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# Detection of Phytochemical Profile of Cordia Dichotoma L. Extracts

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**ABSTRACT:**

Cordiadichotoma is a plant species in the genus Cordia. It is called Lashuda ,Gunda or Tenti in Hindi and Lasura in Nepali and Bhokar in Marathi.Cordiadichotoma (C. dichotoma) is one of the traditional medicinally important deciduous plants available all over India. The fruit has been reported to be rich in polysaccharide. Ripe fruit of C. dichotoma produces a jelly-like, sticky mass. Unani system of drug medicine uses plant as antibacterial, antiviral and antitussive. Joshandah, polyherbal formulations, are extensively used by the masses in India for the treatment of common cold, catarrh, cough, respiratory distress, fevers of which C. dichotoma is chief ingredient.From the ancient time, leaves and stem bark are used in the treatment of dyspepsia, fever, diarrhea, leprosy, gonorrhoea and burning sensation. Leaf of plant traditionally shows the therapeutic uses and actions such as anthelmintic, astringent, diuretic, demulcent, purgative, expectorant, tonic, ulcer and cough. It is used as immunomodulator, antidiabetic, anthelminitic, anti-inflammatory, diuretic and hepatoprotective in folklore medicine. The goal of the present study was to investigate the phytochemical profile of methanolic, ethanolic and Aqueous extracts of Cordiadichotoma Fruit, Bark and leaves extracted by Soxhlet and Maceration method.

**Keywords:** Soxhlet, Maceration, Extract,phytochemicals

## 1. Introduction

From time immemorial, the mankind has depended on the nature and herb products for the sustenance and the well-being and the pages of evolution in the lifestyle of mankind has been decorated with the dominant presence of medicinal plants. This medicinal plants have been the most exploited and depended sources for man. Medicinal plants are those plants which exhibit medicinal and therapeutic properties in the form of biologically active compounds and secondary metabolites this compounds are found either incorporated in the plant parts like leaves or flowers, seeds or bark or sometimes found in the form of exo-polysaccharides, resins and gums. This plants are also called medicinal herbs, have been discovered and used in traditional medicine practices since pre-historic time. Plant synthesis hundreds of chemical compounds for function including defence against Insects, Bacterial, Fungal diseases. Numerous phytochemicals with potential or established biological activity have been identified however, since a single plant contains widely diverse Phytochemical, the effects of using a whole plant as medicine are uncertain. In Developing countries, medicinal plants are used in traditional medicine, Research in this field is based on the knowledge of different Scientific disciplines (i.e. Botany. Plant biology. Phytochemistry. Pharmacology. Toxicology. Pharmacokinetics and Clinical trials) with the final goal being the evaluation of the Quality. Efficacy and Safety of Herbal medicines, as requested by many regulatory authorities worldwide (Jitendra M. et.al. 2014). The WHO established definitive guidelines regarding the methodology of clinical research and the effectiveness appraisal of traditional medicines. The use of plants to cure several kinds of Human diseases as long history.Various parts of plants such as Leaf, Stem. Bark. Root etc. are being used to prevent allay symptoms or Revert abnormalities back to normal since the Practice of Herbal remedies does not adhere strictly to facts accrued using scientific approaches, orthodox medicines sees herbal medicines as an alternative medicine. However, most of the pharmaceutical products currently dispensed by Physicians have a long history of use as Herbal remedies including Opium. Aspirin and Quinine. Modern medicine today utilizes active compounds isolated from higher plants and about 80% of this active Ingredient indicate a Positive correlation between their modern Therapeutic uses and Traditional uses. The search for and use of drugs and dietary supplements obtained from plants have increased in recent years (Dinesh K. et al. 2017).*CordiadichotomaL*. (Boraginaceae) is tree of tropical and subtropical regions, commonly known as Lasaura/Lasura. It is a medium sized tree with short crooked trunk, leaves simple, entire and slightly dentate, elliptical-lanceolate to broad ovate with round and cordate base, flower white, fruit drupe, yellowish brown, pink or nearly black when ripe with viscid sweetish transparent pulp surrounding a central stony part . It grows in sub-Himalayan tract and outer ranges, ascending up to about 1500 m elevation. It is used as immunomodulator, antidiabetic, anthelminitic, diuretic and hepatoprotective in folklore medicine. *Cordiadichotoma* seeds has disclosed the presence of α-amyrins, betulin, octacosanol, lupeol-3- rhamnoside, β-sitosterol, β-sitosterol-3-glucoside, hentricontanol, hentricontane, taxifolin-3, 5-dirhmnoside and hesperitin-7-rhamnoside. The seed contain αamyrin and toxifolin 3, 5, dirhamnoside, which shows significant anti-inflammatory activity by an oral dose of 1gm/kg in albino rats. The seeds of this plant reported to contain fatty acids and flavonoids.(Reena Singh et.al.2010).The whole plant of *C. dichotoma* is edible and is used as food. Immature fruits are pickled and are also used as vegetable. Mixture of flower and curd applied two times in a day used to protect body against heavy sun heat waves. The rural people of coastal areas of Orissa eat the ripe fruits raw. The seed kernels of *C. dichotoma*contain high quantity of fatty oils and proteins which has potential as cattle feed. The polysaccharide gum (97%) obtained from the plant used for various pharmaceutical purposes. Chromium present in the fruit has therapeutic value in diabetes. A fruit also

