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Antiinflammatory Activity of Ethanolic and Aqueous Extracts of *Caralluma adscendens*

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ABSTRACT

The aim of present study was to evaluate anti-inflammatory activity of aqueous and ethanolic extracts of whole plant of *Caralluma adscendens* in rats. The anti-inflammatory activity was evaluated by using Digital Plethysmometer. The study was carried out by using dose of 250 mg /kg of ethanolic and aqueous extract orally. All extract showed significant activity for all dose as compared to diclofenac sodium (10mg/ kg) against carrgenen induced rat paw edema. The percentage inhibition was also noted for both the extract.

Keywords: *Caralluma adscendens ; Carrageenan ;* Anti-inflammatory activity.

INTRODUCTION

Herbal drugs have been used since ancient times as medicines for the treatment of range of diseases. Medicinal plants have played a key role in world health. In spite of the great advances observed in modern medicine in recent decades, plants still make an important contribution to health care. A large proportion of the Indian population for their Physical and Psychological health needs depend on traditional systems of medicine. Medicinal plants have become the focus of intense study in terms of conservation and as to whether their traditional uses are supported by actual pharmacological effects or merely based on folklore (1).

The genus *Caralluma* (Asclipiadaceae), which are comprises about 200 genera and 2500 species. The member of the genus is small plant, erect, fleshy. They have four grooved stems, round shape devoid of leaves and small flowers in several varieties of dark colors. The species of Caralluma found in India are edible and form part of the traditional medicine system of the country (2). The genus *Caralluma adscendens* is a very variable herbs, up to 1 m. in height, with fleshy, almost leafless stems, deep purple-brown or yellowish white flowers, and 10-12 cm slender follicles, distributed in peninsular India from Andhra Pradesh and Maharashtra to Kerala upto 600 m. The herb cotains hydrocarbon, n-pentatriacontane and a glycoside. In addition to Caralluma species commonly used in treatment of rheumatism, diabetes, leprosy, antipyretic and anthelmintic, for tumor, fungal diseases, snake, scorpion bite and antinociceptive activity (3,4) .

MATERIALS AND METHODS

Plant Material

The whole plant was collected from hills of tribal areas with the help of local villagers of west Maharashtra region in the month of June-July. It was authenticated at S. G. M. College, Karad, Satara.

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Preparation of Extract

The whole plant was collected and dried under shade, powdered in mixture and sieved through sieve no.14. and stored in air tight containers .The weighed quantity (200 gm) of dried powdered drug was subjected to successive solvent extraction method by using Petroleum ether (60-80 ^{0}c), Benzene, Chloroform, Acetone, Ethanol in soxhlet extractor and lastly with water by maceration process. The all extracts were concentrated and last trace of solvent was removed by applying vacuum. All extracts were stored in air tight light resistant container in dry place. The extracts of whole plant were subjected to phytochemical screening the aqueous and ethanolic indicated the presence of alkaloids, phenolic compounds, flavonoids and tannins(5).

Animals

Albino wistar rats of either sex weighing between 150 to 250 gms were used. The animals (six per cage) were housed in polypropylene cages under standardized animal house condition (12 hrs light and dark cycles, at 25± 2^o C, relative humidity 55 ±5%) and had free access to standard pellet diet and water *ad libitum.* The Institutional Animal Ethical Committee had approved all the procedures. Experimental studies were undertaken according to their rules and regulations(6).

