



Experimental Evaluation of *Coccinia indica* Leaves for Wound Healing Efficiency

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Abstract

In the current investigation, methanolic extract of *Coccinia indica* was studied for its effect on wound healing, using an excision and incision wound models in rats. The leaves of the plant were extracted with methanol by using soxhlet apparatus. In preliminary wound healing activity, 5% ointment prepared with methanolic extract was evaluated for wound healing potential in excision and incision wound models. Wound contraction studies, Epithelialization period and tensile strength were determined for the assessment of healing potential of plant extract. The results revealed that group treated with methanolic extract shows better wound closure and epithelialization period when compared with control. Thus it was concluded that methanolic extract of *Coccinia indica* has the significant wound healing activity.

Keywords: Wound healing, Excision and Incision, *Coccinia indica*

Introduction

Wound contamination is one of the most ordinary diseases in rising countries because of poor sanitary conditions. Wounds are the physical injuries that result in an opening or breaking of the skin or break in the epithelial integrity of the skin and may be accompanied by disruption of the configuration and function of underlying normal tissue which may result from a discoloration, hematoma, laceration, or an abrasion [1]. Therefore, appropriate methods of healing are necessary for renovation of skin and physiological conditions. Medicinal plants are the confined heritage with universal importance. World is gifted with a rich wealth of medicinal plants [2]. During the past decade, a dramatic increase in exports of medicinal plants attests to universal attention in these products as well as in conventional health systems. The uses of conventional medicines hold a great promise to cure a wide range of ailments among the people particularly in tropical developing countries [3]. The history of herbal medicine is as old as human civilization. Since time immemorial man has used various parts of plants in the treatment and prevention of many ailments [4]. Traditionally, all medicinal preparations were derived from plants, whether in the simple form of plant parts or in the more complex form of crude extracts, mixtures, etc. Today an extensive number of drugs are developed from plants which are active against a number of diseases [5]. The multiple benefits of *Coccinia indica* is a true miracle of nature. Leaves of *Coccinia indica* are 5-10 cm, long, broad, bright green above, paler beneath, studded sometimes rough with papillae, palmately 5-nerved from a cordate base, often with circular glands between the nerves, obtusely 5-angled or sometimes deeply 5-lobed, the lobes broad, obtuse or acute, apiculate, more or less sinuate toothed, petioles 2 - 3.2 cm long. Numerous studies have been conducted on different parts of *Coccinia indica* and this plant has yet developed as a drug by pharmaceutical industries. This has encouraged researchers which are intended at validating the

claims and discovering mechanisms which are possibly explains the potential of this plant on wound repair processes and other treatment procedures.

2. Materials and Methods

2.1 Plant material

The fresh leaves of *Coccinia indica* were collected from the local area of Bhopal District (M.P) and were authenticated by the experts of Department of Pharmacognosy, RKDF College of Pharmacy Bhopal, where the voucher specimen has been preserved for future reference. The leaves of the plant were washed, shade dried and then converted into moderately coarse powder for further use.

2.2 Extract preparation

The moderately coarse powdered leaves were extracted using methanol as solvent on a soxhlet apparatus. The total methanolic extract was concentrated and yield was found to be 8.5 g with reference to powdered plant material.

2.3 Evaluation of wound healing activity

2.3.1 Grouping of experimental animals and treatment

Albino rats of wistar strain were used for this study. Animals were acclimatized to laboratory conditions at least 72 hours before conducting the experiments. The animal studies were approved by Institutional animal ethical committee of RKDF College of Pharmacy, Bhopal (M.P.). Rats were divided into three groups, of six animals in each group.

(Group I) was untreated which acts as control

(Group II) was topically treated with silver sulfadiazine cream

(Group III) was treated with methanolic extract of *Coccinia indica* (MCI)

2.3.2 Preparation of plant formulation

A 5% (w/w) simple cream of methanolic extract of *Coccinia indica* was prepared by mixing the extract with cream base. For this 5g of plant drug was incorporated in 100g of cream base.

