



**COMPARISON OF ANALGESIC AND ANTIINFLAMMATORY
ACTIVITIES OF SPILANTHES ACMELLA (MURR.) AND BRYOPHYLLUM
PINNATA (LAM.)**

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ABSTRACT

Objective- To evaluate the analgesic and anti-inflammatory activities of the alcoholic extract of aerial parts of *Spilanthes acmella*(murr.) and *Bryophyllum Pinnata* (Lam.) in experimental animal models.

Material and methods- *Spilanthes acmella*(Murr) and *Bryophyllum pinnata* (Lam.) were evaluated for anti inflammatory action by carrageenan- induced rat paw edema. The analgesic activity was tested by tail flick method in albino rats.

Result-The alcoholic extract of *Spilanthes acmella* and *bryophyllum pinnata* (Lam.) at a doses 500 mg/kg showed 52% and 60% inhibition of paw edema respectively at the end of three hours and the In the tail flick model, the alcoholic extract of *Spilanthes acmella* and *bryophyllum pinnata* (Lam.) in the above doses increased the pain threshold significantly after 30 min, 1,2 and 4h of administration. SPA showed dose-dependent action in all the experimental models

Conclusion-The present study indicate that the alcoholic extract showed significant analgesic activity and anti-inflammatory activity at dose 500mg/kg BW.

KEYWORDS: Carrageenan, tail flick, *Spilanthes acmella* (SPA)

INTRODUCTION

Spilanthes acmella [SPA] (Bengali-Akarkara, Assamese-Pirazha, Manipuri-Maanja-lei, Telegu-Maratitige) is an indigenous herb belonging to the family Compositae.¹ It is grown as an annual herb throughout the tropics. It has conical small yellow flowers. The whole plant is claimed to possess medicinal properties. The flowers are chewed to relieve toothache and the crushed plant used in rheumatism.^{2,3} The leaves are also eaten raw or as a vegetable by many tribes of India. SPA is generally known as toothache plant.⁴ *Bryophyllum pinnatum* (*Kalanchoe pinnata*), widely known as air plant, miracle life, life plant etc., belongs to the family Crassulaceae. It is used as a traditional medicine in Ayurveda since ages. *B. pinnatum* is a greek word which means sprout leaf. The plant is of major attention due to its medicinal properties. The leaves and bark of the plant possess a bitter taste which can be used to cure vomiting, diarrhoea, earache, abscesses, burns, insect bites, gastric ulcers and urolithiasis. Plant leaf extract is widely used in the rural areas for the treatment of otitis, smallpox, asthma, cough, headache, palpitations, convulsion and to treat edema of legs^{5,6} In the present study we have to compare analgesic and anti-inflammatory activity of both plants.:-

- a) Anti-inflammatory potential of the alcoholic extract of SPA and BPP on carrageenan-induced rat paw edema, and
- b) Analgesic activity using tail flick response in albino rats.

Material and Methods The aerial parts of spilanthes acmella and bryophyllum pinnatum was collected from ahmedabad, Gujrat, India during Jan-2020. A voucher specimen of the plant was deposited in the botany department of saifia science college Bhopal M.P. The assertion No. of the specimen are 068/Bot/Saf./20 and 069/Bot/Saf./20 respectively .The certificate of the authentication is given in annexure A-1. The aerial parts were shade dried at room temperature and coarsely powdered in such a way that the material passed through sieve no. 20 and was retained on sieve no. 40 for desired particle size.

Animals Albino Rats of wistar strain (150-200gm) of either sex were procured from the central animal house of the institute. They were housed in standard polypropylene cages and kept under controlled room temp. (24 ± 2^0) and relative humidity (60-70%) in 12 hour light dark cycle. The rats were given standared labortory diet and water at libitum. Food was withdrawn 12 hour before and during the experiment.The protocols was approved by the institutional animal ethical committee of Pinnacle Biomedical Research Institute(PBRI).The care of the laboratory was taken as per the CPCSEA regulation. (REG. NO. 1824/PO/Ere/S/15/CPCSEA) Protocol approval Ref No is PBRI/IAEC/PN-23076 .

