SHORT COMMUNICATIONS

Diuretic and Antiinflammatory Activities of *Aerva lanata* in Rats

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Accepted 24 March 2000
Revised 7 March 2000
Received 8 September 1999

Alcoholic extract of *Aerva lanata* was tested for diuretic activity, while the effect of benzene and alcoholic extracts of *A. lanata* were investigated in the rat to evaluate the antiinflammatory activity. Carrageenan-induced rat hind paw edema method was employed to test antiinflammatory activity. Alcoholic extract (800 mg/kg) produced inhibition of carrageenan-induced rat paw edema ($P \leq 0.05$). The parameters measured for diuretic activity were total urine volume, sodium, potassium and chloride content. The results clearly indicate that the alcoholic extract at a dose of 800 mg/kg act as diuretic, with respect to control.

Aerva lanata (family-Amaranthaceae) is commonly known as chaya and called as sirupoolai in Tamil. It grows as a weed throughout the plains of India[1]. The whole plant is used as diuretic[2], antibacterial[3], anthelmintic[4], hematemesis[5], antimalarial[6], an antirheumatic[7], antivenin, sedative and demulcent[8]. Also useful to treat headache, spermatorrhoea, scorpion stings[9], fractures[10], dental caries[11], bronchitis[12], urinary calculi[13], to clear uterus after delivery and to prevent lactation[14]. Four aerva flavonoid glycosides[15], alpha and beta amyrin[16], betulin, campesterol[17], chrysin, narcissin[18] and beta sitosterol were reported to present. Also it contains aervolanine[19], aervoside, canthin-6-one, canthin-10-hydroxy-6-one, canthin-10-methoxy-6-one[20], carboline-1-propionic acid[21], feruloyl-tyramine and homo feruloyl -vanillylamine[22]. A survey of literature revealed that no methodical reports on diuretic and antiinflammatory activity of extract of *A. lanata*. Hence, it was decided to investigate these activities systematically.

Plants of *Aerva lanata* were collected from the nearby area of Pradhabaramapuram, Nagai District, Tamil Nadu in December 1998. The botanical identity was confirmed by comparing with the voucher plant kept at our College. Shoots were separated, washed, shade dried and ground to a coarse powder by passing through a hand operated grinding machine. Powdered shoots (336 g) were exhaustively extracted successively with benzene and alcohol (50% V/V) using a Soxhlet apparatus. The extracts were filtered and the solvents were removed under reduced pressure. Extractive values (% W/W) of benzene and alcoholic dry extracts were 2.46 and 6.79 respectively.

Male albino rats weighing between 150 and 170 g bred in The King Institute, Guindy, Chennai were procured for diuretic and antiinflammatory activity. In view of the solubility profiles of extracts in normal saline, the alcoholic extract was chosen for studying diuretic activity. The modified method of Rao and Fonteless[23] was employed for determination of diuretic activity. Rats were divided into six groups of six rats each and were deprived of food and water for 16 h. All the rats were given a priming dose of normal saline (25 ml/kg) p.o.

Alcoholic extract of *A. lanata* and acetazolamide were dissolved in normal saline. One group served as a negative control and was administered normal saline (5 ml/kg) i.p. Second group received acetazolamide (20 mg/

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kg) i.p., while the other groups received the alcoholic extract in doses of 200, 400, 600 and 800 mg/kg i.p.[24] immediately after administration, the rats (two in each cage) were placed in metabolic cages specially designed to separate urine and faeces and kept at room temperature of 25±0.5°. The urine was collected in measuring cylinder upto 5 h after administration. During this period, no food or water was made available to animals. The total volume of urine collected was measured for both control and treated groups. The parameters taken for each individual rat were, body weight before and after test period, total urine volume, concentration of Na^+ and K^+ and Cl^- in urine.

Na^+ and K^+ concentration were determined using an Elico make flame Photometer and Cl^- concentration was estimated by titration with silver nitrate solution (N/50) using 3 drops of 5% potassium chromate solution as an indicator. All results are expressed as mean±standard error. The data was analysed using student "t" test for statistical significance and the level of probability was set at $P \leq 0.05$.