contains some anti-nutritional factors such as phytic acid (355 mg), phytate phosphorus (100 mg) and oxalic acid (250 mg) per 100 g. New natural cellulose fabrics were identified from the branches of the *C. dichotoma*.(Prasad G. Jamkhande et.al.2013).
Phytochemical are chemical compounds produced by Plants, generally to- help them to resist Fungi, Bacteria and Plant viral infection, and also consumption by Insects and other Animal. Therefore in the present investigation efforts were made to detect the phytochemicals from the different plant part's likeLeaves, Bark and fruit of *Cordia dichotoma*L

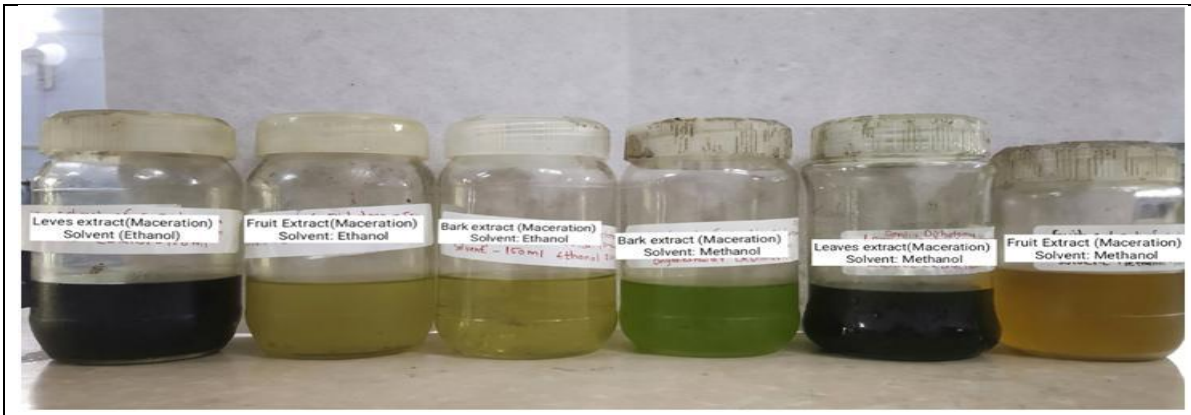
## 2. Materials and Methods

Cordia dichotoma Leaves, Bark and fruit samples were collected from near Canteen of of Padmashri Vikhe Patil College of Arts, Science and Commerce Pravaranagar. Collected samples were washed under tap water and then shade dried for 10-15 days, then dried sample were grinded using mortar and pestle.

