

EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF PLANT EXTRACT OF *CORDIA DICHOTOMA* LEAVES ON CARRAGEENAN-INDUCED PAW EDEMA IN ALBINO WISTER RATS AND ITS PHYTOCHEMICAL ANALYSIS

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Abstract –

CORDIA DICHOTOMA (INDIAN CHERRY) is current research that examined the anti-inflammatory activity of a well-known indigenous medicinal plant that is used to treat pain, inflammation, diarrhea, tumors, and wounds, and as an anti-diabetic, anti-convulsant, anti-allergic, and anti-oxidant. The anti-inflammatory effect of an extract of leaves was tested in an experimental animal model of carrageenan-induced paw edema in the presence of control. In comparison to the reference standard, diclofenac 10 mg (1ml), the results showed that ethanolic extract greatly reduced edema. The findings of this study provide evidence for the use of this plant in the treatment of inflammatory diseases. the current study aimed at investigating the plant's anti-inflammatory activity using different experimental screening methods. This article summarizes the published literature on the anti-inflammatory activities of natural products.

The effects of *Cordia dichotoma* leaves extracts on various stages of acute inflammation were investigated. The experiments were carried out in rats with different phlogistic agents-induced paw edema, namely carrageenan-induced paw edema. Various extracts (ethanol, petroleum ether, and aqueous) of *Cordia dichotoma* leaves were tested orally at doses of 500 mg/kg. The standard was diclofenac sodium at a dose of 10mg/kg. In these models, the extracts demonstrated significant activity (*p0.05 & ***p0.01) when compared to the control. Alkaloids, glycosides, saponins, tannins, and carbohydrates were discovered in the dry powdered seeds. According to the screening model, the ethanol extract and aqueous fraction of this plant have acute anti-inflammatory activity.

Keyword – *Cordia dichotoma* leaves extract, Acute inflammation, analgesic, Anti-inflammatory activity of *Cordia dichotoma*, Carrageenan-induced edema

Introduction –

Plants are a major source of medicine because they contain a reservoir of chemical agents and biologically active compounds. In vivo study pharmacological effects of *Cordia dichotoma* leaf extracts of anti-inflammatory and analgesic properties. The inhibition of H⁺ is caused by a plant rich in alkaloids, flavonoids, carbohydrates, tannins, glycosides anthraquinones, and quinone ¹.

Cordia is a genus of common weeds found in temperate to tropical climates in upland and paddy fields. The leaves of *Cordia dichotoma*, which are used in Asian countries as traditional herbal remedies for stomach and bowel ailments, as well as inflammatory diseases, have been extensively studied. *Cordia dichotoma* (Boraginaceae) is a traditional herbal medicine used to treat stomach problems and diarrhea, as well as an analgesic and sedative ².

Inflammation is the most basic mechanism for tissue repair after an injury, consisting of a series of cellular and microvascular reactions that serve to remove damage and regenerate new tissue. According to reports, inflammation is usually caused by damage to living tissues caused by bacterial, viral, or fungal infections, physical agents, or a faulty immune response ³.

Several nonsteroidal anti-inflammatory drugs have been shown to reduce pain and inflammation by inhibiting the metabolism of arachidonic acid by an isoform of the cyclooxygenase enzyme, reducing prostaglandin production ^{4,5}.

Material and methods

Chemical and drugs – Carrageenan was obtained from Merc Pvt. Ltd and Diclofenac Sodium from Zydus Cadilla Ltd. Analytical grade solvent and other chemicals were used. Drugs carrageenan (prepare 1% w/v solution and inject 0.1 ml underneath the plantar region). Diclofenac (Dose 10 mg/kg, p. orally, prepare a stock solution (50ml) containing 10 mg/kg b.w. of the drug and inject 1 ml/100 g of body weight of the animal) ⁶.

Obtaining samples

plant material of flesh *Cordia dichotoma* was collected from the local garden of Durg district Durg Chhattisgarh, India during the month of August –to September 2021.

Preparation of plant sample

plant materials collected were washed under running tap water and were allowed to drain before air-drying for two weeks. The leaves together with the stem and small branches were ground mechanically with a motor and pestle.

Authentication

The Plant Materials Were Identified and Authenticated from Govt Vishwanath Yadav Tamaskar Post-Graduate Autonomous College, Durg Chhattisgarh 491001 India.

