

Evaluation of Wound Healing Activity of Latex of *Calotropis gigantea* on Male Wistar Rats

Kishor Kumar Roy^{1*}, Ranjan Kumar Maji², Md Kabirul Islam Mollah³, Nitish Majhi⁴

Department of Pharmacology, Bharat Technology, Uluberia, Howrah, Westbengal, India, 711316 ^{1, 2, 3, 4}

Abstract: *Calotropis gigantea* has been used in the management of toothache, fresh skin burns, gum bleeding as well as others to make it qualify as a medicinal plant. This study was designed to assess its wound-healing property on rats and its potentials for anti keloidal activity. Fresh latex of *Calotropis* were obtained and evaluated phytochemically. 18 male Wistar rats were used and one excisional wounds were created on each rats. The rats were divided into three groups of six each. Group 1 was the Normal control and received no treatment, Group 2 was the standard and Group 3 was the test. The Latex of *Calotropis gigantean* (400 mg/kg/day) was evaluated for its wound healing activity in albino rats using excision wound models. Latex treated animals' exhibit reduction in wound area when compared to controls. The extract treated wounds are found to epithelize faster as compared to controls. The povidone iodine ointment 5 % w/w was used as standard.

Keywords: *Calotropis gigantea*, Wound healing, Excision wound, Povidone iodine ointment.

I. INTRODUCTION

The wound is also outlined as a loss or breaking of cellular and anatomic or functional continuity of living tissues. Healing of wound may be a physiological process that is initiated by trauma and sometimes terminated by scar formation. The process of wound healing happens in different phases like natural process, epithelization, granulation, collogenation and tissue reworking.¹ In India, there has been interest within the potential of medicinal plant for development of drugs with wound healing properties as taught in a very well-known form of Indian medicine called Ayurveda. In complementary and alternative medicine, the whole plant of *Calotropis gigantean* (Asclepiadaceae) leaves, barks, fruits, flowers as well as its latex have been employed in the treatment and management of many health conditions such as jaundice, joint pains, fever, asthma, snake bite, malaria, dysmenorrhoea, Muscle pain, eczema and leprosy. The latex is soaked in cotton and applied into dental cavity to treat toothache, gum bleeding and for dressing fresh skin burns etc. This study aims at evaluating the wound-healing property of *Calotropis* latex on male wistar rats with a view to relating the results of activity.^{2, 3, 4}

II. MATERIALS AND METHODS

A. Collection of Plant Materials (Latex)

Latex of *Calotropis gigantea* was collected from local area of Uluberia, Howrah region by making the incision on plant asns sterilized by autoclave.

B. Chemicals

Povidone Iodine (5%w/w) collected from Roy Medical Store, Rathtala, Uluberia, Howrah and Ethanol, Chloroform, sterilized cotton were collected from Modern Chemical Works, Garia, Kolkata.

C. Animals

Healthy male wistar albino rats of approximately the same age, weighing about 150-250 g were used for the study. They were fed with standard diet and water and libitum. They were housed in polypropylene cages maintained under standard conditions (12/12 hr light/dark cycle; 25°C ± 30°C, 35- 60% RH). All works were approved by the Institutional Animal Ethical Committee, Bharat Technology, Uluberia, Howrah.

D. Acute dermal toxicity (fixed dose) ⁵

The acute dermal toxicity study was carried out according to OECD (Organization for Economic Co-operation and Development) guidelines (guideline No.434) in adult male albino rats by "fix dose" method. Latex of the plant *Calotropis gigantea* was applied topically at dose level 2000 mg/kg/day.

E. Selection of dose

For the assessment of cutaneous wound healing activity (excision wound), dose level was chosen in such a way that, dose was approximately one fifth of the maximum dose during acute toxicity studies (400 mg/kg/day).

F. Grouping of animals

Grouping of animals animals were divided in to three groups, each group consisting of 6 rats.

Group I: Received no treatment and served as control.

Group II: Received application of standard drug ointment i.e. povidone iodine (5 % w/w).

Group III: Received application of latex of *Calotropis gigantea* (400 mg/kg/day).

G. Wound healing activity

Excision wound models were used to evaluate the wound-healing activity of latex of *Calotropis gigantea*.

