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Macro and Micromorphological Characterization of Cordia *Dichotoma* Forst f. Stem Bark

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ABSTRACT

Cordia dichotoma Forst.f syn *C. obliqua* Willd; *C. myxa* Roxb belonging to the family Boraginaceae is a medium sized evergreen tree widely distributed throughout the warmer parts of India. It is commonly called lasora or sapistan and serves as a promising cure against the diseases of kidney, liver, spleen, heart and blood. The powdered bark is applied to the skin in cases of broken bones before a plaster was applied, to improve healing. Bark powder is used externally in the treatment of skin diseases. Bark juice together with coconut oil is reported to treat colic. Present paper is an attempt to investigate the anatomical and morphological features of Cordia stem bark from the wild source so as to evaluate its micro structural characteristics. The study illustrates a set of diagnostic characters that can be considered as a first step in ensuring the identity and the degree of purity in the marketed sample of the drug.

Key Words: *Cordia Dichotoma Forst f.* Stem Bark, Macro and Micromorphological Characterization, Unani Medicine

INTRODUCTION

The genus Cordia (Family: Boraginaceae) encompasses about 250 species, cultivated for ornamental plants, wood and medicinal applications. The majority are trees or shrubs found principally in tropical and subtropical regions of the American, Asian and African continents. [1] This genus is widely employed for its various ethnobotanical and ethnopharmacological aspects.

There are 13 species of this genus found in India [2]; one of them is *Cordia dichotoma* Forst f. which is extensively utilized by the traditional communities for various pharmacological applications. The botanical synonyms of this plant includes *C. obliqua* Willd and *C. myxa* Roxb non L.[3];. It is a medium sized (3-5 meters) evergreen tree cultivated nearly all over the Indian sub-continent [4]. Leaves simple, entire and slightly dentate, elliptical- lanceolate to broad ovate with round and cordate base, flowers white, fruit drupe, yellowish brown, pink or nearly black when ripe with viscid sweetish transparent pulp surrounding a central stony part [5]. Various parts of this plant are potentially evaluated for anti-ulcer, contraceptives, anti-inflammatory, anthelmintic, analgesic, anticancer, antioxidant, antimicrobial, antifungal, hepatoprotective and diuretic properties therefore employed in the management of digestive, respiratory, urogenital, cardiac, vascular and blood disorders. As the stem bark of Cordia has anthelmintic, constipating, cooling and diuretic properties it is used for the treatment of gastric and respiratory disturbances. [6-17] *C. dichotoma* Forst f. bark is effectively used for the management of ulcerative coliltis . Juice obtained from the bark relieves severe colic pains. [18, 19] Owing to its

therapeutic potential ; present investigation has been undertaken with an objective to establish the macro and micromorphological characters of *Cordia dichotoma* Forst f. bark so that authentic plant material could be explored for its therapeutic claim. A set of diagnostic characters illustrated in the study can be considered as a first step in ensuring the identity and the degree of purity in the marketed sample of the drug.

MATERIAL AND METHODS

Fresh drug material (stem bark) was collected from the office campus ground ; Janakpuri, New Delhi for morphological and anatomical studies. After proper identification and authentication, the voucher specimen was preserved in the botany section of the lab (DSRU, New Delhi) for future reference. Various organoleptic and morphological characters like colour, shape, size, odour and taste etc. were studied. For anatomical studies free hand transverse section were prepared using a razor blade and stained as per standard and well established methods. [20, 21] The stem bark was further dried ; powdered and sieved through 40 mesh. The powdered drug first cleared in the solution of chloral hydrate and then mounted in solution of chloral hydrate and glycerol to prevent the formation of chloral hydrate crystals during the examination of the slide. Several preparations with different mountants like iodine water, sudan III, ruthenium red, ferric chloride etc. were also made to emphasise the presence of particularly important cells or cell contents. Care should be taken to avoid the presence of any air bubble [22, 23]. Most diagnostic features and the dimensions of the cells and other particles were recorded. Photomicrography was performed by using digital microscope with computer attachment. The powder and its behaviour on treatment with different chemical reagents were studied (Table I). Fluorescence characters of the powdered drug was observed under U.V. . [24] and the results were shown in Table II.

RESULT

Taxonomic Classification

Kingdom: Plantae
Division: Magnoliophyta
Class: Dicotyledons
Sub Class: Astaridae
Order: Lamiales
Family: Boraginaceae
Genus: Cordia
Species: *C. dichotoma* Forst f.

