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Pharmacognostical and Phytochemical of *Cordia Myxa* Bark, It's Analgesic Activity

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Abstract: ***Cordia myxa also known as Assyrian plum or Lasura, It is a deciduous shrub or small tree native to India and other parts of Asia and Africa. Its bark has been used in traditional medicine for various purposes, including: Fever reduction, Digestive issues, Respiratory problems, Skin conditions, Wound healing, Analgesic and anti - inflammatory purposes. Cordia myxa is a deciduous, perennial shrub or small tree up to 12 m tall. The tree provides wood for fuel and timber and fodder for livestock. The gum extracted from the fruit pulp can be used in industrial starch manufacturing. Some parts of the tree also have ethno medicinal uses: the fruits have been traditionally used for treating urinary infections and could have analgesic, anti - inflammatory, diuretic, demulcent, and antimicrobial activities. Cordia myxa bark has been used in traditional medicine for its analgesic properties. This study aimed to investigate the pharmacognostical and phytochemical properties of Cordia myxa bark and evaluate the analgesic activity of its methanolic extract. The phytochemical screening tests g reported the presence of alkaloids, flavonoids, and cardiac glycoside. The methanolic extract exhibited significant analgesic activity, with a maximum effect at 200 mg/kg. The study confirms the traditional use of Cordia myxa bark as an analgesic and provides a scientific basis for its use.***

Keywords: *Cordia myxa*, bark, Pharmacognostical, Phytochemical, Analgesic activity, Methanolic extract.

1. Introduction

The tree *Cordia myxa* belong to Boraginaceous family, it is a deciduous tree, and common names include Lasura, Assyrian plum. It is about 7–12 m tall and grows in deep, moist soils like riverbanks. For the majority of the year, the tree retains its leaves. These have an ovate - elliptic, broad, alternating form. Many white blooms are carried in the inflorescence. Although its exact origin is unknown, *Cordia myx*a bark is thought to have originated in the region that stretches from eastern India to the eastern and southern. Barks: It was used as an astringent and hepatic stimulant, and the juice is used to treat ringworms and chest diseases. *Cordia myxa* bark is often found in tropical forests, coastal areas, dry woodlands, along rivers and streams. The bark of this plant has been particularly useful in treating various health conditions, including pain, inflammation, and fever.

Taxonomical classification:

- **Kingdom:** Planate
- **Sub kingdom:** Tracheobionta
- **Super division:** Spermatophyte
- **Division:** Magnoliophyta
- **Class:** Magnoliophyta
- **Sub class:** Asteridae
- **Order:** Lamiales
- **Family:** Boraginaceae and Borage
- **Sub family:** Cordiodeae
- **Genus:** Cordia
- **Species:** myxa

Vernacular name:

- **Hindi:** Bahu - aar
- **Odia:** Nisori or Gondi
- **Bengali:** Bahubara
- **Marathi:** Bhokar

Figure 1: Cordia myxa bark plant

Microscopy:

A macroscopy study of bark involves observing and describing the visible characteristics of the bark without using a microscope. Here are some key aspects to consider:

1) Color: Note the color of the bark, including any patterns or variations.
2) Texture: Describe the texture of the bark, such as smooth, rough, scaly, or fibrous.
3) Pattern: Observe any patterns on the bark, like ridges, furrows, or reticulations.
4) Thickness: Measure or estimate the thickness of the bark.
5) Surface features: Note any surface features, such as lenticels (breathing pores), wounds, or scars.
6) Exfoliation: Observe if the bark exfoliates (peels off) in scales, flakes, or layers.
7) Odor: Record any distinctive odors emitted by the bark.
8) Taste: Describe the taste of the bark, if applicable.

9) Shape: Note the shape of the bark, including any curvature or twisting.
10) Size: Measure or estimate the size of the bark sample.

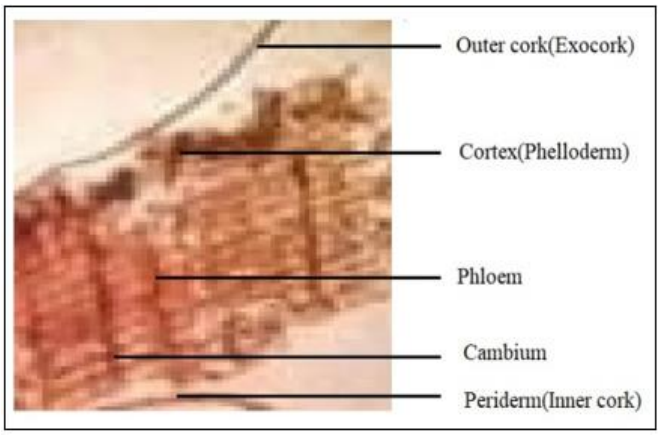

Figure 3: T. S of *Cordia myxa* Bark

Outer cork (Exocork):
- Thick – walled, rectangular cells with prominent lenticels.
- Cells are arranged in longitudinal pattern.
- Presence of radical crack and fissures.