H. Excision wound model ^{6, 7, 8}

Excision wounds were used for the study of wound healing activity on rate of and epithelization. Animals were anaesthetized with slight vapour inhalation of chloroform by using anaesthetics box and the right side of each rat was shaved. The entire wound was left open and the treatment was done topically in all the cases. The latex was applied at a dose of 400 mg/kg/day for 10 days. Wound areas were measured on days 0, 3, 5, 7 and 10 for all groups, using a transparency sheet and a permanent marker.

I. Statistical Analysis

The means of wound area measurement and wound breaking strength between groups at different time intervals were compared using one-way ANOVA, followed by Dunnett’s multiple comparisons using Garphpad Prism 9.

III. RESULTS AND DISCUSSION

During study of wound healing in rats following results were obtained: Acute toxicity studies showed that drug was found to be safe up to maximum dose of 2000mg/Kg/Day body weight of the animal. In studies using excision wound model, the latex treated group III showed significantly greater wound healing as compared to control animals. The standard drug treated animals in normal animals were showed significantly greater wound closure as compared to control and latex treated animals (Table 1).

Table 1: Wound healing of rats after using of different drug.

Sl No.	Treatment	Wound Dimeter cm ²				
		0 Day	3 Day	5 Day	7 Day	10 Day
1.	Normal Control (No Drug Applied)	6.1±0.05	5.8±0.04	4.6±0.05	3.7±0.05	2.8±0.05
2.	Standard (Povidone Iodine oint.)	6.03±0.06**	5.4±0.05**	3.8±0.05**	2.1±0.05**	0.7±0.05**
3.	Test (Latex of <i>Calotropis gigantean</i>)	6.0±0.05**	5.5±0.05**	3.9±0.05**	2.2±0.05**	0.9±0.04**

Values are mean± SEM (n=6), considered statistically significant as compare to normal control group; **p<0.01 considered statistically significant when compared to control group.

