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RESEARCH ARTICLE

Evaluation of Analgesic Activity of Extracts of *Jasminum sessiliflorum* Vahl

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Abstract

The present study was designed to investigate analgesic activity of ethyl acetate and ethanolic extracts of *Jasminum sessiliflorum* Vahl. The analgesic activity was assessed by using acetic acid induced writhing method and tail immersion tests in rats. The ethyl acetate and ethanolic extracts decreased the acetic acid induced abdominal contractions and also significantly increased the reaction time of tail immersion test [1].These results showed that the plant extracts had both central and peripheral analgesic action. The results suggest that the extracts of *J.sessiliflorum* possesses potent analgesic properties, which support its use in traditional medicine and suggesting that the plant should be further investigated for its pharmacological active natural products [2].

Keywords: *Analgesic activity, J. sessiliflorum, Acetic acid induced writhing, Tail immersion test.*

Introduction

Algesia or pain is an ill-defined, unpleasant sensation, usually evoked by an external or internal noxious stimulus. An analgesic selectively relieves pain by acting in the CNS or on peripheral pain mechanisms, without significantly altering consciousness. So analgesic activity means capacity of a substance to neutralize the pain sensation [3].

Pain is an important signal and primarily protective in nature which causes discomfort. Analgesics relieve pain as a symptom, without affecting its cause [4].Analgesics are classes of drugs used to relieve pain.

The pain relief induced by analgesics occurs either by blocking pain signals going to the brain or by interfering with the brain's interpretation of the signals, without producing anesthesia or loss of consciousness.

Analgesic activity of drug or any test sample at different steps of pharmacological investigation can be assessed by various methods like acetic acid induced writhing method and tail immersion tests.

The acetic acid induced writhing method is an analgesic behavioral observation assessment method that demonstrates a noxious stimulation in mice. In tail immersion tests, the flick of the tail when immersed in boiling water is recorded.

Jasminum sessiliflorum Vahl is a species of jasmine native to India, Sri Lanka and the Andaman Islands. It is a climbing shrub with a smooth stem and minutely pubescent branchlets.

Medicinal plants have been valued in developing countries of the world for primary health care due to better cultural acceptability, better compatibility with

human body and lesser number of side effects [5].

Materials and Methods

Collection of Plant Materials

The plant *J. sessiliflorum Vahl* (Family:

Oleaceae) were collected from Tirunelveli district, Tamilnadu, India. The plant was identified and authenticated by Mr. Chelladurai.

Preparation of Extracts

About 1 kg of air-dried plant *Jasminum sessliflorum*, was extracted in soxhlet assembly successively with petroleum ether, chloroform, ethyl acetate, and ethanol (order of increasing polarity). Hot percolation method was employed to obtain the aqueous extract. Each time before extracting with the next solvent, the powdered material was dried at room temperature.

Each extract was concentrated by using rotary vacuum evaporator. The extract obtained with each solvent was weighed and the percentage yield was calculated in terms of dried weight of the plant material. The colour and consistency of the extract were also noted. All the solvents used for this entire work were of analytical reagent grade (Merck, Mumbai).

Animals

28 adult male albino rats (180-220 g) were housed in animal house under standard laboratory conditions (temperature 23 ± 2 ˚C) with 12 h dark and 12 h light cycle. The animals had free access to standard dry pellet diet and water ad libitum. Permission for conduct of these experiments was obtained from, Institutional Animal Ethics Committee.

Antinociceptive Activity

Acetic Acid Induced Writhing Test

The abdominal writhing response to the acetic acid administration involves contractions of the hind limbs. The number of abdominal writhing was recorded for a period of 10 min, starting 5 min after the administration [7].For the writhing tests, rats received acetic acid injection 30 min after receiving their respective treatment. Group I was pretreated with distilled water. Group II received diclofenac sodium (10mg/kg b.w, i.p).Group III, IV, V, VI were treated with ethyl acetate and ethanolic extracts (200 mg/kg b.w o.d; 400 mg/kg b.w, orally) respectively [8].The percentage analgesic activity (PAA) was calculated by using the following formula:

$$PAA = \frac{(C-CD)}{CD} X\,100$$

C = Mean of contractions count in animals treated with different doses of ethyl acetate and ethanolic extract of *J.sessiliflorum* and Diclofenac sodium CD = Mean of contractions count in animals served as negative control

Tail Immersion Tests in Rats

The tail immersion test basically involves the measure of the response latency of rats to a nociceptive stimulus. This involves introducing 3 cm of the rat's tail in hot water at a temperature of 55 ± 0.5◦ C. The reaction time taken by the animal to withdraw its tail was recorded (using a chronometer). The time reaction is taken at 30, 60, 90 and 120 min after administration of different preparation [9].

