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Anti inflammatory activity of various extracts of *Hedyotis umbellata* linn

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ABSTRACT

The powdered aerial parts of *Hedyotis umbellata* (Rubiaceae) were screened for anti inflammatory activity by carrageenan and histamine induced rat paw edema method at a dose of 100 mg/kg body weight, using Ibuprofen as standard drug. All the three extracts i.e., petroleum ether (60-80°), ethyl acetate and methanol exhibited 40% of inhibition of inflammation, while the standard drug at the same dose produce 45% of inhibition. Hence, it is concluded that aerial parts of *Hedyotis umbellata* found to have significant anti inflammatory activity. © 2008 Trade Science Inc. - INDIA

KEYWORDS

Hedyotis umbellata;
Anti inflammatory;
Histamine;
Carrageenan;
Ibuprofen.

INTRODUCTION

The problem of uncontrolled pain led early humans to seek remedies from any materials that they could lay their hands on. In recent times, focus on plant research has increased and non-steroidal anti inflammatory drugs (NSAIDs) constitute one of the most widely used classes of drugs.

Herbal drugs are being proved as effective as synthetic drugs with lesser side effects. Herbal medicines are in line with nature, with less hazardous reactions^[1]. *Hedyotis umbellata* is one such plant, which is reputed to have numerous applications in traditional medicine. The roots and leaves of *H.umbellata* (Rubiaceae), Known as chay root, are considered to be expectorant and are used in the treatment of asthma, bronchitis, bronchial catarrh and anti inflammatory agents^[2]. But to our knowledge there is no any scientific work is available in the literature regarding these properties of *H.umbellata*. Hence it was decided, to investigate these properties of various extracts of *H.umbellata*, in the

present study.

MATERIALS AND METHODS

Plant material

The fresh aerial parts of *H.umbellata* (Rubiaceae) were collected from Tirunelveli (Dt), Tamilnadu, India, in the month of June 2007, and it was authenticated by Dr. D. Stephen, Department of Botany, The American College, Madurai, Tamilnadu, India. A voucher specimen is deposited in the Department of Pharmacognosy, A.K.College of Pharmacy, Tamilnadu. All the chemicals were purchased from S.D. Fine chemicals and all the solvents used were of A.R grade.

Preparation of plant extracts

The collected aerial parts were cleaned, dried under shade and pulverized into coarse powder. The powder was extracted by soxhlet using petroleum ether, ethyl acetate and methanol for 24-36 hrs. All the extracts were filtered, concentrated and evaporated to dryness.

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Animals

Healthy Albino rats of either sex weighing about 150-200 gm were used for the anti inflammatory study. They were fed with standard diet, water and libtum. All the animal experimental protocol has been approved by the institutional animal's ethical committee.

Screening of anti inflammatory activity

1. Carrageenan induced acute paw edema in rats^[3,4,5,6]

In this study 1% carrageenan was used in a dose of 0.1mL as a phlogistic agent (irritant) injected subcutaneous into the plantar aspect of the left hind paw in rats. Albino rats of either sex weighing between 150-200 g were divided into five groups of six animals each. Group 1 animals served as control (normal saline), Group 2 animals received the standard drug (ibuprofen 100 mg/kg/p.o) and Group 3-5 animals received test extracts (100 mg/kg/p.o). After thirty minutes of the above treatment an inflammatory edema was induced with 1% w/v suspension of carrageenan into the sub plantar region of the rats of the rat's hind paw of all the rats.

Immediate after the injection of carrageenan the paw volume was measured in a mercury plethysmograph. There after the paw volume was measured at 1st h, 2nd h, 3rd h and 4th h. The volumes of edema in the drug treated groups were compared in relation to the control group with the corresponding time intervals. Average edema volume for the treated and control rats were noted and expressed as the percentage edema inhibition which was calculates using the formula.

$$\% \text{ edema inhibition} = (1 - V_t/V_c) \times 100$$

Where, V_t = Volume of paw edema in control groups, V_c = Volume of paw edema in treated groups

TABLE 1: Effect of various extracts of *Hedyotis umbellata* on rat's left hind paw edema induced by carrageenan and histamine

Group	Group/ Treatment	Carrageenan					Histamine				
		Volume of Edema in mL at Different hours (h)					Volume of Edema in mL at Different hours (h)				
		1 st h	2 nd h	3 rd h	4 th h	% edema inhibition at 4 th h	1 st h	2 nd h	3 rd h	4 th h	% edema inhibition at 4 th h
Control											
I	(0.9% w/v NaCl)	0.58±0.01	0.6±0.04	0.63±0.004	0.61±0.03	-	0.61±0.002	0.64±0.004	0.69±0.01	0.65±0.002	-
II	Ibuprofen	0.32±0.02	0.34±0.001	0.39±0.01	0.33±0.04	45.90	0.38±0.002	0.46±0.001	0.51±0.05	0.39±0.003	40.0
III	Pet. Ether	0.45±0.01	0.48±0.003	0.53±0.04	0.47±0.005	22.95	0.48±0.001	0.51±0.004	0.55±0.04	0.50±0.003	23.07
IV	Ethyl acetate	0.41±0.002	0.43±0.001	0.46±0.001	0.42±0.002	31.14	0.45±0.004	0.48±0.01	0.51±0.002	0.48±0.006	26.15
V	Methanol	0.39±0.001	0.41±0.02	0.44±0.01	0.40±0.05	34.42	0.41±0.01	0.44±0.003	0.48±0.02	0.45±0.01	30.17

n = six animals in each group; values are mean ± S.E.M; P<0.001 with compared to control

2. Histamine induced paw edema method^[7]

For the study of Histamine induced edema the animals were treated exactly the same method as in carrageenan induced method. But instead of carrageenan, here 0.1 mL of 1% w/v histamine in normal saline (mediators of inflammation) was used.

Statistical analysis

All the values are expressed as mean ± S.E.M. The data were analyzed statistically by student's t-test. P values < 0.001 were considered as significant.

RESULTS AND DISCUSSION

Sub plantar injection of carrageenan and histamine in to the rats paw produced inflammation resulting from plasma extravasations increased tissue water and plasma protein exudation along with neutrophil extravasations, all due to the metabolism of arachidonic acid, either by cyclooxygenase and/or lipooxygenase enzyme pathways.

In carrageenan induced rat paw edema method, 23.95%, 31.14%, 34.42% and 45.90% inhibition was exhibited after 4th h of the extract administration of pet. ether, ethyl acetate, methanolic extracts and ibuprofen respectively. In histamine induced rat paw edema method the total percent of inhibition of edema at 4th hr duration was 23.07%, 26.15%, 30.17% and 40.0% for pet. ether, ethyl acetate, methanolic extracts and ibuprofen respectively (TABLE 1).

The response of carrageenan and histamine induced edema is biphasic, the first phase beginning immediately after injection and diminishing in 1st h, where as, the second phase begins at 1st h and remains through-

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out 3rd h. From this study it has been suggested that the early hyperemia of carrageenan induced edema results from the release of histamine and serotonin. Also, the delayed phase of carrageenan induced rat paw edema results mainly from the potentiating effect of prostaglandin on mediator release, especially of bradykinin^[8]. Hence, it is concluded that the extracts of *H.umbellata* is a potent inhibitor of inflammation and it is confirmed the traditional usage of extracts of *H.umbellata* in the treatment of inflammation and also it is suggested that the anti-inflammatory activity may be produce by inhibiting the several inflammatory mediators^[9].

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