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Evaluation of anti-inflammatory and analgesic activities of *Ficus glomerata* Linn. fruit extract

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ABSTRACT

The fruits of *Ficus glomerata* were extracted with methanol to determine their anti-inflammatory and analgesic activities. The analgesic activity was evaluated using writhing and hot-plate test in mice and anti-inflammatory activity was evaluated using carrageenan-induced paw oedema in rats. The extract at the doses of 500 mg/kg shows a significant analgesic and dose dependent anti-inflammatory activity.

KEYWORDS

Ficus glomerata;
Anti-inflammatory activity;
Analgesic activity;
Fruit extract.

INTRODUCTION

Ficus glomerata Roxb. (Moraceae) is commonly known as Gular. It is a moderate to large sized spreading tree which is widespread in moist land of the greater part of India.

The leaves are used in dysentery, bilious affection and as a mouth wash in spongy gum. The roots are used in cases of dysentery and diabetes while the bark is used for treatment of dysentery[1]. The unripe fruit is acrid, astringent to bowl, tonic, syptically thirst, useful in kapha, biliousness, leucorrhoea and blood diseases. The ripe fruit is traditionally useful is fatigue, urinary discharge, thirst, leprosy, menorrhhagia, nose bleeding and anthelminthic. In Ayurvedic system of medicine, Sushruta prescribed the juice of pounded fruit in intrinsic haemorrahage, decoction of the fruit mixed with powdered rice with sugar and honey for checking miscarriage. Fresh juice of the ripe fruit given as an adjunct or vehicle to a metallic medicine for diabetes and urinary complications[2,3,4]. The analgesic and anti-inflammatory activity of *F.glomerata* leaves and bark extracts has been reported[1,5] but in fruits it has not been yet documented. In this study we have attempted to investigate the analgesic and anti-inflammatory activities of *F.glomerata* fruit extract.

MATERIAL AND METHODS

Plant material

The fruits of *Ficus glomerata* Roxb. (Moraceae) (FG) were collected from surrounding local areas during December 2006. The plant was authenticated by professor B.D. Vashisht, Department of Botany, Kurukshetra University, Kurukshetra (Haryana, India). The fruits were cleaned and dried in the shade, then powdered to 40 mesh and stored in an airtight container at 25^0C.

Preparation of extracts

Dried fruits of the plant were coarsely powdered and 197.5 g of this powdered material was soaked in 400 ml methanol separately for 48 h and extract was filtered and distilled on a water bath. The last traces of the solvent were evaporated under reduced pressure in rotatory evaporator. The yield of the methanolic extract was 3.4 % w/w. For pharmacological experiments a weighed amount of the dried extract was suspended in a 2% (w/v) aqueous Tween 80 solution.

Test animals

Male albino Wistar rats weighing 180-200 g and Swiss albino mice weighing 25-30 g were obtained from

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Haryana Agriculture University, Hisar (Haryana, India). They were housed in Animal house, Institute of pharmaceutical science, Kurukshetra University, Kurukshetra (Haryana) in polycarbonate cages and were kept in a room maintained under controlled room temperature 22 ± 2^0C, relative humidity 60 -70% and provided with food and water ad libitum. The animals were deprived of food for 24 h before experimentation but allowed free access to water throughout. All studies were carried out by using six group of animals for anti-inflammatory analgesic activity in each group.

Anti-inflammatory activity

Carrageenan-induced rat paw oedema

The anti-inflammatory activity of methanolic extract of *Ficus glomerata* on carrageenan-induced paw oedema was determined according to Winter et al[6]. The animals were divided into six groups consisting of six rats each for each extract. The control group received 2.5 ml/kg of saline, the standard group received diclofenac sodium (50 mg/kg), i.p. and the test received the fruit extract at the dose of 100, 300 and 500 mg/kg administered orally. Thirty minutes after administration of different substances, 0.1 ml of 1% w/v of carrageenan suspension was injected to all animals in the left hind paw (plantar region).

The paw volume, up to the tibiotarsal articulation, was measured using a plethysmometer (model 7140, Ugo Basile, Italy). The measures were determined at 0 h (before carrageenan injection) and 15, 30, 60, 90 and 120 minutes after drug treatment.

Analgesic activity

The analgesic activity was measured against chemical and thermal stimulus.

Acetic acid-induced abdominal writhing test

The test was performed as described by Collier et al[7]. Nociception was induced by an intraperitoneal (i.p.) injection of acetic acid 1.0%, 0.1 ml/10g body weight. Mice were treated with the extracts of *Ficus glomerata* (100, 300 and 500 mg/kg, orally (p.o.)) 30 min before acetic acid injection. A group of mice were treated with diflofenac sodium (10 ml/kg p.o.) used as reference drugs

Hot-plate test

The hot-plate was used to measure response latencies according to the method described by Eddy and Leimbach[8], with minor modifications. The paws of mice are very sensitive to heat at temperature, which are not damaging the skin. The response is in the from of jumping, withdrawal of the paws or the licking of the paws. The animals were placed on Eddy's hot plate kept at a temperature of 55 ± 0.5^0C. A cut off period of 15 sec, was observed to avoid damage of the paw. Reaction time and the type of response were noted using a stopwatch. Control mice were treated with vehicle (2% Tween 80, 1 ml/kg). Diclofenac was used as positive control (10 ml/kg) and extract of *Ficus glomerata* (100, 300 and 500 mg/kg, i.p.) were administered. The latency was recorded before and after 15, 30, 60 and 120 min following oral administration of 100, 300 and 500 mg/kg of each of the extract to different groups of six animals each. Average reaction times were then calculated and the percentage variation calculated using following ration.

