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Anti- Inflammatory Activity of Leaf Extracts of *Alternanthera sessilis*

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Abstract

Chloroform and Petroleum ether extracts of leaves of *Alternanthera sessilis* were screened for antinflammatory activity by carrageenan induced rat paw edema method. Both the extracts showed considerable dose dependent activity. However chloroform extract 200mg/kg showed higher activity than other extracts.

Key words: *Alternanthera sessilis Linn*, Amaranthaceae, Carrageenan, Anti-inflammatory activity

1. Introduction

Alternanthera sessilis linn (Amaranthaceae) is an annual or perennial prostate herb with several spreading branches, bearing short petioled simple leaves and small white flowers, found through out the hotter part of India, ascending to an altitude of 1200m[1]. The plant consists of α and β spinasterol[2], lupeal isolated from roots[3]. Plant also contains β- sitosterol, stigmasterol etc[4]. In the indigenous system of medicine the herb has been reported to be used as galactogogue, cholagogue, febrifuge and in indigestion problems[5]. The leaves were used in eye diseases, cuts, wounds and antidote to snake bite; skin diseases [3]. Literature review also indicated that anti-inflammatory property of this species has not been clinically evaluated so far. The present paper reports the anti-inflammatory potency of leaf extracts of *Alternanthera sessilis.*

2. Experimental

Fresh leaves of *Alternanthera sessilis* were collected from local areas of Warangal, AP, India. The plant was identified and authenticated by S.Vastavya, Associate Professor, Department of Botany, Kakatiya University, Warangal, India. A voucher specimen (As-8-2006) is maintained in Phytochemistry and Pharmacognosy department of Vaagdevi College of Pharmacy, Warangal, India.

The leaves were separated, washed, air dried and ground to powder and extracted successively with petroleum ether (60-80^{0}c), chloroform, ethyl acetate, methanol and water by cold maceration. All the extracts were concentrated in vacuum using rotary flash evaporator. The yields were 1, 2.24, 4.36, 9.5 and 10% respectively. Qualitative investigations[6] of petroleum ether and chloroform extracts revealed the presence of steroids, triterpenoids, glycosides, flavonoids and tannins.

Male wistar rats (150-180g) were used to carryout the anti-inflammatory activity. They were maintained under standard environmental conditions and have free access to feed (Nutrient animal feed, Rayan Biotechnology Pvt. Ltd) and water during quarantine period. The institutional animal ethics committee (1047/ac/07/CPCSEA) of Vaagdevi College of Pharmacy, Warangal, A.P, India approved the animal experimental protocol.

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The chloroform and petroleum ether extracts were evaluated for anti-inflammatory activity using carrageenan induced rat paw edema method[7]. The animals were fasted overnight before experimentation, but had been allowed free access to water. Rats were divided into six groups of six animals in each. Group I served as a control and received 1ml/kg of 2% gum acacia orally. Group II served as a standard and received diclofenac sodium 10mg/Kg. Group III to VI received chloroform and petroleum ether extracts at a dose of 100 and 200 mg/kg in 2% gum acacia suspension by oral gastric intubation.

After one hour, edema was induced in all the animals by injecting 0.1ml of freshly prepared 1% carrageenan in normal saline in to the sub plantar region of the right hind paw. The paw volume was measured with Plethysmograph at 0,1,2,3 and 4 hours after carrageenan injection. The percentage of inhibition of edema was calculated using formula:

% Inhibition of edema = (1-Vt/Vc) x100 [8, 9] Where Vt = Paw volume in test group animals. Vc = Paw volume in control group animals.

The results were reported as mean ± S.E.M. The significance of results was calculated using student't' test and was considered statistically significant at *P < 0.05.The results are tabulated in table.1

Table: 1. Anti-inflammatory activity of *Alternanthera sessilis* on carrageenan induced rat paw edema.

Group/ Treatment	Dose (mg/kg ,p.o)	Mean paw edema (ml)± S.E.M			
		1hr	2hr	3hr	4hr
Group I/ Control	-	0.22± 0.04	0.29±0.05	0.34±0.06	0.27±0.06
Group II/ Diclofenac Sodium	10	0.06±0.02* (72%)	0.13±0.03 (55%)	0.09±0.04* (73%)	0.08±0.03 (70%)
Group III/ Chloroform Extract	100	0.14±0.04 (36%)	0.2±0.02 (31%)	0.17±0.03* (50%)	0.17±0.03 (37%)
Group IV/ Chloroform Extract	200	0.08±0.01* (63%)	0.16±0.02 (44%)	0.11±0.03* (67%)	0.10±0.02 (62%)
Group V Petroleum Ether extract	100	0.17±0.02 (22%)	0.22±0.03 (24%)	0.21±0.04* (38%)	0.2±0.01 (22%)
Group VI Petroleum Ether extract	200	0.15±0.03 (31%)	0.21±0.03 (31%)	0.18±0.04* (47%)	0.19±0.04 (29.6%)

Results are expressed as mean ± S.E.M. (n=6). The significance of results was calculated using student't' test and was considered statistically significant at *P < 0.05

3. Results and Discussion

The results of Anti-Inflammatory activity revealed that chloroform and petroleum ether extracts exhibited dose dependent activity. At the dose of 200mg/kg the chloroform extract have shown maximum inhibition of the edema (67%) which is comparable to the standard drug diclofenac sodium effect (73%). The detailed results are shown in table.1.1Carragennan induced paw edema method is a standard and most commonly used technique to screen the acute inflammatory

activity[7]. The development of Carrageenan induced inflammation is a biphasic event. First phase occurs with in an hour of injection of phlogistic agent and is mediated through release of histamine, serotonin and kinins while the second phase which can be measured around 3 to 4 hours is related to release of prostaglandins[10].

In the present study chloroform extract showed slight inhibition of inflammation in first phase and maximum inhibition is observed in second phase, which is mainly due to release of prostaglandins. Whereas petroleum ether extract exhibited less effect than chloroform extract. The possible anti-inflammatory effect may be due to inhibition of cyclooxygenase enzyme which catalyzes the biosynthesis of prostaglandins and thromboxane from arachidonic acid. The anti-inflammatory activity of plant sterols has been already established[11, 12]. The Phytochemical investigations revealed the presence of sterols in *Alternanthera sessilis* leaf extract. The present activity may be due to presence of sterols.

4. Conclusion:

In conclusion, it is clear that anti-inflammatory activity of *Alternanthera sessilis* supports its use given in traditional medicine to reduce inflammation. However, further work should be continued to establish the exact mechanism of action.

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