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Evaluation of spilanthes acmella, murr. roots for anti-inflammatory activity

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ABSTRACT

Aqueous roots extract of Spilanthes acmella, Murr. which is used traditionally in the treatment of rheumatism, gout and claimed to possess for its anti-inflammatory activity. In the present study, the concentration (500mg/kg b.wt. P.O.) of aqueous roots extract of Spilanthes acmella, Murr. was evaluated for anti-inflammatory activity using paw edema model in adult albino rats. Aqueous roots extract showed significant activity ($P<0.001$) as compared to that of diclofenic sodium (150mg/kg P.O.) against carrageenan (0.1ml of 1%w/w) induced paw edema model in adult albino rats.

KEYWORDS

Spilanthes acmella;
Murr. diclofenic sodium;
Carrageenan;
Anti-inflammatory activity.

INTRODUCTION

Spilanthes acmella, Murr. commonly known, as akarkara is annual hair herb, up to 32-60 cm. tall with numerous stems of merigold eye flowers. Stems glandular and hairy with pungent taste. Roots are fusiform, fleshy, long, finger like thick, cylindrical and tapering, having some hair like rootlets. It has shrinkled surface, compact out bristle, aromatic and with pungent taste. The whole plant is acrid in taste[1]. The roots reported to contain alkaloids, carbohydrates, tannins, steroids and carotenoids[2-3]. Roots are also used as anti-inflammatory, depurative and powerful irritant. A decoction of root is useful as a gargle in dental caries, odontalgia, pharyngitis and tonsillitis. It is used to treat paralysis, hemiplegia, cephalalgia, epilepsy, cholera, rheumatism and typhus fever[4-5].

In this study, we have evaluated the anti-inflammatory of the Aqueous roots extract of Spilanthes acmella, Murr. using carrageenan induced paw edema model in adult albino rats.

MATERIALS AND METHODS

Plant material

Roots of Spilanthes acmella, Murr. were collected from areas of Hubli, Karnataka, India and authenticated by Dr. G.R.hegde, Professor and Head, Dept. of Botany, Karnataka University, Dharwad Karnataka.

Extraction

To prepare water extract, the dried roots powder was extracted with distilled water (5g/100ml) with constant stirring for 4h and then filtered through a filter paper and evaporate to dryness in a rotary evaporator under reduced pressure at 40^0C as described elsewhere; and on the evaporation, brownish colored residue was obtained 0yield 3.6%(w/w) respect to the dry starting material and was stored in a dedicator[6-7]. The dried extract was used for further studies.

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TABLE 1: Anti-inflammatory activity of aqueous extract of spilanthes acmella, Murr. roots

Group	Dose (mg/kg P.O.)	Paw volume mean ± SEM					% Inhibition of edema
		1hr.	2hr.	3hr.	4hr.	5hr.	
Control	-	9.1±0.21	9.2±0.13	10.2±0.15	11.3±0.18	11.3±0.19	-
Standard (Diclofenic sodium)	150	8.1±08.08	9.9±0.23	7.2±0.12	7.0±0.17**	6.2±0.21***	45.13
Aqueous extract	500	7.3±0.14	8.0±0.11**	6.1±0.11**	5.92±0.07***	4.6±0.18***	64.07

***P<0.0001, **P<0.001 when compared with the control values of corresponding hour: n=6.

Acute toxicity study

Healthy albino mice of either sex weighing 25-30g. maintained under controlled conditions of temperature (20-25^{0}C) and humidity (55%) were used for toxicity study as per Up and Down or Staircase method[8]. The effective oral dose of aqueous Roots extract of Spilanthes acmella, Murr. was found to be 500mg/kg body weight.

Screening of anti-inflammatory activity

Animals

Healthy male albino rats (200-250g) of wistar strain were obtained from the central animal faculties Indian Institute of Sciences, Bangalore. The animals were housed under controlled conditions of temperature (25^{0}C) and humidity (55%). They were provided with pellet diet (amrut rat and mice pellet sagli) and water adlibitum, edema represent the early phase of inflammation in carrageenan-induced paw edema and is the simplest and most widely used model for the studying the anti-inflammatory activity of new compounds.

Procedure[9-11]

Rats were divided into three groups of six animals each.

