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WOUND HEALING PROPERTIES OF *CLEOME VISCOSA* LINN

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Abstract

The leaves and whole plant of *Cleome viscosa* are used as a folk remedy to cure the wounds, ulcers, inflammations and skin infections. The present investigation was undertaken to evaluate the wound healing property of the leaves and whole plant of *Cleome viscosa* on experimentally induced excision wound model in rats. The studies on the wound healing models revealed that, the methanolic extract of *Cleome viscosa* possess significant wound healing activity,

***Key words*:** *Cleome viscosa;* wound healing property; excision wound model; wound; skin infections

1. Introduction

Cleoma viscosa (Family: Cleomaceae) is an annual erect, branched, viscid pubescent herb in 30-90cm height with 3-7 foliate leaves, white, yellow, pink flowers, stems grooved, densely clothed with glandular and simple hairs found in waste grounds and grassy places. The natives and traditional healers of India called this plant as 'Hul hul'. [1,2].Traditionally the leaves, bark, root and seeds of the plants of Cleome genus are used as stimulant, ant scorbutic, anthelmintic, rubifacient, vesicant, carminative, stomachic, laxative, diuretic, anti inflammatory, anti tumour, antiseptic, anti leprosy[1,2,3,4]. The plant is good for malarial fevers and useful in blood diseases, uterine complaints. The leaves are also used in for wounds and ulcers. *Cleome viscose* leaves and young shoots used to cook like a vegetable, which is having sharp mustard like flavour. The pungent seeds and seed pods can be used as a mustard substitute in curries [6-7].

The analgesic, anti microbial, anti diarrhoeal, anti pyretic, hepatoprotective, anti hyper lipidemic and anti ulcer activities of the aerial parts has been reported [8-17]. The popular use of the whole plant and leaves refers mainly to its antiseptic, anti inflammatory activity and wound healing.

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As there is no scientific data available to substantiate the traditional use of this plant for healing wounds, in the present study, we investigated the wound healing activity of the methanolic extracts of *Cleome viscosa* leaves and whole plant in experimental animal models.

2. **Materials and methods**

2.1. *Plant material and extraction*

Cleome viscosa plant is a common weed throughout Andhra Pradesh. The *Cleome viscosa* plant material collected from local areas of Warangal, A.P. Its parts were authenticated by Prof. S.V.Raju, Taxonomist, Department of Botany, Kakatiya University, Warangal, A.P, India. A voucher specimen (CV-028) was maintained in the Department of Pharmacognosy, Vaagdevi college of pharmacy, Hanamkonda.

The fresh air- dried, powdered crude drugs obtained from the *Cleome viscosa* leaves and whole plant and were extracted with methanol solvent by maceration process at room temperature for 7 days in conical flask with occasional stirring and shaking. The methanolic extracts were dried and incorporated in to simple ointment (5 % w/w) base. Preliminary phytochemical analysis was carried out for the extracts according to the standard procedures [8, 10, 18, 19].

2.2**.** *Experimental animals*

Albino rats of either sex (130–180gm) were procured from Mahaveera Enterprises, Hyderabad under standard laboratory condition (25 ± 2°C temperature, 55± 5% relative humidity, and 12 hrs light and dark cycles for about 7 days prior to dosing. The animals were housed three per cage of same sex in polypropylene cages provided with bedding of paddy. Pellet chew feed standard diet under good management conditions and water *ad libitum* was provided to the animals.

3. **Acute-toxicity studies**

Healthy adult Wistar albino rats of either sex, starved overnight, were divided into groups (n=6) and were orally fed with increased dose of ethanol extracts. Total ethanol extracts administered orally in doses of up to 2g/Kg, did not produce any sign of toxicity and mortality in rats when observed for 7 days after administration [21].

4. **Wound healing activity by excision model**

Plan of work

Adult wistar albino rats (130-180 gm) of either sex were used for evaluation of wound healing activity. The animals were divided into 4 groups.

Group I: Received 2% sodium alginate
Group II: Received Neosporin ointment (0.2%)
Group III: Received 5% Whole plant methanolic extract ointment (WPME)
Group IV: Received 5% Leaf methanolic extract ointment (LME)
The hairs were removed from the dorsal thoracic region of the rats using depilitor and Veet hair removing cream. A full thickness excision wound of circular area of 500mm^2 and 2mm in depth was created along the markings under mild anaesthesia**.** Six animals each served as control and treated group; simple ointment and ointment containing the extracts were applied everyday topically from 0 to 22 day post wounding or number of days required for falling of the escher without any residual raw wound gave the period of epithelization, starting from the day of the excision.. Changes in wound area were calculated giving an indication of the rate of wound contraction. The areas of the wounds were measured by tracing the wounds on to a graph paper on the day of wounding and subsequently on 4th, 8th, 12th, 16th and 22nd day post wounding. The number of days required for falling of the scar without any residual raw wound, gave the period of epithelization. The observations of the percentage wound contraction were made on 4th, 8th, 12th, 16th and 22nd day post wounding days. All the values were statistically analyzed by unpaired student t test comparing with control [20, 22].

5. **Results and discussion**

Wound Healing activity study

In the acute oral toxicity studies, no mortality and no macroscopically organ abnormality/damage were observed. Acute toxicity studies showed that *Cleome viscosa* extracts were safe up to maximum dose of 2g/Kg body weight of the animal.

The animals treated with methanolic extracts of *Cleome viscosa* showed a significant wound healing activity as evidenced by the reduction in the number of days required ,for falling of the escher and the wound contraction compared to the standard. The changes in wound area were measured at fixed time intervals, viz 4th, 8th, 12th, 16th and 22nd days post wounding. Period of epithelization was 22nd days for the treatment groups, whereas it was 30 days for control group animals. The wound healing results are showed in the Table.1.
The results showed that the plant *Cleome viscosa* possessed effective wound healing activity as compared to control group, there by justifying its use in the indigenous system of medicine.

Table 1.Wound healing activity of ointment of WPME and LME of *Cleome viscosa* Linn.

GROUPS	Wound area (mm^2) ± SEM and (% of wound contraction) post wounding days					Epithelization in days ± SEM
	0 day	4th day	8th day	12th day	16th day	
CONTROL	79.02 ± 5.75 (0%)	70.06 ± 8.18 (11%)	58.53 ± 3.83 (25%)	50.6 ± 4.2 (35%)	40.5 ± 0.11 (49%)	35.06±0.46
Standard (Neosporin)	79.02 ± 5.75 (0%)	56.91 ± o.41 (27%)	22.44 ± 4.97* (71%)	2.01 ± 1.57* (97%)	0* (100%)	16.50±0.23
Whole plant Methanol extract (WPME)	81.5 ± 4.86 (0%)	54.17 ± 7.6 (33%)	22.99 ± 6.34* (72%)	2.63 ± 1.56* (97%)	0* (100%)	16.50±0.23
Leaf Methanol extract (LME)	84.77 ± 8.08 (0%)	57.43 ± 5.74 (32%)	32.18 ± 4.37* (62%)	8.01 ± 1.59* (90%)	2.64 ±1.56* (97%)	18.83±0.16

Student t-test. * -> $P < 0.05$

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