**Extraction of Plant part**
Extraction of plant part extracts were carried out by
**1.** Hot Continuous extraction method( Soxhlet apparatus)
**2.** Maceration Technique.

**Hot Continuous Extraction Method (Soxhlet Apparatus) :**( Sukhdev swami handa. et.al., 2008) (James Redfern et.al.2014)10 gram of grinded powder of samples were kept in "thimble"made up of Whatmann filter paper no. 1.Then thimble were inserted into the thimble chamber or the Soxhlet extractor of the Soxhlet apparatus.Extraction were carried out in different solvents like Ethanol , Methanol and Water etc. 100 ml of which were filled in the round bottom flask.The upper part were fitted with a condenser by introducing water inflow & outflow.The solvent were heated at its boiling point using the isomantle, the solvent vaporizes and then condenses. The condensate then drips into the reservoir containing thimble.When the liquid extract reaches the siphon arm and hence the capacity it pours back into the flask and the cycle begins again.The process were continued until solvent drop cannot leave residue when evaporated.Extracts were collected in vials and stored at 4°C

**Maceration Technique**
10 gram grinded powder of samples were kept in air tight flasks and 100 ml of solvent were added. The flasks were kept on shaker at 120 rpm for 3 days. Extracts were collected in vials and stored at 4°C.




**Different Extacts of *C. dichotoma*extracted by Soxhlet Method.**

**Phytochemical Detection:** The extracts were subjected to analysis of different phytochemicals.

1. **Tannin ($FeCl_3$ test):** Ferric test is specifle for phenolic compounds only for Tannin. It is based on principle that phenolic reacts with ion salt forming bluish green colour.2 ml of 1% aqueous $FeCl_3$ was added in 2 ml of extract, then formation of Bluish green colour indicates presence of Tannin. (Prajwala B. et.al. 2018)

2. **Alkaloid (Wagner's test):** Alkaloid are basic in nature when acids added they form precipitate after boiling it gives reddish brown colour. 1% HCI was added in 2ml extract, then solution was steamed for 2-3 minutes, formation of reddish brown colour indicates presence of Alkaloid (Prajwala B. et.al.2018)

3. **Saponin (Frothing test) :** In aqueous solution saponin align themselves vertically on The surface with their hydrophobic ends oriented away from the water. These has the effect of reducing the surface tension of the water causing it to a foam. 5ml of Distilled water was added in 0.5 ml of extract solution was shook for 2-3 minutes, frothing persistence indicates presence of Saponins. (Prajwala B.et.al. 2018)

4. **Cardiac glycoside (Keller-Kiliani test):** The test is based on specificity of action of the acid hydrolysis of deoxy-sugar like digitoxyin (Glycoside) that is transform to digitoxygenin (Aglycon) and 3-digitox (Sugar residue) and eventually cymarose. Digitoxin is obtained first by alkaline hydrolysis from acetyl digitoxin and reddish ring forms at the inter phase the upper acetic acidlayer soon turns bluish green.1 ml of Glacial acetate. 1% aqueous $FeCl_3$ and 2-3 drops of concentrated $H_2So_4$, were added in 2 ml of extract, formation of Blue green colour indicates presence of Cardiac glycoside (Prajwala B. et.al., 2018).

5. **Flavonoids (Shinoda test):** Shinoda test was detected the presence of Flaven-3, 4-diol group flavonoids or iso flavonoids. In the Shinoda test strong acid was hydrolysed the Glycoside- flavonoid to aglycon-flavonoid, then form tomato red complex with magnesium. 1ml concentrated HCI was added in 2ml of extract, magnesium ring was put in the solution, appearance of Tomato pink colour indicates presence of Flavonoids (Prajwala B. et al., 2018).

6. **Phenol:** The principle of Folin Ciocalteau assay is the reduction of the Folin Ciocalteau reagent in the presence of phenolic resulting in the production of molybdenum-tungsten blue colour in alkali sodium carbon component. 0.75ml of Folin Ciocalteau reagent (1:10 dilution with water) was added in Iml of extract, then it was incubated at room temperature for 10 min. in that 0.75ml of 6% sodium carbonate was added, again it was incubated at room temperature for 90 min, formation of blue colour indicates positive test. (Prajwala B. et.al. 2018).

