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ANTI-INFLAMMATORY ACTIVITY OF *COMMIPHORA CAUDATA* (WIGHT AND ARN)

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ABSTRACT

Ethyl acetate and methanolic extracts of *Commiphara caudata* syn: *Protium caudatum* were tested for anti-inflammatory activity in rats by carrageenan induced hind paw oedema method. Both; ethyl acetate extract and methanolic extract of *Commiphara caudata* (200 mg/kg of body weight) exhibited significant anti-inflammatory activities, when compared with control. Indomethacin was used as a reference anti–inflammatory drug.

Key words : *Commiphora caudata,* Anti-inflammatory activity, Carrageenan, Paw edema.

INTRODUCTION.

Commiphora caudata(wight and Arn) [1, 2]

The genus *Commiphora* contains about 165 species of spiny balsamiferous trees and shrubs distributed in Africa and tropical Asia. Many of the species yield resins of commercial importance. About 5 species occur in India namely *commiphora berryi* (Arn), *commiphora caudata* (wight and Arn), *commiphora mukul* (Hook. exstocks) and *commiphora roxburghii* (Arn), of which *commiphora mukul* and *commiphora roxburghii* yield Indian Bdellium, a gum resin, obtained by incision of the bark, which is largely used as incense, as a fixative in perfumery and as a substitute for African Bdellium. It is also a common adulterant of Myrrh. The plant *Commiphora caudata* (family : Burseraceae) is a shrub ant. It is claimed to possess astringent, sweet, cooling, aphrodisiac, diuretic and antidiabetic activities. It is used for fever, strangury, vitiated conditions of vata and pitta in siddha systems of medicine. The leaves are useful in rheumatalgia. It was reported to contain tannins, carbohydrates and oleo-gum resin.

The prolonged use of synthetic anti-inflammatory drugs such as non steroidal anti-

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inflammatory drugs has the risk of gastrointestinal ulceration, bleeding and even perforation[3]. Hence, search for natural anti-inflammatory compounds that possess established therapeutic efficacy and at the same time, devoid of these effect is justified. Therefore, an effort has been made to experimentally determine the anti-inflammatory activity of ethyl acetate extract and methanolic extract of *Commiphora caudata.*

EXPERIMENTAL

Materials

The entire parts of plant (including roots) were collected from Vasudevanallur. Tirunelveli, India during the month of February 2006 and identified by a botanist of Government Siddha Medical College, Palayamkottai, Tirunelveli. The plant was dried in shade for 6 days and coarsely powdered. Solvents ethyl acetate and methanol (AR grade) were obtained from SD Fine Chemicals, Mumbai, India.

The displacement volume was measured by digital plethysmometer (Cat 7140 UGO BASILE, COMERIO-ITALY,).

Method

Extraction

The coarsely powdered material was extracted separately with ethyl acetate and methanol by Soxhlation for six hours and concentrated in a rotary evaporator. A green colored residue and dark green colored residue were obtained in ethyl acetate extraction and methanol extraction, respectively. The yields of the extracts were 8.10% w/w and 10.80% w/w, respectively.

Antiinflammatory activity

The method of Winter et al.[4] was employed for the assessment of anti-inflammatory activity of herbal extracts. Adult healthy albino rats of either sex, each weighing 150-200 g were used for the study. All the animals were maintained under standard conditions of temperature and humidity with feed and water ad libitum. Rats were fasted over night before experiment was carried out and divided into four groups of six animals each.

Group 1(Control)

Received carrageenan 0.1 mL (1% w/v in normal saline solution)[5] by injection into

subplantar region of the left hind paw of the rats by hypodermic needle (No : 26) and right hind paw served as the control. Normal saline at a dose of 0.2-0.3 mL was given orally half an hour before injecting carrageenan.

Group 2 and 3 (Herbal extracts treated)

Received ethyl acetate extract and methanolic extract respectively at the dose level of 200mg/kg body weight of experimental animals by oral intubations, half an hour before injecting carrageenan into subplantar region of the left hind paw of the rats.

Group 4 (standard drug treated)

Received standard drug indomethacin 20 mg/kg in water by oral intubation, half an hour before injecting carrageenan into subplantar region..

Assessment of anti-inflammatory activity

Measurement of displacement volume

Displacement volume was measured after the injection of carrageenan at 0, 60, 120, 180 and at 240 min. Percentage protection or inhibition of edema was calculated using the following formula.

$$\% \text{ Inhibition of paw oedema} = 100 \times \left(\frac{1 - \text{Increase in paw volume of treated group}}{\text{Increase in paw volume of control group}} \right)$$

RESULTS AND DISCUSSION

The results of anti-inflammatory activities of ethyl acetate and methanolic extracts of *Commiphora caudata* are given in Table 1. The Mean % increase in paw volumes of ethyl acetate and methanolic extracts at 0 , 60 , 120 , 180 and at 240 min. were 27.63 ± 2.4, 34.24 ± 2.1, 45.38 ± 4.6, 56.35* ± 5.2, 62.73* ± 6.5 and 24.32 ± 2.2, 30.12 ± 2.5, 40.21 ± 3.1, 42.31* ± 2.2 and 56.43* ± 2.1, respectively. The percentage inhibition in paw volumes of ethyl acetate and methanolic extracts were 49.98% and 55.00%, respectively. Based on the above results, both the extracts showed significant anti-inflammatory activities when compared with control. The mean % increase in paw volume at 180 min. and 240 min. of methanolic extract was 42.31 ± 2.2 and 54.43 ± 2.1 and the percentage inhibition in paw volume was 55% indicating that the methanolic extract has better anti-inflammatory activity than that of ethyl acetate extract.

Table 1. Anti inflammatory activity *commiphora caudata* against carrageenan induced paw oedema in albino rats

Treatment	% increase in paw volume. Mean ± S. E. (n = 6)					% inhibition in paw volume
	Post insult time of assay (min.)					
	0	60	120	180	240	
Control	39.83 ± 3.25	85.85 ± 4.24	97.81 ± 4.52	119.42 ± 7.12	125.42 ± 5.42	-
Ethyl acetate extract	27.63 ± 2.4	34.24 ± 2.1	45.38 ± 4.6	56.35 ± 5.2*	62.73 ± 6.5*	49.98
Methanol extract	24.32 ± 2.2	30.12 ± 2.5	40.21± 3.1	42.31± 2.2*	56.43± 2.1*	55.00
Indomethacin	20.35 ± 1.12	24.6 ± 2.36	30.4 ± 3.62	42.62 ± 2.1*	48.24 ± 4.92*	61.53

Mean ± S. E. M, n = 6 * $p < 0.001$ Vs Control by students 't' test.

Oedema which develops after carrageenan induced inflammation is a biphasic event. The initial phase is attributed to the release of histamine and serotonin. The oedema maintained between the first and second phase is due to kinin like substances[6]. The second phase is said to be promoted by prostaglandin like substances. Both the extracts significantly reduces the paw volume during the second phase of oedema. Hence, both the extracts may act like anti-inflammatory drugs like hydrocortisone phenylbutazone and indomethacin i.e. during the second phase of edema. Further studies are required to elucidate the exact mechanism by which *Commiphora caudata* exerts the anti-inflammatory activity.

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