

**CORDIA DICHOTOMA (INDIAN CHERRY) FORST. – A REVIEW****Dr. Anamika Tuli<sup>\*1</sup>, Dr. Bhawana Mittal<sup>2</sup>, Dr. Ramesh Chandra Tiwari<sup>3</sup>**Post Graduate Scholar<sup>1</sup>, Assistant Professor<sup>2</sup>, Prof. and H.O.D<sup>3</sup>

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**ABSTRACT**

More than half of the world's population relies on the traditional medicine and major role of the traditional medicine including the use of plant extract and their active constituents. Among them, *Cordia dichotoma* Forst., a small to moderate size plant of family Boraginaceae, commonly called *bhokar*, *lasura*, *gonda*, Indian cherry and *shlesmataka*. Plant parts such as leaves, fruit, bark and seed have been reported for possessing antidiabetic, antiulcer, anti-inflammatory, immune-modulator and analgesic activity. Screening of fruit, leaves and seed shows the presence of pyrrolizidine alkaloids, coumarins, flavonoids, saponins, terpenes and sterols. Present review focuses on details of geographical distribution, physicochemical parameters, phytoconstituents and pharmacological properties of *Cordia dichotoma* reported so far.

**KEY WORDS:** *Cordia dichotoma*, *Sleshmataka*, Anti-inflammatory, Traditional medicine.**INTRODUCTION**

Plant derived medicines are considered to be first line of defense in maintaining health and combating diseases and even today plant source is principal source of new drug of therapeutic property. Approximately 72,000 plant species were estimated for having medicinal properties of which, India recognizes more than 3,000 plant species having medicinal values. Ayurveda is “science of life”, pointed out concept of positive health means metabolically well-balanced human beings.<sup>[1]</sup> More than half of the world's population relies on the traditional medicine and major role of the traditional medicine including the use of plant extract and their active constituents. Among them, *Cordia dichotoma* Forst is small to medium-size deciduous tree with a short crooked trunk, short bole and spreading crown. Leaves are simple, entire and slightly dentate, elliptical-lanceolate to broad ovate with a round and cordate base. The stem bark is grayish brown smooth or longitudinally wrinkled. Flowers are short stalked, bisexual and white to pinkish in colour and appear in loose corymbose cymes. Fruits are edible with sticky flesh mass. It is a yellow or pinkish-yellow shining globose or ovoid drupe seated in a saucer-like enlarged calyx. It turns black on ripening and the pulp gets viscid.<sup>[2]</sup>

**Geographical Distribution**

*C. dichotoma* is commonly found in tropical and subtropical regions. It grows in the sub-Himalayan tract

and outer ranges, ascending up to about 1500 m elevation. It is found in divers of forests ranging from the dry deciduous forests of Rajasthan to the moist deciduous forests of Western Ghats in India and tidal forests in Myanmar. In Maharashtra, it grows in moist monsoon forest. It does not grow gregariously, but is found growing singly in moist shady ravines and valleys. The species is widespread in the Philippines and found in thickets and secondary forests at low and medium altitudes.<sup>[1]</sup>

**Scientific Classification**

Kingdom: Plantae  
Division: Magnoliophyta  
Class: Dicotyledons  
Subclass: Astaridae  
Order: Lamiales  
Family: Boraginaceae  
Genus: Cordia  
Species: dichotoma Forst

**Common Names<sup>[3]</sup>**

Fragrant man jack, snotty gobbles, glue berry, pink pearl, bird lime tree, and Indian cherry

Vernacular Names<sup>[4]</sup>

Arabic	Dilk
Assamese	Goborsuta
Bengali	Bahanari, Bohari, buhul, boho-dari, bahubara, Bahuvar
English	Sebesten, Glue Berry, Pink Pearl Tree, Bird Lime Tree, Fragrant Manjack, Snotty Gobblers, Indian Cherry
Gujarati	Vadagunda
Hindi	<i>Lasoda, Dela, Tenti, Gunda, Bhairala, Bhokar, Gondi, Guslasah, Lasora, Lasura, Lessora, Rasalla</i>
Kannada	Chikkachalli, Doduchallu
Punjabi	Lasuda
Marathi	Bhonkar, Bhokar
Malayalam	Naruvari, Naruviri
Nepalese	Lasura
Tamil	Vidi, Naruvili, Selu, Sirunaruvili, Vallagu, Viri, Virisu, Viriyan, Vidi Maram
Telegu	Nakkera