Preparation of plant extract

Extraction process

Soxhlet extraction

When the target molecule has limited solubility in a solvent and the impurity is insoluble in that solvent, Soxhlet extraction is required. If the desired component has a high solubility in a solvent, it can be removed from the insoluble substance using simple filtration. The advantage of this approach is that instead of passing multiple batches of warm solvent through the sample, only one batch is recycled ⁷.

The extraction of the plant was done using three different solvents. The first extraction method involves varying the quantities of the three basic extraction solvents: water, ethanol, and petroleum ether.



Figure 1 Extracted Drug

Procedure

About 10 gm of powdered material of *Cordia dichotoma* was extracted with ethanol as a solvent by hot extraction method using Soxhlet apparatus. The extraction was continued until the solvent in the thimble became clear then a few drops of solvent were collected in the test tube during the completion of the cycle and a chemical test of the solvent was performed. After each extraction, the extract was evaporated to dryness some part of the extract was preserved for preliminary Phytochemical screening for the detection of plant constituents ⁸.

Extraction methodology

- Preparation of petroleum ether leaves Extract of *Cordia dichotoma*
- Preparation of Ethanolic leave Extract of *Cordia dichotoma*
- Preparation of water Extract of *Cordia dichotoma*

Preparation of petroleum ether leaves Extract of *Cordia dichotoma*

Cordia dichotoma leaf powder was crushed to a coarse powder, defatted with 20 mL water and 80 mL ethanol, and extracted by Soxhlation. The concentrated ethanolic extract was then evaporated to dryness and stored at 4 C in the refrigerator for later use. The percentage yield of the petroleum ether leaves extract of *Cordia dichotoma* was found to be 14 percent w/w on a dry weight basis.



Preparation of ethanol leave Extract of *Cordia dichotoma*

The material was collected, treated with water to remove any undesired material, and dried in the shade. Crushed *Cordia dichotoma* leaves that had been air-dried. The crushed leaves were extracted using a hot percolation process utilizing Soxhlet equipment with a solvent ratio of increasing polarity, namely ethanol. To get residue, the extract was evaporated until it was completely dry. Under reduced pressure, these extracts were concentrated. The percentage yield of the ethanolic leaves extract of *Cordia dichotoma* was discovered to be 15% w/w on a dry weight basis.

Preparation of water leave Extract of *Cordia dichotoma*

The material was collected, treated with water to remove any undesired material, and dried in the shade. Crushed *Cordia dichotoma* leaves that had been air-dried. The crushed leaves were extracted using a hot percolation method with a Soxhlet apparatus with different solvent ratios of increasing polarity, viz. water. To obtain a residue, the extract was evaporated dry. Under reduced pressure, these extracts were concentrated. The percentage yield of *Cordia dichotoma* water leaves extract was measured on a dry weight basis.

Phytochemical screening

Qualitative profiling - Ethanolic, petroleum ether, and water extract of *Cordia dichotoma* was used for qualitative assessment of the major classes of phytochemicals namely flavonoids, alkaloids, carbohydrates, glycosides, etc. The test was performed according to various standard methods. The test was based on the visual observation of color change or formation of a ppt after the addition of specific reagents.

Pharmacological evaluation

Animal model - Albino rats weighing 100-150 gm of used in the experiment.

The animal house was maintained hygiene with food and water at a temperature of 25°C and a room humidity of 45-55 percent. On alternate days, cleaning and sanitation were performed. Paddy husk was provided as bedding, which was replaced on a daily basis. All of the experiments were carried out with the approval of the Institute of Animal Ethical Committee.

Wistar albino rats of either sex weighing between 100-150 g were used for animal studies. The animals were grouped in clean polyacrylic cages and maintained under standard laboratory conditions and relative humidity with dark and light cycles. They were allowed free access to a standard dry pellet diet and water ad libitum. The rats were acclimatized to the laboratory condition for ten days before the commencement of the experiment. The Institutional Animal Ethics Committee had approved the experimental protocols and care of animals was taken according to CPCSEA guidelines.

