

A STUDY OF ANTI-INFLAMMATORY ACTIVITY OF METHANOLIC FRACTION OF AERIAL PARTS OF *CORCHORUS AESTUANS* LINN.

Patel Rashmika P.^{*1}

Jodhpur National University, Rajasthan, India

Article Received on:27/03/2011 Revised on:29/04/2011 Approved for publication:12/05/2011

*Lecturer, Department of Pharmacognosy, B. Pharmacy College, Rampura, Kakanpura, Panchmahal, Gujarat, India.,
Email: rashmikapatel@gmail.com

ABSTRACT

In the present study methanol extract of aerial parts of the plant *Corchorus aestuans* Linn. was taken and its anti-inflammatory potential was evaluated using carrageenan induced rat paw edema. The increase in paw thickness was measured using digital vernier caliper after 1, 2, 3 and 4h of injection. Methanol fraction of aerial parts of the plant at dose of 200 mg/kg significantly inhibited acute phase of inflammation. The study reveals that the methanol fraction of aerial parts of *Corchorus aestuans* Linn. possesses significant anti-inflammatory activity.

KEY WORDS: Anti-inflammatory, carrageenan, rat paw edema

INTRODUCTION

Corchorus aestuans Linn. (Syn. *Corchorus acutangulus* Lam.) , family-Tiliaceae, is an annual herb occurring throughout the hotter parts of the Subcontinent, Indochina, Australia, Tropical Africa, West Indies, and Central America.^{1,2} It is popularly known as Jute. A coarse fibre is occasionally extracted from this plant in the hotter parts of India which is of no commercial value. The roots and leaves are said to cure gonorrhoea and used in making an injection for urethral discharge. The seeds are stomachic and used in pneumonia.^{3,4} The plant is said to possess anticancer, antipyretic, anticonvulsant, stomachic and digitalis glycosides like action.⁵ Yet, anti-inflammatory potential of methanol fraction of aerial parts was not proved by the experimental model, the present study deals with the evaluation of anti-inflammatory activity by *in-vivo* model.

MATERIALS AND METHODS

Collection and identification of the plant material

The aerial parts of the plant *Corchorus aestuans* Linn. were collected from the local area of Kheda district, Gujarat, India, in the month of August 2009 and its authentication was confirmed by Dr. M. S. Jangid, Botany Department, Sir P. T. Science College, Modasa, Gujarat, India. Herbarium of the plant has been deposited at Department of Pharmacognosy, B. Pharmacy College, Rampura, Kakanpura, Dist. Panchmahal, Gujarat, India for future reference.

Preparation of the extract

The aerial parts of *Corchorus aestuans* Linn. were collected, washed and dried under shade and then

coarsely powdered with a mechanical grinder. The powder was passed through sieve No. 40 and stored in an airtight container for the extraction. 100gm of the powdered drug was extracted with petroleum ether for 24 hours by Soxhlet apparatus. The marc left after petroleum ether extract was dried and then extracted with 95% methanol in Soxhlet apparatus for 72 hours. After completion of extraction, the extract was filtered through Whatmann No. 1 filter paper. The filtrate was concentrated to dryness in a vacuum and stored in a desiccator.

Animals used in the study

Wistar albino rats of either sex weighing between 180-200 gm were used for the study. They were obtained from the animal house, Cadila pharma Ltd., Dholka. They were kept in the departmental animal house at 25 ± 2°C and relative humidity 45-51.5% on a 12 hour light/dark cycle. They were fed with standard rodent pellet diet supplied by Hindustan Lever Ltd., Kolkata, India and water *ad libitum*. The animals were fasted overnight during the experiment but had free access to water during the study.

Animal model to evaluate anti-inflammatory activity Carrageenan induced rat paw edema

Anti-inflammatory activity of methanol extract of aerial parts of *Corchorus aestuans* Linn. was evaluated using carrageenan induced edema in rats described by Winter *et al.* Five groups of albino rats (n=6) were randomly distributed in control, standard and test groups. The

initial paw volume of each animal was measured by means of a mercury plethysmometer.^{6,7,8}

Grouping and treatment protocol

Group I: Control group

Animals received normal saline 0.9% (10ml/kg P.O.)

Group II: Standard group

Rats were treated with Indomethacine (10mg/kg I.P.)

Group III: Test group I

Rats were treated with methanol extract (50mg/kg P.O.)

Group IV: Test group II

Rats were treated with methanol extract (100mg/kg P.O.)

Group V: Test group III

Rats were treated with methanol extract (200mg/kg P.O.)

