CODEN (USA): IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

Available online at: http://www.iajps.com *Research Article*

STUDY OF THE CNS ACTIVITIES OF *MIMOSA PUDICA Linn.* IN ANIMAL MODEL

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Received: 20 March 2017 **Accepted:** 26 March 2017 **Published:** 28 March 2017

Abstract

The present study was undertaken to evaluate the effects of CNS of Mimosa Pudica Linn. ***Mimosa pudica*** *is a creeping annual or perennial herb of the pea family Fabaceae often grown for its curiosity value: the compound leaves fold inward and droop when touched or shaken, defending themselves from harm, and re-open a few minutes later. aqueous leaf extract of Mimosa Pudica suspended in water in presence of 3%v/v Tween-80 solution were administered orally. All the drugs were administered i.p for experimental purpose. Adult albino mice (25-30gms) of either sex were used for the study. The animals were divided into three groups containing of 6 animals of each group-1 received normal saline, group-2 received standard drug and group-3 received test drug aqueous extract of Plant extract (MP) maintained in a well-ventilated room with 12:12 hour light/dark cycle in polypropylene cages. Locomotor activity results showed that plant extract treated mice exhibited significant result when compared with that of standard in improvement of locomotor performance. Elevated Plus Maze is used to evaluate psychomotor performance and emotional aspects of rodents. Results showed that plant extract treated mice exhibited significant increase in the number of open arm entries. The number of arm entries, but decreases in time spent in closed arm reflects anxiolytic property. Rota rod test, the difference in the fall of time from the rotating rod between the vehicle and extract treated groups were taken as an index of muscle relaxation. Test drug showed significant decrease in the locomotory score and fall of time of the mice from the rotating rod. From the above observations we can conclude that aqoues extract of Mimosa pudica possesses significant CNS activities at both the dose level which is comparable with the standard.*

Keywords: *Mimosa Pudica, Actophotometer, Rotarod*

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Please cite this article in press as R. Naga Kishore et al, ***Study of the CNS activities of mimosa pudica linn. in animal model*** *, Indo Am. J. P. Sci, 2017; 4(03).*

INTRODUCTION:

The long historical use of medicinal plants in many traditional medical practices, including experience passed from generation to generation has demonstrated the safety and efficacy of traditional medicine. However, scientific evaluation is needed to provide evidences of their safety and efficacy. Narcotic analgesics are associated with addictive properties and numerous side effects including respiratory depression, drowsiness, decreased gastro intestinal motility, nausea and alteration in autonomic nervous system activities[1]. The search for pharmacological agents to overcome these shortcomings has become a major goal in pain research. For centuries, medicinal plants are the basis for the treatment of various diseases. Nearly 80% of people living in developing countries still depend on plant-based traditional medicine for their primary health care and almost three-fourths of the herbal drugs used worldwide are derived from medicinal plants. Anxiety is the displeasing feeling of fear and concern[2]. When anxiety becomes excessive, it may be considered as an anxiety disorder. Anxiolytics are also known as minor tranquilizers. Herbal drugs are widely used for the treatment of various diseases. Although herbal drugs often contain highly active pharmacological compounds but much importance is not given to their safety evaluation, may be due to a popular notion "anything herbal is safe." Lately, with recent increasing interest in traditional or herbal drugs for the prevention and treatment of various disorders, there is also increasing concern about the safety of traditional, herbal product based medicines[3-5].

Mimosa pudica (from Latin: *pudica* "shy, bashful or shrinking"; also called **sensitive plant**, **sleepy plant**, **Dormilones**, **touch-me-not**, or **shy plant**) is a creeping annual or perennial herb of the pea family Fabaceae often grown for its curiosity value: the compound leaves fold inward and droop when touched or shaken, defending themselves from harm, and re-open a few minutes later. The species is native to South America and Central America, but is now a pantropical weed. It can also be found in Asia in countries such as Bangladesh, Thailand, India, Indonesia, Malaysia, Philippines, and Japan. It grows mostly in undisturbed shady areas, under trees or shrubs. *Mimosa pudica* is well known for its rapid plant movement. Like a number of other plant species, it undergoes changes in leaf orientation termed "sleep" or nyctinastic movement[6]. The foliage closes during darkness and reopens in light. This was first studied by the French scientist Jean-Jacques d'Ortous de Mairan.

The leaflets also close when stimulated in other ways, such as touching, warming, blowing, or shaking. These types of movements have been termed seismonastic movements. The stimulus is transmitted as an action potential from a stimulated leaflet, to the leaflet's swollen base (pulvinus), and from there to the pulvini of the other leaflets, which run along the length of the leaf's rachis. The present study is to evaluate the effects of CNS of Aqueous extracts of *Mimosa Pudica Linn.*

MATERIALS AND METHODS:

Plant Material:

Mimosa Pudica Plant leaves were collected from local area and authenticated from the department of Pharmacognosy, GCOP, R.R.Dist. The Leaves of the plants were dried under shade at room temperature, later chopped and grounded into coarse powder. The powdered materials were used for extract preparations. The aqueous leaf extract of *Mimosa Pudica* suspended in water in presence of 3%v/v Tween-80 solution were administered orally. All the drugs were administered i.p for experimental purpose[7-9]. Each time preparations of the extracts were prepared when required. The drugs were administered at a constant volume of 10ml/kg for each animal. All chemicals and reagents used were analytical grade and procured from approved chemical suppliers.

