Journal of Biomedical and Pharmaceutical Research 1 (1) 2012, 36-38

RESEARCH ARTICLE

Invention of Analgesic and Anti-Inflammatory Activity of Ethanolic Extract of *Mimosa Pudica Linn Leaves.*

[1]*Dr. Chandrashekar D. K., [2]Dr. Deepak M. Manthale
[1,2]Department of Microbiology, MRMC, Gulbarga

ABSTRACT

The ethanolic extract of the leaves of *Mimosa pudica* at the doses of 200 and 400mg/kg was tested for anti-inflammatory and analgesic activity. The extract produced dose dependent and significant inhibition of carrageenan induced paw oedema.The analgesic activity was found to be more significant on the acetic acid induced writhing mode[l] ($p<0.001$) than the tail flick model ($p<0.001$). So the extract inhibits predominantly the peripheral mechanism. The presence of flavonoids in the ethanolic extract may be contributory to its analgesic and anti-inflammatory activity.

KEYWORDS: Anti-inflammatory, analgesic activity, Aspirin, Ibuprofen, *Mimosa pudica*

1. INTRODUCTION:

Mimosa pudica (Mimosaceae) commonly called as the "shy plant" is phytochemically rich in steroids, alkaloids, tannins, triterpenes, flavonoids and c-glycosylflavones[1]. Traditionally the plant is used in the treatment of hydrocele, dysentery, as an anthelmentic, diuretic, emetic and for snake bites.[2] Reports on the hyperglycemic[3], anticonvulsant[4] and its substantial neutralization of hyalouronidase and protease in snakevenoms[5] is available. An extensive literature survey does not reveal analgesic and anti-inflammatory activity of leaves. So the present study was undertaken to investigate the anti-inflammatory and analgesic activity of ethanolic extract of leaves of *Mimosa pudica.*

2. MATERIAL AND METHODS:

2.1: PLANT COLLECTION AND AUTHENTICATION:

The fresh leaves of *Mimosa pudica* were collected from agriculture field of Gulbarga district; were authenticated in Botony Department of Gulbarga University, Gulbarga.

2.2: PREPARATION OF EXTRACTS:

After authentication fresh plant was collected in bulk, washed under running tap water to remove adhering dust, dried under shade and powdered with the help of a mechanical grinder. The coarse powder was then boiled in distilled water and filtered. The filtrate was evaporated to dryness (yield 19% w/w with respect to dried material).The ethanolic extract thus obtained was then screened for analgesic and anti-inflammatory activity.

2.3: EXPERIMENTAL ANIMALS:

Swiss albino mice (18-20 g) and Wistar rats (150–200 g) of either sex were procured from Sri Venkateshwara Enterprises, Bangalore and were acclimatized for 10 days under standard housing condition maintained at a room temperature of 24± 1ºC; related humidity 45-55% with 12:12 hrs light/dark cycle. The animals were habituated to laboratory condition for 48 hrs prior to the experimental protocol to minimize any nonspecific stress.

2.4: LD50 DETERMINATION:

Adult wistar albino rats of either sex weighing between 150-200 g and Swiss albino mice of either sex weighing between 20-30 g were used for the study. The animals were obtained from GKVK animal house Bangalore. The experimental protocols have been approved by the institutional Animal Ethics committee.

2.5: CARRAGEENAN INDUCED PAW EDEMA IN RATS[6]:

The anti-inflammatory activity was assessed by using carrageenan as the edematogenic agent. The selected albino rats were housed in groups of 6 each in acrylic cages under laboratory conditions. They were fasted overnight but had free access to water. The test sample was suspended in gum acacia and administered orally one hour before injection of carrageenan (0.1ml of 1% w/v solution) in normal saline into the subplantar region of left paw of each rat. The contralateral paw was injected with an equal volume of saline. All the groups received one of the following through intra peritoneal route: control (1% w/v gum acacia), Ibuprofen (10mg/kg) and the ethanolic extract at doses of 100 and 200mg/kg respectively. The paw swelling was measured at 0 and 3 hours after carrageenan injection by a plethysmograph as the volume

*Corresponding author: Dr. Chandrashekar D. K / Email: chandrashekarmrmc@gmail.com

of mercury displaced by the inflamed paw. The observations are tabulated in table-1.

2.6: ACETIC ACID INDUCED WRITHING METHOD IN MICE: [7]

Analgesic activity was assessed by acetic acid induced writhing method and Tail Flick method. In the writhing test adult swiss albino mice of either sex were used in four groups of 6 each. Aspirin (100mg/kg) was used as standard. 1% w/v gum acacia was used as control and the ethanolic extract was used at doses of 100 and 200mg/kg respectively. Mice were made to writhe by an intraperitoneal injection of 0.6%v/v aqueous acetic acid (0.1 ml/kg). Test substances were administered 30 minutes before injection of acetic acid. Animals were kept under observation immediately after acetic acid injection for 30 minute period. The number of writhes (full extension of hind paws) were recorded and tabulated in Table 2. The percentage inhibition of writhing was calculated.

2.7: ACETIC ACID INDUCED TAIL FLICK METHOD IN MICE: [8]

In the Tail Flick method the prescreened animals (reaction time: 3-4sec) were divided into groups as that of writhing test. Pentazocine (30mg/kg) was used as standard. The tail flick latency was assessed by the analgesiometer. The strength of the current passing through the naked nichrome wire was kept constant at 6 ampere. The distance between the heat source and the tail skin was 1.5 cm. The site of application of the radiant heat in the tail was maintained at 2.5 cm measured from the root of the tail. The cut-off reaction time was fixed at 10 sec to avoid damage. The observations were recorded and tabulated in Table 3.