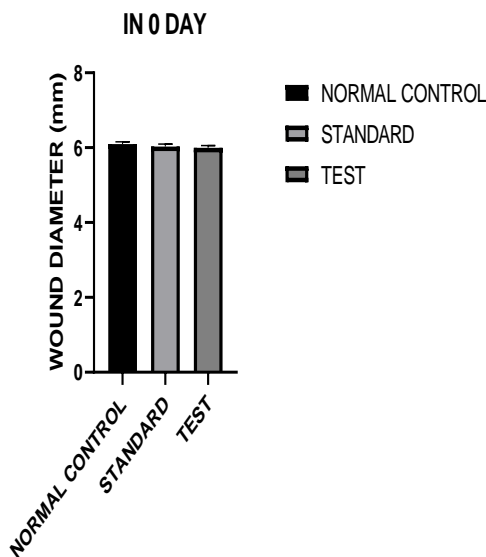


Fig 1: Wound healing in 0 day

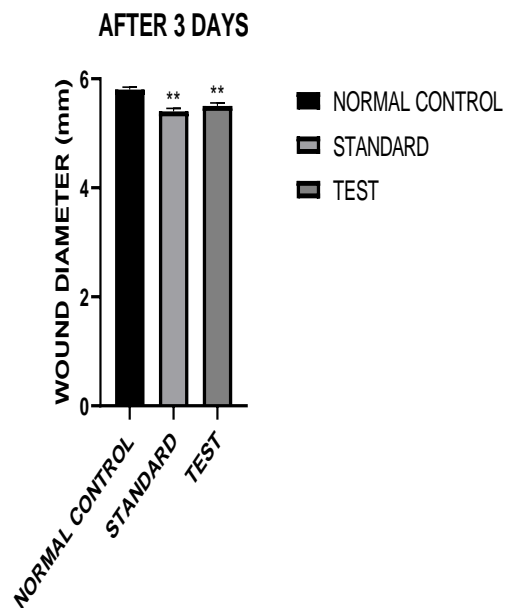


Fig 2: Wound healing in 3 day

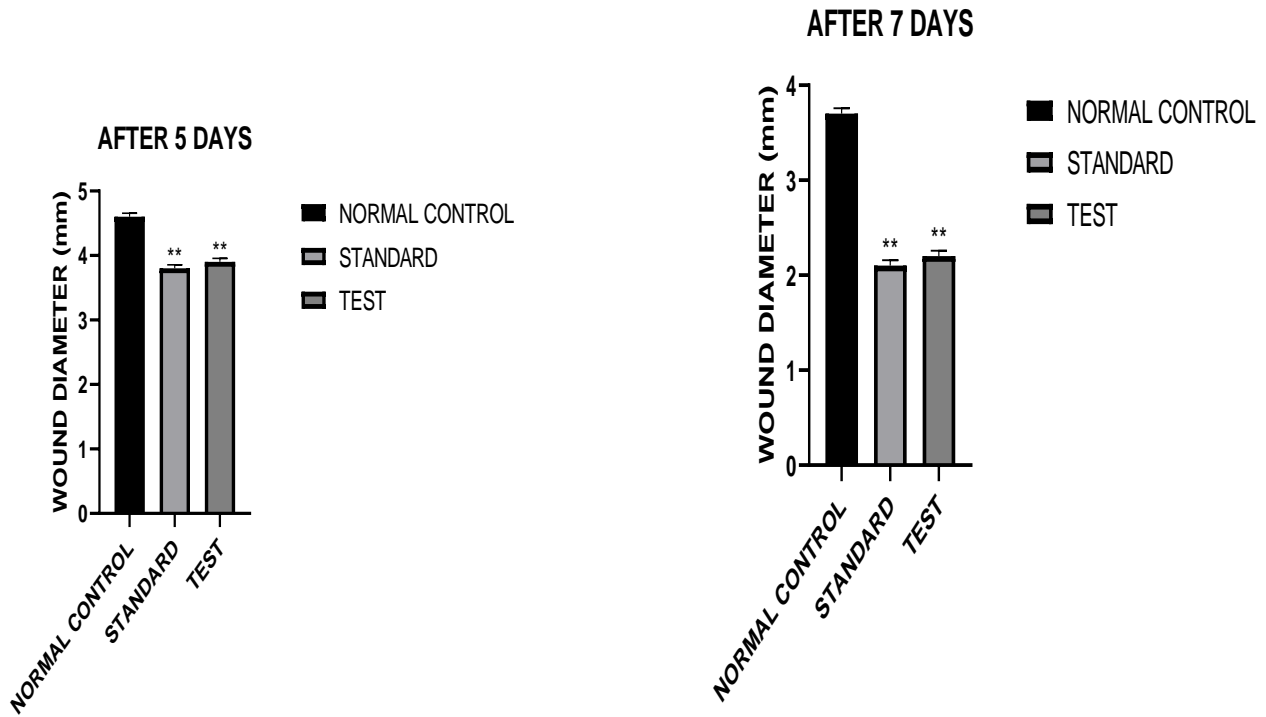


Fig 3: Wound healing in 5 day

Fig 4: Wound Healing in 7 day

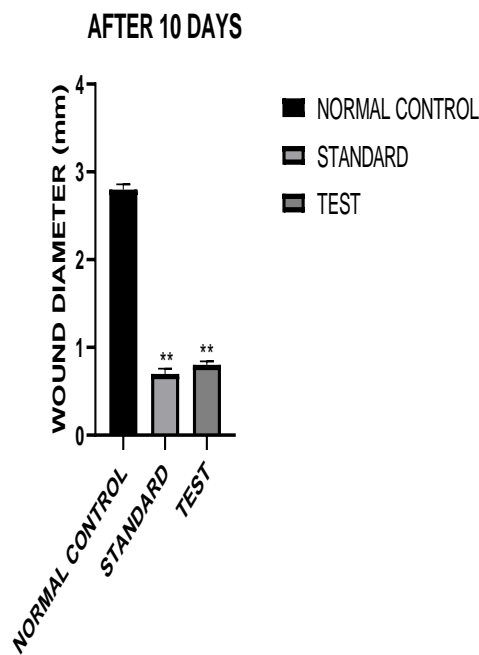


Fig 5: Wound healing in 10 day

**IV. CONCLUSION**

The wound healing activity of latex of *Calotropis gigantea* by using excision wound model and the latex showed the significant wound healing activity as like as standard Povidone Iodine ointment.

V. ACKNOWLEDGMENT

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