



## Research Article

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### ANTI-INFLAMMATORY ACTIVITY OF LEAF OF *MELASTOMA MALABATHRICUM* L. (MELASTOMATACEAE)

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#### ABSTRACT

In the present study, *Melastoma malabathricum* leaf was extracted with ethanol and evaluated for anti-inflammatory activity in rats using a carrageenan induced paw edema method. Ethanol extract exhibits potent anti-inflammatory activity at 500mg/kg at 3hr after administration. The study was compared with standard drug indomethacin (10mg/kg). Observed pharmacological activity in the present study provides scientific validation of ethnomedicinal uses of this plant in treating acute inflammation.

**Keywords:** *Melastoma malabathricum*, Paw edema, Carrageenan.

#### INTRODUCTION

Despite progress within medical research during the past decades, the treatments of many serious diseases remain problematic<sup>1</sup>. Chronic inflammatory diseases remain one of the world's major health problems<sup>2</sup>. Currently, both steroidal anti-inflammatory drugs and Non-Steroidal Anti-Inflammatory Drugs (NSAID<sub>s</sub>) are used in the relief of inflammation. Steroids have an obvious role in the treatment of inflammatory diseases, but due to their toxicity, can be used over short periods. Prolonged use of NSAID is also associated with severe side effects<sup>3</sup>. Consequently, there is a need to develop new anti-inflammatory agents with minimum side effects<sup>4</sup>.

*Melastoma malabathricum* belongs to the Melastomataceae family. It is also called Singapore Rhododendron or Senduduk. It is an erect shrub or small tree 1.5-5m tall. It was traditionally used to treat diarrhea, dysentery, leucorrhoea, hemorrhoids, wounds and infection during confinement, toothache, flatulence, sore legs and thrush and it was used by the Jah hut people in Malaysia to cure diarrhea<sup>5</sup>.

To present knowledge, no reports on the effects of this plant on experimental inflammation available. This study was therefore under taken to evaluate the effects of an ethanol extract of the leaf of *Melastoma malabathricum* on anti-inflammatory activity in carrageenan induced rat paw edema method.

#### MATERIALS AND METHODS

##### Collection of plant sample

Leaves of *Melastoma malabathricum* was collected from Dandeli, Joide Taluk, Hubli District, North Karnataka. With the help of local flora, Voucher specimens (VOCB 1678) were identified and preserved in the Ethnopharmacology Unit, Research Department of Botany, V.O.Chidambaram College, Tuticorin, Tamil Nadu for further references.

##### Preparation of plant extract for anti-inflammatory activity

The leaf of *Melastoma malabathricum* were cut into small pieces, washed, shade dried at room temperature and the dried leaves was powdered in a Wiley mill. Hundred grams of leaf powder was packed in Soxhlet apparatus and extracted with ethanol. Extracts were concentrated in a rotary evaporator. The concentrated ethanol extract was used for anti-inflammatory activity.

##### Animals

Adult Wistar albino rats of either sex (150-200g) were used for present investigation. Animals were housed under standard environmental conditions at temperature (25±2°C) and light and dark (12:12 hr). Rats were feed standard pellet diet (Goldmohur brand, MS Hindustan lever Ltd., Mumbai, India) and water *ad libitum*. Study was carried out as per Samsun clinical laboratory in Tirupur, IAFC approval No: 82/PHARMA/SCRI,2010

##### Acute toxicity study

For toxicity studies, six albino rats of either sex were administered orally with the test substance in the range of doses 200-2000mg/kg and the mortality rates were observed after 72hr. The ethanol extract of *Melastoma malabathricum* has shown no mortality at 2000mg/kg. Therefore 2000mg/kg dose was considered as LD<sub>50</sub> cut off dose (safe dose), 1/8th and 1/4th of that were selected (250 and 500 mg/kg) for the experiment as sub-maximal and maximal dose respectively.

##### Anti-inflammatory activity

##### Carrageenan-induced hind paw edema

Albino rats of either sex weighing 150-200grams were divided into 4 groups of six animals each. The dosage of the drugs administered to the different groups was as follows. Group I- Control (normal saline 0.5ml/kg), Group II and Group III - *Melastoma malabathricum* ethanolic extract (250 and 500mg/kg, p.o.) respectively and Group IV- Indomethacin (10mg/kg,p.o.). All the drugs were administered orally.

After one hour of the administration of the drugs, 0.1 ml of 1% w/v carrageenan solution in normal saline was injected into the sub-plantar tissue of the left hind paw of the rat and the right hind paw was served as the control. The paw volume of the rats were measured in the digital plethysmograph (Ugo basile, Italy), at the end of 0 min, 60min, 120min and 180min. The percentage increase in paw edema of the treated groups was compared with that of the control and the inhibitory effect of the drugs were

studied. The relative potency of the drugs under investigations was calculated based upon the percentage inhibition of the inflammation. Percentage inhibition was calculated using the formula;

$$\text{Percentage inhibition} = [(V_c - V_t) / V_c] \times 100$$

Where,  $V_t$  the percentage represents the percentage difference in increased paw volume after the administration of test drugs to the rats and  $V_c$  represents difference of increased volume in the control groups.

