

EVALUATION OF WOUND HEALING EFFECT OF *MAERUA OBLONGIFOLIA* IN ALBINO RATS

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ABSTRACT

Background: This particular study emphasis on the in-vivo wound healing effect of *Maerua oblongifolia* in albino rats. **Methods:** Plant powder (10g) was soaked in 30 ml of ethanol (70%) in a soxhlet extractor for 72h. The extract was concentrated in a rotary flash evaporator at a temperature not exceeding 50°C. It was then evaporated to dryness. The excision wound model was employed for wound healing activity in albino rats. Healthy albino rats (150-200g) of either sex were taken for excision wound model. Animals were divided into three groups of six animals in each. The Group1 is control. The

Group 2 animals were treated with Soframycin, that served as standard. Group3 animals were treated with herbal extract of *Maerua oblongifolia*. All animals had free access to pelleted food and water. Temperature was maintained at 23±1°C. The results were expressed as mean±SEM.

Results: Complete wound healing was observed with *Maerua oblongifolia* treated rats in 15 days as that of Soframycin ointment. **Conclusion:** The findings from this research indicates that the ethanol extract of *Maerua oblongifolia* are effective in inhibiting the growth of wound associated pathogen and faster the process of wound healing.

KEYWORDS: *Maerua oblongifolia*, Soframycin, wound model, Wound healing.

INTRODUCTION

Wound is the disruption of cellular and anatomic continuity of living tissue produced by physical, chemical, electrical or microbial insults to the tissue. Wound healing is the dynamic process of regeneration or repair of broken tissue.^[1] Normal wound-healing response begins with injury and is a concentrated sequence of events. The healing cascade is activated when

platelets aggregate and the release of clotting factors resulting in the deposition of fibrin clot at the site of injury.^[2] The fibrin clot serves as a provisional matrix and sets the stage for the subsequent events of healing.

Inflammatory cells also arrive along with the platelets at the site of injury providing key signals known as cytokines or growth factors. The fibroblast is the connective tissue responsible for collagen deposition that is needed to repair the tissue injury. In normal tissues, collagen provides strength, integrity, and structure. When tissues are disrupted following injury, collagen is needed to repair the defect and restore anatomic structure and function.

Hence, there is a need for herbal based wound healing agents. Murva is one of the potent phytochemical, obtained from *Maerua oblongifolia* (Forssk.) A. Rich.) of family Capparaceae, has been traditionally used to cure various diseases.^[3] Ethnomedicinal survey reveals that Murva (*Maerua oblongifolia*) is used to cure various diseases such as fever, stomach ache, skin infections, urinary calculi, diabetes mellitus, epilepsy, pruritis, rigidity in lower limbs, abdominal colic and cough.^[4]

In the present study *Maerua oblongifolia* extract was prepared and its feasibility was checked by wound healing activity in albino rats as compared to Soframycin ointment.

METHODS

Preparation of plant extract

A weighed quantity 30g of the air-dried powdered drug was taken and extracted with Ethanol (70%) in a Soxhlet extractor for 72h. The extract was concentrated in a rotary flash evaporator at a temperature not exceeding 50°C. It was then evaporated to dryness.

Evaluation of in vivo wound healing activity

Study setting

Albino rats (150-200 g) were housed in standard plastic rat cages with stainless steel cover lids and wheat straw was used as bedding material. All animals had free access to pelleted food and water. Temperature was maintained at 23±1°C. The animals were divided into three groups as given below. Each group consisted of six animals each.

Group-I: Control (Simple ointment base 0.5 g/kg body weight).

Group-II: Positive control (Soframycin ointment 1% w/w).

Group-III: herbal extract (2.5% w/w).

Excision wound model: The rats weighing (150to200g) were selected and their hairs from dorsal thoracic central region were shaved after anaesthetized to a diameter of 30mm with the aid of rizer blades. The anticipated area of the wound was marked on the shaved skin. Skin wound were created with aid of toothed forceps, surgical blades and pointed scissors. The wound was cleaned with cotton swab soaked in alcohol.

