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Anti-inflammatory and Analgesic Activities of *Mimosa Pudica* L. Herb Extract

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ABSTRACT

WHO has recognized herbal medicine as an essential building block for primary health care in Asia. Traditionally, herbs of *Mimosa pudica* L. are being used to treat various symptoms, e.g. insomnia, hematuria, inflammation, emesis, dismenorrhoea, menorrhagia, arthritis rheumatoid, convulsion, depression, and diabetes. Previous *in vitro* study showed that herbs extract of *Mimosa pudica* L reduced uric acid formation *via* xanthine oxidase inhibition of 82.11 and 62.10% for concentration 125 and 62.5 µg/mL, respectively. This study was performed to study anti-inflammatory and analgesic activities of *Mimosa pudica* L .herb extract on rodents. Anti-inflammatory activity assay was done using carageenan-induced paw edema method on white male rats. Dosages used were 250, 500 and 1000 mg/kg of body weight. The results showed that all three dosages inhibited edema at the percentages of 35.20, 42.74, and 51.10% respectively. Analgesic activity of *Mimosa pudica* L herb extract at dosage of 125, 250 and 500 mg/kg of bodyweight was observed on mice using writhing reflex method withaceticacid0,07 % as inducer. The results showed that all three dosages inhibited pain at the percentage of 9.58, 45.35, and 60.28% respectively. It is concluded that herbs extract of *Mimosa pudica* L can be proposed as anti-inflammatory and analgesic agents.

I. INTRODUCTION

NSAIDs used in the inflammatory conditions do not cure and remove the underlying cause of the disease but they only modify the inflammatory response to the disease. Large numbers of NSAIDs are available in the market with their advantages and disadvantages. Though there are standard drugs like Aspirin, Indomethacin, Phenylbutazone, etc., these drugs are not entirely free of side effects and have their own limitation. Thus there is still a need to develop newer and safer anti-inflammatory drugs. NSAIDs use is frequently limited by gastrointestinal side effects, ranging from dyspepsia to life threatening bleeding from ulceration. It is believed that NSAIDs by inhibiting COX pathway causes inhibition of prostaglandins synthesis, which are responsible for maintaining gastric mucosal integrity. Herbal medicines used in Ayurveda remain the major source of health care for the world's population. WHO has recognized herbal medicine as an essential building block for primary health care of vast countries like India. Traditionally, herbs of *Mimosa pudica* L. are being used in insomnia, hematuria, inflammation, emesis, dismenorrhoea, menorrhagia, arthritis rheumatoid, convulsion, depression, and diabetes. It has been reported that herbs of *Mimosa pudica* L. showed diuretic, antidiabetic and antioxidant activities. Also herbs of *Mimosa pudica* are rich in mimosine (N-(3-alanyl)-3-hydroxy-4-piridone), norepinefrine, linoleneic acid , oleic acid, palmitic acid, stearic acid, phenol, amino acid, steroid/triterpenoid, sterol, tannins, and flavonoids (Depkes RI, 1995; ASEAN Countries, 1993), 4"-hydroxymycine, dan cassiaocidentalin B (Lobstein *et al*, 2002). While in Central Java leaves of *Mimosa pudica* L. are being used to cure insomnia.

Therefore, by considering the traditional claim, chemical constituents and reported activities of *Mimosa pudica* L. this study was planned to study anti-inflammatory and analgesic activities of *Mimosa pudica* L. herbs extract.

II. MATERIALS AND METHODS

II.1 Collection of plants

Herbs of *Mimosa pudica* L. were collected from Bandung, West Java, Indonesia. These herbs were identified and authenticated in Botanical Taxonomy Laboratory, Department of Biology, UniversitasPadjadjaran, West Java, Indonesia.

II.2 Preparation of extract

Herbs were room-dried for 10 days and were coarsely powdered. The powder was sieved using 40 mesh sieve. About 500 g of herbs dried powder were extracted with ethanol for 72 h. The extract was evaporated and dried ethanolic extract was kept in airtight container prior to be further assayed.

II.3 Experimental section

Male ICR mice of 15-20 g of body weight and Wistar albino rats of 150-200 g of body weight were housed in standard cages at room temperature for 1 week before the experiments. Animals were provided with standard rodent pellet diet, and water *ad libitum*. The animals were deprived of food for 24 hours before treatment. All experiments were performed in the morning.

II.3.1 Analgesic activity

II.3.1.1 Writhing test

The extract suspended in Arabic gum at the dosage of 125, 250 and 500 mg/kg of body weight was oral-administered60 minutes before the animals were induced by intraperitoneal injection of 1.0% acetic acid in distilled water (0.1mL/10 g of body weight). The number of writhing and stretching movements were counted within 60 minutes as described by Hendershot and Forsaith, 1959. The percentage of inhibition was determined for each experimental group (n=5). Acetosal (65mg/kg of body weight) was used as standard drug.

