



# International Journal of Pharmaceutical Research and Development (IJPRD)

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## EFFECT OF *CARDIOSPERMUM HALICACABUM* L. VAR. *MICROCARPUM* (KUNTH) BLUME SEED OIL ON ACUTE AND SUBACUTE INFLAMMATION.

G.Jayanthi<sup>1\*</sup>,

T.Sathishkumar<sup>2</sup>, T.Senthilkumar<sup>3</sup>, M.Jegadeesan<sup>4</sup>

<sup>1</sup>Department of Botany Vellalar College For Women (Autonomous) Erode – 638 012, Tamil Nadu, India.

<sup>2</sup>Department of Chemistry M,A.M. College of Engineering and Technology Trichy-621105

<sup>3</sup>Department of Botany Govt. Arts College (Autonomous) Salem-636 007, Tamil Nadu, India

<sup>4</sup>Dept. of Environmental and Herbal Sciences, Tamil University, Thanjavur, Tamil Nadu, India.

### ABSTRACT

The anti-inflammatory activity of the oil (petroleum ether extract) of *Cardiospermum halicacabum* L. var. *microcarpum* seed was investigated on carrageenin induced hind paw oedema and cotton pellet granuloma models in albino rats, to find the pharmacological basis for its ethnomedical use. The paw volume was measured plethysmometrically at 0, 1, 3, and 5 hours. In the subacute model, cotton pellet granuloma was produced by implantation of 10±1 mg sterile cotton in the axilla under ether anesthesia. The rats were fed with an oil at various dose levels (3.3, 6.6 and 9.9ml/kg). Dichlofenac sodium was used as standard drug. The oil produced a significant dose dependent inhibition against the tested models. The oil (9.9ml/kg) showed the maximum inhibition at the end of 3h. In carrageenin-induced rat paw oedema. In sub acute inflammation the oil exhibited a 68.57% reduction in maximum dose.

**KEYWORDS** : *Cardiospermum halicacabum*, *dichlofenac sodium*, *paw oedema*, *cotton granuloma*, *anti-inflammatory*.

### INTRODUCTION

*Cardiospermum halicacabum* L. var. *microcarpum* (Kunth) Blume. (Family: Sapindaceae) is a deciduous, branching herbaceous climber, which is distributed throughout the tropical and subtropical regions<sup>1&2</sup>. The whole plant has been used for several centuries in the treatment of rheumatism, stiffness of limbs, snake bite<sup>3</sup>. The roots act as a diaphoretic, diuretic, emetic, emmenagogue,

laxative, refrigerant, stomachic and sudorife<sup>4</sup>. Leaves and stalks are used in the treatment of diarrhoea, dysentery and headache<sup>5</sup>. Phytochemical constituents such as flavones, aglycones, triterpenoids, glycosides and a range of fatty acids and volatile ester have been reported from the various extracts of this plant,<sup>6,7&8</sup>; and Chilsholm and Hopkins, 1958). The seeds of this plant has been used for anticancerous<sup>9</sup> and the seed oil has

### Correspondence to Author

G.Jayanthi

Department of Botany Vellalar  
College For Women (Autonomous)  
Erode – 638 012, Tamil Nadu, India

Email: jayanthi\_tu@yahoo.co.in

been found to have insect repellent properties<sup>10</sup>. However, the seed has not been experimentally tested for its anti-inflammatory activity. Hence, an effort was made to investigate the same with seed oil in experimentally induced in rats.

## MATERIALS AND METHODS

### Plant material

The seeds of *C.halicacabum* var. microcarpum were collected from Thirumalairayan Pattinam, Karaikal, Union Territory of Puducherry, India. The botanical identity was confirmed by a qualified botanist in the Dept, of Environmental and Herbal Sciences, Tamil University and they were identified with help of Floras<sup>11,12&13</sup>. A voucher specimen TUH51A has been kept at the Tamil University Herbarium, Thanjavur for future reference.

### Isolation of seed oil

Fatty oil was quantitatively extracted from the seeds with petroleum ether at 60-80°C through soxhlet apparatus<sup>14</sup>. The oil was stored in sealed vials in a refrigerator (5-8) and subjected for screening of anti-inflammatory studies.

### Animals used

Adult albino Swiss male rats weighing 130-150g were used. They were housed in standard micro lon boxes and were given standard laboratory diet and water ad-libitum.

