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EVALUATION OF ANTI INFLAMMATORY AND ANALGESIC ACTIVITIES OF *CORDIA MONOICA* ROXB ROOTS

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ABSTRACT

Cordia monoica Roxb belongs to family Boraginaceae. It is fairly common in south India. It is a small tree with white flowers and yellow fruits. In the present study an attempt has been made to evaluate the anti inflammatory and analgesic activity of the chloroform and ethyl acetate extracts of the roots of the *Cordia monoica* Roxb. Acute toxicity studies were performed as per OECD-423 guidelines. Toxicity signs and symptoms were not observed. Anti inflammatory activity was evaluated by carrageenan induced rat paw edema model at the doses of 100 mg/kg and 200 mg/kg. Analgesic activity was carried out by tail flick method at the dose levels of 100 mg/kg and 200 mg/kg. Anti inflammatory and analgesic activities was observed in the above models as compared to control and standard. This study suggested that, *Cordia monoica* possess anti- inflammatory properties and analgesic activities.

Keywords: *Cordia monoica,* Anti inflammatory, Analgesic, Carrageen, edema

INTRODUCTION

Inflammation is an immune response against pathogens, tissue injury and surgical trauma. This response gives rise to the initial cardinal signs of inflammation, which include redness, heat, swelling, pain and loss of function [(1)]. Inflammation is linked to other diseases such as arteriosclerosis, obesity, cancer, chronic obstructive lung disease and asthma. Most common drugs for the treatment of inflammations are non steroidal anti inflammatory drugs. These drugs inhibit the cyclooxygenase enzymes (COX-1 and COX-2) and consequently reduce the prostaglandin levels [(2)]. However, these compounds provoke undesirable side effects such as peptic ulcer formation, bleeding and perforation of the gastric mucosa (3). Glucocorticoids, which are alternative drugs for the treatment of chronic inflammation, can induce systemic adverse effects in chronic patients, such as adrenal insufficiency [(4)]. Therefore, naturally originated agents with very little side-effects are required to substitute chemical therapeutics. Several medicinal plants have shown promising results for alleviating pain. *Cordia monoica* Roxb belongs to family Boraginaceae. It is available in Deccan & Carnatic hilly areas. It is a small tree grows upto 6m.

Leaves are alternative, size 5.9X2.5-5 cm; base is rounded, crenate margin, acute apex, and rough with white discs above, thinly pubescent below. Flowers are fragrant, yellow in colour. Drupes are ovoid, bright orange red colour. Flowering and fruiting process occur during the months of October to December [(5-8)]. The present study was undertaken to evaluate *Cordia monoica* Roxb roots for the anti inflammatory and analgesic activities.

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MATERIALS AND METHODS

Plant Material

The roots of *Cordia monoica* Roxb were collected from Talakona forest in Chittoor District of Andhra Pradesh in the month of June, 2013. Authenticated by Dr. K. Madhava chetty, Assistant professor, S.V.University, Tirupathi. The voucher specimen is preserved in Department of Pharmacognosy, A.S.N Pharmacy College for further reference.

Preparation of Extract

The roots of *Cordia monoica* were dried and powdered. The powder was extracted by using Soxhlet apparatus with chloroform and ethyl acetate. The extract was further concentrated under reduced pressure.

Animals

Healthy adult Wister rats of either sex weighing 180-200gm were used for the study of anti- inflammatory activity. Mice of either sex were used for the study of analgesic activity. They were maintained under standard environmental conditions and were fed with standard pellet diet with water ad libitum. The experimental protocol was approved by the Institutional Animal Ethical Committee of National Botanical Research Institute, Lucknow [(IAEC/I-002) of CPCSEA Reg. no.222/2001/CPCSEA].

Acute Toxicity Studies:

Acute oral toxicity studies were performed as per OECD-423 guidelines. Healthy Wister mice were used for the study. The animals were divided into six groups containing six animals in each group. The extract was administered orally at the doses from 200- 2000mg/kg. There were no signs of toxicity and mortality was observed up to 2000mg/kg.

Anti- inflammatory activity

Carrageenan induced rat paw edema

The anti inflammatory activity was evaluated in healthy adult Wistar albino rats (180-200gms) in groups of six animals of each dose. The test samples (chloroform & ethyl acetate extracts of *Cordia monoica* 100 and 200 mg/kg), Indomethacin- 10 mg/kg, 0.5% of w/v sodium CMC-0.2 ml/100gm were used. The test samples are given orally. After 30min of this treatment, 0.1ml of 1% carrageenan in saline was injected into the sub plantar region of the left hind paw of each rat for induce edema to all groups [9-11]. The paw edema was measured plethysmographically 1hr and 4hrs after carrageenan administration and compared with the standard treated group. The anti inflammatory effect was expressed as percentage inhibition of edema.