Animals:

Adult albino mice (25-30gms) of either sex were used for the study. The animals were divided into three groups containing of 6 animals of each group-1 received normal saline, group-2 received standard drug and group-3 received test drug aqueous extract of Plant extrac[10-13] (MP) maintained in a well-ventilated room with 12:12 hour light/dark cycle in polypropylene cages. Standard pellet feed and drinking water was provided ad libitum. Animals were acclimatized to laboratory conditions one week prior to initiation of experiments and the protocol was approved by the institutional animal ethical committee.

Experimental

Locomotor activity

The locomotor activity can be easily studied with the help of actophotometer, the rats were grouped and treated with drugs. Turn on the equipment (check & make sure that all the photocells are working for accurate recording) and placed individually each rat in the activity cage for 10 minutes[14]. Note the basal activity score of all the animals. Inject the drug diazepam (Dose: 5 mg/kg, ip; make a stock solution containing 0.5 mg/ml of the drug & inject 1 ml/100 g

body wt of mouse), and after 30 mins re-test each mouse for activity scores for 10 mins[16]. Note the difference in the activity, before & after chlorpromazine. Calculate percent decrease in motor activity.

Elevated plus Maze test

The plus – maze consists of two open arms and two closed arms (50 x 10 x 40 cm each) elevated to a height of 50 cm Extract and diazepam (1mg/kg) were administered to groups. Thirty minutes post treatment, each mouse was placed in turn in the centre of the maze facing one of the closed arms. The cumulative times spent by each mouse in the open and closed arms of the maze were recorded for 5 min.

Rota Rod

The effect on motor coordination was assessed using a rota-rod apparatus. Rota rod apparatus consisted of a base platform and an iron rod of 3 cm diameter and 30 cm length, with a non slippery surface. This rod was divided in to four equal sections by three disks, and then enabling four mice to walk on the rod at the same time at the speed of 22rpm observed over a period of 15, 30, 45, 75, and 90 min. Intervals between the mounting of the animal on the rod and falling off of it were recorded as the performance time[15-17]. There after four mice were randomly selected to determine locomotor activity. The effect on motor coordination was assessed using a rota-rod apparatus. In brief, mice were trained to remain for 5 min on the rod rotating at speed of 22 rpm.

Statistical analysis:

The values Mean±SEM are calculated for each parameter. For determining the significant inter group difference each parameter was analysed separately and one-way analysis of variance was carried out.

RESULTS AND DISCUSSION:

Elevated plus maze

Administration of diazepam (0.5 m/kg) significantly increases number of open arm entries, time spent in open arms and the number of rearings in open arm. They showed a reduction in the time spent in closed arm. Plant extracts treated mice exhibited significant increase in the number of open arm entries. The number of arm entries, but decreases in time spent in closed arm as shown in the table 1.

Rot rod test

A significant decrease in the locomotor score was observed for diazepam when compared to the control animals. Both the doses of plant extract showed significant decrease in the locomotory score when compared to control animals as shown in table 2.

Table 1: Elevated plus maze test

Treatment	Dose(mg/kg)	Time spent in open arm (s)	Entries in open arm
Saline	1ml	30.25±4.41	3.98±0.52
Diazepam	0.5	78.59±3.52	8.64±0.47*
Plant Extract	200	67.92±4.80	7.32±0.21*

All values are mean ±SEM (n=6); *p< 0.1 when compared to control

Table 2: Rota rod test

Treatments	Time (sec) of animals remained without falling from rod					
	15min	30min	45min	60min	75min	90min
Saline	180.2±9.1	152.9±8.5	140.1±6.8	128.1±7.6	109.9±5.8	93.5±8.4
Diazepam	157.6±6.9*	142.7±6.4	138.2±6.5	112.9±6.3	97.6±4	73.1±4.4
Plant Extract	152.1±5.8*	110.1±4.9	103.4±7	94.5±6.5	92.4±4.8	77.1±4.1*

All values are mean ±SEM (n=6); *p< 0.1 when compared to control.

Table 3: Actophotometer Test

S.No	Treatment	Dose (mg/kg)	Drug Administration (sec)		% change in activity
			Before	After 60 min	
1.	Control	--	305	294	3.60%
2.	Diazepam	5	368	75	79.61%
3.	Plant Extract	200	398	173	56.53%
All values are mean ±SEM (n=6); *p< 0.05 when compared to control.					