Anti-inflammatory activity

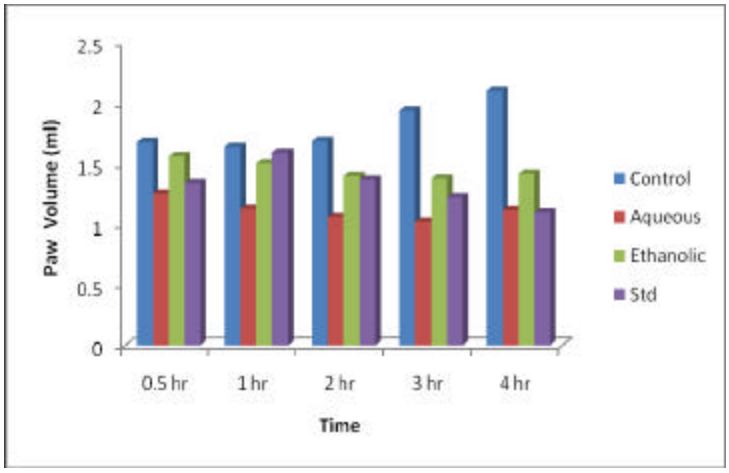
Ethanolic and aqueous extracts of whole plant was evaluated for anti inflammatory activity by carrageenan induced hind paw edema method (7). Albino rats of either sex weighing 200-250 gm were divided in four groups of six animals each. The first group served as a control, second and third test groups were received aqueous and ethanolic extracts in dose of 250 mg/kg respectively and the fourth group was treated with reference standard (received diclofenac 10 mg/kg orally) . Animals were treated with extracts by oral route and subsequently one hour after treatment, 0.1 ml of 1% w/v suspension of carrageenan (Sigma chemicals co., USA) in normal saline was injected into the subplanter region of left hind paw to all groups to induce edema .The paw edema volume was measured immediately after injection (0 hr) and then at 30, 60, 120 , 180 and 240 min, plethysmometrically (UGO Basil,7140 Italy) . The difference between initial and subsequent reading gave the actual oedema volume which was compared to control.

Table 1. Anti inflammatory activity of *Caralluma adscendens*.

Group	Dose (mg/kg)	Left hind paw volume (mean±S.D) (ml) 0.5 hr	1 hr	2 hr	3 hr	4hr
Control		1.68	1.64	1.69	1.94	2.1
Aqueous Extract	250	1.25 ± 0.09[?]	1.13 ± 0.08[?]	1.06 ± 0.04[?]	1.02 ± 0.06[?]	1.12 ± 0.05[?] (46%)
Ethanolic Extract	250	1.56 ±0.07 [?]	1.50 ±0.10 [?]	1.40 ±0.05 [?†]	1.38 ±0.08 [?]	1.42 ± 0.05[?] (32%)
Diclofenac Sodium	10	1.34 ±0.05 [?]	1.59 ±0.12 [?]	1.37 ±0.06 [?†]	1.22 ±0.04 [?]	1.1 ± 0.03[?] (47%)

**Indicates mean of six animals; S. D. Standard deviation; [?] p value compared to control (p < 0.001) i.e. significant; [†]: p value compared to control (p < 0.05)*

Fig. 1. Graph of Anti inflammatory activity of *Caralluma adscendens*



The percentage inhibition of inflammation was calculated using the formula (7, 8).

% inhibition = 100 (1- Vt/ Vc)

Where Vc represents edema volume in control and Vt represents edema volume in groups treated with extracts.

Statistical Analysis

The experimental data were calculated as mean ± SEM., evaluated by unpaired one way ANOVA test .Values of $p < 0.001$ were considered stastically significant.

RESULTS

The results obtained as mean increase in paw volume and % inhibition are represented in Table 1. The result indicate that ethanolic and aqueous extracts of *Caralluma adscendens* at the dose 250 mg/kg was found to reduce edema in left hind rat paw significantly ($p < 0.001$) at 0, 30, 60, 120 , 180 and 240 min. which was comparable to standard. The maximum inhibition was shown by the whole plant ethanolic and aqueous extract after 4 hrs 32% and 46% respectively, where as the standard drug showed 47% of inhibition.

DISCUSSION

Carrageenan induced paw edema was taken as a prototype of exudative phase of inflammation where development of edema being described as biphasic. The initial phase is attributed to release of histamine, serotonin and kinins after injection of carrageenan. A more prolonged second phase is related to the release of prostaglandins like substance (9).

The present study has shown that the ethanolic and aqueous extracts of *Caralluma adscendens.* At dose 250 mg/kg exhibited significant anti-inflammatory activity being reported for first time. Preliminary phytochemical screening showed that the *Caralluma adscendens* revealed the presence of high sterols, saponin glycosides and flavonoids. The flavonoids are known to possess anti-inflammatory activity by inhibiting the cyclooxygenase responsible for synthesis of inflammatory prostaglandins (10). Thus the anti-inflammatory activity of many plants have been attributed to their high sterols and flavonoids , It is assumed that the effect could be due to the constituents such as flavonoids and sterols supporting the results for the present study (11,12). It can be concluded that ethanolic and aqueous extract of *Caralluma adscendens* is endowed with centrally acting antiinflammatory activity on acute inflammatory processes.

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