

## Comparative anti-inflammatory activity studies of three species of *bharangi*

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### ABSTRACT

The aim was present study of different species of Bharangi (*Clerodendron serratum*, *Premna herbaceae* and *Gardenia resinifera*) for anti-inflammatory activity investigation in carrageenan – induced rat paw oedema. The ethanol extracts of roots of various species of bharangi exhibited significant anti-inflammatory activity at a dose of 350 mg/kg (po), when compared to control group. The activity is compared with standard phenylbutazone (PB). It was found that there was a significant reduction in the oedema in the groups treated with 70% ethanol extracts of PH, followed by CS and GR when compared to control. Bharangi is an important drug. In Ayurvedic, description of drugs by various classics and compilation have created controversies with regards to the authentic botanical source. One such a drug is bharangi, where roots of CS, PH and GR are used in different parts of country. Three species have been investigated. The plants have been graded based on anti-inflammatory activity.

**Key words:** anti-inflammatory, *bharangi*

### INTRODUCTION

In the Present study, the roots of different species of *Bharangi* (*Clerodendron serratum*, *Premna herbaceae* and *Gardenia resinifera*) were investigated for anti-inflammatory activity in carrageenan – induced rat paw oedema. The ethanol extracts of roots of various species of *bharangi* exhibited significant anti-inflammatory activity at a dose of 350 mg/kg (po), when compared to control group. The activity is compared with standard phenylbutazone (PB). *Premna herbaceae* (PH) and *Clerodendron serratum* (CS) were found to exhibit significantly more anti-inflammatory activity when compared to *Gardenia resinifera* (GR).

*Bharangi* is an important drug. In Ayurveda, description of drugs in various classics and compilation has resulted in several plants being used as same drug, creating controversies with regards to the authentic botanical source. One such a drug is *bharangi*, where roots of CS, PH and GR are used in different parts of country. The different parts of

the plants are used either singly or as an ingredient in the ayurvedic preparation which are claimed to be useful in the treatment of bronchitis, asthma, hiccough, bloodpressure, epilepsy, antiperiodic, cathartic, antispasmodic, etc<sup>1-4</sup>. However the ayurvedic practitioners use three different plants, CS, PH and GR. In the present study, anti-inflammatory activity of these three species has been investigated. The plants have been graded based on anti-inflammatory activity, which would help to monitor dose better during their therapeutic activity.

The roots of CS, PH and GR were collected at Devarayana Durga forest, Tumkur district, Karnataka. These were identified and authenticated with the herbarium specimens obtained from the centre for ecological science, Indian Institute of science (I.I.Sc) Bangalore. A voucher specimen has been deposited in the institute. The shade dried roots were powdered to particle size No:60 and subjected to soxhlet extraction with different solvents starting from petroleum ether followed by benzene,

chloroform acetone and ethanol (70%).The extracts were concentrated by rotary vaccum flash evaporator and the residue was collected. A suspension was prepared in gum acacia (2%).

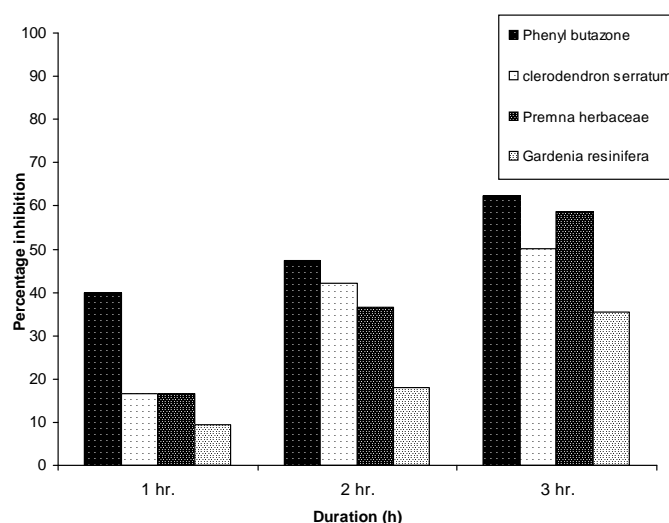
Anti inflammatory activity was evaluated using carrageenan – induced rat hind paw oedema model<sup>5</sup>. Albino rats of either sex, weighing between (200-250g) were divided into eight groups of six animals each and were given the following treatment Group I( control) received 2 ml of 2% gum acacia orally. group II,( standard) received 150 mg/kg PB. Group III, IV, and V received the ethanol extracts of *CS*, *PH* and *GR* at 350mg/kg dose orally respectively.

