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**PHARMACOGNOSTIC EVALUATION AND PRELIMINARY PHYTOCHEMICAL  
SCREENING OF *CORDIA DICHOTOMA* FORST FRUITS.**

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**ABSTRACT**

The present communication deals with the pharmacognostical and preliminary phytochemical studies on the fruits of *Cordia dichotoma* Forst. Very less reports are available on pharmacognostic and phytochemical studies, hence, the present study was undertaken to investigate the same. All the parameters were studied regarding the WHO and pharmacopoeial guidelines. Ash values, extractive values in different solvents, fluorescence analysis, treatment with different reagents and phytochemical screening have been carried out. The study will be useful for the identification of fruit of *Cordia dichotoma* and will prevent its adulteration.

**KEYWORDS:** *Cordia dichotoma*, Bhokar, Pharmacognosy, Phytochemical, Fluorescence analysis, extraction.



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## INTRODUCTION

*Cordia dichotoma* Forst belonging to family Boraginaceae is medium sized tree with a short, usually crooked trunk (90-100 cm in girth) and bearing globose, grows in India, Srilanka and other warmer countries.<sup>1-3</sup> The medicinal attributes of *Cordia dichotoma* have been known since a long time. The fruits of the plant have been used as cooling, astringent, emollient, expectorant, anthelmintic, purgative and diuretic<sup>4</sup>. A number of pharmacological properties such as analgesic, anti-inflammatory and hepatoprotective have been reported<sup>5-7</sup> *Cordia dichotoma* fruits shows the presence of pyrrolizidine alkaloids, coumarins, flavonoids, saponins, terpenes and sterols<sup>8</sup>. The fruit contains about 70% pulp; the pulp contains per 100 g: water 6 g, protein 35 g, fat 37 g and carbohydrate 18 g. The seed contains per 100 g: water 32 g, fat 46 g; the principal fatty acids are: palmitic acid, stearic acid, arachidic acid, behenic acid, oleic acid and linoleic acid<sup>9</sup>. In the present study, an effort has been made to establish the pharmacognostical as well as phytochemical study of *Cordia dichotoma* fruits.

## MATERIALS AND METHODS

### **Plant Material**

Fresh ripe fruits of *Cordia dichotoma* Forst were collected from the local area of Pune District of Maharashtra, India. The plant specimen was identified and authenticated as *Cordia dichotoma* Forst by Botanical Survey of India, Pune, India. The voucher specimen (No. MUGCOD2) is preserved in the herbarium of Department of Pharmacognosy.

### **Pharmacognostical Studies**

#### **Fluorescence analysis of powdered drug under Ultra-violet light**

Powdered drug was screened for fluorescence characteristics with and without chemical treatment<sup>10,11,12</sup> Physicochemical parameters of the powdered crude drug such as loss on drying, total ash, acid-insoluble ash, water soluble ash, alcohol soluble extractive value, water soluble extractive value fruit of plant

*Cordia dichotoma* were performed according to the standard methods.<sup>13,14,15,16</sup>

#### **Successive Extraction with Various Solvents**

Successive extraction was carried out with Soxhlet apparatus using different solvents like petroleum ether (60<sup>o</sup> – 80<sup>o</sup>C), chloroform, acetone, methanol and water as per their polarity successively. The extract was dried using rotary evaporator and was kept in a dessicator till experimentation. Obtained extract was weighed and percentage yield was calculated in terms of air-dried powdered crude<sup>13,14,15,16</sup>. The percentage yield of different extracts of powdered drug of *Cordia dichotoma* and their colour, consistency were reported in the Table 3.

#### **Phytochemical Screening**

The dried extracts were screened for the presence of various phytoconstituents / secondary metabolites responsible for the therapeutic values of the drug like presence of alkaloids, glycosides, carbohydrate, tannins – phenolic compounds, proteins and amino acids, gums and mucilage, flavonoids, saponins and steroids etc<sup>2,4,17</sup>. The resulting data were recorded in the Table 4.

#### **Fluorescence Analysis of drug extract under Ultra-violet Light**

Extracts of *Cordia dichotoma* were screened for fluorescence analysis. The observations pertaining to their colour in day light and under ultra-violet light (short wave length and long wave length) were recorded<sup>18,19</sup>.

## RESULTS

By performing the fluorescence characteristic of the powder drug with different chemical reagents, change in colour of the drug with fluorescence was observed when seen in short UV light. The observations pertaining to their colour in day light and under ultra-violet light (short and long) were recorded. (Table 1).

