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## ***In vivo* anti-inflammatory activity of the endemic medicinal plant *Caralluma sarkariae* R.Br. using Carrageenan induced paw oedema in swiss albino mice**

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### **Abstract**

*Caralluma sarkariae* is a succulent, endangered and endemic plant from southern Western Ghats. This species has used by ethnomedicinal practices by traditional healers of Southern Tamilnadu. Traditionally the plant has been used as the treatment of Rheumatism, ulcer, asthma, fever, inflammation, diabetes, stress, cancer and obesity. The methanolic extract of *C. sarkariae* was investigated for anti-inflammatory activity by carrageenan induced paw oedema method. The result indicated that the methanolic extract at the dose of 150mg/kg b.wt showed a maximum anti-inflammatory activity at 69% as compared to the standard drug. The findings of the study suggest that the methanolic extract of *C. sarkariae* showed significant activities which confirm the traditional usage of this medicinal plant to treat the inflammatory diseases.

**Keywords:** *Caralluma sarkariae*, methanol extract, carrageenan and paw oedema

### **1. Introduction**

The term inflammation means burn which is derived from the Latin word – Inflammare. Inflammation generally includes an order of events which can be considered under three phases viz. acute transient phase, delayed sub-acute phase and chronic proliferate phase. Inflammation results in the liberation of endogenous mediators like histamine, serotonin, bradykinin, prostaglandins etc. Prostaglandins are ubiquitous substances that indicate and modulate cell and tissue responses involved in inflammation. These mediators even in small quantities can elicit pain response (Anilkumar, 2010) <sup>[1]</sup>. Medicinal plants are the main sources of chemical substances with potential therapeutic effects. Now-a-days herbal drugs are routinely used for curing diseases rather than chemically derived drugs having side effects. Herbal medicines derived from plant extracts are being increasingly utilized to treat a wide variety of diseases. The biologically active substances derived from plants may have poor pharmacological or toxicological profiles for the use of human perspectives. There is a growing interest in the pharmacological evaluation of various plants used in Indian traditional systems of medicine.

*Caralluma sarkariae* (Apocynaceae) is an endemic and endangered medicinal plant in southern Western Ghats. It is a succulent herb found South and East India. *C. sarkariae* is an indigenous medicinal plant, has a folk (Siddha and Ayurvedha) reputation in rural southern India. Traditionally, the plant has been in use as an anti-inflammatory, diabetes, expectorant, carminative, digestive, stomachache, asthma, anti-stress, cancer, tumor, diabetes, rheumatism, paralysis, joints pains, fever, ulcer and obesity (Zakaria *et al.*, 2008) <sup>[12]</sup>. Thus, the present investigation was carried out to evaluate the anti - inflammatory potential of *C. sarkariae* in experimental animal model.

### **2. Materials and methods**

#### **2.1 Collection of plant material**

The whole plant part of *Caralluma sarkariae* R.Br. was collected during the month of January 2016, from Virudhunagar district, Southern Western Ghats of Tamilnadu. The plant was identified and authenticated by a plant taxonomist.

*In vivo* Anti-inflammatory activity Carrageenan-induced paw oedema in swiss albino male mice (Winter and Poster, 1957) <sup>[11]</sup>

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All the animals were divided into 5 groups comprising five animals in each group. In all groups acute inflammation was produced by sub-plantar injection of 0.1ml freshly prepared 1% suspension of carrageenan in normal saline in the right hind paw of the mice and paw volume was measured differential volume meter at 0 to 180 mins after carrageenan injection. All the animals were premedicated with indomethacin (10mg/kg b.wt.) orally two hour before infection. Mean increase in paw volume was measured and percentage was calculated for all the extracts. All the extracts were subjected for acute toxicity studies and 1/10th of the LD50 dose was selected for pharmacological activity. Percentage inhibition of paw volume was calculated by the following formula

$$V_c - V_t$$

$$\% \text{ inhibition} = \frac{\text{-----}}{V_c} \times 100$$

$$V_c$$

**Table 1:** *In vivo* anti-inflammatory activity of methanolic extract of *Caralluma sarkariae* on carrageenan induced paw oedema in swiss albino male mice