After 1h, rats were administrated with subcutaneous injections of 0.05 ml of w/v solutions of carrageenan into the plantar surface of the right hind paw. The paw was marked with ink at the level of lateral malleolus and immersed up to this mark. The paw volume was measured plethismographically at zero hour i.e immediately after injection and followed by every hour till 3 hour after injection of carrageenan to each group. The difference between the initial and subsequent readings gave actual oedema volume.

Percentage of inhibition of inflammation was calculated using the formula % inhibition = 100

$(1 - V_t/V_c)$ , where  $V_c$  represents oedema volume in control and  $V_t$  is oedema volume in group treated with test compounds. The data was analysed using student 't' test and was found significant  $P<0.05$ ) at 2hour and highly significant  $P<0.001$  at 3 hour intervals. The % inhibition of rat paw oedema in the treated group compared to control at 1 hour was  $PB>CS>PH>GR$ ; at 2 hour was  $PB>CS>PH>GR$  and at 3 hour was  $PB>CS>PH>GR$ .The results represented as % inhibition of inflammation are presented in fig. 1.

Carrageenan-induced inflammation is a biphasic phenomenon<sup>6</sup>.The first phase of oedema is attributed to the release of histamine and 5 hydroxytryptamine. Plateau phase is maintained by kinin like substances and second accelerating phase of swelling is attributed to prostaglandin like substances<sup>7</sup>.The knowledge of these mediators involved in different phases is important for interpreting mode of drug action. In carrageenan-induced rat paw oedema test, it was found that there was a significant reduction in the oedema in the groups treated with 70% ethanol extracts of *PH*, followed by *CS* and *GR* when compared to control. Thus it can be concluded that ethanol extract of *PH* and *CS* possess almost equal significant anti inflammatory activity. This study may be useful for monitoring the dosage with reference to botanical species and percentage of biological activity for deriving prescribed therapeutic efficacy.



**Fig. 1: The anti-inflammatory activity of clerodendron serratum Premna herbaceae & gardenia resinifera**

Table 1: Data showing anti – inflammatory activity of 70% alcoholic extracts of three drugs and phenyl butazone on rat paw oedema model

Group	Drug	No. of animals	Average wt. of animals	Dose Mg/kg body wt	1 Hour			2 Hour			3 Hour		
					mean O.V.	S.E.M. +OR-	R.O.V. %	Mean O.V.	S.E.M. +OR-	R.O.V. %	Mean O.V.	S.E.M. +OR-	R.O.V. %
I.	Control	6	210.80	350	0.15	0.0236	-	0.36	0.0389	-	0.69	0.055	-
II.	Phenylbutazone	6	210.00	150	0.09	0.002	40.00	0.19	0.003	47.25	0.26	0.004	62.30
III.	ClerodendronSerratum	6	205.18	350	0.125	0.012	16.66	0.21	0.028	42.14	0.31	0.038	50.07
IV.	PremnaHerbaceae	6	215.10	350	0.125	0.009	16.66	0.23	0.011	36.63	0.285	0.007	58.69
V.	GardeniaResinifera	6	220.00	350	0.136	0.024	9.33	0.298	0.002	17.90	0.445	0.043	35.50

Where

Mean O.V. = Mean oedema volume

S.E.M. = Standard error mean

R.O.V. = Reduction in oedema volume

t (10, 0.05) = 2.228

t cal at 3 hour = 6.4112, 8.8177 and 3.9108 for III, IV &amp; IV group drugs

t cal &gt; at (10,005), there is a significant difference between control and test drugs – the drugs are significant

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