Antiinflammatory activity was evaluated using the carrageenan-induced rat paw edema method according to Winter *et al.*[25] Rats were divided into six groups, each group consisting of eight animals. One group served as negative control (received 0.75% CMC 5 ml/kg). Ketorolac tromethamine 10 mg/kg (KT 10) p.o. was used as standard drug. Third and fourth groups were received benzene extract 400 and 800 mg/kg (ALB 400 and ALB 800) p.o. Fifth and sixth groups were treated with alcoholic extract 400 and 800 mg/kg (ALA 400 and ALA 800) p.o. The paw volume was measured at 0 and 3 h after the injection of carrageenan and the apparatus used was plethysmometer[26]. Drug pre-treatment was given 1 h before the injection of carrageenan.

A. lanata extract at the dose levels of 400 and 800 mg/kg acted as an aquaretic, kaliuretic and chloruretic Table-1. Acetazolamide increased the urine volume three fold, while *A. lanata* extract at 800 mg dose by 2.5 fold. Potassium excretion level was significantly increased as nearly two fold when compared to reference diuretic. The extract (600 and 800 mg/kg) shows significant ($P<0.05$) aquaretic and kaliuretic effect when compared to control. But, the extract is only kaliuretic upto the dose level of 400 mg/kg with respect to controls. Alcoholic extract of *A. lanata* was found to inhibit carrageenan-induced rat paw edema remarkably and in a dose dependent pattern Table 2. Edema suppressant effect of ALA 800 was 40.6±3.48, which was nearly equivalent to that of KT 10. The edema suppressant effect was significant ($P<0.05$) at the dose of 800 mg/kg of ALA when compared to control.

TABLE 1 : DIURETIC EFFECT OF ALCOHOLIC EXTRACT OF *AERVA IANATA*

Parameters	Experimental Groups					
	Control (normal Saline) (1)	Acetazolamide (2)	*Aerva lanata* extract (mg/kg) 200 (3)	400 (4)	600 (5)	800 (6)
Urine Volume (ml/Rat)	0.7±0.1	2.1±0.2*	0.7±0.1	0.9±0.1	1.4±0.2	1.8±0.2*
Sodium (mEq/l)	87±11	113±14	89±11	108±13	90±8	84±12
Potassium (mEq/l)	84±12	99±15	147±18	148±14	125±12	150±14
Chloride (mEq/l)	202±12	24±4	227±7	235±13	187±14	253±18
Na^+ and K^+ Ratio	1.03	1.14	0.61	0.73	0.72	0.56

*Statistically significant at $P \leq 0.05$.

TABLE 2 : ANTIINFLAMMATORY ACTIVITY OF BENZENE AND ALCOHOLIC EXTRACT OF *AERVA IANATA*

Treatments	Dose (mg/kg)	Increase in paw Volume at 3 h (x ± SEM)	% Inhibition of paw volume (x ±SEM)
Control (0.75% CMC)	-	3.2 ± 0.1	-
Ketorolac tromethamine	10	1.5 ± 0.1	53.2 ± 4.48*
Benzene extract	400	2.8 ± 0.2	12.5 ± 1.84
Benzene extract	800	2.5 ± 0.1	21.8 ± 2.32
Alcoholic extract	400	2.3 ± 0.1	28.2 ± 2.46
Alcoholic extract	800	1.9 ± 0.1	40.6 ± 3.48*

* Statistically significant at $P \leq 0.05$.

The alcoholic extract (800 mg/kg) of *A. lanata* increased the urine volume moderately, which was equivalent to that of acetazolamide. The sodium and potassium ratio was decreased as half fold, since the extract act as potent kaliuretic. The results clearly shows that the extract act as diuretic in a dose-dependent manner. These findings justifies the usefulness of *A. lanata* in the treatment of inflammation and renal dropsies.

ACKNOWLEDGEMENTS

Authors express their sincere gratitude to Arulthiru Bangaru Adigalar, President and Thirumathi Lakshmi Bangaru Adigalar. Vice President, Adhiparasakthi College of Pharmacy, Melmaruvathur, for providing all facilities. Also we thank Mr. S. Elumalai and Mr. D. Began, Department of Instrumental Methods of Chemical Analysis, for this technical support.

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