7. **Steroids:** When chloroform solution of steroid (if steroid present in extract) is treated With concentrated $H_2SO_4$ red colour is formed. 10 ml of Chloroform was added in 1ml of plant extract, then equal volume of concentrated $H_2SO_4$, was added, the upper layer in the test tube was turned into red and sulphuric acid layer showed yellow colour with green fluorescence. (Prajwala B. et al. 2018).

8. **Glycosides:** Aqueous NaOH was added in 0.5ml of extract, formation of yellow colour indicates presence of glycoside. (Prajwala B. et.al, 2018).

**1. For Carbohydrates**
**1. Fehling's test:** (Khandelwal, 2011):1 ml of Fehling's A and 1 ml of Fehling's B Solution were mixed. Then boiling for 1 minute. Equal volume extract were added. Heating in boiling water bath for 5-10 minutes. First yellow then brick red precipitate Indicates a positive result and presence of reducing sugars.

**2. Benedict's test** (Khandelwal, 2011): Test - Equal volume of Benedict's reagent and Extract were mixed in test tube. Heated in boiling water bath for 5 minutes Observation – Green, yellow or red coloured solution, Inference - Presence of reducing sugars.

**J.For Starch-1.Barfoed's test-** (Khandelwal, 2011)**:** Equal volume of Barfoed's reagent And extractwere mixed. Heated for 1-2 minutes in boiling water bath and cooled Observation – Formation of red precipitate, Inference - Presence of monosaccharide

**K.For Proteins:Biuret test-**(Khandelwal, 2011) **:**Extract + 4 % NaOH + few drops of 1% CuSO4 solution, Observation – Violet or pink colour**,** Inference - Presence of proteins.

**L.For Amino-acids-Ninhydrin test:** (Khandelwal, 2011): 3ml of extract and 3 drops of 5% Ninhydrin solution was heated in boiling water bath for 10 minutes**, Observation** – Purple or bluish colour, Inference - Presence of amino Acid.

**M. For Anthraquinone glycosides-Borntrager's test-** 3ml of Extract + dilute H2SO4, Boiled and filtered. To cold filtrate, equal volume of benzene or chloroform was added, shaken well. Lower organic layer was separated and to this ammonia was added slowly. Observation - Pinkish red color to ammonical layer. Inference - Anthraquinone glycosides present.

**N. Test for Tannins and Phenolic Compounds**-(Khandelwal, 2011)

**1. KmNo$_4$test:** (Potassium Permagnate)-Extract + dilute Potassium Permagnate Solution. Indicator- Decolourization, Inference- Presence of Tannin.
**2. Lead acetate Test:** Extract + lead acetate solution. Indicator- White Precipitate, Inference- Presence of Tannin.

**O. Coumarin Glycosides:**Extract + 1N NaOH**,** Indicator- Blue or Green Fluroscence Inference- Coumarin Glycosides present.

**Phytochemical activity:**
Result summarized in table no.1 revealed that when Cordia dichotoma Leaves, Bark and fruit samples were processed for phytochemical tests by Soxhlet Method. Methanol & Ehtanol extract showed variation in presence and absence of biochemical. In Methanol & Ehtanol extract of leaves, bark & fruit showed Tannin, Glycosides, Carbohydrates, Anthraquinone glycosides and Phenols were present. Whereas Flavonoids, Alkaloid, starch and Amino acids were absent.