Vernacular Name(s):

Arabic : Dabak, Dabk
Bengali : Bahubara, Bohari, Bohodari, Buhal, Chhotobohnari
English : Sabesten Plum
Gujrati : Gundomoto, Lepistan, Pistan, Racegundo, Rayagundo, Vedgunda
Hindi : Bhairala, Bhokar, Chhotalaslasa, Chhotalasora, Gondi, Guslasah, Lasora, Lasura, Lessora, Rasalla
Malyalam : Celu, Ceruvannichi, Cheruviri, Karati, Madaviriyasam, Vidi, Virasham, Viri, Viriyasam
Marathi : Bargund, Bhokar, Bhokara, Bhokur, Chokri, Goden, Godan, Selu, Sherti, Semar, Vargund,Montabhokar
Persian : Sapistan, Sugpistan
Punjabi : Laswara
Sanskrit : Bahuvaraka, Bhukampadaruka, Bhukarbudara, Bhuselu, Laghushelu, Bhutadruma, Kshudrashleshmataka, Laghupichhila, Laghushita,
Tamil : Naruvili, Selu, Sirunaruvili, Vallagu, Vidi, Viri, Virisu, Viriyan
Telugu : Bankanakkara, Chinnabotuku, Chinnanakkera, Inki, Nakkera, Nakkeri, Nekkara, Urunakkera, Virigi
Urdu : Lasora

Macromorphological characterization

Bark dry, in small pieces having length 2.5cm – 4.5cm and thickness 1 cm – 1.5 cm; outer surface greyish brown, rough with longlitudinal and transverse cracks and fissures; outer fracture short, inner surface

light brown, fibrous with fibrous fracture. (Fig. 1)

Fig. 1 : *Cordia dichotoma* Forst f. Stem Bark external & internal surface view

Micromorphological characterization

T.S. of stem bark shows a wide zone of rhytidoma consisting of tangential bands of cork tissues alternating with dead elements of secondary phloem. Phellem or cork cells few layered, thin walled, square to rectangular in shape measuring 72µ - 108µ in length and 36µ - 72µ in width. Phellogen indistinct. Phelloderm multilayered, parenchymatous. Phloem consists of sieve elements, companion cells, phloem parenchyma and phloem fibers traversed by radially elongated, uni-biseriate medullary rays. Group of phloem fibers present in tangential bands alternating with the bands of ceratenchyma. (Fig. 2-9)

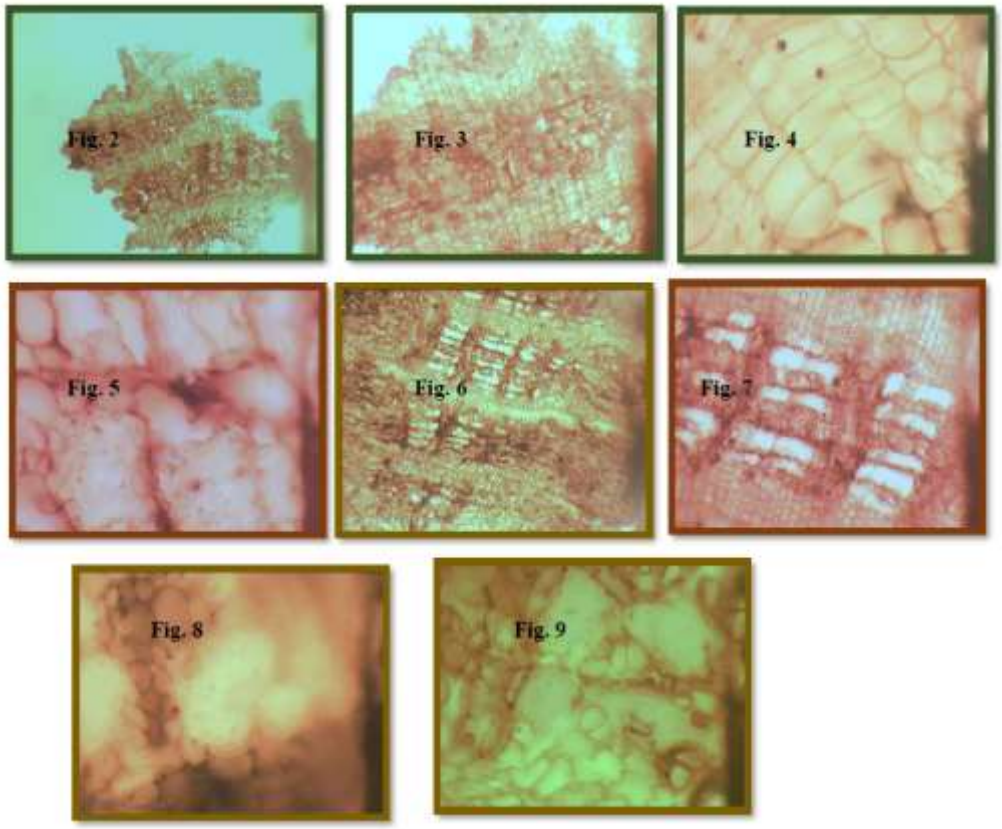


Fig. 2: (x4)T.S. of stem bark showing periderm; Fig. 3 : (x40) T. S. of stem bark showing rhytidoma (enlarged view); Fig. 4 : (x40) Cork cells in enlarged sectional view; Fig. 5 : (x40) Secondary phloem in enlarged sectional view; Fig. 6 : (x4) T.S. of stem bark showing bands of phloem fibers; Fig. 7 : (x40) enlarged sectional view of bands of phloem fibers; Fig. 8 : (x40) T. S. of stem bark showing medullary rays ; Fig. 9 : Phloem elements in sectional view