Statistical analysis

All data were represented as mean ± S.E.M. and as percentage. Results were statistically evaluated using Dunnett's t test. $P<0.01$ was considered significant.

RESULTS AND DISCUSSION

Analgesic activity

Acetic acid-induced writhing

The effect of the methanolic of *Ficus glomerata* is shown in TABLE 1. The methanolic extract at 100, 300 and 500mg/kg p.o. caused an inhibition on the writhing response induced by acetic acid. The maximal inhibition of the nociceptive response was achieved at a dose of 500 mg/kg.

Hot plate test

The plant extract, when given in doses of 100, 300 and 500 mg/kg, orally elicited a significant analgesic activity in the hot plate as evidenced by increase in latency time in seconds (TABLE 2) as compared with vehicle control at the end of 15, 30, 60, 120 min. The increase in latency time was dose dependent.

Carrageenan-induced rat paw oedema

The effect of the methanolic of *Ficus glomerata* is shown in TABLE 3. The methanolic extract at 100, 300 and 500mg/kg p.o. caused an inhibition on the writhing caragrageenan-induced rat paw oedema. The maximal inhibition in oedema volume was achieved at a

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TABLE 1: Effect of methanolic extract of fruits of *Ficus glomerata* in the writhing test

S. no.	Drug treatment	Dose per/kg	No.of animals	Mean ± SEM	
				Change in no.of wriths	't' value
1	Control	1.0 % acetic acid	6	13±2.2	-
2.	Standard	10 mg/kg	6	7 ± 0.83	5.217
3.	*Ficus glomerata*	100 mg/kg	6	6 ± 0.48	6.086
4.	*Ficus glomerata*	300 mg/kg	6	5± 0.33	6.956
5.	*Ficus glomerata*	500 mg/kg	6	4 ± 0.75	7.826

F = 19.4; df = 4, 25; P < 0.01; N = 6, values are mean ± SEM. The data were analyzed by one way ANOVA followed by Dunnett's t test. P < 0.001. P < 0.01 compared to control group

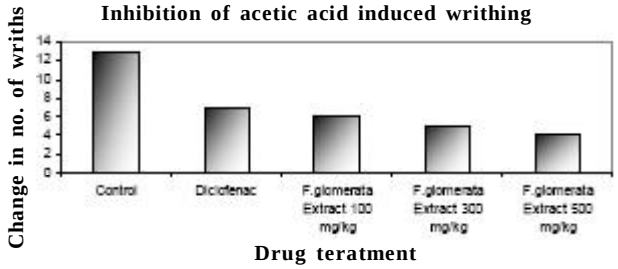
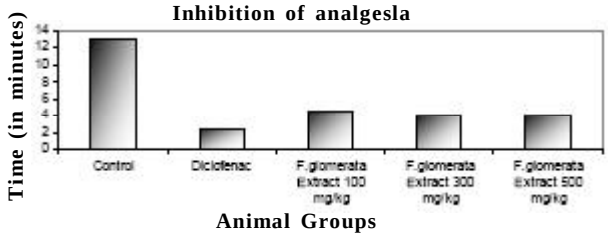


TABLE 2: Effect of methanolic extract of fruits of *Ficus glomerata* in the hot plate test

S. no.	Drug treatment	Dose per/kg	No. of animals	Mean ± SEM		
				Reduced analgesia (min)	Percentage inhibition	't' value
1	Control	Saline	6	13±1.12	-	-
2.	Standard	Diclofenac	6	2.5 ± 0.28	80	14.00
3.	*Ficus glomerata*	100 mg/kg	6	4.5 ± 0.28	65.3	11.33
4.	*Ficus glomerata*	300 mg/kg	6	4.0 ± 0.41	69.2	12.00
5.	*Ficus glomerata*	500 mg/kg	6	4.0 ± 0.28	69.2	13.00



dose of 500 mg/kg.

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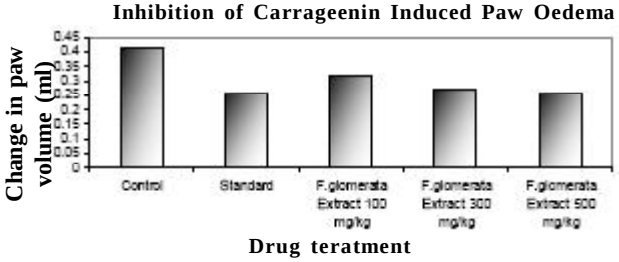
TABLE 3: Effects of methanolic extract administered intraperitoneal on the latency of mice exposed to the hot plate

S. no.	Drug treatment	Dose per/kg.	No. of animals	Mean ± SEM		
				Change in paw volume (ml)	Percentage inhibiton	't' value
1.	Control	-	6	0.413±0.014	-	-
2.	Standard	7mg/kg	6	0.255±0.030	38.3	24.06
3.	*Ficus glomerata* 100 mg/kg	100 mg/kg	6	0.320±0.019	22.6	14.28
4.	*Ficus glomerata* 300 mg/kg	300 mg/kg	6	0.270±0.010	34.7	21.80
5.	*Ficus glomerata* 500 mg/kg	500 mg/kg	6	0.257±0.011	37.8	23.68



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