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PRELIMINARY STUDIES ON ANALGESIC AND ANTI-INFLAMMATORY ACTIVITIES OF SPILANTHES ACMELLA (MURR.)

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ABSTRACT

Objective: To evaluate the analgesic and anti-inflammatory activities of the alcoholic extract of stem of *Spilanthes acmella* in experimental animal models. **Material and methods:** *Spilanthes acmella* was 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* at a doses of 200 and 400 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 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 200 mg/kg and 400mg/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] However, no scientific data are available to validate the folklore claim. Therefore, this study was undertaken to evaluate the :-

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

MATERIAL AND METHODS

Preparation of the extract Fresh aerial parts of SPA were purchased from the Ayurmed biotec pvt limited Mumbai. The Stem were cleaned, dried under shade and powdered by a mechanical grinder. Sixty grams of the pulverized stem was extracted with ethanol using a soxhlet apparatus. The yield was 13.5% in powder form. The extract of SPA was administered as a suspension in 2% gum acacia to the animals. Phytochemical studies Freshly prepared SPA extract was subjected to phytochemical screening tests for the detection of various constituents using conventional protocol.

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 experimental protocols was approved by the institutional animal ethical committee. The care of the laboratory was taken as per the CPCSEA regulation. (REG. NO. 06/2009/CPCSEA/JNU)

Drug

The following chemicals and drugs were used

Carrageenan, Aspirin, pethididne

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 100 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 siginificant and P value <.01was considered as more significant.

Table no. 1: Anti-inflammatory activity of *spilanthes acmella* murr. Stem.

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 I	200 mg/kg	.26±.032*	56%
Test II	400 mg/kg	.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 Test 1-200 mg/kg extract

Standard-100 mg/kg BW Aspirin Test 2-400 mg/kg extract

Table no. 2: Analgesic activity of *spilanthes acmella* murr stem 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 I	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 Test 1-200 mg/kg extract ip

Standard-10 mg/kg BW pethidine ip Test 2-400 mg/kg extract ip

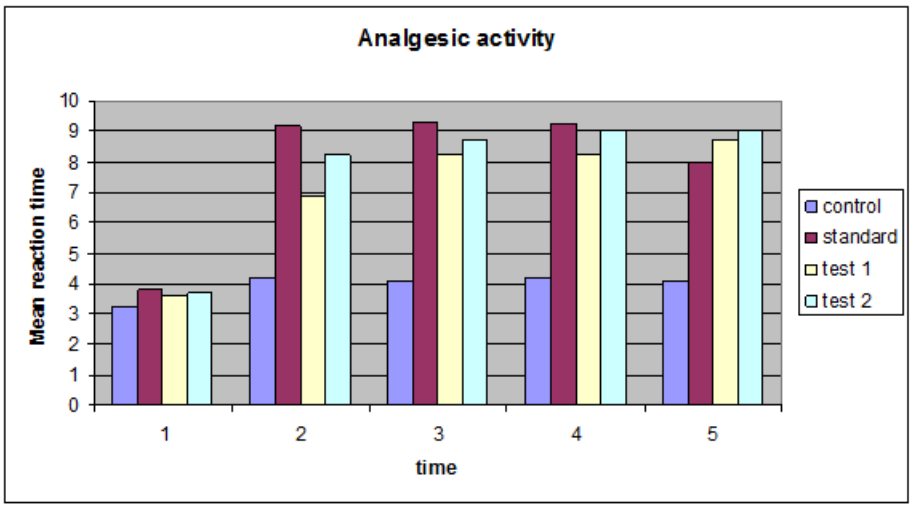

Fig. no. 1.

RESULT

The results of the animal experiments are shown in Tables 1. In the acute inflammation model, the alcoholic extract of SPA in doses of 100, 200 and 400 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 (100, 200 and 400 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 SPA extract produced dose-dependent 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 SPA in doses of 100, 200 and 400 mg/kg significantly suppressed carrageenan-induced paw edema in rats and demonstrated significant analgesic activity in tail flick models.

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