## SYNONYMS

Paryaya	D.Ni <sup>[5]</sup>	So.N <sup>[6]</sup>	M.Ni <sup>[7]</sup>	K.Ni <sup>[8]</sup>	B.Ni <sup>[9]</sup>	R.Ni <sup>[10]</sup>	Sa.Ni <sup>[11]</sup>	Ni.A <sup>[12]</sup>	P.Ni <sup>[13]</sup>
Sleshmataka	-	+	+	+	+	+	+	-	-
Bahuvaar	+	-	+	+	+	+	+	+	-
Lekhsataka	-	+	-	-	-	+	+	-	-
Pichhil	+	+	-	+	+	+	+	-	-
Dwijkutsit	+	+	+	+	-	+	+	-	-
Shelu	+	+	+	+	+	+	+	+	-
Sheetphala	-	+	-	-	-	+	+	-	-
Sheet	-	-	+	-	+	+	+	+	+
Shaakat	-	-	-	-	-	+	+	-	-
Karbudaraka	+	+	+	+	-	+	+	-	-
Bhutdrum	-	-	-	-	-	+	+	-	-
Gandhpushpa	-	-	-	-	-	+	+	-	-
Bhutvriksha	-	-	+	-	+	-	+	+	+
Vishaghaati	-	-	-	-	-	-	-	+	-
Uddalaka	-	-	-	-	-	-	-	+	-
Uddal	-	-	+	-	+	-	+	+	-
Bhutpadap	-	-	+	-	-	-	-	-	+
Shailik	-	-	+	-	-	-	-	-	+
Shleshmantaka	-	-	+	-	-	-	+	-	-
Pichhili	-	-	+	-	-	-	-	-	-
Shailuk	-	-	+	-	-	-	-	-	-
Lekhsaaraka	+	-	-	+	-	-	-	-	-
Shaapit	+	+	-	+	-	-	+	-	-

Ayurvedic Properties<sup>[14]</sup>

## RASA PANCHAKA

*Rasa* : Madhura , Katu , Tikta , Kashaya

*Guna* : Ruksha

*Virya* : Sheeta

*Vipaka* : Katu

*DoshaKarma* : Kapha – Pittahara

## Rasa of Shleshmataka as per different Nighantu

It's clear from the text mentioned below in the table that *Shleshmataka* contains mainly *Tikta rasa* along with *Katu*, *Madhura* and *Kshaya rasa*.

Rasa	Dh.N	So.Ni	M.Ni	K.Ni	B.Ni	R.Ni	Sa.Ni	Ni.A	P.Ni
Madhur	+	-	+	+	+	+	+	-	+
Katu	-	-	-	+	-	+	+	-	-
Tikta	-	-	-	-	+	-	-	-	-

Kashaya	-	-	+	-	+	+	-	-	+
<b>Guna</b>									
Ruksha	+	-	-	-	-	+	-	-	+
Snigdha	-	-	-	+	+	-	+	+	-
<b>Virya</b>									
Sheet	+	-	+	+	+	+	+	+	-
Ushna	-	-	-	-	-	-	-	-	-

➤ **SLESHMATAKA MENTIONED IN DIFFERENT AYURVEDIC TEXTS**

• **Various uses of Shleshmataka as per Charaka Samhita**

Part used	Formulations	Int. /Ext.	Indications	Reference
Anukta	Kwath	External	Vishaghna	Ch. Su. 4/11
Twak	Pinda	Internal	Sneha-Virechan	Ch. Vi. 7/26
Anukta	Kwath	Internal	Vamana	Ch. Vi. 8/135
Root , Patra	Ras	External	Raktgatvaat	Ch.Chi23/188
Patra	Ras	External	Luta visha	Ch.Chi.23/200
Twak	Kwath / kalka	External	Keeta / luta	Ch.Chi. 7/204
Twak	Lepa	External	Dugdh durgandh	Ch.Chi.30/275

• **Various uses of Shleshmatakas per Sushruta Samhita**

Part used	Formulation	Int. / Ext.	Indications	Reference
Phal	Anukta	Anukta	KaphaVardhak	Su. Su. 46/ 193
-	Saka	Internal	Raktpitahar, sangrahi	Su. Su. 46/249
-	Pradeha	External	KaphaVardhak	Su. Ch. 5/10
Phal	Sneha	Internal	Pita-Vaathar	Su. Ch. 31/5
Patra	Pichhil Basti	Internal	-	Su. Ch. 38/85
-	Yavagu	Internal	Vishvega	Su. Ka. 2/45
-	Agad	Internal	Darvikar, Rajiman Sarpa	Su. Ka. 5/75
-	Ksharagad	Internal	Sarpvisha	Su. Ka. 6/3
-	Mahasugandhi Agad	Internal	Sarpvisha	Su. Ka. 6/21
Twak	Aalvishaagad	Internal	Aalvisha	Su. Ka. 6/21
Patra	Paan	Internal	Madataya	Su. Ka. 47/32