II.3.2 Anti-inflammatory activity

II.3.2.1 Carrageenan-induced paw edema test

The extract suspended in Arabic gum at the dosage of 125, 250 and 500 mg/kg of body weight was oral-administered60 minutes before the animals were induced by 0.1 mL of 1% carrageenan into sub-plantar surface of rat paw, and the paw volume was measured plethysmometrically at 1 h, 2 h, 3 h, 4 h, and 5 h. The animals were divided into five groups (n=3). Indomethacin was used as standard drug.

Results were expressed as,

Edema Volume = Vt – Vc

Vt = Paw volume in mL, at time t, after carrageenan administration.

Vc = Paw volume in mL, before carrageenan administration.

Inhibition rate (%) = Ec-Et / Ec × 100

Ec = edema volume of control group.

Et = edema volume of treated group.

III. RESULTS AND DISCUSSION

III.1 Analgesic activity

The results of the analgesic activity of ethanolic extract of *Mimosa pudica* L. was showed in Table 1, while the protection percentage against pain was showed in Table 2.

Table 1. Writhing testin 60 minutes of observation

Group	Average amount of writhing in 60 minutesobservation												Total
	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	60'	
Dosage 125 mg/kgof body weight	24.8	26.4	21.2	18.6	16	15.6	12.2	11.2	9.6	10.8	8.6	8	**183**
Dosage 250 mg/kg of body weight	19.6	16.2	13	10.4	10	9.4	8.4	6.2	4.8	4.6	4.2	3.8	**110.6**
Dosage 500 mg/kg of body weight	13.4	16.8	10.6	9	6	5.8	5.6	1.8	3.2	2.8	3.2	2.4	**80.4**
Arabic gum suspension	39.4	27.6	23	17	15.2	15.8	14	12.8	10.2	10.4	7.8	9.2	**202.4**
Acetosal	13.8	16.4	12.2	11.2	10.4	7.6	7.2	4.8	3.6	2.2	2.4	3	**94.8**

Thewrithings decreased in time and dose dependent manner. It can be predicted that the decreasing of writhing due to analgesic activity of some chemical compounds in the extract.

Table2. Protection Percentage against Pain

Test groups	Dosage (mg/kg of body weight)	Pain Protection (%)
Aspirin	65	53
*Mimosa pudica*L.Extract	125	9.58
*Mimosa pudica*L.Extract	250	45.35
*Mimosa pudica*L.Extract	500	60.28

Mimosa pudica L. herb extract at dosage500 mg/kg of body weight showed the best percentage of pain protection (60.28%).

III.2 Anti-inflammatory activity

Indomethacine at the dosage of 10 mg/kg average at 1st, 2nd, 3rd , 4th, 5th hour has shown 73.71% inhibition, respectively. At 3rd hour, the ethanolic extract of *Mimosa pudica* L. at the dosage of 250, 500 and 1000 mg/kgof body weight showed 35.20, 13.44 and 31.18% inhibition, respectively. The results of this work were showed in Table 3.

Table 3. Antiinflammatory activity

Time (Hour)	Inflammatory Percentage (%)				
	Negative Control PGA 2 %	**Positive Control** Indomethacine 10 mg/kg of body weight	**D I** Extract 1000 mg/kg of body weight	**D II** Extract 500 mg/kg of body weight	**D III** Extract250 mg/kg of body weight
1	169. 70	50.58	55.57	35.30	56.28
2	202.97	37.92	123.05	134.43	149
3	225.44	43.13	95.34	136.67*	166.27*
4	179.11	54.01	90.98	125.73*	132.56*
5	141.63	43.08	83.25	94.14*	90.60*

*shows significant comparison with negative control (p<0.01)

Negative control: PGA Suspension 2%

Positive control: Indomethacine 10 mg/kg bw

D I: Ethanolic extract 1000 mg/kg of body weight

D II: Ethanolic extract 500 mg/kg of body weight

D III: Ethanolic extract 250 mg/kg of body weight

It can be seen that ethanolic extract of *Mimosa pudica* L. at the dosage of 500 mg/kg of body weight and 250 mg/kg of body weight has maximum percentage of inflammation at 3rd hour, while maximum percentage of inflammation at the dosage of 1000 mg/kg of body weightwas at 2nd hour.

Table 4. % Inflammation Inhibitory

Test Groups	Inhibitory Percentage (%)
Indomethacine 10 mg/kg of body weight	73.71
Extract 1000 mg/kg of body weight	51.10
Extract 500 mg/kg of body weight	42.74
Extract 250 mg/kg of body weight	35.20

Antiinflammatory activity of the extractstarted to occur at the 4th hour and was stable until 5th hour. The resultant calculated inflammatory inhibition, can be seen that extract at the dosage of 1000 mg/kg of body weight have the highest inflammation inhibitory percentage which was 51.10%. Meanwhile, the positive control group showed a inhibition percentage of 73.71%. The result was shown at Table 4.

IV. CONCLUSION

Mimosa pudica L herb extract showed anti-inflammatory (1000 mg/kg of body weight reduces 51.10% inflammation in rats) and analgesic (500 g/kg of body weight reduces 60.28% pain in mice) activities.

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