Table No.1: Phytochemical tests results of the plant extracts extracted by Soxhlet Method

| Sr.No | Test | Leaves | | Fruit | | Bark | |
|---|---|---|---|---|---|---|---|
| | | **Methanol** | **Ethanol** | **Methanol** | **Ethanol** | **Methanol** | **Ethanol** |
| 1. | Tannin($FeCl_3$ test) | + | + | - | - | - | - |
| 2. | Saponin(Frothing test) | - | - | - | - | - | - |
| 3. | C. Glycosides(Keller-Kiliani) | + | + | + | + | + | + |
| 4. | Glycosides | + | + | + | + | + | + |
| 5. | Steroid | - | - | + | + | + | + |
| 6. | Fehling's test(For Carbohydrates) | - | - | + | + | - | + |
| 7. | Benedict's test(For Carbohydrates) | + | + | + | - | + | + |
| 8. | Barfoed's test (For Starch) | - | - | - | - | - | - |
| 9. | Biuret test (For Proteins) | - | - | - | - | - | - |
| 10. | Ninhydrin test (For amino acids) | - | - | - | - | - | - |
| 11. | Borntrager's test(For Anthraquinone glycosides) | + | + | - | - | - | - |
| 12. | $KMnO_4$ test (For tannin) | - | - | + | + | + | + |
| 13. | Lead acetate test(For tannin) | - | - | + | + | + | + |
| 14. | Test for Coumarin glycosides | - | - | + | + | + | + |
| 15. | Alkaloid test | - | - | - | - | - | - |
| 16. | Flavonoids test | - | - | - | - | + | - |
| 17. | Phenols | + | + | + | + | + | + |

**+** = Present
**-** = Absent

Table No.2: Phytochemical tests results of the plant extracts extracted by Maceration

| Sr.No. | Test | Leaves | Fruit | Bark |
|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Methanol | Ethanol | Methanol | Ethanol | Methanol | Ethanol |
| 1. | Tannin($FeCl_3$ test) | + | - | - | - | - | - |
| 2. | Saponin(Frothing test) | - | - | - | - | - | - |
| 3. | C. Glycosides(Keller-Kiliani) | + | + | + | + | + | + |
| 4. | Glycosides | + | + | - | - | + | + |
| 5. | Steroid | - | - | + | + | - | - |
| 6. | Fehling's test(For Carbohydrates) | - | - | + | + | - | + |
| 7. | Benedict's test(For Carbohydrates) | + | + | + | - | + | + |
| 8. | Barfoed's test (For Starch) | - | - | - | - | - | - |
| 9. | Biuret test (For Proteins) | - | - | - | - | - | - |
| 10. | Ninhydrin test (For amino acids) | - | - | - | - | - | - |
| 11. | Borntrager's test(For Anthraquinone glycosides) | + | + | - | - | - | - |
| 12. | $KMnO_4$ test (For tannin) | - | - | + | + | + | + |
| 13. | Lead acetate test(For tannin) | - | - | + | + | + | + |
| 14. | Test for Coumarin glycosides | + | + | - | - | + | + |
| 15. | Alkaloid test | - | - | - | - | - | - |
| 16. | Flavonoids test | - | - | + | + | - | - |
| 17. | Phenols | + | + | + | + | + | + |

Result summarized in table no.2 revealed that when *Cordia dichotoma* Leaves, Bark and fruit samples were processed for Phytochemical tests by Maceration Method. Methanol & Ehtanol extract showed variation in presence and absence of biochemical. In Methanol & Ehtanol extract of leaves showed presence of CGlycosides, glycosides, Carbohydrates Anthraquinone glycosides, Coumarin glycosides and Phenols.In Methanol and Ehtanol extract of fruit showed presence of Steroids, C Glycosides, glycosides, Carbohydrates ,tannins, flavonoids,

phenols, whereas in bark extract presence of Steroids, C Glycosides, glycosides, Carbohydrates ,tannins, Coumarin glycosides and phenols,

## 3. Conclusion

The plant extracts shows presence of various biologically active phytochemicals like Tannin, Cardiac Glycosides, Glycosides, Steroids, Carbohydrates, Anthraquinone Glycosides, Flavonoids, Alkaloids, Coumarin Glycosides and Phenols. Therefore there is a urgent need to do further research on the same topic.