• **Various use of shleshmataka as per Ashtanga Hridaya**

Part used	Formulations	Int. / ext.	Indications	Reference
Beej	Tail	External	Palitya	Ah. Ut. 24/36
Twak	Tail	External	Bhagandar	Ah. Ut. 39/4
Phal / Twak	Yavagu	Internal	VishNashak	Ah. Ut. 35/22
-	Agad	Internal	Sarpvisha	Ah. Ut. 36/60
-	Lepa	External	Vrischikvisha	Ah. Ut. 37/29
-	Swaras	Internal	Vrischikvisha	Ah. Ut. 37/41
Twak	Agad	Internal	Luta visha	Ah. Ut. 38/84

• **Various use of shleshmataka as per Ashtanga Samgraha**

Part used	Formulations	Int. / ext.	Indications	Reference
Beej	Tail	External	Palitya	Ah. Ut. 24/36
Twak	Tail	External	Bhagandar	Ah. Ut. 39/4
Phal / Twak	Yavagu	Internal	VishNashak	Ah. Ut. 35/22
-	Agad	Internal	Sarpvisha	Ah. Ut. 36/60
-	Lepa	External	Vrischikvisha	Ah. Ut. 37/29
-	Swaras	Internal	Vrischikvisha	Ah. Ut. 37/41
Twak	Agad	Internal	Luta visha	Ah. Ut. 38/84

• Various use of *sleshmataka* as per *Bhavprakash Samhita*

Part used	Formulations	Int. /ext.	Indications	Reference
-	Tail	Internal	Paliyta	B.p. purvkhand 7/234

• Various use of *sleshmataka* as per *Yog ratnakar*

Part used	Formulation	Int. /ext.	Indications	Reference
Twak	Lepa	External	Raktajvarna	Vransoth ch /7
Twak	Lepa	External	Masurika	Masurika ch /269
Twak	Ras	Internal	Ajaka	Netrarog ch /8
-	Kwath	Internal	Yonivyapaad	Yonivyapad ch/4
Twak	Kwath, kalka, Churna	Both	Luta visha, keetavisha	Vish ch/1

### Chemical Constituents<sup>[14]</sup>

The phytochemical constituents isolated so far from the plant *C. dichotoma* are given below –

- ✓ **Bark:** Allantoin,  $\beta$ -sitosterol and 3', 5-dihydroxy-4'-methoxy flavanone-7-O- $\alpha$ -L- rhamnopyranoside, apigenin. Fruits and leaves: Presence of pyrrolizidine alkaloids, coumarins, flavonoids, saponins, terpenes and sterols. Fruit: Arabinoglucan, D-glucose (67.6%) and L-arabinose (13.2%).
- ✓ **Seed:**  $\alpha$ -amyrins, betulin, octacosanol, lupeol-3-rhamnoside,  $\beta$ -sitosterol,  $\beta$ -sitosterol-3-glucoside, hentricontanol, hentricontane, taxifolin-3-5-dirhamnoside, hesperitin-7-rhamnoside and fatty acids such as palmitic acid, stearic acid, arachidic acid, behenic acid, oleic acid and linoleic acid. Four flavonoid glycosides (robinin, rutin, rutoside, datiscoside and hesperidin), a flavonoid aglycone (dihydrorobinetin), phydroxybenzaldehyde, 4-hydroxybenzoic acid, p-hydroxyacetophenone, p-hydroxypropiophenone, latifolicinin C and 2 phenolic derivatives (chlorogenic acid and caffeic acid) were isolated from seeds.
- ✓ **Twigs:**  $\beta$ -sitosterol and  $\beta$ -sistostreol-3-glycoside, 1, 2-dilinoleoyl-3-linolenoylglycerol
- ✓ **Leaves:** Flavonoids such as apigenin, rutin, quercetin, quercitrin, (quercetin-3-O-rutinoside, quercetin-3-O-2Grhamnosylrutinoside), isorhamnetin-3-O-rutinoside, kaempferol-3-O-robinoside, kaempferol-3-O-rutinoside, kaempferol-3-O-2G-rhamnosylrutinoside, flavone (luteolin) and phenols such as methyl rosmarinic acid,  $\beta$ -sitosteryl-3- $\beta$ -glucopyranoside-6'-O-palmitate, chlorophyll, octacosanol, pyrrolizidine alkaloids, saponins, terpenes (betulin), and sterols such as  $\beta$ -sitosterol,  $\alpha$ -amyrin, 4-hydroxy-transcinnamate ester triterpenoids (0.075 %) and amino acids (1.39 %).