### Carrageenin- induced rat paw Oedema.

The rats were divided into five groups (n=6) and group one served as a negative control (received 0.75% CMC, 5ml/kg). The second group was administrated diclofenac sodium (5mg/kg) as a standard drug; while the other groups were given oil (3.3, 6.6 and 9.9 ml/kg) orally. Oedema was produced by the method described by Winter<sup>15</sup>. The paw volume was measured plethysmographically just before and 1,3 and 5h. after the injection of carrageenin. The apparatus

used for the measurement of rat paw volume was that of, Buttle<sup>16</sup>. Drug pretreatment was given 1h. before the injection of carrageenin in the mean increase in paw volume was measured and the percentage inhibition was calculated.

### Cotton pellet granuloma

Sub acute inflammation was produced by the method described by Winter and Porter<sup>17</sup>. Sterile cotton (10±1mg) soaked in 0.2ml of distilled water containing penicillin (0.1mg) and streptomycin (0.13 mg) was implanted subcutaneous bilaterally in the axilla under ether anaesthesia. The animals were divided into five groups (n=6). Oil (3.3, 6.6 and 9.9 ml/kg), diclofenac sodium and control vehicle were administered daily for 7 days. (0-7 days). On day 8 the pellets were dissected out, dried at 60°C, and dry weight was determined. The weight of the cotton pellet before implantation was subtracted from the weight of the dried dissected pellets. All the results were statistically analysed by student's t-test.

## RESULT AND DISCUSSION

In the acute inflammation model, the oil showed maximum and dose dependent inhibition in the carrageenin induced rat paw oedema over a period at 5h, (Table.1). Oedema suppressant effect of all treated groups were to be significant (P<0.001) as compared to control. Both standard and candidate drugs showed maximum activity in 3h. and the activity decline thereafter. But 5h. the effect of oil at 9.9ml/kg almost equal to standard drug diclofenac sodium, (5mg/kg). In the subacute inflammation model, the weight of the granulation tissue formation was significant (P<0.001) reduced in all the groups of test and diclofenac sodium. The inhibitory effect of tested doses were 50%, 61% and 68.5% respectively (Table.2).

**Table 1.** Effect of oil of *C.halicacabum* L. var *microcarpum* on carrageenin induced rat paw oedema.

Group (n=6)	Dose	1h	3h	5h
Control	5ml	0	0	0
Dichlofenac sodium	5mg/kg	55.03	73.08	63.64
Oil	3.3ml/kg	28.18	30.91	29.28
Oil	6.6ml/kg	44.83	47.72	49.6
Oil	9.9ml/kg	55.95	65.30	59.26

Figures in parenthesis indicate the % of inhibition

P.value was calculated by student's t-test compared to control. (P≤0.001).

**Table 2.** Effect of oil of *C.halicacabum* L. var *microcarpum* on subacute inflammatory model in rats.

Group (n=6)	Dose	Weight of dry cotton pellet granuloma (mg) (mean±SD)	Percentage of inhibition (mean±SD)
Control 0.75% CMS	5	87.117±4.386	-
Dichlofenac sodium	5mg/kg	17.2±0.905	80.20
Oil	3.3	43.517±3.099	50.00
Oil	6.6	34.05±1.409	60.91
Oil	9.9	27.38±1.114	68.57

P≤0.001 vs control student's t-test

Days of drug treatment=10.

This indicates action against release of histamine, serotonin and kinins in early phase, while later phases suspected to be arachidonate metabolites producing an oedema dependent on mobilization of neutrophils<sup>18</sup>. Moreover carrageenin induced paw oedema are more effectively controlled with arachidonate cyclo-oxygenase inhibitors than arachidonate lipo-oxygenase inhibitors<sup>19,20,21,22&23</sup>. In case of cotton pellet-induced granuloma oil exhibited significant reduction. The response to subcutaneously implanted cotton pellet in rats has been divided into three phases: a transductive, exudative and a proliferative phase<sup>24</sup>. These results rather suggest that the extracts inhibit the proliferative phase of inflammation.

Thus seed oil of *C.halicacabum* var. *microcarpum* could be successfully used for inflammatory condition equally as their aerial parts. Presence of arachidic acid, oleic acid, erucic acid and decanoic acid are the major component of the seed oil of *C.halicacabum* and these might be responsible for anti-inflammatory activity.

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