2.3.3 Excision wound model

A circular skin piece of full thickness (approximately 300 mm²) was removed from a predetermined saved dorsal area. The entire wound was left open. The wound closure rate was assessed by tracing the wound on post-wounding days 4, 8, 12, 16 and 20. The wound contraction areas were measured using a graph paper. Wound contraction and epithelialization period were evaluated for the assessment of healing potential of methanolic extract of *Coccinia indica* [6, 7].

2.3.4 Incision wound model

A 6-cm long parallel incision was made through the entire thickness of the shaved skin with the help of sharp blade. Incision was closed with interrupted sutures with stitches 1 cm apart. The sutures were removed on the 12th post-wound day and the tensile strength of wound was measured [8, 9].

2.4 Statistical Analysis

Results, expressed as Mean \pm SEM, were evaluated by Student's *t*-test. Values of $P < 0.05$ were considered statistically significant.

2.5 Results and Discussion

2.5.1 Wound contraction studies in excision wound model

In excision wound model, the rate of healing of wound was faster in animals treated topically with methanolic extract of *Coccinia indica* compared to the control group as shown in fig 1.

2.5.2 Epithelialization period in excision wound model

Number of days required for falling of escher without any residual raw wound showed the period of epithelialization as in fig 2.

2.5.3 Determination of tensile strength in incision wound model

In incision wound model, tensile strength of methanol extract treated group was found to be increased when compared with control group as shown in fig 3.

2.6 Conclusion

Plant products are probable agents for wound healing and largely favored because of their widespread availability, non-toxicity, absence of unwanted side effects and their effectiveness as crude preparations [10]. These findings prompted us to further investigate other tropical plants, which had reported medicinal values, for wound healing. The findings of the present study showed a significant increase in wound contraction rate, epithelialization and skin tensile strength which concludes that extract of *Coccinia indica* in cream base may be capable of promoting wound-healing activity.

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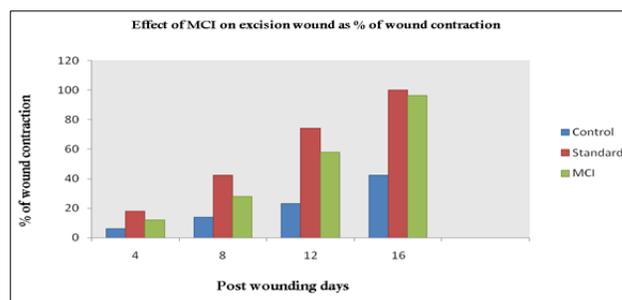


Fig 1: Effect of Methanolic extract of *Coccinia indica* on wound contraction studies in excision wound model

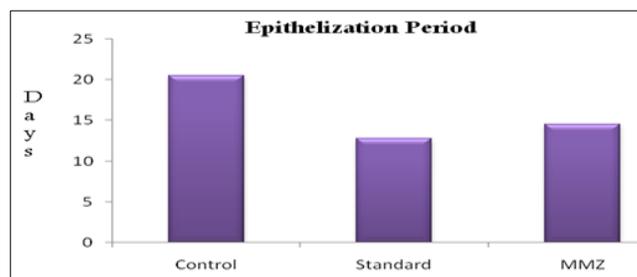


Fig 2: Effect of Methanolic extract of *Coccinia indica* on epithelialization period in excision wound model

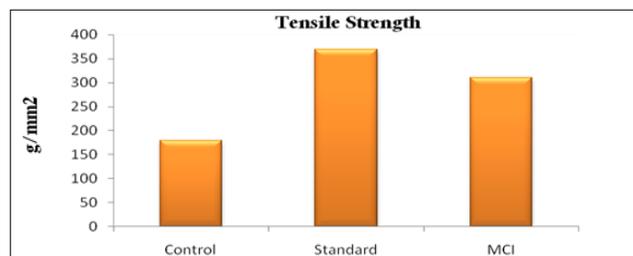


Fig 3: Effect of Methanolic extract of *Coccinia indica* on tensile strength determination in incision wound model

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