The first group served as the control and received vehicle only 1% Tween 80 solutions in distilled water.

Second group was administered with standard drug Diclofenic sodium (150 mg/kg, orally).

Third group was treated with aqueous extract (500mg/kg, b.wt. orally). The dose of extract was selected on the basis of acute toxicity test (LD_{50} dose of extract).

A mark was made on both the hind paws just below the tibio-tyarsal junction so that every time the paw could be dipped in the mercury column of Plythysmo graph up to the mark to ensure constant paw volume.

Thirty minutes after treatment an inflammatory edema was induced in the left hind paw by injection of 0.1 ml of carrageenan (1% w/w) in the plain tissue of the paw of all the animals.

The right paw served as the reference to non-inflamed paw for comparison the relative increase in the paw volume was measured in control, standard and extract treated groups in the time duration of 1,2,3,4 5th hr.

Edema formation was assayed by the percentage increase in paw volume i.e. edema rate (E) in animals treated with standard drug and treated with the extract of Spilanthes acmella, Murr. aqueous extract.

These were compared with the increased paw volume of control animals. Thus % inhibition of paw volume in treated animal's i.e.

Edema rate (E) % = (vt/vc) × 100 which was used for calculating the percent inhibition of edema using the formula-

Inhibition rate (1) % = {1-(vt/vc)} × 100

Where vt and vc are the mean relative changes in the paw volume of the test and control respectively.

Statistical analysis

The experimental results were expressed as the mean standard error of mean (SEM) and the statistical significance was evaluated by using the student's-T test. The P- values of less than 0.001 imply significance.

RESULTS AND DISCUSSION

TABLE 1, clearly indicates that the Aqueous roots extract of Spilanthes acmella Murr. showed maximal anti-inflammatory effect in the carrageenan induced rat paw edema in carrageenan hind paw edema test. Statistically, it was found that there was no reduction in the edema in all the groups with test drug after 2 hour. But at the end of 5-hour Aqueous extract 500mg/kg P.O. significantly reduced the paw volume, which is comparable to control group. After 5 hrs. the Aqueous extract (500mg/kg P.O.), reduced inflammation by around 64.07%, where as standard drug diclofenic sodium

(150mg/kg P.O.) reduced the inflammation by around 45.13%

Further studies are required to determine the mechanism and active constituents involved in the anti-inflammatory activity of roots of Spilanthes acmella, Murr.

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REFERENCES

[1] A.K.Nadkari; 'Indian Material Media', Popular Prakashan Pvt. Ltd., Bombay, 1031 **(1976)**.
[2] B.N.Rastogi, Mehrotra; 'Compendium of Indian Medicinal Plants', CDRI Lucknow, Publication and Information Directorate, New Delhi, **2**, 27 **(1993)**.
[3] K.R.Kirtikar, B.D.Basu, Bishen Sing; 'Indian Medicinal Plant', Dehradun, India, 2nd Edition, **2**, 1360-1368.
[4] Wealth of India; 'A dictionary of India Raw Materials and Industrial Products', New Delhi, Publications and Information Directorate, CSIR, **2**, 11-12 **(1988)**.
[5] S.N.Yoganarasimhan, V.chelladuri; Medicinal Plants of India, **2**, 513.
[6] K.R.Khandelwal; 'Practical Pharmacognosy Techniques and Experimentals', Nirali Prakashan, Pune, **2**, 149-56 **(2000)**.
[7] H.P.Tiwari, A.Kakkar; J.Ind.Chem.Soc., **67(9)**, 784-785 **(1990)**.
[8] M.N.Ghosh; 'Fundamental of Experimental Pharmacology', Scientific Book Agency, Calcutta, 2nd Edition, 153-157 **(1984)**.
[9] Mohammed, S.Kumar; Indian Drugs, **42(2)**, 75 **(2005)**.
[10] D.Satyanarayana, A.D.Joshi, K.S.Chandrashekar, K.Vijaynarayana; R.Br.I.Ds., **41(7)**, 405-507 **(2004)**.
[11] Mikayw, H.Yamamota, E.Kubota, O.Hamaguchi; Br.J.Pharmacol., **110**, 447, **(1993)**.