Inflammation

Inflammation is a complex biological response of vascular tissues to harmful stimuli such as pathogens, irritants, or damaged cells. It causes redness, color (heat), and dolor (pain) in the affected region, and is a complex biological response of vascular tissues to harmful stimuli such as pathogens, irritants, or damaged cells. It is the body's protective system for removing harmful stimuli and initiating the tissue's healing process. Inflammation, on the other hand, if left untreated, can lead to disorders like vasomotor rhinorrhea and rheumatoid arthritis because of their side effects, cost, and potency, existing medicines such as opiates and NSAIDs are thought to be ineffective in all cases of inflammatory illnesses. Plants have been used to heal illnesses since antiquity^{9,10}.

Acute Toxicity Studies

The 'up and down' method was used to test acute toxicity in adult female albino rats. The animals fasted overnight before extracts of *Cordia dichotoma* dissolved in normal saline were administered orally at various dose levels the next day. The animals were then monitored continuously for 3 hours for general behavioral, neurological, and autonomic profiles, and then every 30 minutes for the next 3 hours until death occurred after 24 hours.

The plant's ethanol, chloroform, and aqueous extracts were tested for acute toxicity and anti-inflammatory activity in albino Wistar rats with Carrageenan-induced hind paw edema. Acute toxicity studies of the extract revealed that it was non-toxic up to the OECD guideline dose of 2000mg/kg body weight orally ¹¹.

Acute toxicity test

The animals were divided into five groups containing six animals each. Extract was dissolved in distilled water and administered orally as a single dose to rat at 10 mg/kg of body weight (b.w.). rats were observed periodically for symptoms of any toxicity.

Evaluation of anti-inflammatory activity

Anti-inflammatory Activity

Carrageenan-induced rat paw edema

The rats were separated into three groups, each containing six rats (one control, one standard, and three test groups), and acute inflammation was generated according to the edema assay ¹².



Figure 3 Administration of Carrageenan in Rat

Rats were divided into five different groups (n = 5). Group I served as control and received vehicle orally. Group II, III, and IV received *Cordia dichotoma* extract ((1 gm /kg b.w.) orally. Group V received diclofenac sodium (10 mg/kg) orally. One hour after the respective treatment of 1% freshly prepared carrageenan in normal saline was injected into the sub-plantar region of the right hind paw of rats. The paw volume was measured at 0 h i.e., immediately after carrageenan injection and then at 120 min using a plethysmometer ¹³.

All extracts were given to the animals at a dose of 500mg/kg body weight. The extract's anti-inflammatory activity was found to be nearly equal to that of the standard drug used in the study.

The anti-inflammatory activity of an different three solvents extract of *Cordia dichotoma* leaves at doses of 500 gm/kg against carrageenan-induced paw edema in rats was tested in acute inflammatory models.

The results are analyzed used using one-way ANOVA, followed by Dunnett's test $P < 0.05$, and were deemed significant when compared to the control. *Cordia dichotoma* extract inhibited carrageenan-induced edema and activity in rats in a dose-dependent manner. As a standard drug, sodium diclofenac was used. The aqueous extract of *Cordia dichotoma* leaves was found to have significant anti-inflammatory activity ¹⁴.

- Carrageenan 1% w/v solution was used as a control group.
- Carrageenan + Diclofenac (10 mg/kg b.w.) was the control group.
- Carrageenan + ethanolic extract (500 mg /kg b.w.) was the first test group.
- Carrageenan + petroleum ether extract (500mg/kg b.w.) was the second test group.
- Carrageenan + water (500 mg/kg b.w) was the third test group.

After Carrageenan injection, the paw volume was measured using a Plethysmograph at 0 and 120 minutes ¹⁵.

The percentage of edema inhibition was estimated using the following formula:

$$\text{a percentage Edema inhibition} = (V_c - V_t / V_c) \times 100$$

Where in the test group, V_t stands for paw volume.

Animals in the control group had a paw volume of V_c .

measuring the length of the thread (rat paw circumference) using a carrageenan-induced paw edema model –

The anti-inflammatory activity of *Cordia dichotoma* extract was investigated in rats using a carrageenan-induced paw edema model. Paw circumference was measured using a metric ruler before and after carrageenan injection by wrapping a thread around the paw of rats and measuring the length of the thread (paw circumference). The animals were divided into five groups: control

and experimental. Different groups received vehicle or plant extract (500 mg /kg body wt.) orally, while the positive control group received diclofenac sodium (10 mg/kg body wt, p.o) 30 minutes before injecting 1 percent w/v freshly prepared -carrageenan into the left hind paw.