Thirty minutes after the treatment, 0.1ml of 1% carrageenan solution was injected in the plantar region of the right hind paw of rats. The paw volume was measured at 1, 2, 3, 4 hour after carrageenan injection using plethysmograph.^{9,10,11} The difference in edema volume was calculated in each control, test and standard group and compared with the control group for the determination of percentage of inhibition of paw edema. Percent inhibition of paw edema was calculated by following equation,

$$\text{Anti-inflammatory activity (\% inhibition)} = (1-D/C) \times 100,$$

Whereas,

D = represents the percentage difference in increased paw volume after the administration of test drugs to the rats.

C = represents the percentage difference of increased volume in the control groups.

STATISTICAL ANALYSIS

All the data were represented as mean ± S.E.M. and analyzed by ANNOVA, Dunnett's t-test for the possible significant interrelation between the various groups. A value of P<0.0001 was considered statistically significant.

RESULTS AND DISCUSSION

In carrageenan induced rat paw edema there was significant reduction in paw volume in Indomethacine standard group (p<0.0001) as compared to control group

at 4 hour readings. There was dose dependent decrease in paw volume in methanolic extract treated groups (Table 1 & Figure 1). The methanol extract (50, 100 and 200 mg/kg) significantly (p<0.0001) and dose-dependently inhibited carrageenan-induced rat paw edema (58.16, 69.39, and 78.57%, respectively) when compared with control group after 1 hour of carrageenan injection (Table 2, Figure 2).

CONCLUSION

Carrageenan induced inflammation is a useful model to detect oral action of anti-inflammatory agents. The present results indicate the efficacy of methanolic extract of aerial parts of *Corchorus aestuans* Linn. as an efficient therapeutic agent in acute anti-inflammatory conditions.

REFERENCES

1. Indian Journal of Traditional knowledge 2010; 9a (222): 194.
2. Ali SI, Nasik E, Feroz sons. Flora of Pakistan, Karachim Pakistan. 1974; 75: 20.
3. Dr. K. Madhava Cheffy, K. Sivaji, K. Tulasi Rao. Flowering Plants of Chattier District, Andhra Pradesh, India. P. 48.
4. Pancho JV, Obien SR. Manual of rice field weeds in the Philippines. Rice Research Institute, Philippines 1995; p.78-80.
5. C. P. Khare. Indian Medicinal Plants: An Illustrated Dictionary. p. 171-72.
6. Winter CA, Risley GA, Nuss GW. Carrageenan induced edema in hind paw of the rat as an assay for anti-inflammatory drugs. Proc. Soc. Exp. Bio. Med 1962; 111: 544-47.
7. Vogel G. In: Drug discovery and Evaluation. New York: Springer-Verlag; 2002. p. 725.
8. Vinagar R, Schreiber W, Hugo RJ. Biphasic development of carrageenan edema in rats. J. Pharmacol .Exp. Ther. 1969; 66: 96-103.
9. Singh H, Ghosh MN. Modified plethysmometer for measuring foot volume of unanesthetized rats. J. Pharm. Pharmacol. 1968; 20: 316-17.
10. Di Rosa M, Giroud JP, Willoughby DA. Studies on the mediators of the acute inflammatory response induced in rats in different sites by carrageenan and turpentine. J. Pathol. 1971; 104: 15-29.
11. Mohammed A, Kumar S. Synthesis of some hydrazone derivatives and their anti-inflammatory activity. Indian drugs 2005; 42-75.

Table 1: Effect of Methanol extract on carrageenan induced rat paw edema (Mean paw volume)

Drug	Mean paw volume (ml)			
	1 h	2 h	3 h	4 h
Control (10ml/kg)	0.75±0.09	0.83±0.18	0.92±0.21	0.98±0.95
Indomethacine (10mg/kg)	0.23±0.07	0.18±0.08	0.16±0.10	0.12±0.80
Methanol extract (50mg/kg)	0.57±0.05	0.51±0.10	0.46±0.12	0.41±0.50
Methanol extract (100mg/kg)	0.53±0.06	0.43±0.10	0.35±0.12	0.30±0.53
Methanol extract (200mg/kg)	0.47±0.03	0.35±0.09	0.24±0.07	0.21±0.46

(Values are expressed as Mean±SEM; (n=6); (P<0.0001, ANOVA, Dunnett's test) control vs. treated groups.)