Microscopical characterization of the powder

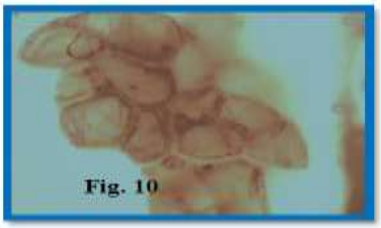
Colour : Dark brown

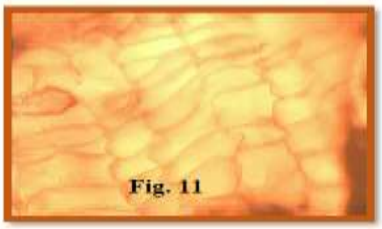
Odour : Indistinct

Taste : Indistinct

On examination under the microscope it shows :- (Fig. 10-13)

- Abundant fragments of cork in surface view, showing polygonal, moderately thick walled cells.
- Fragment of cork in sectional view showing layers of thin walled, square to rectangular shape cells measuring 72µ - 108µ in length and 36µ - 72µ in width.
- Groups of thin walled parenchyma cells.
- Pieces of fibers that are simple, unseptate, thick walled having width 18µ - 27µ.





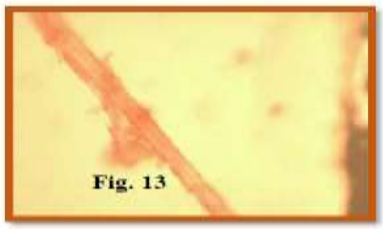


Fig.10 : (x40) Fragment of cork cells in surface view ; Fig. 11 : (x40)Cork cells in sectional view; Fig. 12 : (x40) Group of parenchyma cells in powder ; Fig. 13 : (x40) Piece of fibre

TABLE - I ACID/CHEMICAL REAGENT REACTION WITH POWDER

S.No.	ACID/CHEMICAL REAGENT	OBSERVATION
1.	Conc. Sulphuric Acid	Black
2.	Conc. Hydrochloric Acid	Coffee Brown
3.	Conc. Nitric Acid	Orange
4.	Glacial Acetic Acid	No change
5.	Picric Acid	No change
6.	Iodine Solution	Brown
7.	Ferric chloride Solution (aq.)	Bluish green
8.	Sodium hydroxide Solution (5%)	Chocolate Brown
9.	Potassium hydroxide Solution (5%)	Chocolate Brown
10.	Powder as such	Dark Brown

TABLE – II FLUORESCENCE ANALYSIS

S.No.	Reagent	Colour in Day-Light	Observation under U.V.Light		
			Modifying Colour	Quality of colour	Degree of radiance
1	Mounted in Nitro-Cellulose	Chocolate Brown	Green	Dark	Bright
2	1N Sodium hydroxide in methanol	Chocolate Brown	Green	Dark	Bright
3	Treated with 1N Sodium hydroxide in methanol & mounted in Nitro-Cellulose	Yellowish Brown	Fluorescent Green	Light	Bright
4	1N Hydrochloric Acid	Coffee Brown	Oily Yellow	Light	Bright
5	Treated with1N Hydrochloric Acid & mounted in Nitro-Cellulose	Dark Brown	Green	Dark	Bright
6	1N Sodium hydroxide in Water	Chocolate Brown	Green	Dark	Bright
7	Treated with 1N Sodium hydroxide in water &mounted in Nitro-Cellulose	Coffee Brown	Fluorescent Green	Light	Bright
8	Dilute Nitric Acid (1:1)	Orange	Oily Yellow	Light	Bright
9	Dilute Sulphuric Acid (1:1)	Dark Brown	Green	Dark	Bright
10	Powder as such	Dark Brown	Coffee Brown	Dark	Dull

CONCLUSION

Identification of the raw herbal material is an imperative prerequisite prior to any

pharmaceutical preparation. Macro and micro- morphological perspective of crude herbal drugs is an integral component while proposing diagnostic protocols for establishing its botanical identity and ascertaining its quality. Hence, the diagnostic characters illustrated in the present investigation can be considered as a first step in ensuring the identity and degree of purity in the marketed sample of the drug.