To investigate the extract's mechanism of action in inducing its anti-inflammatory effect, the following antagonists were used: 10 mg/kg body weight diclofenac sodium. The antagonists were given orally 30 minutes before the chosen dose of *Cordia dichotoma*¹⁶.

Animal behavior was observed and recorded in all treated groups. All animals' paw sizes were measured after 120 min of carrageenan injection. Using a digital compact camera, images of the plantar surface of different rats paws were captured before and after treatment.

Evaluation of analgesic activity

Hotplate Method (Thermal Stimulation)

Experimental rats of either sex was chosen at random and placed into five groups: group-I, group-II, group-III, group-IV and group-V, each with six rats for the control, positive control, and test sample groups, respectively. Control (1 percent solution in water, 10mg/kg, p.o.), positive control (Diclofenac sodium 10 mg/kg, p.o.), and test sample (ethanolic extract of 500 mg/kg, p.o. were given to each group¹⁷.

The animals were placed on Eddy's hot plate, which was held at 55.5 0C. To avoid paw damage, a 15-second cut-off interval was observed. When animals licked their fore or hind paws or leaped prior to 120 minutes following oral administration of the samples, reaction time was observed.

The heated surface of a hotplate analgesia meter was kept at 55 0.2°C. Each animal was placed in a glass cylinder (20 cm in diameter) on the plate's heated surface. Each rat was only timed twice: before and 5, 10, 15, or 20 minutes after the i.c.v. injection. When the animals lift and lick their paws or attempt to jump out of the breaker, the pain threshold is considered to be crossed. The cut-off time was set at 20 seconds to minimize damage to the animal's paws¹⁸.

Peripheral analgesic effect - Acetic acid-induced method

The samples' analgesic efficacy was tested in rat using the acetic acid-induced writhing method. The experimental animals are given acetic acid intraperitoneally to produce pain sensations in this procedure. Any common NSAID medicine can be used as a positive control. Diclofenac sodium was utilized in this investigation to achieve this goal. After an overnight fast, the Albino rat was given the plant extract orally in doses (500 mg /kg body weight). Test samples and vehicle were given orally 30 minutes before a 0.7 percent v/v acetic acid solution (0.1ml/10g) was injected intraperitoneally, however Diclofenac sodium was given 15 minutes before the acetic acid injection¹⁹.

The creatures were then placed on a table for observation. Each mouse in each group was counted for the number of writhings they made over the course of 15 minutes, starting just 5 minutes after the acetic acid solution was injected intraperitoneally. Writhing to its full extent was not always achieved by the animal, as some animals began to writhe but did not complete it. Half-writhing was the term used to describe this incomplete writhing. As a result, two half-writhing were considered one full writhing. The number of writhes in each treated group was compared to the number of writhes in a control group, with Diclofenac sodium (10 mg/kg) used as a reference substance (positive control) ²⁰.

Statistical analysis

The results of the statistical analysis for the animal experiment were expressed by analyzed using ANOVA. The outcomes were compared to those of the vehicle control group. The significance levels of p greater than 0.05 and 0.001 were judged statistically significant. Statistic software graph pad Prism 5.0 was used for all statistical analyses.

Result

Anti-inflammatory activity

The level of different compounds in leaves of *Cardia dichotoma* are shown in table 03. among the parts, leaves show the highest value in petroleum extract solvent, followed by the different solvent extract. Differences among leaves parts were significant (P < 0.05).

Table 1. Anti-inflammatory activity of *Cordia dichotoma* leaves extract on carrageenan-induced paw edema in rats

S. N.	Group	Dose mg/kg p.o.	Mean Paw Volume (ml) and S.E.M. / total increase in paw volume	% Inhibition
1.	Control	-	1.58 ± 0.05	-
2.	Ethanol extract	500	0.56 ± 0.04***	64.55
3.	Petroleum extract	500	0.65 ± 0.04***	58.86
4.	Aqueous extract	500	0.58 ± 0.06***	63.29
5.	Standard drug	10	0.63 ± 0.06***	60.12

Results are expressed as mean ± SEM (n=6). Statistically analysed by one-way ANOVA followed by Dunnett's post hoc test. ***P < 0.001 vs Control group