**Table 1: Anti-inflammatory activity of *Melastoma malabathricum* leaf extracts against carrageenan induced paw edema model**

Treatment	Dose (mg/kg)	Edema volume (ml)				% Inhibition After 180 min
		0 min	60 min	120 min	180 min	
Control (Group -I)	Normal saline	29.83±1.23	55.91±1.87	94.23±1.89	148.34±2.35	-
<i>Melastoma malabathricum</i> leaf extract (Group -II)	250 mg/kg	27.23±1.44	84.49±1.63	62.13±1.32*	72.42±1.21*	51.17
	500 mg/kg	23.83±1.41	37.49±1.95**	43.67±1.28**	34.34±1.42***	76.85
Indomethacin (Group -III)	10 mg/kg	27.83±1.72	39.89±1.34**	35.27±1.62**	30.22±1.57***	79.62

Each Value is SEM ± 5 individual observations \*\* $p < 0.01$ ; \*\*\* $p < 0.001$  compared paw edema induces control Vs drug treated rats.

## RESULTS AND DISCUSSION

The anti-inflammatory activity of extract of *Melastoma malabathricum* was calculated by carrageenan- induced paw edema method in albino rats. In model, *Melastoma malabathricum* at doses of 250 and 500mg/kg caused significant inhibition of paw edema by 51.17% ( $p < 0.05$ ) and 76.85% ( $p < 0.001$ ) respectively, 3hrs after carrageenan administration (Table 1). It shows that the plant extract have significant anti-inflammatory effect and the results were compared with indomethacin (79.62%).

Inflammation is a common phenomenon and it is a reaction of living tissues towards injury<sup>6,7</sup>. The carrageenan induced paw edema test is widely accepted as a sensitive phlogistic tool for investigating potential anti-inflammatory agents, particularly the non-steroidal type. The development of edema in the paw of the rat after the injection of carrageenan is due to the release of histamine, serotonin and prostaglandin. Acute hind paw edema is induced in rats by injecting 0.1 ml of 1% w/v carrageenan which reaches a peak edema levels at 3-5hours after carrageenan injection. Prostaglandin- $E_2$  powerful vasodilator, synergizes with other inflammatory vasodilators such as histamine and bradykinin and contributes to the redness and increased blood flow in areas of acute inflammation<sup>8,9</sup>. In the present study the extracts were tested at 2 different dose levels to know if they were dose dependent. From the results obtained the leaf ethanol extract showed highly significant activity ( $p < 0.001$ ) comparable to the reference drug used (250 and 500mg/kg), there was a significant differences in their anti-inflammatory activity hence they were found to be dose-dependent.

2-(3,5-Diphenyl-pyrazole-1-yl)benzothiazole and (+)-3,4-Dehydroproline amide were reported in the ethanol extract of *Melastoma malabathricum* leaf by GC-MS analysis. These compounds may have the role in anti-inflammatory effect. Further studies will be carried out to isolate and characterize other anti-inflammatory chemical constituents present in the ethanolic extract of this plant.

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## REFERENCES

- Bohin L. Structure-activity studies of natural products with anti-ndon Press, Oxford.1995; 137-161.
- Yesilada E, Ustun O, Seik ZE, Takaishi Y, Ono Y, Honda G. Inhibitory effect inflammatory effects In: phytochemistry of plants used in traditional Medicine. Edk.Hostettmann. Charles of Turkish folk remedies on inflammatory cytokine: interleukine-1 $\alpha$ , interlenkin- 1 $\beta$  and tumour necrosis factor J. of Ethnopharmacol 1997; 58: 59-73.
- Miller TA. Protective effects of prostaglandins against gastric mucosal damage: current knowledge and proposed mechanism. American J. of Physiol 1983; 245: 601-623.
- Vane JR, Boffing RM. Inflammation and the metabolism of actions of anti-inflammatory drugs. FASEB Journal 1987; 1:89-96.
- Sunilson JAJ, Anandarajagopal K, Kumari AVAG, Mohan S. Antidiarrhoeal activity of leaves of *Melastoma malabathricum*. Indian J Pharm S 2009;71; 691-695. <http://dx.doi.org/10.4103/0250-474X.59556> PMID:20376227 PMCid:2846479
- Mohamad STK, Azeem AK, Dilip C, Sankar C, Prasanth NV, Duraisami R. anti-inflammatory activity of leaf extracts of *Gendarussa vulgaris* Nees. Asian J Trpo Biomed 2011; 4(2):147-149.
- Tian YQ, Kou JP, Li LZ, Yu BY. Anti-inflammatory effects of aqueous extract from radix *Liripoe* muscari and its major active fraction and component. Chin J Nat Med 2011; 9(3): 222-226.
- Georgewill OA, Georgewill UO. Nwankwoala RNP, Anti-inflammatory effects of *Moringa oleifera* lam extract in rats. Asian Pac J Trop Med 2010; 3(2):150-151. [http://dx.doi.org/10.1016/S1995-7645\(10\)60052-1](http://dx.doi.org/10.1016/S1995-7645(10)60052-1)
- Georgewill OA, Georgewill UO. Evaluation of the anti-inflammatory activity of extract of *Vernonia amyglalina*. Asian Pac J Trop Med 2010; 3(2):150-151. [http://dx.doi.org/10.1016/S1995-7645\(10\)60057-0](http://dx.doi.org/10.1016/S1995-7645(10)60057-0)

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