Statistical Analysis

The results are reported as mean ± S.E.M. The statistical analyses were performed using one way analysis of variance (ANOVA). Group differences were calculated by post hoc analysis using Tukey's test. For all tests, differences with values of $P<0.05$ were considered significant

Results and Discussions

Antinociceptive Activity

Acetic Acid Induced Writhing Test

The results presented in Table 1, shows that the ethyl acetate and ethanolic extracts (200 and 400 mg/kg b.w) of *Jasminum sessiliflorum Vahl* inhibited significantly ($p< 0.001$) the acetic acid induced abdominal constrictions.

The protective effect of the extracts reached a maximum inhibition of 61.96% for ethanolic extract and 56.24% for ethyl acetate extract at the dose of 400 mg/kg b.w. Diclofenac sodium (standard) was more potent than the antinociceptive dose of the extract, with percentage protection of 81.75%.

Table 1: Effects of ethyl acetate and ethanolic extract of *J.sessiliflorum* on acetic acid–induced writhing response

Groups	Treatment	Number of writhing movements	% reduction in reaction time
Group I	Distilled water	32.00 ± 2.52	-
Group II	Diclofenac sodium 10mg/kg	5.84 ± 0.90	81.75%
Group III	200mg/kg ethyl acetate extract of ***J.sessiliflorum***	16.24 ± 1.68	47.75%
Group IV	400mg/kg ethyl acetate extract of ***J.sessiliflorum***	14.44 ± 1.56	56.24%
Group V	200mg/kg ethanolic extract of ***J.sessiliflorum***	13.04 ± 1.38	60.48%
Group VI	400mg/kg ethanolic extract of ***J.sessiliflorum***	12.55 ± 1.16	61.96%

Values are expressed as mean ± SEM

Tail Immersion Test in Rats

The effects of the ethyl acetate and ethanol extracts (200 and 400 mg/kg b.w) of *Jasminum sessiliflorum* in the tail immersion test in rats is presented in Table 2. A significant ($p< 0.05$) increase in the reaction time was observed in the tail immersion test in rats after 30, 60, 90 and 120 min when compared with the control. Morphine (standard) at dose of 10 mg/kg b.w exhibited more potent activity at 30, 60, 90 and 120 min than the extracts.

Table 2: Effect of ethanolic and ethylacetate extract of Jasminum sessiliflorum on tail withdrawal reflex

Groups	Drug (dose), route	Reaction time (s)			
		30 min	60 min	90 min	120 min
Group I Control	Distilled water	1.5 ± 0.4	1.6 ± 0.4	1.8 ± 0.4	2.4± 0.4
Group II Standard	10mg/kg (i.p) Morphine	5.9 ± 0.2	8.2 ± 0.6	8.5 ± 0.4	8.8 ± 0.6
Group III Ethyl acetate extract	200mg/kg through orally	5.1 ± 0.1	5.4 ± 0.2	5.7 ± 0.4	6.0 ± 0.2
Group IV Ethyl acetate extract	400mg/kg through orally	5.6 ± 0.2	5.9 ± 0.6	6.2 ± 0.4	6.5 ± 0.8
Group IV Ethanolic extract	200mg/kg through orally	5.5 ± 0.4	5.9 ± 0.6	6.3 ± 0.4	6.6 ± 0.7
Group V Ethanolic extract	400mg/kg through orally	6.4 ± 0.6	6.8 ± 0.7	7.2 ± 0.6	7.6 ± 0.8

Conclusion

The peripheral analgesic effect of the extracts was tested by using acetic acid-induced writhing test. This assay is widely accepted as a model for visceral pain [10, 11]. The involvement of central mechanisms was studied by using the tail-immersion tests, known to activate spinal nociceptive pathway [11].

Ethyl acetate and ethanolic extract of *J. sessiliflorum* demonstrated a dose-dependent, significant antinociceptive activity in animal models of pain. Acetic acid believed to increase the PGE2 and PGF2α in peritoneal fluid (6). The analgesic activity shown in models of pain is indicative that ethyl acetate and ethanolic extracts of *J. sessiliflorum* might possess centrally and peripherally mediated antinociceptive properties. Chemical components of ethyl acetate and ethanolic extract of *J. Sessiliflorum* such as flavonoids, saponins or phenolic compounds may be responsible for the antinociceptive activities of this extracts.

It can be concluded that the extracts possesses anti-nociceptive properties which are probably mediated via inhibition of prostaglandin synthesis as well as central inhibitory mechanisms which may be of potential benefit for the management of pain and inflammatory disorders. Further investigations are needed to throw light on the potential chemical entity responsible for producing the effects [12, 20].

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