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Antiinflammatory activity of fruits of *Cuminum cyminum* Linn

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Abstract

In the Present study, hydrodistillation of the fruits of *C.cyminum* Linn (Umbelliferae.) were investigated for antiinflammatory activity in carrageenan-induced rat paw oedema. The volatile oil showed dose–dependent inhibition of rat paw oedema, at dose of 0.1ml/kg, body wt i.p, when compared to control group. The activity was compared with that of the standard drug, diclofenac sodium.

Key words: Anti-inflammatory activity, *Cuminum cyminum*, fruits, volatile oil.

Introduction

Inflammatory diseases including different types of rheumatic diseases are very common throughout the world. Several indigenous drugs have been described in Ayurveda for the treatment of inflammatory diseases, but there is no scientifically known rationality behind these drugs[1].

Cuminum cyminum Linn (Umbelliferae), commonly known as Jeera in Hindi, Jeeragi in Kannada.Is indigenous to Nile territory. It is cultivated in Morocco, Sicily, India, Syria and China. In India, expect Assam and West Bengal, it is cultivated in all states. About 90% of the world production is from India and most of it comes from states of Rajasthan and Gujarat. Cumin fruits contain 2.5 to 4.5% volatile oil, 10% fixed oil and proteins, volatile oil mainly consists of 30 to 50% cuminaldehyde, small quantities of α-pinene, β-pinene, phellandrene, cuminic alcohol, hydrated cuminaldehyde and hydro cuminine [2]. The fruit has a sharp burning taste, astringent, carminative, tonic to the intestine, aborcificant, emmenagogue, stops epitasis, heals corneal opacities, ulcers and styes, cures haemoptysis, scabies, gonorrhoea, asthma, relieves cough, inflammations, enlargement of spleen; applied to boils and ulcers (yunani). A literature survey revealed that no scientific investigation regarding antiinflammatory activity of the volatile oil of Cumin fruits has been reported. In the present

investigation, an attempt was made to test the, Cumin fruits for antiinflammatory activity based on its traditional use[3].

Materials and Methods

For the present study, Fruits of *C.cyminum* Linn were obtained from the local market. The fruits were authenticated and voucher specimen was deposited in the herbarium of department of Pharmacognosy, K.L.E.Societys College of Pharmacy, Gadag, Karnataka. The fruits were subjected to hydrodistillation for 4 hrs using Clevenger apparatus and produced 3 %(v/w) yield. The volatile oil obtained was diluted with 5%v/v solution of Tween 80 in distilled water. All intraperitonial (i.p) injections were administered in volumes not higher than 10ml/kg of body wt of animals.

Antiinflammatory activity was assessed using the carrageenan-induced rat paw oedema method [4]. The ethical clearance was obtained by the Institutional Animal Ethics committee (Registration number 221/CPCSEA) before the experiment. Rats were kept in polypropylene cages and fed on standard laboratory diet with water *ad libitum*. The animals were exposed to 12 h of darkness and light each. Animals were divided into six groups of 6 animals each and were given the following treatments.

Group 1 (control) received 1 ml 0f 5%v/v solution of Tween 80 in distilled water orally; group 2 received 15 mg/kg of diclofenac sodium orally; groups 3, 4 and 5 received volatile oil 0.02,0.05 and 0.1ml/kg i.p respectively. After 1 h, subcutaneous injections of 0.1ml of 1% w/v solution of carrageenan into the subplanter side of the left hind paw. The paw was marked with ink at the level of lateral malleolus and immersed in mercury up to this mark. The paw volume was measured plethysmographically immediately after injection (0 h) and followed by every hour for 6 h after injection of carrageenan to each group. The difference between the initial and subsequent reading gave the actual oedema volume.

Results and Discussion

Percentage inhibition of inflammation was calculated using the formula, % inhibition = 100 (1- vt/vc) where Vt represents oedema volume in test compounds and Vc represent oedema volume in control. The data was analyzed using student's t-test. Level of significance was set at $p < 0.001$. The results obtained as mean increase in paw volume (ml) and % inhibition are represented in Table 1. The highest percentage inhibition of oedema is observed with at 0.1ml/kg i.p. i.e. 67.36 at 6 h as compared to standard. i.e. 69.47.

Carrageenan-induced inflammation is a biphasic phenomenon [5, 6]. The first phase of oedema is attributed to 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 [7]. The knowledge of these mediators involved in different phases is important for interpreting mode of drug action.

The results obtained indicate that administration of volatile oil results decrease in the Rat paw oedema at 0.1ml/kg i.p, in the dose administered, and was found to have statistically significant anti-inflammatory activity ($P > 0.001$). While standard drug, Diclofenac sodium showed significant activity ($P < 0.001$). The volatile oil such as α- pinene and β-pinene have been reported to possess anti-inflammatory activity [8]. In the present study also, the anti-

inflammatory activity of *Cuminum cyminum* Linn could be attributed to the presence of α-pinene and β-pinene.

Table 1: Effect of fruits of *C.Cyminum* Linn volatile oil on Carrageenan-induced paw Oedema in rats

Treatment	Mean increase in paw volume ± S.E (ml) at different time intervals			
	0 h	2 h	4 h	6 h
Control (Vehicle)	0.29± 0.003	0.43 ± 0.004	0.89 ± 0.005	0.95 ± 0.005
Diclofenac Sodium (5 mg / kg, p.o)	0.16 ± 0.002 (44.80)	0.18 ± 0.005* (58.10)	0.30± 0.004* (66.29)	0.29 ± 0.006* (69.47)
C.cyminum volatile oil (0.1ml/kg,i.p)	0.17 ± 0.005 (41.40)	0.19 ± 0.005* (55.81)	0.29± 0.008* (67.41)	0.31 ± 0.008* (67.36)
C.cyminum volatile oil (0.05ml/kg,i.p)	0.29 ± 0.006	0.40 ± 0.015 (6.97)	0.87 ± 0.008 (2.24)	0.92 ± 0.009 (3.15)
C.cyminum volatile oil (0.025ml/kg,i.p)	0.29 ± 0.005	0.40 ± 0.005 (6.98)	0.84 ± 0.001 (5.61)	0.95 ± 0.001 (0.03)

- *Indicates significant anti-inflammatory activity.
- Values are mean ± SE ; n = 6 ; * p < 0.001 vs. control.
- The percent inhibition of paw volume is indicated in brackets.

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