**Table 1**  
**Fluorescence Characteristics of Cordia dichotoma**  
**fruit powder drug with Different reagents**

Sr. No	Reagent + Drug	Colour of powder at day light	UV light short wave	UV light long wave
1.	Untreated powder	Blackish brown	Brown	Black
2.	Powder + saturated picric acid	Yellowish brown	Green	Black
3.	Powder + Nitric acid	Brown	Brown	Blackish
4.	Powder + 1 N HCl	Brownish	Brownish	Greyish brown
5.	Powder + conc. H <sub>2</sub> SO <sub>4</sub>	Blackish	Black	Black
6.	Powder + glacial acetic acid	Brownish	Brownish	Blackish
7.	Powder + 1N NaOH	Blackish	Greyish	Greenish black
8.	Powder + Iodine	Brownish	Blackish brown	Blackish
9.	Powder + Ferric chloride	Yellowish brown	Dark green	Black

The moisture content was 9.3% which was not so high as to facilitate bacterial growth. The other physicochemical parameters which ascertain the quality, purity and also help in evaluation the crude drug. The total ash value of the plant materials indicated the amount of minerals and earthy materials attach to the plant materials. Analytical results showed total ash value, acid insoluble ash value and water soluble ash value which were determined to be

not more than 8.1% w/w, 3.4% w/w and 2.6% w/w respectively. While study of extractive value, water soluble extractive value indicated the presence of sugars, acid and inorganic compounds and was found to be 5.6% where as alcohol soluble extractive value indicated the presence of polar constituents like phenols, alkaloids, steroids, glycosides and flavonoids and was found to be 12.4% (Table 2).

**Table 2**  
**Physicochemical Parameters of Cordia dichotoma fruit**

Sr. No	Parameters	Mean % w/w
1.	Loss on drying	9.3
2.	Total ash value	8.1
3.	Acid – insoluble ash value	3.4
4.	Water soluble ash value	2.6
5.	Alcohol soluble extractive value	12.4
6.	Water soluble extractive value	5.6

The powder plant material was extracted with a series of solvent in there increasing order of polarity i.e. petroleum-ether, chloroform and methanol by soxhlet apparatus, while aqueous extract was obtained by maceration. Then colour, consistency, and extractive value of the extracts were evaluated. The pet. ether and water extract have more extractive value (2.07% and 2.18%) and chloroform and methanolic have less(1.67% and 1.92%) extractive value. (Table 3)

**Table 3**  
**Extractives values of different extracts fruit of**  
**Cordia dichotoma powdered drug**

Sr. No	Type of extract	Colour	Odour	Consistency	Extractive value (w/w)
1.	Pet ether (60° -80° C)	Light green	Characteristics	Greasy	2.07
2.	Chloroform	Green	Characteristics	Sticky	1.67
3.	Methanol	Brown	Characteristics	Sticky	1.92
4.	Aqueous	Brown	Characteristics	Sticky	2.18

All the extracts were subjected to various chemical tests for preliminary identification of various phyto-constituents. The extracts were observed to contain alkaloid, carbohydrates, phenol, tannins, flavonoid, steroids in petroleum ether, chloroform, methanolic and aqueous extract.( Table 4)

**Table 4**  
**Preliminary Phytochemical screening of *Cordia dichotoma* fruit extracts**

Sr. No	Phytoconstituents	Pet ether (60° -80° C)	Chloroform	Methanol	Aqueous
1.	Alkaloids	-	-	+	+
2.	Carbohydrates	-	+	+	+
3.	Glycosides	-	-	-	-
4.	Flavonoids	-	-	+	+
5.	Phenol and tannins	+	+	+	+
6.	Steroids	-	-	+	+
7.	Triterpenoids	-	-	-	-
8.	Saponins	-	+	-	-
9.	Proteins	-	-	-	+
10.	Amino acids	-	-	+	-

- Negative; + Positive

Further finding revealed that extract of *Cordia dichotoma* contains some fluorescence compound which gives colour fluorescence at short wave length. (Table 5)

**Table 5**  
**Fluorescence characteristics of different extracts of *Cordia dichotoma* fruit**

Sr. No	Type of extract	Day light	UV short light	UV long light
1.	Pet ether (60° -80° C)	Light green	Green	Dark green
2.	Chloroform	Green	Dark green	Black
3.	Methanol	Brown	Deep brown	Black
4.	Aqueous	Brown	Deep brown	Black

## DISCUSSION

Generally the herbal drugs are currently being used in the treatment of various diseases without standardization. The quantitative determination of some pharmacognostical parameters is useful for setting standards for crude drugs. The results of these investigations could serve as a basis for proper identification, collection and investigation of the plant. The phytochemical screening revealed the presence alkaloids, carbohydrates, phenolic compounds, Tannins, flavonoids and saponins. The presence of phyto-constituents indicates that plant might be medicinal importance. The physico chemical investigation of crude drugs is a vital parameter in detecting adulteration. It will serve as a standard data for the quality control of the preparations containing this plant in future.

