



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; 6(1): 470-471
Received: 28-11-2016
Accepted: 29-12-2016

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Antiinflammatory activity of the methanolic root extract of *Merremia tridentata* (L.) Hall. F

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Abstract

The various extracts of roots of *Merremia tridentata* were tested for anti-inflammatory activity by carrageenan induced paw edema method in rats. A 50% methanolic extract at a dose of 50 and 100 mg/kg body weight showed significant anti-inflammatory activity when compared to control group. Whereas petroleum ether and benzene extracts were found to be less active, which was not significant. Ibuprofen (40 mg/kg) was used as reference standard in the present study.

Keywords: *Merremia tridentata*, methanolic extract, anti-inflammatory, carrageenan.

1. Introduction

Inflammatory diseases including different types of rheumatic diseases are very common throughout the world. Inflammation continues to be an area of great interest for research, probably due to the non-availability of a safer and more effective anti-inflammatory agent. The greatest disadvantage in presently available potent synthetic drugs lies in their toxicity and reappearance of symptoms after discontinuation. Therefore, the screening and development of drugs for their anti-inflammatory activity is still in progress and there is much hope for finding anti-inflammatory drugs from indigenous medicinal plants. Plant derived-products have gained importance apparently due to their abundance, being economic and lesser chances of toxicity and interactions.

Merremia tridentata (L.) hall.f. (Convolvulaceae) is a trailing herb that occurs wild in the coastal region of India^[1]. Traditionally this plant has been used for treating rheumatoid arthritis, constipation, and piles. Aerial part of *Merremia tridentata* has been tested for its wound healing² and anti-inflammatory activity³, so far pharmacological activities of root part of *merremia tridentata* have not been reported scientifically. Hence, in the present study the anti-inflammatory effect of this drug was investigated.

2. Materials and Methods

The roots of *Merremia tridentata* (L.) hall. f. (Convolvulaceae) were collected from Kukkiatte, Udupi, Karnataka state, India. The plant was authenticated by Dr. S. Gopalkrishna Bhat, Department of Botany Science College, Udupi. Shade dried and powdered plant material was subjected to hot continuous extraction (Soxhlet) with Petroleum ether, Benzene and 50 % methanol. Each extract was concentrated on a rotary vacuum flash evaporator to obtain the above respective residues. These residue fractions were suspended in 0.5 % gum acacia and tested for anti-inflammatory activity. All the test materials were administered orally.

Adult Wister albino rats of either sex, weighing between 120 to 150 g were used. They were kept on standardized diet and water *ad libitum*. The animals were treated with *Merremia tridentata* root extracts (50 & 100 mg/kg p.o.) Reference group treated with Ibuprofen (40 mg/kg p.o.) 60 min before injection of 0.1 ml of 1% carrageenan and control group with 0.5% gum acacia.

2.1 Anti-inflammatory Activity

Acute inflammation was produced by sub-plantar injection of 0.1 ml of 1 % carrageenan in normal saline in the right hind paw of the rats⁴ Paw volume was measured plethysmometrically by the method of Chattopadhyay, *et al.*^[5] at '0' hours and 3 hours after carrageenan injection. The percentage of paw edema was calculated.

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2.2 Acute Toxicity Studies

No visible toxicity was observed even after 72 hours of the oral administration of extracts at concentration 500 and 1000 mg/kg body weight in Wister albino rat. All the animal experiments are done as per the CPCSEA, OECD guidelines No. 420 [6].

2.3 Statistical Analysis

Results expressed as mean \pm S.E.M. were evaluated by student's t-test. P- Value less than 0.001 were considered statistically significant.

Table 1: Effect of *Merremia tridentata* root extracts on carrageenan induced paw edema in rats.

Treatment	Dose (mg/Kg)	Mean paw Volume (ml) at 0 hr	Mean paw Volume (ml) at 3 hours	% inhibition of edema at 3 hours
Control (0.5 ml gum acacia)	5 ml	0.91 \pm 0.02	2.50 \pm 0.03	---
Pet. ether Ext.	50 mg	0.90 \pm 0.02	2.35 \pm 0.03	8.9
	100 mg	0.89 \pm 0.03	2.30 \pm 0.02	11.4
Benzene Ext.	50 mg	0.91 \pm 0.02	2.23 \pm 0.03	17.0
	100 mg	0.91 \pm 0.02	2.20 \pm 0.04	18.90
50 % methanol Ext	50 mg	0.90 \pm 0.03	1.05 \pm 0.03	40.30*
	100 mg	0.92 \pm 0.03	1.72 \pm 0.02	49.70*
Ibuprofen	40 mg	0.90 \pm 0.02	1.65 \pm 0.02	52.90*

All drugs were given orally 1 hr prior to carrageenan. n = 5, values are mean \pm SEM; *p<0.001

4. Discussion

Edema represents the early phase of inflammation in carrageenan induced paw edema and is simplest and most widely used acute inflammation model for studying anti-inflammatory agents. The development of edema is believed to be biphasic of which the first phase is mediated by release of histamine, serotonin and kinins in the first hour after injecting carrageenan and the second phase is related to release of prostaglandin like substance in 2-3 hrs [7].

A 50% methanolic extract of the roots of *Merremia tridentata* showed significant anti-inflammatory activity at 3 hours against carrageenan injection, suggesting that the extracts predominantly inhibit the release of prostaglandin like substance from phlogenic stimuli.

The phytochemical studies revealed that it contains flavonoids of type 7-O-methyl apigenine, luteolin, glycoflavones and proanthocyanidins. The other constituents reported are p-hydroxy benzoic acid, gentisic acid, 2-hydroxy 4-methoxy benzoic acid, vanillic acid, syringic acid [8]. The chemical investigation shown the presence of diosmetin, luteolin, disosmetin-7-O- β -D-glucoside and luteolin-7-O- β -n-glucoside [9]. The presence of flavonoids may be responsible for anti-inflammatory activity. There are reports that flavonoids possess anti-inflammatory activity [10, 11].

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3. Results

In this investigation, toxicity studies clearly indicate the non-toxicity of *Merremia tridentata* root extracts. In acute inflammation model, the carrageenan induced paw oedema was significantly reduced by 50% methanolic extract of *Merremia tridentata* when compared to standard Ibuprofen. Hence, the results of the present investigation suggest that roots of *Merremia tridentata* have significant anti-inflammatory activity against carrageenan induced paw oedema as shown in table No. 1.

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