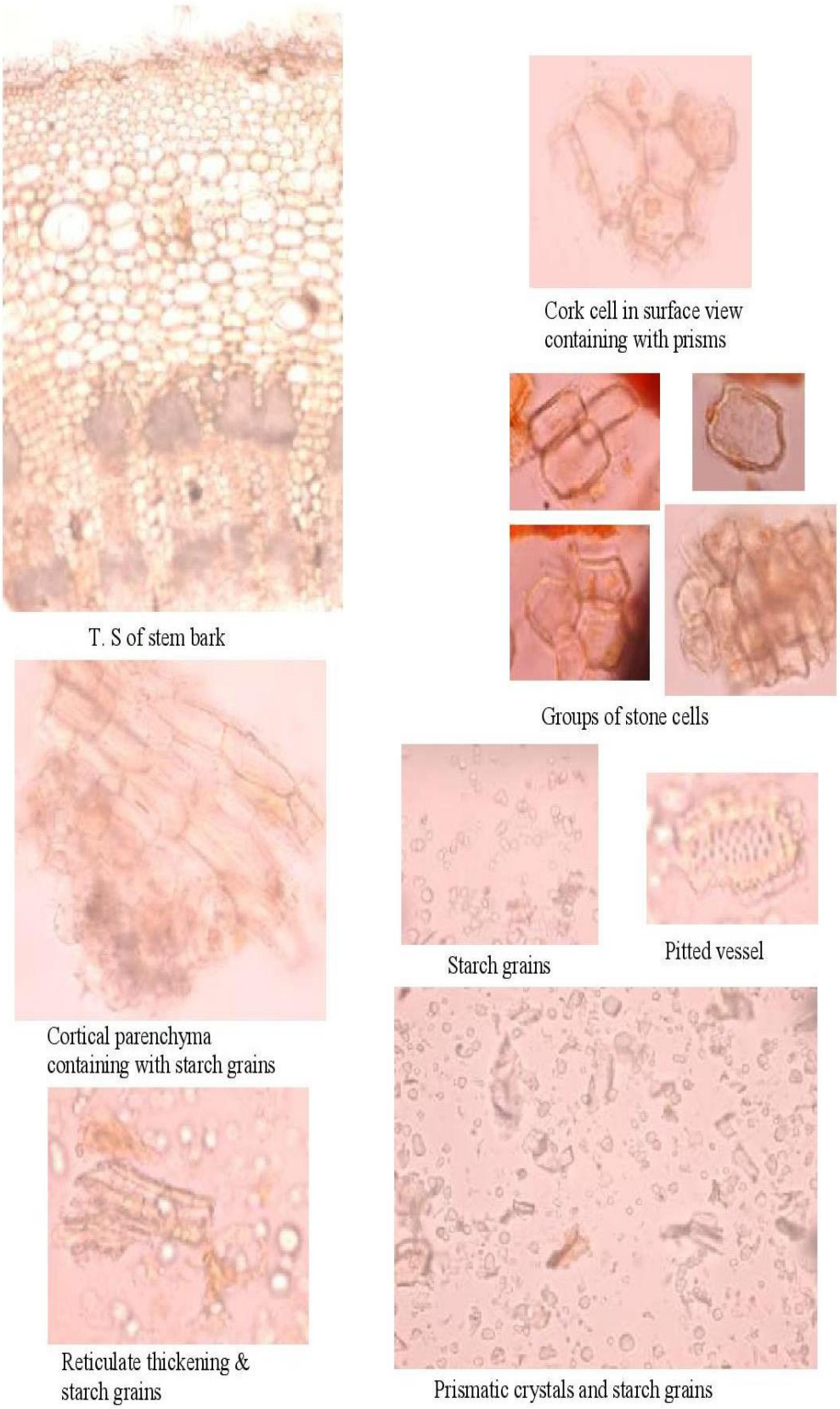

Plate-1: Microscopy and powder microscopy of Dahiman stem bark

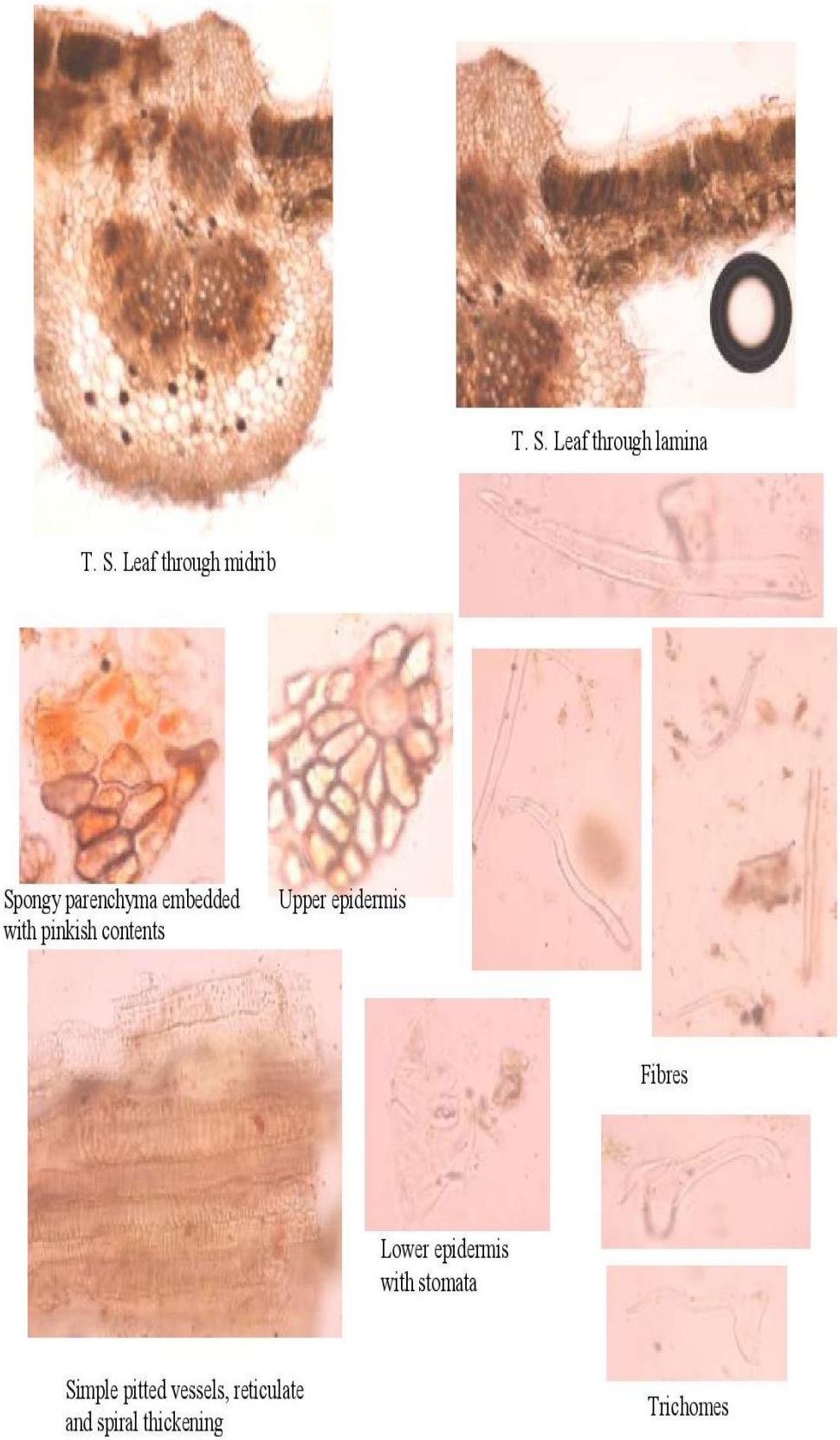

Plate-2: Microscopy and powder microscopy of Dahiman leaf

DISCUSSION AND CONCLUSION

Crude drug is the base material for manufacturing herbal medicines. Efficacy of any drug depends on the genuineness of the raw material used for its preparation. Adulteration of the genuine raw material is the main cause for deterioration of the desired therapeutic effect of a particular drug. The present pharmacognostic study on two different sample of Cordia macleodii (Hook. F & Thomson) stem bark and leaves following a series of physico chemical parameters such as Total Ash, Water Soluble Ash, Acid In-Soluble Ash, Ethanol Soluble Extractive Value, Water Soluble Extractive Value And Loss On Drying on 105oC, preliminary phytochemical characteristics, Fluorescence study, HPTLC profile, and Microscopic identification indicates that still is potent & authentic as it was thousands years ago. So it can be concluded that these parameters can be used for quality evaluation of single drug and for manufacturing authentic polyherbal medicines with correct identity.

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