



Analgesic and anti-inflammatory activity of *Adiantum venustum*

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ABSTRACT

Adiantum venustum is a plant belongs to the family *adiantaceae*. The dried powdered plant material was extracted with ethanol and it showed positive test for flavonoids, alkaloids, saponins and carbohydrates. An attempt was made to correlate the analgesic and anti-inflammatory activity of the crude extract with a standard synthetic drugs - paracetamol (150mg/kg) and Diclofenac sodium (10mg/kg). The analgesic property was evaluated by Eddy's hot plate method. A good analgesic activity was seen with (100mg/kg) when compared with other dose levels (50mg/kg). Chronic anti-inflammatory study was evaluated by carrageen induced paw edema method. The result of anti-inflammatory study at two dose levels tested in rats, exhibited significant anti-inflammatory activity. The maximum percentage inhibition of inflammation was (71.15%) recorded with 100 mg/kg of plant extract. A further decrease in dose level (50mg/kg) showed decrease in anti-inflammatory activity. © 2008 Trade Science Inc. - INDIA

KEYWORDS

Adiantum venustum;
Anti-inflammatory activity;
Analgesic activity;
Ethanol extract;
Eddy's hot plate method
and carrageen.

INTRODUCTION

Adiantum venustum^[1] is a plant belongs to the family *adiantaceae*. A graceful little fern found very commonly in north east Himalayas, Kashmir and in Simla at altitudes of 1350 to 1350m in shaded forest beds. It is common in Punjab; stipes ebeneous-glossy; fronds 3-4 pinnate, pinnules obovate- cuneate, striated, 2-3 lobed, finely dentate- serrate; fertile lobes with two, rarely three notches-each notch bearing a large sorus at the bottom^[1]. The fern is hardy in sheltered places and grows in forests often forming the most characteristic under vegetation over large areas. This plant ap-

pears to constitute most of the official *Hansraj* in Punjab. The leaves are slightly bitter, resolvent, deobstruent, expectorant, diuretic, emmenagogue, purgative, aphrodisiac; useful in biliousness, phlegmatic tumours, inflammation disease of chest. The plant were used in ophthalmia, hydrophobia, tumours, colds, headache. The oil is applied to bites and tuberculous glands and wounds and also to bring out a thorn which has penetrated into the body (Unani)^[3]. It possesses astringent and aromatic properties. It is emetic in large doses, and is a tonic, febrifuge and expectorant. It is administered as an anodyne in bronchitis and is useful as mild tonic. The plant is used as an antidote to scorpion venom^[4].

Petroleum ether extract of the plant gave 21-hydroxy adiantone, adiantone, 3-filicene a carotenoid possibly α carotene monoepoxide, leucopelargonidin and kaempferol and quercetin glycosides^[5].

EXPERIMENTAL

Plant material

The plant *Adiantum Venustum* (Family: Adiantaceae) was collected in the month of May 2005 from Kolli hills, TamilNadu, India. The plant material was taxonomically identified by the Botanical survey of India, Coimbatore, TamilNadu and the voucher specimen has been preserved in our laboratory (BSI/SC/5/23/05-06/Tech-603) for future reference.

Chemicals and reagents

The plant material used in the present study were ethanolic extract of *Adiantum Venustum* (50 and 100mg) and paracetamol (150mg/kg) carrageenan (S.D. Fine Chemicals Limited, Bombay), and Diclofenac sodium 10mg/kg (Novartis).

Preparation of extract

The dried powdered plant material was extracted with ethanol in a Soxhlet extraction apparatus^[6]. The solvent was removed under reduced pressure and semi solid mass was obtained (yield 14.25%). The extract showed positive test for flavonoids, alkaloids, saponins and carbohydrates. The extract at different doses of 50 and 100mg/kg was suspended in 2% w/w aqueous suspension of carboxy methyl cellulose. Paracetamol (150mg/kg) Diclofenac sodium 10mg/kg were used as standards for present study.

Animals

Albino mice of either sex (20-30g) were used for the present study. They were maintained under standard environmental conditions and were fed with standard pellet with water ad libitum.

Analgesic activity

Eddy's hot plate method^[7]

Weigh and number the mice. Take the basal reaction-time by observing hind paw licking or jump response (whichever appears first) in animals when placed

on the hot plate maintained at constant temperature (50°C). Normally, animals show such response within 6-8 sec. A cut off period of 15 seconds is observed to avoid damage to the paws.