Drug

The following chemicals and drugs were used

Carrageenan, Aspirin, pethidine

Acute toxicity study No adverse effect or mortality was detected in albino rats up to 2 gm/kg, p.o. of SPA during the 24 h observation period.

Anti-inflammatory study

Carrageenan induced paw edema

The animals were divided into groups as shown in Table 1. Acute inflammation was produced by subplantar injection of 0.1 ml of 1% suspension of carrageenan with 2% gum acacia in normal saline, in the right hind paw of the rats, one hour after oral administration of the drugs. The paw volume was measured plethysmometrically (Mecaid) at '0' and '3' hours after the carrageenan injection. The difference between the two readings was taken as the volume of edema and the percentage antiinflammatory activity was calculated. Aspirin 10 mg/kg, p.o. suspended in 2% gum acacia was used as the standard drug.

Analgesic activity

Tail flick method The prescreened animals (reaction time:3-4 sec) were divided into groups as shown in Table 2. Pethidine 5 mg/kg acted as the standard drug. The drugs were administered intraperitoneally. The tail flick latency was assessed by the analgesiometer (Inco, India). The strength of the current passing through the naked nicrome wire was kept constant at 6 Amps. 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.

Statistical analysis The results were analyzed for statistical significant using One Way ANOVA followed by dunnet's test. A P value $<.05$ was considered as significant and P value $<.01$ was considered as more significant.

Table no:1 Anti-inflammatory activity of *Spilanthes acmella*(Murr) and *bryophyllum pinnata* (Lam.) extract

Group	Dose of Drug mg/kg	Increase in paw vol.(mean±SEM) in ml	% inhibition of paw vol. (ml)
Control	10 ml/kg	.55±.12	-
Standard	100 mg/ kg	.21±.04**	64.6%
Test 1	400 mg/kg SPA	.26±.032*	56%
Test 2	400 mg/kg BPP	.25±.02*	60%

Here n= 6 animal in each group, represented values are mean+SEM

*P < 0.05 Significant, **P < 0.01 Significant V/S control treatment

Control-Normal saline 10 ml/kg

Standard-10 mg/kg BW Aspirin

Test 1-500 mg/kg Alc extract spilanthes acmella

Test 2-500 mg/kg Alc. bryophyllum pinnata

Table no: 2 Analgesic Activity of *Spilanthes acmella*(Murr) and *bryophyllum pinnata* (Lam.) extract

Treatment	0 min.	30 min.	60 min.	120 min.	180 min.
Control	3.25±.20	4.20±.4	4.10±.29	4.20±.25	4.10±.5
standard	3.80±.17	9.17±.5**	9.30±.30**	9.26±.4**	8.0±.85**
Test 1	3.6±.28	6.90±.7*	8.25±.7**	8.25±.7**	8.70±.80**
Test 2	3.7±.25	7.5±.8**	8.70±.25**	9.0±.5**	9.0±.6**