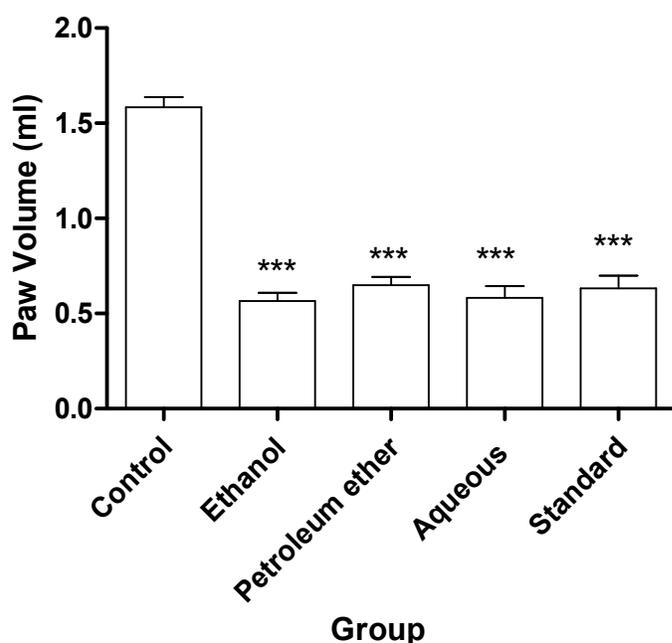


Figure 4 Graphical representation by the Anti-inflammatory activity of *Cordia dichotoma* leaves extract on carrageenan-induced paw edema in rats.

Table 2. Effect of *Cordia dichotoma* leaves extract and its fraction on Acetic acid-induced writhing

S.no.	Group/test solution applied	Dose mg/kg p.o.	No. of Writhing (Mean ± S.E.M.)	% Inhibition
1	Control group	-	35.33±1.35	-
2	Ethanol extract	500	16.67±0.49***	52.31
3	Petroleum extract	500	17.67±0.61***	51.42
4	Aqueous extract	500	17.17±0.60***	51.40
5	Standard drug	10	19.67±0.21***	44.32

Results are expressed as mean ± SEM (n=6). Statistically analysed by one-way ANOVA followed by Dunnett’s post hoc test. ***P < 0.001 vs Control group.

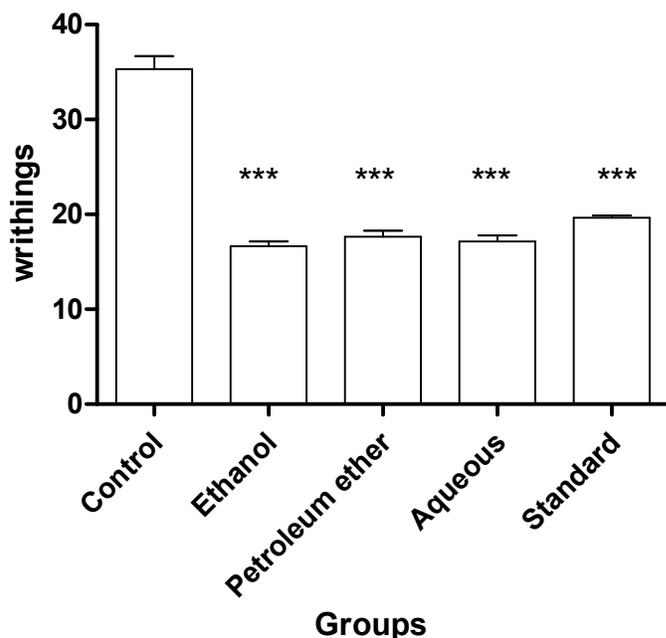


Figure 5 Graphical representation by the effect of *Cordia dichotoma* leaves extract and its fraction on Acetic acid-induced writhing.

Table 3. Analgesic activity of *Cordia dichotoma* leaves extract on hot plate method -

S.no.	Group	Latency time (after 120 min)	% Inhibition
1	Control	5.16±0.30
2	Ethanol extract	10.00±0.57***	93.79
3	Petroleum ether extract	13.00±0.79***	151.93
4	Aqueous extract	13.00±0.66***	151.93
5	Standard drug	14.67±0.21***	184.30

Results are expressed as mean ± SEM (n=6). Statistically analysed by one-way ANOVA followed by Dunnett's post hoc test. ***P < 0.001 vs Control group