Actophotometer

Locomotor activity of aqueous solvent soluble fraction of Plant extract studied at a dose of 200 mg/Kg, using Actophotometer experiment.

The percentage of reduction in spontaneous motor activity with diazepam (5 mg/kg i.p) after 1 hour is 79.61 % i.e. there is highly significant (P<0.05) when compare to control, where as Plant extract (200mg/kg oral) showed dose and time dependent decrease in locomotor activity that is 56.33% respectively when compared to standard. The values are highly significant (P<0.05) as shown in the table 3

CONCLUSION:

Locomotor activity results showed that plant extract treated mice exhibited significant result when compared with that of standard in improvement of locomotor performance. Elevated Plus Maze is used to evaluate psychomotor performance and emotional aspects of rodents. Results showed that plant extract treated mice exhibited significant increase in the number of open arm entries. The number of arm entries, but decreases in time spent in closed arm reflects anxiolytic property. Rota rod test, the difference in the fall of time from the rotating rod between the vehicle and extract treated groups were taken as an index of muscle relaxation. Test drug showed significant decrease in the locomotory score and fall of time of the mice from the rotating rod.

From the above observations we can conclude that aqoues extract of *Mimosa pudica* possesses anxiolytic activity at both the dose level which is comparable with the standard. However further studies are required to know the exact mechanism of action of *Mimosa pudica*.

REFERENCES:

1.Biswas, Tuhin Kanti, and Biswapati Mukherjee. "Plant medicines of Indian origin for wound healing activity: a review." *The international journal of lower extremity wounds* 2.1 (2003): 25-39.

2.Joseph, Baby, Jency George, and Jeevitha Mohan. "Pharmacology and traditional uses of Mimosa pudica." *International journal of pharmaceutical sciences and drug research* 5.2 (2013): 41-44.

3.Amalraj, T., and S. Ignacimuthu. "Hyperglycemic effect of leaves of Mimosa pudica Linn." *Fitoterapia* 73.4 (2002): 351-352.

4.Zhang, Jing, et al. "Studies on the active components and antioxidant activities of the extracts of Mimosa pudica Linn. from southern China." *Pharmacognosy magazine* 7.25 (2011): 35.

5.Sangma, Tultul Koksi, et al. "Diuretic property of aqueous extract of leaves of Mimosa pudica Linn. on experimental albino rats." *Journal of Natural Products* 3 (2010): 172-178.

6.Joyamma, V., et al. "Biochemical mechanisms and effects of Mimosa pudica (Linn) on experimental urolithiasis in rats." *Indian journal of experimental biology* 28.3 (1990): 237-240.

7.Bum, E. Ngo, et al. "Anticonvulsant activity of Mimosa pudica decoction." *Fitoterapia* 75.3 (2004): 309-314.

8.Kokane, Dnyaneshwar D., et al. "Evaluation of wound healing activity of root of Mimosa pudica." *Journal of Ethnopharmacology* 124.2 (2009): 311-315.

9.Temmei, Yusuke, et al. "Water channel activities of Mimosa pudica plasma membrane intrinsic proteins are regulated by direct interaction and phosphorylation." *FEBS letters* 579.20 (2005): 4417-4422.

10.Vinothapooshan, G., and K. Sundar. "Anti-ulcer activity of Mimosa pudica leaves against gastric ulcer in rats." *Research journal of pharmaceutical, biological and chemical sciences* 1.4 (2010): 606-614.

11.Lozoya, M., and X. Lozoya. "Pharmacological properties in vitro of various extracts of Mimosa pudica Linn." *Tepescohuite Arch Invest Mex* 87 (1989): 93.

12.Fondeville, J. C., H_ A. Borthwick, and S. B. Hendricks. "Leaflet movement of Mimosa pudica L. indicative of phytochrome action." *Planta* 69.4 (1966): 357-364.

13.Ayissi Mbomo, Rigobert, et al. "Effect of Mimosa pudica (Linn.) extract on anxiety behaviour and GABAergic regulation of 5-HT neuronal activity in

the mouse." *Journal of Psychopharmacology* 26.4 (2012): 575-583.
14.Girish, K. S., et al. "Hyaluronidase and protease activities from Indian snake venoms: neutralization by Mimosa pudica root extract." *Fitoterapia* 75.3 (2004): 378-380.
15.Gandhiraja, N., et al. "Phytochemical screening and antimicrobial activity of the plant extracts of Mimosa pudica L. against selected microbes." *Ethnobotanical leaflets* 2009.5 (2009): 8.
16.Mahanta, Monimala, and Ashis Kumar Mukherjee. "Neutralisation of lethality, myotoxicity and toxic enzymes of Naja kaouthia venom by Mimosa pudica root extracts." *Journal of ethnopharmacology* 75.1 (2001): 55-60.
17.Ganguly, Mausumi, et al. "Effect of Mimosa pudica root extract on vaginal estrous and serum hormones for screening of antifertility activity in albino mice." *Contraception* 76.6 (2007): 482-485.