## CONCLUSION

The pharmacognostic standards for the plant of *Cordia dichotoma* are laid down for the first time in this study. The information obtained from preliminary phytochemical screening will be useful in finding out the genuity of the drug. Ash values, extractive values, and fluorescence analysis can be used as reliable aid for detecting adulteration. The therapeutic properties of medicinal plants are perhaps due to the presence of various secondary metabolites such as alkaloids, flavonoids, glycosides, saponins, sterols, etc.<sup>20</sup> These simple but reliable standards will be useful to a lay person in using the drug as a home remedy. Using these standards, the plant can be differentiated from other related species and thus would help in opening up of new avenues in the use of natural products for therapeutic purposes. Also the manufacturers can utilize them for identification and selection of the raw material for drug production.

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## REFERENCES

1. Kuppast IJ, Vasudev NP, Wound healing activity of *Cordia dichotoma* Forst. F. fruits. Nat Prod Rad, 5 (2): 99, (2006).
2. Rastogi RP, Compendium of Indian medicinal plants, New Delhi: C D R I and Publications, 211, (1993).
3. Kapoor LD, Hand book of Ayurvedic medicinal plants, 1<sup>st</sup> ed. Washington: CRC Press, 180, (1994).
4. Yoganarsimhan SN. Medicinal Plants of India, Vol- I, Interline publishing Pvt. Ltd Bangalore: Karnataka., 38, (2000).
5. Rapisarda A, Ficarra R, Tommasin S, Caldbro ML and Hungsa S., *Cordia francisci*, *C. martinicensis*, *C. myxa*, *C. serratifolia* and *Culmfolia* leaves as new source of routine; Analgesic and anti-inflammatory activity, *Planta Medica*, 42:643. (1992).
6. Wassel G, El-Menshaw B, Saud A, Meharuna G, El-Merzabani M. *Pharmazie* 42:709, (1987).
7. Rajesh MG, Paul B, Latha MS, Efficacy of Kamilari in alcoholic liver cirrhosis, *Antiseptic*, 7:320, (2000).
8. Alarcon, D. L., Martin, M. J. and Motilva, V., Antiulcerogenic activity of flavonoids and gastric protection *J. Ethnopharmacol.*, 42, 161–170,(1994)
9. Srivastava SK, Srivastava SD, Taxifollin 3, 5- dirhamnoside from the seeds of *Cordia dichotoma*, *Phytochemistry*, Volume 18, , 205-208, (1979)
10. Kulkarni Y.A., Gokhale S.B, Yele S.U, Surana S.J, Tatiya A.U, Pharmacognostical studies and preliminary phytochemical investigations on the bark of *Persea macrantha* (Nees) Kosterm (Lauraceae). *Indian Journal of Natural Products and Resources*, 2(2), 211-217, (2011).
11. Kulkarni Y.A., Yele S.U, Surana S.J., Gokhale S.B. Pharmacognostical studies of *Machilus macrantha* leaves. *Pharmacognosy magazine* 4(13): 83-88, (2008).
12. Ansari MM, Ahmad J, Ahmad A, Ansari SH. Pharmacognostical characterization and standardization of *Morus alba* stem bark. *J Med Aromatic Plant Sci*, 28: 28, (2006).
13. Government of India, Ministry of Health and Family Welfare, The Ayurvedic Pharmacopeia of India Part-1, 1st ed., Vol. III. The Controller of Publication, New Delhi, 233, (2001).
14. Government of India, Ministry of Health and Family Welfare, Indian Pharmacopoeia, Vol. II. The Controller of publications, Delhi, A-54, (1996).
15. Khandelwal KR. Practical Pharmacognosy: Technique and experiments, 18th ed., Mumbai: Nirali Prakashan, 124, (2008).
16. Kamick CR. Pharmacopoeial standards of herbal plants, Sri Saguru publication, 124, (1994).
17. Ramaan N. Phytochemical Techniques, New Indian Publishing Agency, 19, (2006).
18. Kokashi CJ, Kokashi RJ, Sharma M. Fluorescence of powdered vegetable drugs in ultra-violet radiation. *J Am Pharm Assoc.*47:715-717, (1958).
19. Pratt RT, and Chase ER, Fluorescence powder vegetable drugs in particular to development system of identification. *J.Am.Pharm.Assoc*, 38:324-331, (1949).
20. Alwashli A, Al-sobarry M, Cherrah Y, Alaoui K. Anti-Inflammatory and analgesic effects of ethanol extract of *Dracaena Cinnabari* Balf, as endemic plant in Yemen. *International Journal of Pharma and Bio Sciences*, 3(2): 96-100, (2012).