### Pharmacological activities

#### In Vitro and In Vivo

#### 1 - Antioxidant Activity<sup>[15]</sup>

The total antioxidant activity of the extract was determined using the ABTS/H<sub>2</sub>O<sub>2</sub> discoloration method, which corresponded to data from standard materials

(ascorbic acid and BHT). *C. dichotoma* showed significant antioxidant potential at various concentrations. When the antioxidant activity of fruit pulp extract was observed it was 58.09mg/ml, 54.23mg/ml, 50.06 and the standard ascorbic acid was 72.34.

#### 2 - Anti-inflammatory activity<sup>[16]</sup>

Anti-inflammatory activity of *C. obliqua*, *C. verbenacea*, *C. myxa*, *C. curassavica*, *C. macleodii* and *C. platythyrsa* has been reported. Different extracts of *C. curassavica*, *C. platythyrsa* and *C. macleodii* reduced carrageenan-induced oedema in rats and mice. Dichloromethane extract of leaves and stem of *C. curassavica* showed significant anti-inflammatory activity.[177] Methanol bark extract of *Cordia platythyrsa* and ethanol leaf extract of *C. macleodii* also showed potential anti-inflammatory activity.

#### 2 - Wound healing activity<sup>[17]</sup>

The wound healing activity of ethanol extract of fruits of *C. dichotoma*, which fractionated with Petroleum ether, solvent ether, ethyl acetate, butanol and butanone fractions, was screened using three different models, viz. excision wound, incision wound, and dead space wound in Wistar rats. All the fractions showed significant wound healing property.

#### 3- Analgesic activity<sup>[18]</sup>

The crude ethanol extract of leaves of *C. dichotoma* at the oral dose of 500 mg/kg body weight was screened for its analgesic activities. The extract produced significant writhing inhibition in acetic acid induced writhing in mice in comparison to diclofenac sodium. The methanol extracts of leaf powder at a dose of 400 mg/kg showed significant analgesic activity in Eddy's hot plate method.

#### 4- Antimicrobial activity<sup>[19]</sup>

The methanol and butanol extract of the bark inhibited the growth of *Escherichia coli*, and *Pseudomonas aeruginosa*, *Streptococcus pyogenes*, *Staphylococcus aureus*, *Aspergillus niger*, *Aspergillus clavatus* and *Candida albicans*. The ethanol extract of the leaves was

also demonstrated significant antimicrobial activity against *Streptococcus aureus*, *Streptococcus pyogenes*, *Vibrio cholera*, *Streptococcus epidermis*, *Hafnia* and *Escherichia coli*.

**6- Antiulcerative colitis<sup>[20]</sup>** - Methanol fraction of the bark significantly reduced pathological score and improved healing in acetic acid-induced ulcerative colitis in experimental mice.

**7- Antidiabetic<sup>[21]</sup>** - Methanol extract of the fruit was reported for antidiabetic activity in alloxan-induced diabetes in rats at a dose of 200 mg/kg. Wound healing Solvent ether, ethyl acetate, butanol and butanone fraction of the fruit displayed significant wound healing potential at a dose of 300 mg/kg in the experimental model of wound in rats.

**8- Cytotoxic<sup>[22]</sup>** - The ethanol extract of the leaves was reported to have potent cytotoxic activity against brine shrimp *Artemia salina* with LC50 value of 20 lg/ml and LC90 value of 180 lg/ml.

## CONCLUSION

*C. dichotoma* is highly potent plant being used traditionally for various human ailments. Its therapeutic properties may be due to the presence of varied range of compounds isolated from this plant including but not limited to apigenin, cordioic acid, quercetin, linolenic acid, rutin, hesperidin, arabinose, caffeic acid, robinin and arabinoglucan. This plant also contains carbohydrates, proteins, tannins, saponins, amino acids, steriods, glycosides and phenolic compounds. Owing to the presence of multiple useful compounds and its multifaceted uses *C. dichotoma* attain a lot of medicinal importance. It is scientifically proven by various researchers to possess activities like antidiabetic, antiatherosclerotic, antihypertensive, antilipidemic, wound healing, antifungal, antimicrobial, analgesic, anticancer, anti-inflammatory, antipyretic, antioxidant, antiviral, gastroprotective, antiulcer, anthelmintic, antiimplantation and hepatoprotective activity.

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