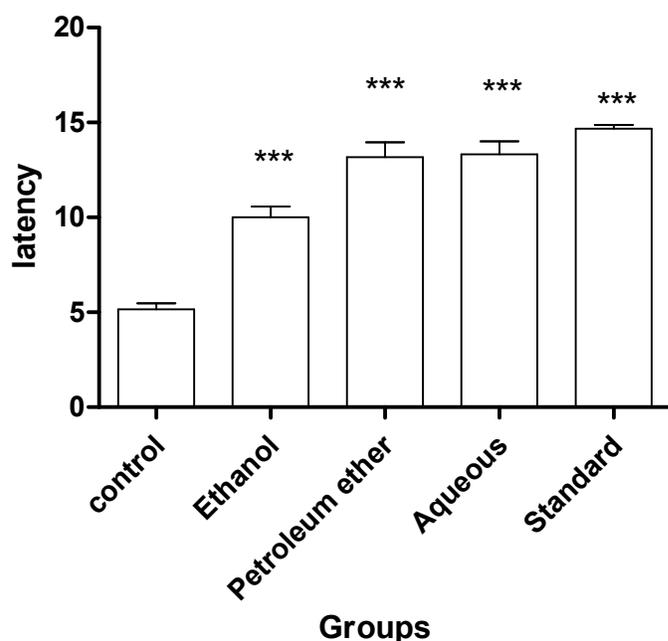


Figure 6 Graphical representation by the Analgesic activity of *Cordia dichotoma* leaves extract on the hot plate method.

Table 4. Phytochemical constituents of *Cordia dichotoma*

S. No	Parameters	Leaf		
		Water Extract	Pet. Ether 30 ml +Water 70ml extract	Ethanol 80ml+ Water 20 ml extract
1	Alkaloids	+	+	+
2	Carbohydrates	+	+	+
3	Phenol	+	+	+
4	Flavonoids	+	+	+
5	Glycosides	+	+	+
6	Saponin	-	-	-

Discussion –

In this study anti-inflammatory activity of extract of *Cordia dichotoma* leaves were evaluated by different *in vivo* screening methods. Preliminary phytochemical screening of the aqueous extract of *Cordia dichotoma* leaves revealed the presence of flavonoids, alkaloids, and glycosides. Further separation of the specific phytochemicals is in progress. The Cyclo-oxygenase and Lipo-oxygenase enzyme play important roles in the process of inflammation.

Notably, there were some limitations to the current study. Other inflammatory mediators should be identified to confirm the effect of the *Cordia dichotoma* extract, and different models should be developed to further evaluate the extract's anti-inflammatory effects.

The anti-inflammatory efficacy of the ethanolic extract of *Cordia dichotoma* is investigated in this work using an experimental approach. A useful experimental animal paradigm for testing the anti-inflammatory impact of natural products is carrageenan-induced rat paw edema. The first phase (30 minutes after carrageenan challenge) is mediated by serotonin and histamine release from mast cells, the second phase (60 minutes) is mediated by kinins, and the third phase (120 minutes) is mediated by prostaglandins, cyclooxygenase products, and lipoxygenase products.

In the acute toxicity assay, no deaths were observed during the 72h period at the doses tested. At these doses, the animals showed no stereotypical symptoms associated with toxicity. New powerful anti-inflammatory and antipyretic drugs with a wide margin of safety are desperately needed. Medicinal plants are thought to be promising sources of therapeutic compounds and can be useful candidates.

Several studies revealed that *Cordia dichotoma* leaves had a wide range of biological activities. To the best of our knowledge, no previous research has determined *Cordia dichotoma* anti-nociceptive or anti-inflammatory effects. We previously demonstrated that *Cordia dichotoma* had an anti-nociceptive effect in a variety of models.

Taken together, the current study's findings demonstrated that *Cordia dichotoma* leaf extract has potent anti-inflammatory and analgesic properties. The ethanolic, petroleum ether, and aqueous extract significantly reduces the paw volume as compared to the control group.