Table 2: Effect of Methanol extract on carrageenan induced rat paw edema (Percentage of inhibition)

Drug	Percentage (%) inhibition			
	1 h	2 h	3 h	4 h
Control (10ml/kg)	–	–	–	–
Indomethacine (10mg/kg)	69.33 %	78.31 %	82.61 %	87.76 %
Methanol extract (50mg/kg)	24.00 %	38.55 %	50.00 %	58.16 %
Methanol extract (100mg/kg)	29.33 %	48.19 %	61.96 %	69.39 %
Methanol extract (200mg/kg)	37.33 %	57.83 %	73.91 %	78.57 %

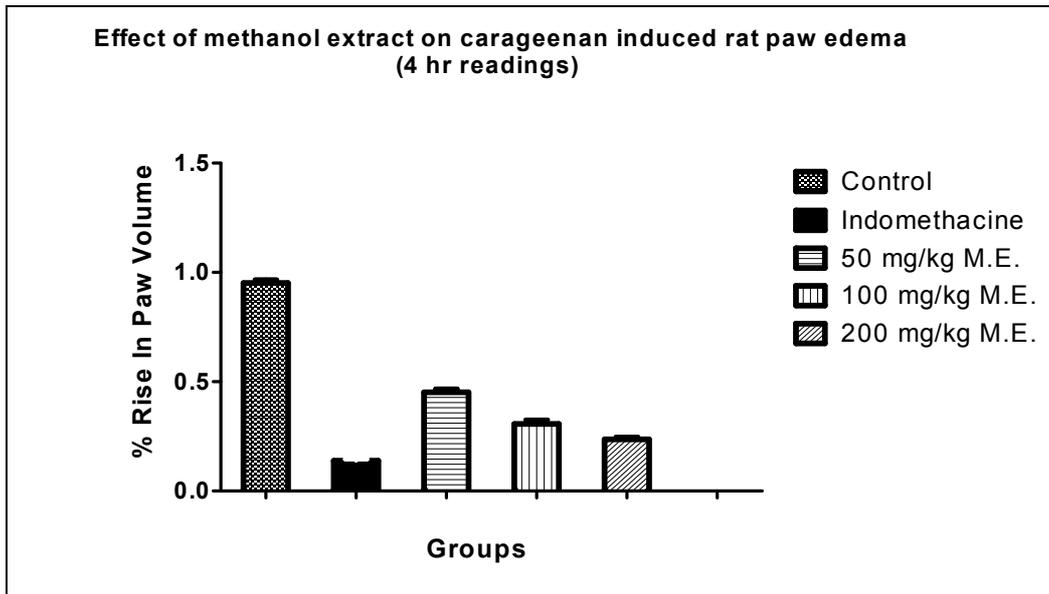


Figure 1: effect of methanol extract on carrageenan induced rat paw edema (mean paw volume)

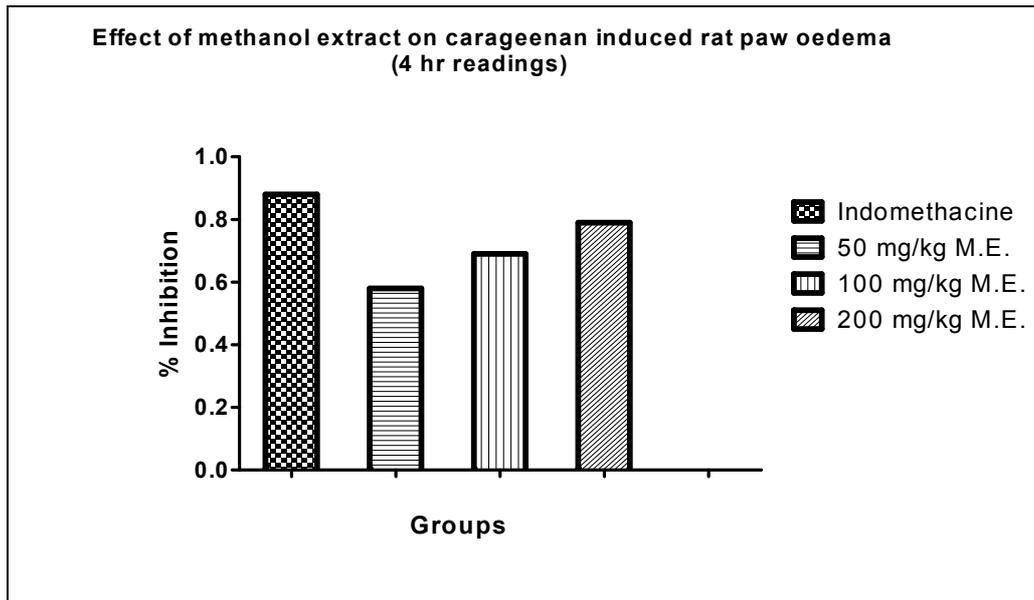


Figure 2: effect of methanol extract on carrageenan induced rat paw edema (percentage of inhibition)

Source of support: Nil, Conflict of interest: None Declared