The animals divided were made into 4 groups, each consists of four in number.

- In group I (control-Negative control) animals are tested by the Eddy's hot plate method without administering any drug. Note the reaction time of animals on the hot plate 15, 30,45 and 60 minutes.
- In group II (Standard drug-Positive control) inject paracetamol to animals and note the reaction time of animals, on the plate at 15, 30, 45 and 60 minutes after the drug administration.
- In group III, inject extract (test-50mg/kg) to animals and note the reaction time of animals, on the plate at 15, 30, 45 and 60 minutes.
- In group IV inject extract (test-100mg/kg) to animals and note the reaction time of animals, on the plate at 15, 30, 45 and 60 minutes.

As reaction time of extract was found more or equal to standard drug (Paracetamol) than our extract, the sample was found to have analgesic effect. Calculate the percentage increase in reaction time at each time interval.

Anti-inflammatory activity

Carrageenan-induced paw edema method^[8]

The rats were divided into four groups (n=4). Acute inflammation was produced by the sub planar administration of 0.1ml of 1% carrageenan in normal saline in the paw of the rats. The different groups were treated topically with *Adiantum Venustum* which was prepared as simple ointment with base (50 and 100mg/kg), Diclofenac sodium ointment (10mg/kg) was used as

TABLE 1 : Analgesic effect of ethanolic extract of *Adiantum Venustum* whole plant using eddy's hot plate method

Treatment	Observation of reaction time in seconds			
	15	30	45	60
Control	2.41±0.0253	3.05±0.0212	3.82±0.017	3.15±0.012
Standard (Paracetamol)	3.25±0.0185	3.26±0.1427	3.11±0.185	7.15±0.017
Extract (50mg/kg)	3.14±0.0215	3.35±0.1417	3.18±0.145	9.41±0.015
Extract (100mg/kg)	3.59±0.0275	3.40±0.1558	3.15±0.2171	10.12±0.158

Value shows that mean SEM (n=5) p<0.01. The experimental groups were compared with control

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TABLE 2 : Anti-inflammatory activity response

Treatment	Dose (mg/kg)	Paw volume (ml) after 3 hour	Percentage of inhibition
Carrageenan control	0	0.741±0.018	-
Diclofenac sodium	10	0.347±0.021	74.65%
Adiantum venustum	50	0.380±0.015	68.15%
Adiantum venustum	100	0.364±0.009	71.15%

Values are mean±SEM (n=4); Experimental groups were compared with control p<0.01

control. The paw volume was measured at 0 hour and 3 hour after carrageenan injection using plethysmometer. The animals were pretreated with the extract one hour before the administration of carrageenan suspension. The extract and the standard used for this study were prepared in the same manner as mentioned earlier. The ratio of the anti-inflammatory effect of *Adiantum Venustum* was calculated by the following equation:

$$\text{Anti-inflammatory activity (\%)} = (1-D/C) \times 100$$

where D represents the percentage difference in paw volume after *Adiantum Venustum* which was administered to the rats, and C represents the percentage difference of volume in the control groups.

RESULTS AND DISCUSSION

Analgesic study

The results indicate that the extracts possess significant analgesic activity at two dose levels (50, 100 mg/kg body weight) tested on animals when compared with that of the standard drug paracetamol. The tested dose 100mg/kg found to be more analgesic effect than the dose 50mg/kg.

Anti inflammatory study

The results indicate that the extracts possess significant anti-inflammatory activity at the two dose levels (50, 100mg/kg body weight) tested on animals when compared with that of the standard drug diclofenac sodium. The minimum anti-inflammatory activity was recorded with 50mg/kg with a percentage inhibition of 68.15%. The maximum anti-inflammatory activity observed was 71.15% with 100mg/kg.

CONCLUSION

An attempt was made to correlate the analgesic and anti-inflammatory activity of crude extract with the standard synthetic drugs. The analgesic property was evaluated by Eddy's hot plate method and chronic anti-inflammatory study was evaluated by carrageenan induced paw edema method. The dose levels tested were 50 and 100 mg/kg body weight. A good analgesic activity was seen with (100mg/kg) when compared with other dose levels (50mg/kg). A significant dose related increase in analgesic activity was observed.

The result of anti-inflammatory study at two dose levels tested in rats, exhibit significant anti-inflammatory activity. The maximum percentage inhibition of inflammation was (71.15%) recorded with 100 mg/kg of plant extract.

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