Here n= 6 animal in each group, represented values are mean ±SEM

*P < 0.05 Significant, **P < 0.01 Significant V/S control treatment

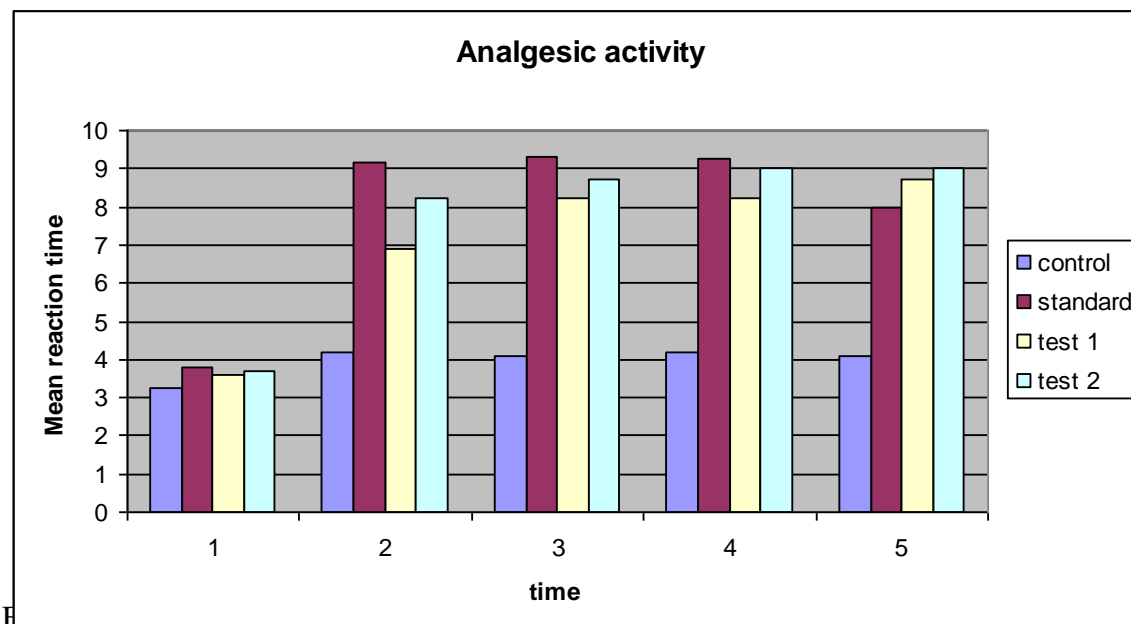
Control-Distilled water 1ml/kg ip

Standard-10 mg/kg BW pethidine ip

Test 1-500 mg/kg Alc extract spilanthes acmella ip

Test 2-500mg/kg Alc. extract bryophyllum pinnata ip

Fig no 1 Analgesic activity



RESULT

The results of the animal experiments are shown in Tables 1. In the acute inflammation model, the alcoholic extract of SPA and BPP in doses of 500 mg/kg, p.o. produced dose-dependent inhibition of paw edema. The test and the standard drugs produced significant inhibition of paw edema as compared to the control. The alcoholic extract of SPA and BPP (500 mg/kg, s.c.) The result of analgesic activity is shown in Table 2 In the tail flick model, there was no significant difference in the mean predrug reaction time between the different groups. Thirty min after drug administration, reaction time increased significantly for the test and standard groups when compared to the predrug reaction time. The test drug produced a dose dependent increase in the reaction time at various time intervals of observation.

DISCUSSION

Carrageenan-induced hind paw edema is the standard experimental model of acute inflammation. Carrageenan is the phlogistic agent of choice for testing anti-inflammatory drugs as it is not known to be antigenic and is devoid of apparent systemic effects. Moreover, the experimental model exhibits a high degree of reproducibility. Carrageenan-induced edema is a biphasic response. The first phase is mediated through the release of histamine, serotonin and kinins whereas the second phase is related to the release of prostaglandin and slow reacting substances which peak at 3 h.¹⁰ The increase in the paw volume following carrageenan administration in the control (0.57 ± 0.14 ml) and aspirin treated group (0.21 ± 0.01 ml) corresponds with the findings of previous workers.^{11,12} The BPP extract produced more effect than SPP extract and significant inhibition of carrageenan-induced paw edema. The inhibition was however, less than that of the standard drug, aspirin. The abdominal constriction response induced by acetic acid is a sensitive procedure to establish peripherally acting analgesics. In the tail flick model, the test drug in different doses increased the pain threshold significantly during the period of observation and this indicates the involvement of a higher center. The results of the present study suggest that the alcoholic extract of BPP (500 mg/kg) significantly suppressed carrageenan-induced paw edema in rats and demonstrated significant analgesic activity in tail flick models than alcoholic extract of SPA.

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