Treatment Groups	Concentrations of doses	Paw thickness (mm)				% Inhibition
		0 min	60 min	120 min	180 min	
Group I	Normal saline	5.49±0.06	7.67±0.04	9.01±0.12	10.22±0.08	--
Group II	100 (mg/kg)	5.30±0.02	5.25±0.05	4.98±0.17	3.62±0.21	65
Group III	150 (mg/kg)	5.27±0.06	5.16±0.10	4.62±0.40	3.18±0.09	69
Group IV	10 (mg/kg)	5.18±0.50	4.50±0.04	3.99±0.10	2.61±0.10	75

Value is SEM ± 5 individual observations

Group I : Control mice given normal saline

Group II: Mice given methanolic extract of *C. sarkariae* at the dose of 100mg/kg b.wt.

Group III: Mice given methanolic extract of *C. sarkariae* at the dose of 150mg/kg b.wt.

Group IV: Mice given Indomethacin at the dose of 10mg/kg b. wt.

Carrageenan induced oedema of rat foot is used widely as a working model of inflammation in the search for new anti-inflammatory agents and appeared to be the basis for the discovery of Indomethacin, the anti-inflammatory drug. Dale and Foneman, 1984 reported that the steroidal anti-inflammatory drugs reduce the vasodilation which occurs during inflammation. The non-steroidal anti-inflammatory drugs block prostaglandin and thromboxane formation by inhibiting cyclooxygenase activity. According to Dassoler *et al.*, 2004 the inflammatory mediators such as cytokine, histamine, serotonin, leukotrienes and prostaglandin increase the vascular permeability to all on the migration leukocytes cells to act on the site of inflamed tissue. Any interruption of this sequence of events results in the reduction of the liberation of the mediators causing the microcirculation to come back to normal hemodynamic state (Lope *et al.*, 1987) [6]. Carrageenan induced inflammation is useful in detecting orally active anti-inflammatory agents which is acting through mediators of acute inflammation (Badole *et al.*, 2012) [2]. The extract exhibited the paw oedema in last phase of inflammation and it may be attributed to the inhibition of the release of pro-inflammatory mediators like prostaglandins. Most of the apocyanaceae members have anti-inflammatory potential. The ethyl alcohol extract of *Wrightia tinctoria* (Apocyanaceae) showed 70% protection of HBRC in hypotonic solution (Rajalakshmi and Jyothi, 2012) [7]. The ethanolic extract of seeds of *Holarrhea pubescens* showed significant activity against inflammation (Santanu and subramaniyam, 2013) [8]. The leaf extract of *H.*

Where

Vt- means increase in paw volume in mice treated with test compounds

Vc- means increase in paw volume in control group of mice.

### 3. Result and Discussion

The anti-inflammatory activity of methanolic extracts of *C. sarkariae* was evaluated by carrageenan induced paw oedema method. Methanolic extracts of *C. sarkariae* was tested at 100mg/kg b.wt. and 150mg/kg b.wt dose levels significantly reduced the carrageenan induced paw oedema inflammation as compared with that of the standard drug, indomethacin. This result indicated that the methanolic extract at the dose of 150mg/kg b.wt showed a maximum anti-inflammatory activity at 69% as compared to the standard drug. The methanolic extract of *C. sarkariae* at dose of 150mg/kg b. wt, produced significant inhibition (Table-1).

*antidysenterica* exhibited effective synthesis of prostaglandins. Hence it is showed anti-inflammatory activity (Sujan *et al.*, 2010) [10]. The aqueous fruit pulp extract of *Hunteria umbellata* has been showed the inhibition against acute inflammation (Igbe *et al.*, 2010) [5]. The ethanolic extract of *Alafia barteri* (100mg/kg) caused a significant inhibition against carrageenan induced paw oedema test (Sofidiya *et al.*, 2014) [9].

### 4. Conclusion

In modern era the trend towards the use of alternative and complementary green medicine is increasing and it offers extraordinary chances for the development of herbal medicine. Although methanolic extract of *C. sarkariae* exhibited significant anti-inflammatory activities exact mechanisms underlying the observed pharmacological effects can only be elucidated after isolation of active components using a wide range of experimental models.

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