## 4. References

1. Prasad G. Jamkhande et.al. ; "Plant profile, phytochemistry and pharmacology of Cordia dichotoma (Indian cherry)": A review; 2013; Asian Pacific Journal of Tropical Biomedicine Volume 3, Issue 12.
2. Disha Raghuvanshi ET. al. "Phytochemistry, and pharmacological efficacy of Cordia dichotoma G. Forst. (Lashuda): A therapeutic medicinal plant of Himachal Pradesh";2022; Elsevier, Volume:153.
3. Reena Singh et.al. "Role of Cordia dichotoma seeds and leaves extract in degenerative disorders"; 2010; International Journal of Pharmaceutical Sciences; Volume 2, Issue 1.
4. Nazim Hussain et.al. "Anti-Inflammatory and Antioxidant Activities of Cordia Dichotoma Forst";2009; Biomedical and Pharmacology Journal; Vol. 13(4), p. 2093-2099.
5. Erum Iqbal et. al. "Phytochemical Screening, total phenolics and antioxidant activities of bark and leaf extracts of Goniothalamus veluntinus from Brunei Darussalam"; 2015; Journal of King Saud University.
6. Krishnadutt Pratihast, Rajneesh Kumar and Sudhanshu Kumar Bharti; "Comparative antimicrobial activity of ethanolic and aqueous extract of Tinospora cordifolia",2019:The Pharma Innovation International Journal; Vol. 8, Issue 3.
7. Muskan M. Bhaldar et.al. "A Comparative Anthelmentic Studies on Jasminum Grandiflorum and Cordia Dichotoma";2019; International Journal of Scientific Research in Science and Technology; Volume 8, Issue 4.
8. Shilpa Raina et.al. "Anticancer Activity of Cordia dichotoma against a Panel of Human Cancer Cell Lines and Their Phytochemical Profiling via HPLC and GCMS";2022;MDPI;
9. Pankaj B. Nariya et.al. "Antimicrobial and antifungal activities of Cordia dichotoma (Forster F.) bark extracts"; 2011; An International Quarterly Journal of research in Ayurveda; Vol 32; Issue 4.
10. Mostafa H. Al-Musawi et.al. "In vitro study of antioxidant, antibacterial, and cytotoxicity properties of Cordia myxa fruit extract"; 2022; Iranlan Journal of Microbiology; Volume 14 Number 1.
11. Abeer Ibrahim et.al. "Antioxidant, cytotoxicity and anti-tumor activity of Cordia dichotoma fruits accompanied with its volatile and sugar composition"2019; Annals of Agricultural Sciences;
12. Nazim Hussain et.al. "Bioactive Antidiabetic Flavonoids from the Stem Bark of Cordia dichotoma Forst.: Identification, Docking and ADMET Studies" 2021; Molbank 2021.
13. Consolacion Y. Ragasa, Virgilio Ebajo Jr et.al. "Chemical Constituents of Cordia dichotoma G. Forst." 2015; Journal of Applied Pharmaceutical Science;Vol. 5 (Suppl 2)

14. Kiran Reddy Kanubaddi;Cordia dichotoma crude extracts: potent source of natural antibacterial and antioxidant agents";2014; International Journal of Advanced Research; Volume 2, Issue 2.
15. M. Padmaa Paarakh; "Cordia dichotoma G forst.: a comprehensive review"; 2022International Journal of Advance Research and Innovative Ideas in Education ; Vol-8 Issue-5.
16. Sunil Kumar Prajapati et.al. "Exploring phytochemicals and pharmacological uses of cordia dichotoma (indian cherry): a review" 2017; Journal of Drug Delivery & Therapeutics; 7(6):125-131.
17. Devaraj Bharathi et.al. "Green synthesis of silver nanoparticles using Cordia dichotoma fruit extract and its enhanced antibacterial, anti-biofilm and photo catalytic activity"2018; IOP science.
18. Anjali Ganjare, Nishikant Raut; "Phytochemical and pharmacological properties of Cordia dichotom (Bhokar): A short a review"; 2019; Asian Journal of Pharmacy and Pharmacology; 5(5):858-865.