Analgesic activity:

Tail flick method

The analgesic activity was tested using analgesiometer [11]. Mice were randomly distributed in control and test groups of four animals each. The chloroform and ethyl acetate extracts (100 and 200 mg/kg) and standard drug Pentazocin 30mg/kg were administered to each group orally. The basal reaction time was noted at 15 min, 30 min, 45 min and 60 min. After administration, the tip of the mice was placed in the radiant heat of analgesiometer at 55^0 C±0.5^0 C. The actual tail flick response of mice was calculated and compared with control group.

Table 1: Anti inflammatory activity of Cordia *monoica* Roxb on carrageenan induced paw edema in albino rats

Group N -6	Treatment	Dose	Volume of mercury displayed in ml					% inhibition of edema at 4 Hr
			0	1 Hr	2 Hr	3 Hr	4 Hr	
I	0.5 % w/v sodium CMC (Control)	0.2ml/100gm	5.8±0.212	6.9±0.31	7.4±0.212	8.9±0.09	8.6±0.31	-------
II	Indomethacin	10mg/kg	4.7±0.196	5.9±0.136	6.1±0.127	6±0.26	4.9±0.238**	45.47
III	Chloroform extract	100mg/kg	4.6±0.128	5.8±0.132	6.4±0.137	7±0.215	6.5± 0.098**	24.27
IV	Chloroform extract	200mg/kg	4.5±0.348	5.8±0.125	6.5±0.26	6.9±0.45	6.1±0.127***	31.21
V	Ethyl acetate extract	100mg/kg	4.5±0.354	5.9±0.126	6.8±0.27	6.4±0.40	6.1±0.216***	30.16
VI	Ethyl acetate extract	200mg/kg	4.7±0.351	5.8±0123	6±0.23	6.2±0.41	5.8±0.128***	34.67

Result expressed as mean ± SEM from observations

**p<0.01 ***p<0.001

Table 2: Analgesic activity of Cordia *monoica* Roxb

Group	Treatment	Dose	Basal Reaction time (Sec.)	Reaction time (Sec.)			
				15 min	30 min	45 min	60 min
I	0.5 % w/v sodium CMC (Control)	2 mL/Kg	2.17 ±0.281	2.5±0.204	2.67±0.192	2.67±0.192	2.67±0.192
II	Indomethacin	30 mg/kg	2.33±0.192	3.0±0.408	4.67±0.385**	6.33±0.304**	8.67±0.451**
III	Chloroform extract	100mg/kg	2.17±0.281	3.17±0.28	3.5±0.204	4.5±0.391*	5.5±0.312**
IV	Chloroform extract	200mg/kg	2.67±0.192	3.33±0.192	4.83±0.436*	5.83±0.549**	6.83±0.683**
V	Ethyl acetate extract	100mg/kg	1.83±0.28	2.33±0.192	4.0±0.33*	5.0±0.236**	6.67±0.304**
VI	Ethyl acetate extract	200mg/kg	2.0±0.236	3.17±0.436	4.5±0.391	5.83±0.436**	7.33±0.304**

RESULTS AND DISCUSSION

Carrageenan-induced edema has been commonly used as an experimental animal model for acute inflammation 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 tissues surroundings. The late phase is sustained by prostaglandin release and mediated by bradykinin, leukotrienes, polymorphonuclear cells and prostaglandins produced by tissue macrophages [(12)]. The results obtained from the present study provided evidence that chloroform and ethyl acetate extracts of the roots of *Cordia monoica* possessed an anti-inflammatory activity in acute inflammatory model.

The chloroform and ethyl acetate extracts of the roots of *Cordia monoica* showed significant anti inflammatory and analgesic activity at both the dose levels (100mg/kg & 200 mg/kg). The chloroform extract showed 24.27% and 31.21% of inhibition at the dose of 100 mg/kg and 200 mg/kg respectively. The ethyl acetate extract showed 30.16% and 34.67% of inhibition at dose of 100 mg/kg and 200 mg/kg respectively. The percentage inhibition of paw edema by the ethyl acetate extract was found to be higher than the chloroform extract. The degree of analgesia observed with ethyl acetate extract revealed a higher degree of analgesic activity than the chloroform extract.

CONCLUSION

The present study revealed that the *Cordia monoica* Roxb possess significant anti inflammatory and analgesic activities which are supporting the folklore claims. Hence the attempts are going on for the isolation of the compounds responsible for the activities.

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