Cortex (phelloderm):
- Parenchymatous cells with thin walls
- Cells are arranged in a longitudinal pattern
- Presence of sclereids and fibers
- Cells are elongated and traped

Phloem:
- Sieve elements and companion cells
- Phloem fibers and parenchyma cells
- Presence of strach gains and crystals
- Cells are elongated and trapered

Cambium:
- Thin layer of maristematic cells.
- Cells are arranged in a longitudinal pattern
- Presence of ray cells and fusiform initials

Periderm (inner bark):
- Thick – walled, rectangular cells
- Cells are arranged in a longitudinal pattern
- Presence of lenticels and stomata
- Cells are elongated and tapered

Physical evaluation:
Various physical evaluations of *Cordia myxa* bark were conducted, including assessments of loss on drying, extractive value, ash value, swelling index, and foaming index. Results shown in Table no.1

Phytochemical study:
Phytochemical screening tests for alkaloids, glycosides, flavonoids, saponins, tannins. Isolation and characterization of bioactive compounds thin layer chromatography.

The phytochemical study was conducted to identify and understand the different phytochemicals present in *Cordia* myxa bark. A little amount of methanol extract was dissolved in distilled water separately and filtered. The filtrates were taken for various tests for detection of carbohydrates. The presence or absence of phenols (ferric chloride test), flavonoids (sodium hydroxide test), alkaloids (Dragendroff's test, Wagner's test), cardiac glycosides (Killer - Killani test), carbohydrate (Molisch'sTest, Fehling Test), saponin (Foam Test), and steroids (Salkowski test) were qualitatively screened for in the phytochemical constituents of *Cordia myxa* leaves. Results shown in Table no.2

Table 1: Physical Evaluation Parameters

Sl. No.	Parameter	Values
1	Loss on drying	10.6%
2	Ash values	
	a. Total ash	6%
	b. Acid insoluble ash	2%
	c. Water soluble ash	1%
3	Extractive values	
	a. Distilled water soluble extractive	11%
	b. Methanol soluble extractive	12%
	c. Ethanol soluble extractive	10%
	d. Ethyl acetate soluble extractive	1%
	e. Pet ether soluble extractive	2%
	f. Chloroform soluble extractive	1%
4.	Swelling index	Negative
5.	Foaming index	Less than 100

Table 2: Phytochemical screening results

Sl. No. -	**Test**	**Results**	
		Powdered drug	**Methanolic extracts**
1.	**Test for Carbohydrates**		
	A. Molisch's test	-	-
	B. Fehling's test	-	-
	C. Benedict's test	-	-
	D. Barfoed's test	-	-
2.	**Test for Gums &Mucilage**	-	-
3.	**Test for Alkaloids**		
	A. Wagner's reagent	+	+
	B. Hager's test	+	+
	C. Dragendroff's test	+	+
	D. Mayer's test	-	-
4.	**Test for Glycoside**		
	A. Modified Borntrager's test	-	-
	B. Legal's test	-	-

	C. Balject's test	-	-
	D. Keller – Killiani's test	+	+
	E. Test for Cyanogenetic Glycosides	-	-
5	**Test for Saponins**		
	Foam test	+	+
	Haemolysis test	-	-
6	**Test for Proteins and Amino acids**		
	A. Hydrolysis test	-	-
	B. Xanthoproteic test	-	-
	C. Ninhydrin test	-	-
	D. Biuret test	-	-
	E. Tannic acid (10%w/v)	-	-
	F. With heavy metals	-	-
7	**Test for fixed oils and fats**	-	-
8	**Spot test**	+	+
9	**Saponification test**	+	+
10	**Test for Phytosterols**		
	Liebermann's test	+	+
	Liebermann's – Burchard's test	-	-
	Salkowski's test	+	+
11.	**Test for Tannins**		
	A. Ferric chloride test	-	-
	B. Gelatine test	-	-
	Test for flavonoids		
	Fecl3 test	-	-
	Fluorosence test	-	-
	Reaction with alkali and acid	-	-
12.	**Test for Starch**	-	-
13	**Test for Steroids & Triterpenoids test**		
	Sulfur powder test	-	-
14	**Test for Napthoquinones**		
	Dam – Karrer test	-	-
15.	**Test for tannins and phenolic compounds**		
	5% fecl3 solution	-	-
	Reaction with copper sulphate	-	-
	Reaction with lead acetate	-	-
	Reaction with potassium dichromate	-	-
16.	**Test for volatile oil**	-	-

Pharmacological evaluation:

Acute toxicity study:

The experiment will start by choosing male albino rats that weigh between 200 and 220 grams and are in good health. Then, four groups of six rats each will be formed from these rats. To ensure that all the groups have the same conditions, the animals will fast for the entire night before the test chemical is given. Then, in accordance with the study design, the various animal groups will receive varying dosages of the extract. This method guarantees uniformity and makes it possible to systematically assess the extract's effects at various dose levels.