As the results show that Carrageenan causes inflammation and increases the paw volume. The other group receives Carrageenan with treatment. The ethanolic, petroleum ether, and aqueous extract significantly reduce the paw volume as compared to the control group. The ethanolic extract of the *Cordia dichotoma* significantly reduces the paw volume and shows the highest anti-inflammatory activity as compared to the petroleum ether and aqueous extract of the *Cordia dichotoma*. Carrageenan-induced edema has been commonly used as an experimental animal model for acute inflammation study and is believed to be biphasic. The early phase (1-2 h) of the carrageenan model is mainly mediated by histamine, serotonin, and increased synthesis of prostaglandins in the damaged tissue surroundings. The later phase is sustained by prostaglandin release and mediated by bradykinin, leukotrienes, polymorphonuclear cells, and prostaglandins produced by tissue macrophages. Results of the study indicate that the extract of *Cordia dichotoma* 500 mg/kg acts significantly by inhibiting carrageenan-induced paw volume. Diclofenac sodium is used as a standard that inhibits the cyclo-oxygenase enzyme and significantly produces anti-inflammatory activity against the Carrageenan-induced paw volume.

The inflammatory response is a physiological characteristic of vascularized tissues. Increased vascular permeability occurs as a result of contraction and separation of endothelial cells at their boundaries to expose the basement membrane, which is freely permeable to plasma proteins and fluid, which leads to exudation of fluid rich in plasma proteins including immunoglobulins (antibodies), coagulation factors and cells into the injured tissues. Exudation, which is a consequence of increased vascular permeability, is considered a major feature of acute inflammation. Chemical-induced vascular permeability (acetic acid) causes an immediate sustained reaction that is prolonged over 24 h and its inhibition suggests that the *Cordia dichotoma* extract may effectively suppress the exudative phase of acute inflammation in a concentration-dependent manner showing maximum inhibition (52.74%) at 500 mg/kg.

The anti-inflammatory activity of *Cordia dichotoma* extract found may be due to the presence of therapeutically active flavonoids, alkaloids, and glycosides. Flavonoids are known to prevent the synthesis of prostaglandins and have therapeutic applications on inflammation.

The hot plate model results show that the aqueous, ethanolic, and petroleum ether extract of *Cordia dichotoma* possess a significant analgesic activity as compared to the normal control group. As the results indicate that the aqueous and petroleum ether extract of *Cordia dichotoma* possesses a better analgesic activity than the ethanolic extract. Diclofenac is used as a standard and it significantly reduces the pain as compared to the control group.

The data obtained from the present study indicated that several factors may contribute to the anti-inflammatory action of *Cordia dichotoma*. Firstly, potent inhibition of rat paw edema shows inhibition of prostaglandins synthesis is a major mechanism by which the plant extract exerts anti-inflammatory activity. Secondly, *Cordia dichotoma* reduced the increased vascular permeability in mice, indicating the suppressive effect of *Cordia dichotoma* on the vascular response in the process of acute inflammation.

Conclusion –

The present study indicated that ethanol, petroleum, and water extract of *Cordia dichotoma* leaves is safe in rats. In addition, it has both analgesic and anti-inflammatory activities in rodent models. The presence of alkaloids, flavonoids, carbohydrates, and phenolic compounds was also confirmed in the extract.

The anti-inflammatory activities of *Cordia dichotoma* were similar to those of non-steroidal anti-inflammatory medications like diclofenac sodium. It's also possible that *Cordia dichotoma* mode of action is linked to the inhibition of histamine, serotonin, and prostaglandin formation. However, more research is needed to identify and describe the anti-inflammatory chemical ingredients found in the plant extracts.

Based on the results obtained by the in-vivo study we concluded that the aqueous, ethanolic, and petroleum ether extract of *Cordia dichotoma* possess a significant anti-inflammatory activity as compared to the carrageenan-induced paw volume. The anti-inflammatory activity is mainly due to the chemical constituent present in the *Cordia dichotoma*. The ethanolic extract of the *Cordia dichotoma* shows the highest anti-inflammatory activity as compared to the other extract. The results of the hot plate model show that the extract of aqueous, ethanolic, and petroleum ether extract of *Cordia dichotoma* possess significant analgesic activity. However further studies is also required to identify the chemical constituents which are responsible for the anti-inflammatory and analgesic activity.

In conclusion, this study scientifically demonstrates, for the first time, promising anti-inflammatory activity in *Cordia dichotoma*. This is an important finding, both globally and locally, because inflammation is a common medical condition for which available drug therapies are poor. About 3.5 to 4 billion people in the world rely on plants as sources of drugs, mostly the tribal population is dependent on traditional medicine for their primary health care needs. *Cordia dichotoma* is noncommercial and abundantly available throughout the year.

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