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Anti-inflammatory activity of *Derris scandens*

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Abstract

The anti-inflammatory activity of the leaf and root extracts of *D. scandens* as well as the isolated flavonoids, ovaliflavanone and lupinifolin were studied on carrageenan induced paw edema in rats. The leaf and root chloroform extract of *D. scandens* exhibited significant activity at 400mg/kg, when compared to the standard drug at 10mg/kg. The isolates, ovaliflavanone showed higher degree of activity compared to lupinifolin.

Key words: *D. scandens* extracts and its isolates, anti-inflammatory activity.

1. Introduction

Derris scandens. Benth is a spreading, climbing shrub and is widely distributed throughout the plains of Southeast Asia. Its dried stems are used for the treatment of muscle ache and pain, as well as arthritis, as an expectorant, antitussive and a diuretic [1]. A hydro-alcoholic extract of the stem was reported to have both antimicrobial [2] and immuno-stimulating activities [3]. In a pharmacological study, the polar fractions of *D. scandens* when applied, resulted in a marked decrease in blood pressure and heart rate [4]. Coumarins, isoflavones and their glycosides have been previously reported as chemical constituents from various parts of *D. scandens* [5-14]. In view of the medicinal value of the species, we have carried out the anti-inflammatory activity of the leaf and root extracts of *D. scandens* and also the isolated prenylated flavanones 1 and 2 respectively.

2. Materials and methods

2.1 Plant material

Plant material comprising of leaves and roots of *D. scandens* were collected from Amboli ghat, Konkan coast of Maharastra, India. The specimen was authenticated by Dr. P. S. N. Rao, Joint Director, Botanical Survey of India, Western circle-7, Pune, India. A voucher specimen (SG/DSL/04/335) has been deposited at the Herbarium, Department of Pharmaceutical Sciences, Andhra University, Visakhapatnam, India.

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2.2 Extraction

The air dried leaves and roots (1 kg, each) of *D. scandens* were powdered and extracted with 2.5 L chloroform. The extracts obtained, were then concentrated under reduced pressure to get the corresponding residues. The extracts gave a positive Liebermann-Burchard reaction for sterols and triterpenoids, positive test with ferric chloride and Shinoda's test (Phenolic compounds).

2.3 Isolation (leaves of D. scandens)

Extraction of the leaves with chloroform (at room temp. and the solvent removed *in vacuo*) yielded 7 g of crude extract. This extract was applied to a silica gel (300 g) column, using *n* -hexane, *n* -hexane-benzene, benzene-chloroform and chloroform as eluents, resulting in 7 major fractions (A-G). Fractions A-C were combined after they were found to be similar on TLC, which yielded stigmasterol (12 mg).

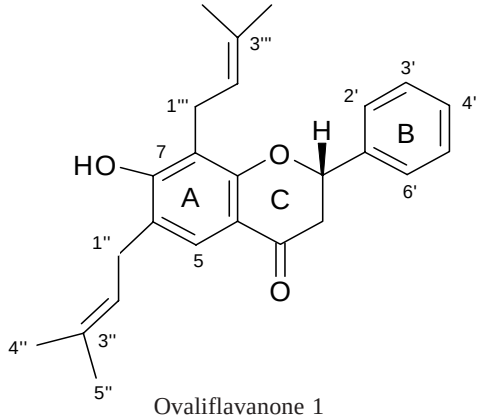
Fraction D-E on crystallization using Pet.ether-benzene afforded 1 as yellow needles (ovaliflavanone, 32 mg). Fraction F on purification using PTLC followed by crystallization using benzene afforded 2 (lupinifolin) as yellow needles (40 mg), while G on repeated purification using PTLC (Pet.ether-$CHCl_3$; 4:6) gave β-sitosterol as colourless needles (15 mg). The flavonoids fluoresced yellow on TLC and intensified on exposure with ammonia vapor. The structures of the isolated flavonoids were elucidated from analyses of 1D and 2D NMR spectroscopic data including ^{1}H, ^{13}C NMR, HMQC and HMBC [15,16].

2.4 Anti-inflammatory activity

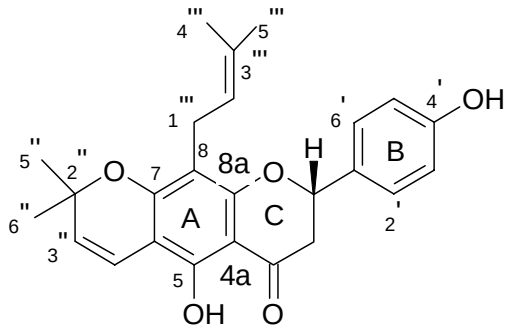
Albino rats (120-160g) of either sex were used. They were kept in standardized environmental conditions and maintained on the standard rodent diet and water *ad libitum.* Acute inflammation was induced by 0.1 ml of 1% (w/v) carrageenan into the plantar region of the right hind paw of rats [17]. The extracts at (200mg/kg and 400mg/kg), ovaliflavanone 1, lupinifolin 2 (2.5mg, 5mg/kg) indomethacin (Standard, 10mg/kg) were administered orally, 18 h and 2 h before carrageenan injection. The paw thickness was measured by Zeitlin's apparatus.

3. Results and discussion

The treated group with *D. scandens* leaf extract showed significant % of inhibition of paw thickness 49.23 % at 400mg/kg dose and 26.36



Ovaliflavanone 1



Lupinifolin 2

Table 1.
Anti-inflammatory activity of *D. scandens*

Treatment	Dose (mg/kg)	% of inhibition	Total % of Inhibition (6 h)
D. scandens (L)	200	26.36	
	400	49.23	47.02 ± 0.69
D. scandens (R)	200	25.00	
	400	37.26	35.79 ± 1.02
Ovaliflavanone 1	2.5		
	5	26.72	24.42 ± 1.40
Lupinifloin 2	2.5		
	5	15.63	11.95 ± 0.84
Indomethacin	10	50.00	38.99 ± 1.45

Leaf (L), root (R), Results were expressed as mean ± SEM.
Values are mean ± S.E.M.; (n = 6)

% at 200mg/kg dose while, the root extract showed reduction in paw edema 37.26% at 400mg/kg dose and produced 25.0% inhibition at 200mg/kg dose level (See Table I). The flavanone 1 produced 26.72%, 15.63% of inhibition of paw edema at 5mg and 2.5mg dose levels while, 2 inhibited the paw edema by 17.5% and 10.57% at 5mg and 2.5mg doses respectively.

The total percent of inhibition of edema in the six hours duration is 47.02 ± 0.69, 35.79 ± 1.02, 24.42 ± 1.40, 11.95 ± 0.84, 38.99 ± 1.45 for *D. scandens* leaf extract, *D. scandens* root extract, ovaliflavanone 1, Lupinifolin 2 and the standard drug, indomethacin respectively. *D. scandens* leaf and root extracts exhibited good activity at 400mg/kg body weight. Though the isolated flavonoids, ovaliflavone and lupinifolin did not show much activity, the extracts exhibited promising activity at 400mg/kg dose. The anti-inflammatory activity of the extracts may be attributed to the presence of flavonoid components.

4. Acknowledgements

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