



Research Article

WOUND HEALING ACTIVITY OF ETHANOLIC EXTRACT OF *POLYALTHIA LONGIFOLIA* LEAVES IN EXCISION WOUND MODEL IN RATS

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Abstract: The present study was conducted to evaluate the wound healing effect of *Polyalthia longifolia* leaf extract in excision wound model in rats. The ethanolic leaf extract of *Polyalthia longifolia* (5% and 10%) were topically applied and the wound healing potential was evaluated in rats. The wound healing efficacy was studied by using excision wound model, which was inflicted by cutting away 500 mm² of the skin on the antero – dorsal side of the rats. Povidone iodine ointment was used as reference standard. Wound healing property, based on wound contraction was measured and assessed up to 14 days. The topical application of ethanolic leaf extract of *Polyalthia longifolia* (5% and 10%) had promoted wound healing in rats. There was significant contraction of wound observed with topical application of ethanolic leaf extract at both doses of *Polyalthia longifolia* in rats. Further phytochemical studies are required to isolate the active compounds responsible for these pharmacological actions.

Key words: *Polyalthia longifolia*, Excision wound model, wound healing

INTRODUCTION

Plant and plant products are being used as a source of medicine since long. According to the World Health Organization, more than 80% of the world's population, mostly in poor and less developed countries depends on traditional plant-based medicines for their primary health care needs.¹

Polyalthia longifolia cv. *pendula* (Annonaceae) is native to the drier regions of India and is locally known as “Ashoka” and is commonly cultivated in India, Pakistan, and Sri Lanka. *P. longifolia*, although an ornamental tree, finds its reference in Indian medicinal literature owing to its popular Hindi name Ashoka. Ashoka (Latin name: *Saracaasoka* (Roxb) De Wilde) is also a Sanskrit name in Ayurveda of a drug used for the treatment of uterine disorders.² This plant is used as an antipyretic agent in indigenous systems of medicine³. Pharmacologic studies on the bark and leaves of this plant display effective skin disease, antimicrobial activity⁴, cytotoxic function⁵ and hypotensive effects⁶. The present study was undertaken to authenticate the wound healing activity of *Polyalthia longifolia* leaves.

MATERIAL AND METHODS

(i) Chemicals and Reagents

Alloxan procured from LOBA Chemie (Mumbai). All other chemicals and reagents used in this study were of analytical grade.

(ii) Plant material

The leaves of *Polyalthia longifolia* were collected from outskirts of Erode, in the month of May. The leaves of *Polyalthia longifolia* were identified and authenticated by

the botanist, Botanical Survey of India, Agricultural University, Coimbatore. The (voucher no:92/614) specimen had been deposited in the herbarium for future reference.

(iii) Preparation of extract and

100 g of powdered drug was soaked in 250 ml of 95% ethanol solution for 24 h followed by cold maceration for further 48 h with occasional shaking. The mixture was filtered using muslin cloth followed by removal of excess of solvent by means of rotatory evaporator. The dried extract was used for the study.

(iv) Preparation of formulation

5 g and 10 g of dried extract was admixed with simple ointment base to obtain 5% and 10% of *Polyalthia longifolia* ointment respectively.

(v) Animals

Male Wistar Albino rats weighing between 150–220 g were used for the study. The animals were obtained from animal house of Nandha College of Pharmacy, Erode, India. On arrival the animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of 24 ± 2°C and relative humidity of 30–70 %. A 12:12 light: dark cycle was followed. All animals were allowed free access to water and fed with standard commercial pelleted rat chaw (Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee (688/2/C-CPCSEA) and were in accordance with the guidelines of the CPCSEA.

(vi) Wwound Healing Activity

An excision wound was inflicted by cutting away approximately 500 mm² full thickness of shaved skin at a predetermined area on the antero dorsal side of the rats under pentobarbitone (30 mg/kg., i.p) anesthesia. The entire wound was left open. Animals were closely observed for any infection and those which showed signs of infection were separated, excluded from the study and replaced.⁷

Totally 30 animals were used in this study. The rats were divided into 5 groups of 6 animals each. Excision wound was inflicted in all the rats of 4 groups. Group I, animals were treated with simple ointment base. Group II and III, were treated with 5% and 10% of *Polyalthia longifolia* ethanolic extract in simple ointment base respectively. Group IV, animals were treated with standard povidone iodine ointment. All the test drugs were applied topically on the wound, twice daily for 14 days.

RESULTSTable I: Effect of *Polyalthia longifolia* leaf extract on excision wound in rats.

Groups	Drug Treatment	Wound Contraction (days)			
		1	4	7	14
Group I	Control (Simple Ointment)	13.26 ± 0.14	49.28± 2.47	83.14± 3.57	199.45± 9.12
Group II	<i>Polyalthia longifolia</i> (5%)	17.32± 1.14	96.34± 5.66**	204.55± 2.19**	386.16± 10.68**
Group III	<i>Polyalthia longifolia</i> (10%)	18.66± 1.60	114.22± 4.18**	226.63± 10.17**	422.67± 15.62***
Group IV	Povidone Iodine Ointment	18.30± 2.17	124.11± 7.18**	239.45± 12.33***	436.19± 10.49***

Values are in Mean ± SEM; (n = 6)

*P < 0.05, **P < 0.01, *** P < 0.001 Vs Control

The results of wound healing activity of *Polyalthia longifolia* leaf extract in rats are showed in Table I. Topical application of both concentrations 5% and 10% of *Polyalthia longifolia* leaf extract promotes the contraction of wound in rats, when compared to control. The wound contraction after topical application of test drugs on 4th day of observation shows that in control it was 49.28±2.47. In 5% and 10% of *Polyalthia longifolia* leaf extract it was 96.34± 5.66 and 114.22± 4.18 respectively, whereas in standard drug povidone iodine ointment it was 124.11± 7.18. Observation shows that on 7th day onwards, the topical applications of both the concentrations of *Polyalthia longifolia* leaf extract promoted the wound contraction faster than control. Wound contraction progressed much faster in *Polyalthia longifolia* leaf extract from 7th day than the normal control. There was significant (p < 0.001) contraction of wound, observed with *Polyalthia longifolia* leaf extract and standard povidone iodine ointment on 7th to 14th day when compared with control. Topical applications of *Polyalthia longifolia* leaf extracts promoted wound contraction as that of povidone iodine treated groups.

DISCUSSION

The present study was undertaken to evaluate the wound healing activity of *Polyalthia longifolia* leaf extract

Assessment of wound contraction

Wound contraction was monitored by metric measurement of the wound area once on 1st, 4th, 7th and 14th post wounding days. This was studied by tracing the raw wound area on a transparent polythene paper and the traced area was measured by using a graph paper. The wound contraction was measured as a percentage decrease of original wound size of 500 mm² for each animal of a group.

(vii) Statistical analysis

Results were expressed as mean ± SEM. The data were analyzed by using one way analysis of variance (ANOVA) followed by Dunnet's t test. P values < 0.05 were considered as significant.

in rats. *Polyalthia longifolia* at both the concentrations promoted the wound healing in excision wound model in rats. Delay in wound healing may be due to the lack of blood flow, impaired local immune and cell defenses and microbial infections. *Polyalthia longifolia* exhibits wound healing activity may be due to its anti microbial activity.

CONCLUSION

From the result it could be concluded that the topical application of ethanolic leaf extract of *Polyalthia longifolia* shows significant wound healing activity in rats. Further phyto-chemical studies are required to isolate the active compounds responsible for wound healing activity which could be a major contribution to prove the claims in Indian systems of medicine.

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