Groups	Treatment	Dose (mg/kg)	Increase in paw volume (Mean ± SEM) in ml at 3 hr.	% inhibition of paw edema at 3 hr
1	control	10ml/kg	0.50±0.04	---
2	Ibuprofen	10	0.32±0.02*	43.16
3	Ethanolic Extract	100	38±0.05*	40.31
		200	25±0.06*	55.60

Table No. 01: Effect of ethanolic extract of *Mimosa pudica* on carrageenan induced Paw edema in rats.

n=6 in each group. *p<0.05 compared to control.

Groups	Treatment	Dose (mg/kg)	Increase in paw volume (mean ± SEM) in ml at 3 hr.	%inhibition of paw edema at 3 hr
1	control	10ml/kg	0.50±0.04	-
2	Ibuprofen	10	15.41±2.35*	77.81
3	Ethanolic Extract	100	33.21±2.15*	38.15
		200	24.20±1.25*	60.41

Table No. 02: Effect of ethanolic extract of *Mimosa pudica* on acetic acid induced writhing in mice.

n=6 in each group. *p<0.01 compared to control.

Groups	Treatment	Dose (mg/kg)	Reaction time in sec (mean ± SEM)			
			Basal reaction time	30 min	1 hr	2hr
1	Control	2 ml/kg	3.14±0.20	3.20±0.24	3.55±0.21	3.65±0.25
2	Pentazocine	30	2.40±0.38	6.12±0.23*	7.60±0.70*	8.10±0.56*
3	Aqueous extract	100	2.45±0.20	4.30±0.30	6.00±0.95	7.20±0.70
		200	2.20±0.25*	5.10±0.25*	5.24±0.70*	6.50±0.80*

Table No. 03: Effect of ethanolic extract of *Mimosa pudica* on tail flick response in rats.

n=6 in each group. *p<0.01 compared to control.

Statistical analysis of the differences observed between control and treated groups Were carried out using student's t-test. P value<0.05 was considered significant.

3. RESULTS AND DISCUSSION:

In the carrageenan induced inflammation model, the ethanolic extract in doses of 100 and 200 mg/kg per oral produced dose dependent inhibition of paw edema. The test and standard drugs produced significant inhibition of paw edema as compared to the control. The ethanolic extract suppressed the acetic acid induced writhing response significantly in a dose dependent manner. The results were found to be significant in comparison to the control. In the tail flick model, 30minutes after drug administration reaction time was increased significantly for the test and standard drugs when compared to the prodrug reaction time. The test drug produced a dose dependent increase in the reaction time.Carrageenan induce edema is a biphasic response. The first phase was mediated through the release of histamine, serotonin and kinins whereas the second phase was mediated through the release of prostaglandin and slow reacting substances which peak as 3hr.[9] The ethanolic extract of mimosa pudica produced dose dependent and significant inhibition of carrageenan induced paw edema. The ethanolic extract exhibited analgesic activity in a dose dependent manner against chemical and thermal noxious stimuli. The analgesic activity was found to be more significant on the acetic acid Induced writhing model ($p<0.01$) and thus it appears that the test drug inhibits predominantly the peripheral pain mechanism[10]. Flavonoids are known to target prostaglandins which are involved in the late phase of acute inflammation and pain preception[11]. Hence the presence of flavonoids in the ethanolic extract of mimosa pudica may be contributory to its analgesic and anti-inflammatory activity.

REFERENCES:

1. Wealth of India. (1962) Vol 5, Raw Materials, CSIR, New Delhi; 382.

2. Nandkarni AK, Chopra RN, Indian Materia Medica,(1993) 3rd edn. Popular prakashan Pvt.Ltd. Bombay, India; 222-223.

3. Amalraj, T. lgnacimuthu. S, (2002) Hyperglycemic effect of the leaves of Mimosa pudica Linn. *Fitotherapia;* 73,351-352.

4. Ngo Burn E, Dawack DL, Schmutz M, et al. (2004). Anticonvulsant activity of Mimosa pudica decoction. *Fitotherapia*,; 75,309-314.

5. Girish KS, Mohanakumari HP, Nagaraju S, et al. (2004) Hyalouronidase and protease
activities from Indian snake venoms: Neutralization of Mimosa pudica root extract, *Fitotherapia*; 75,378-380.

6. Winter CA, Risely EA, and Nuss GW, (1962). Carrageenan induced edema in hind paw of the rat as an assay for anti-inflammatory drugs. Proc.Soc. Exp. Biol; 111,544.

7. Turner RA: Screening methods in pharmacology. Academic press Inc. Ltd. London, 1965.

8. Sheth UK, Dadkar NK, Kamat UG,(1972) Drugs acting on CNS, selected topics in experimental pharmacology. Kothari Book Depot, Bombay.

9. Vinegar R, Schreiber W, and Hugo R (1969) Biphasic development of carrageenan oedema in rats. J. pharmacol.Exp. Ther; 166, 96-103

10. Chakraborty A, Devi RK,B. Rita S, et al. (2004) Preliminary studies on anti-inflammatory and analgesic activites of spilanthes acmella in experimental animal models. Ind. J.Pharmacol. 36,148-150.

11. Rajnarayana K, Reddy MS, and Chaluvadi MR (2001) Bioflavonoidas classification,
Pharmacological, biochemical effects and therapeutical potential. Ind.J.pharmacol. 33, 2-16.