

Wound Healing and Diuretic Activities of *Canthium parviflorum* Lam

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Abstract – Aqueous and ethanolic extract of leaves of *Canthium parviflorum* were evaluated for wound healing and diuretic activities. Extract in the form of ointment is applied topically on excision wound in rats showed significant healing process as evidenced by increased rate of wound contraction as compared to control. The aqueous extract of 10% w/w ointment exhibited equivalent wound healing activity as Nitrofurazone ointment. Significant diuretic activity was exhibited by extracts. Graded dose response for both activities were observed for the extracts.

Key words : wound healing, diuretic, *Canthium parviflorum*

Introduction

Canthium Parviflorum Lam. (syn: *Plectronia parviflora*) of Rubiaceae is a thorny shrub found through out Indian forests and dry plains. The plant is well known for its various medicinal properties in India. Leaves and roots of this plant are used as astringent, diuretic, febrifuge, anthelmintic, anti-diarthoeal, and for leucorrhoea (warrier *et al.*, 1994; Kamala Ramachandran, 1992; Togunashi *et al.*, 1983). Decoction of leaves as well as the root is prescribed in certain stages of flux (Nadkarni., 1976). In Ayurvedic system of medicine it is used as laxative and to cure gout (Vaidya Bhagwan Dash and Kanchan gupta, 1991). Tribes of Orissa state in India use fruits of this plant to treat headache. Since *Canthium parviflorum* leaf is used as astringent, it was presumed that the leaf would also possess wound healing property. On the basis of the above claim, the present study was focussed on evaluation of the wound healing and diuretic activity of the aqueous and alcoholic extracts of *Canthium parviflorum* leaves.

Materials and Methods

Plant material – *Canthium parviflorum* leaf was collected near our college in Melmaruvathur and identified in the

Department of Pharmacognosy, Captian Srinivasa Moorthy Drug Research Institute for Ayurveda, Chennai-600106. Leaves were collected in June 2002. The collected leaves were washed with tap water to remove the dust and adhering materials, then dried in the shade. The dried material was powdered by means of mechanical grinder and coarsely powdered leaves were used for extraction.

Extraction – Powdered leaves were macerated with chloroform water for two days, filtered and filtrate was concentrated to yield aqueous extract (AE). For the preparation of ethanolic extract (EE), powdered leaves were extracted with 90% ethanol in a soxhlet apparatus. Solvent was removed by distillation under reduced pressure.

Animals – Male Wistar albino rats with body weight between 175-225g were used in these studies. They were housed in well ventilated, temperature controlled (25±2°C) animal room. The animals were fed with standard rodent pellet diet (M/s Sai Durga Feeds and Foods, Bangalore.) and water ad libitum. All the animals were acclimatized for a week before use.

Wound healing activity – The wound healing activity was determined by excision wound model (Bairy and Mallikarjun Rao, 1993) using rats (n=6). The extracts at two concentrations (5% and 10% w/w) were formulated as an ointment in simple ointment base. The experimental animals were anaesthetized with ether and a round seal of 500 mm² was impressed on the hair removed dorsal lumbar central region, the skin of the impressed area was excised to the full

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Table 1. Wound healing activity (excision wound model) of *Canthium parviflorum* leaf extracts

Treatment	Concentration (% w/w)	Percentage Wound contraction		
		5 th Day	10 th Day	15 th Day
Simple Ointment B.P.	–	18.53±3.27	42.89±2.30	61.53±4.54
Nitrofurazone Ointment	0.2	64.69±2.17*	83.23±3.81*	99.89±1.34*
AE	5	43.43±4.91*	57.19±3.89*	93.20±1.52*
	10	63.36±1.87*	80.44±2.90*	99.84±0.25*
EE	5	42.81±2.90*	64.08±2.47*	86.86±1.34*
	10	47.39±1.81*	65.81±2.84*	86.19±1.19*

Significance level: *p<0.01 compared to control.

Table 2. Diuretic activity of *Canthium parviflorum* leaf extracts

Treatment	Dose (mg/kg)	Urine volume (ml/kg)	Urine Electrolyte Meq/l (5 Hr)		
			Na ⁺	K ⁺	Cl ⁻
Control	–	2.63±0.09	45.64±2.16	50.72±5.80	88.68±19.93
Frusemide	100	21.35±0.58**	104.34±4.21**	34.52±1.72	206.99±22.03**
AE	250	3.73±0.12**	157.31±4.52**	149.67±3.15**	169.99±21.24*
	500	4.48±0.13**	175.35±5.24**	139.79±4.01**	243.98±15.21**
EE	250	3.16±0.19*	68.11±1.84**	67.80±1.22*	221.73±25.71**
	500	6.63±0.19**	157.24±4.24**	138.53±2.13**	229.15±26.76**

Significance level: *p<0.05 and **p<0.01 compared to control.

thickness to obtain a wound measuring around 500 mm². Haemostasis was achieved by blotting the wound with cotton swab soaked in normal saline solution. The rats were individually maintained in separate cages. The extracts ointments and Nitrofurazone ointment (0.2% w/w) as reference standard were applied once daily till the wound was completely healed from the day of wounding. Wound healing property of this drug was monitored by wound contraction and wound closure time. Wound contraction was calculated as percentage reduction in wound area. The progressive decrease in the wound area was monitored periodically by tracing the wound margin on transparent graph sheet on wounding day followed by 5th, 10th and 15th day. The wound healing activity data is presented in Table 1.

Diuretic activity – Rats (n=6) were fasted (Lipschitz *et al.*, 1943) and deprived of water for 18 hr prior to the experiment. On the day of the experiment all the animals were given normal saline 25 ml/kg orally by gavage in which extracts or Frusemide was dissolved. Extracts were given at the dose of 250 and 500 mg/kg. Frusemide at the dose of 100 mg/kg as standard and control received only normal saline. Immediately after dosing, the animals were placed in metabolic cages specially designed to separate urine and faeces and kept at room temperature of 25±0.5°C. Urine was collected in measuring cylinder upto 5 hr after dosing, during the course of experiment no water or food was made available to the animals. The parameters monitored for each individual rats were total urine volume and concentration of electrolytes (Na⁺, K⁺ and Cl⁻) in the urine. Na⁺ and K⁺ concentrations were measured using flame

photometer and Cl⁻ concentration by titration with silver nitrate solution (N/50) using 5% potassium chromate solution as indicator. The diuretic data is presented in Table 2.

Statistical analysis – All values were expressed as mean ± SEM. Test of significance was analysed by “t” test.

Results and Discussion

It was observed that AE and EE exhibited significant wound healing activity. 10% w/w of AE ointment exhibited highly significant activity as equivalent as Nitrofurazone ointment, which was clearly evidenced from its percentage closure i.e 99.84% on 15th day. Significant diuretic activity and dose - dependent response was exhibited by AE and EE. Significant increase in urine volume and urine sodium is a good indicator of diuresis (Limura, 1981). Wound healing and diuretic activity of leaf extracts of *canthium parviflorum* may be attributed to the astringent property and presence of mannitol (Dutta *et al.*, 1966) respectively.

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