Declaration by Authors

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REFERENCES

1. I.C.E.Borroso, F. D.Oliveira : Pharmacognostic diagnosis of fruit of Cordia sellowiana Cham and Cordia myxa L (Boraginaceae jussieu) Rev. Bras. Farmacogn, 19 ; 2009, pp 458-470
2. Tirupathi K., Kumar SS, Raju VS, Ravikumar B, Krishna DR, Mohan GK : A review of medicinal plants of the genus Cordia : their chemistry and pharmacological uses J Nat Rem 2008; 8(1):1-10
3. Anonymous : The Useful Plants of India; PID ; CSIR; New Delhi; ; 1994; pp-140
4. Nadkarni K.M. : Indian Materia Medica; Vol. I; Popular Prakashan Pvt. Ltd.; Bombay; 1976; pp: 380
5. Anonymous : The Wealth of India; Vol II ; C; PID; CSIR; N D;1950; pp 346
6. Parekh J, Chanda S. : In vitro screening of antibacterial activity of aqueous and alcoholic extracts of various Indian plant species against selected pathogens from Entero bacteriaceae ; African Journal of Microbiology Research; 2007; 1(6): 92-9
7. Rawat S, Saini R, Sharma A. : Phytochemical study and anti microbial activities of Cordia dichotoma ; International Research Journal of Pharmacy; 2013; 4 (12)
8. Thirupati K, Kumar SS, Goverdhan P, Ravikumar B, Krishna D, Mohan GK : Hepatoprotective action of Cordia dichotoma against carbon tetrachloride induced injury in rats; Nigerian Journal of Natural Products and Medicine; 2007; 11: 37-40
9. Sharker SM, Khadiza P, Shahid IZ : Analgesic, antibacterial and cytotoxic activity of Cordia dichotoma; Pharmacology online; 2009; 2: 195-202
10. Shah D, Nitin M, Prasad K, Limbani B : Gastoprotective and antiulcer effect of Cordia dichotoma; International Research Journal of Pharmacy; 2011; 2(9): 70-72
11. Bhattacharya P, Saha A : Evaluation of reversible contraceptive potential of Cordia dichotoma leaves extract; Rev. Bras. Farmacogn.; 2013; 23(2): 342-350
12. Jamkhande PG, Barde SR, Patwekar SL, Tidke PS : Plant profile, phytochemistry and pharmacology of Cordia dichotoma (Indian cherry) : A review; Asian Pac. J. Trop Biomed.; 2013; 3(12): 1009-1012
13. Hussain N, Kakoti BB : Review on ethno botany and psychopharmacology of Cordia dichotoma ;Journal of Drug Delivery and Therapeutics; 2013; 3(1): 110-113
14. Mahesweta R, Kumar B, Kumar N, Patel A, Kumar B : Antioxidant activity of taxifolin obtained from methanolic extracts of C. dichotoma L. seeds ; Int. J Pharm Sci Res; 2014; 5(7) : 2896-2901
15. Singh R, Lawania RD, Mishra A, Gupta R : Role of Cordia dichotoma seeds and leaves extract in degenerative disorders; Int. J. Pharm Sci Rev Res; 2010; 2(1): 21-24
16. Pankaj B. Nariya, Nayan R. Bhalodia, Vinay J. Shukla, Rabinarayan Acharya, Mukesh B. Nariya ; In vitro evaluation of antioxidant activity of Cordia dichotoma (Forst f.) bark, AYU; 2013; 34(1) : 124-128
17. Nariya PB, Bhalodia NR, Shukla VJ, Acharya RN : Antimicrobial and antifungal activities of Cordia dichotoma (Foster F.) bark extracts AYU; 2011; 32:585-589
18. Ganjare AB, Nirmal SA, Patil AN : Use of apigenin from Cordia dichotoma in the treatment of colitis; Fitoterapia 2011; 82(7) ; 1052-1056
19. Ganjare AB, Nirmal SA, Rub RA, Patil AN, Pattan SR : Use of Cardia dichotoma bark in the treatment of ulcerative colitis; Pharmaceutical Biololgy ; 49 (8): 850-855

20. Khandelwal, K R : Practical Pharmacognosy; Nirali Prakashan Publications; 2008
21. Kokate C K; Purohit AP; Gokhale SB : Pharmacognosy; 47th edition; Nirali Prakashan; Pune; 2012
22. Trease G E & Evans : Pharmacognosy 12th Ed.; London; Bailliere Tindal; 1983;538-544.
23. Wallis T E : Textbook of Pharmacognosy; 5th Ed.; London; J & K Churchill Ltd. 1969; 578- 582.
24. Kokoski J., Kokoski R and Siama F.J. : Fluorescence of powdered vegetable drugs under U.V. radiation; J. Amer. Pharm Assoc.; 1985; 47(10) : 715

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