Group - I (Control): The rats assign to group - I will be orally administered with 1 ml per 100 grams of body weight of 10ml distilled water solution. These rats will be served as the control group for the experiment. This control group allows to compare the effects of the experimental treatment with those of a standard vehicle solution, ensuring that any observed effects are attributable to the administered extract rather than the vehicle itself.

Group - II, III, IV (Test): The animals design as test groups II, III, and IV will be orally administered a single dose of *Cordia myxa* extract at concentrations of 200 mg/kg, 400 mg/kg, and 700 mg/kg, respectively. The extract will be delivered in 10ml distilled water solution. Subsequently, these test animals will undergo continuous observation for a period of 24 hours, which will be monitored any physiological changes, potential adverse effects, or mortality. This observation period will extend over 14 days, allowing for a comprehensive assessment of the short - term and longer - term effects of the administer *Cordia myxa* extract at varying dosage levels. This rigorous observation protocol is crucial for evaluating the safety and potential toxicity of the extract under investigation.

Analgesic:

Analgesics are medications that relieve pain. Unlike medications used for anesthesia during surgery, analgesics don't turn off nerves, change the ability to sense your surroundings or alter consciousness. They are sometimes called painkillers or pain relievers.

Tail flick method using hotplate Albino Wister rats of both sexes were chosen, and were numbered according to the group. Take basal reaction time to radiant heat by placing the tip (last 1 - 2 cm) of the tail on the radiant heat source. The end point is defined as the tail becoming disconnected from the heat source. Rats typically take 3 to 5 seconds to withdraw. A cut - off of 10 - 12 seconds has been established

to prevent tail injury. Any animal whose withdrawal duration is shorter than 3 to 5 seconds was not included in the study. Take at least 3 - 5 basal reactions for each rat at a gap of 5 minutes to confirm normal behaviour of the animals. Inject 100 & 200 mg/kg of a methanolic bark extract *Cordia myxa* and 5 mg/ kg of Tramadol. Take note of the reaction times at 0, 15, 30, 60, and 120 minutes following the administration of the drug. Maximum analgesia is considered when the reaction time reaches 10 seconds and the tail is removed from the source of heat to avoid tissue damage. Using this technique, the analgesic efficacy of a Methanolic bark extract *Cordia myxa* was tested. Calculated the percentage increase in reaction time at a specified interval.

Materials:

a) Healthy albino rats
b) Thermometer
c) Methanolic extract
d) Gastric tube

2. Method

Healthy Wister strain albino rats will take. The animals are allowed to adapt in the cages for 30 minutes before testing. The lower 5cm portion of the tail was immersed in a cup of freshly filled water. Within few seconds the rats reacts by withdrawing the tail. The reaction time was recorded by stop watch. The standard test substances were given to the animals by gastric tube. After the drug was administered the reaction time recorded at interval of 30, 60, 120, 180, 240 minutes. The mean reaction time was found out and compared with the value of standard drug.

Group - I (Control):
Animals in group - I will be received an oral administration of 10ml/100gm of body weight in distilled water and the serve as control.

Group - II (Test):
Animals in test groups II will be orally given the methanolic extract of *Cordia myxa* at doses of 80 - 250mg/kg body weight in distilled water. After drug administration, the temperature of the rat's different groups will be recorded at 0, 1, 2, and 3 hours. Subsequently, the mean temperature of the test groups will be compared with the standard group to evaluate the analgesic effect of the test substance.

3. Results

It was observed that extract at dose of 250mg/kg weight showed maximum analgesic activity on comparison with the standard and control. The result indicated that major component responsible for analgesic activity may be present in extracts. Data was expressed as mean ±SEM and the statistical different between the groups was analysed by using test. The value of $p< 0.05$ was considered as statistically significant.

Table 3: Analgesic effect of *Cordia myxa* bark extract

S. No.	Treatment	Reaction Time (Second) ± SEM				
		Initial Time	0hours	1hours	2hours	3hours
1.	Control	1.03±0.01	1.04±0.02	2.01±0.16	3.02±0.12	4.01±0.14
2.	Methanolic extract (250mg/kg)	3.00±0.33	3.00±0.22	4.00±0.40	2.00±0.30	1.00±0.20

4. Conclusion

This study investigated the pharmacognostical and phytochemical properties of *Cordia myxa* bark and evaluated its analgesic activity. The key findings include:

- *Cordia myxa* bark contains a diverse range of phytoconstituents, including alkaloids, glycosides, and flavonoids.
- The methanolic extract of *Cordia myxa* bark showed significant analgesic activity in animal models.
- The study supports the traditional use of *Cordia myxa* bark in folk medicine for pain relief and highlights its potential for further research and development as a novel analgesic agent.

Overall, this study contributes to the scientific understanding of *Cordia myxa* bark's pharmacological properties and its potential applications in pain management.

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