The *Maerua oblongifolia extract* and Soframycin ointment were applied on wound once daily for 15 days starting from the first day of wounding. Wound contraction was measured for 15days at interval of 2days.^[5] Contraction which mainly contributes for wound closure was studied by tracing the raw wound area on transparent paper every alternate day till wounds were completely covered with epithelium. The various parameters that indicate wound healing like the wound closure (wound contraction), scar formation and period of epithelisation were analysed. Raw area of the wound was traced with the help of transparent paper on 4th, 8th, 12th and 16th day. Scar formation without any wound area was considered as the criteria for epithelization. Graph paper (mm²) was used to measure the wound area planimetrically. The ratio of percentage of wound closure area to that of original wound area was calculated as the extent of wound healing. Wound contraction(WC) was calculated as a percentage change in the initial wound size i.e.

Percentage Wound Closure= $\frac{\text{Initial wound size} - \text{specific day wound size}}{\text{Initial Wound size}} \times 100$

RESULTS AND DISCUSSION

The process of healing of wounds involves different phases like granulation, formation of collagen, scar maturation. The cellular structures are restored by dynamic and complex processes. In this study, excision wound model was used to assess the effect of herbal extract of Murva on wound healing activity. The result showed that the extract possessed a wound healing activity. The present study demonstrated that the herbal extract of murva have potential wound healing property as that of standard.

This effect may be explained by several mechanisms like coating the wound, chelating free radicals and reactive oxygen species, forming complexes with proteins in cell wall of microorganism, stimulation of wound contraction and increased formation of fibroblasts and capillaries. And there was no adverse effects induced by the extract, due to which, it can be recommended for skin wounds and ulcers.^[6]

Table 1: Wound area measurement (mm²).

Sl.No	Groups	0 th day	4 th day	8 th day	12 th day	16 th day
1.	Control	567.0± 18.34	379.0±0.47	348.3±0.67	273.67±0.76	96.83±0.44
2.	Std (Soframycin)	562.25±11.07	288.0±0.32	205.5±0.57	111.67±0.96	11.5±1.55
3.	Test (2.5%)	568.0±0.13	367.0±0.43	322.5±0.96	201.0±1.21	68.15±0.41

Table 2: Percentage wound contraction (mm²/rat).

Sl.No	Groups	4 th day	8 th day	12 th day	16 th day	Period of epithelialization (in days)
1.	Control	32.1± 024	37.5± 0.17	50.3± 0.37	81.67± 0.16	18.83±0.44
2.	Std (Soframycin)	47.25±0.57	62.3±0.26	79.5±0.250	96.67± 0.67	10.05±1.59
3.	Test (2.5%)	34.2±0.19	42.8± 0.43	63.5±0.59	86.50±1.63	12.5±0.81

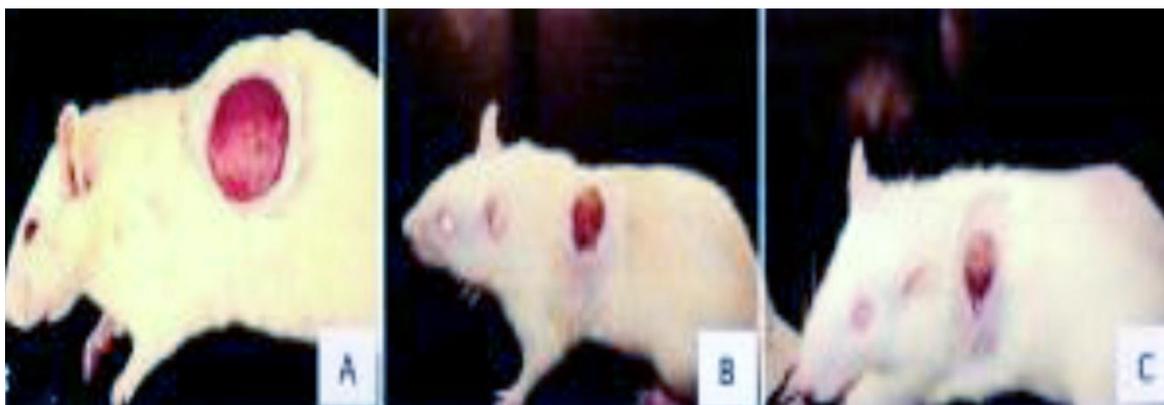
A- Control, B- standard (soframycin) and C- test extract (250mg)**Fig. 1: Wound healing effect of control, standard, test extract on 1st day.****A- Control, B- standard (soframycin) and C- test extract (250mg)****Fig. 2. Wound healing effect of control, standard and test extract on 4th day.****A- Control, B- standard (soframycin) and C- test extract (250mg)**



Fig. 3: Wound healing effect of control, standard and test extract on 8th day.

A- Control, B- standard (soframycin) and C- test extract (250mg)

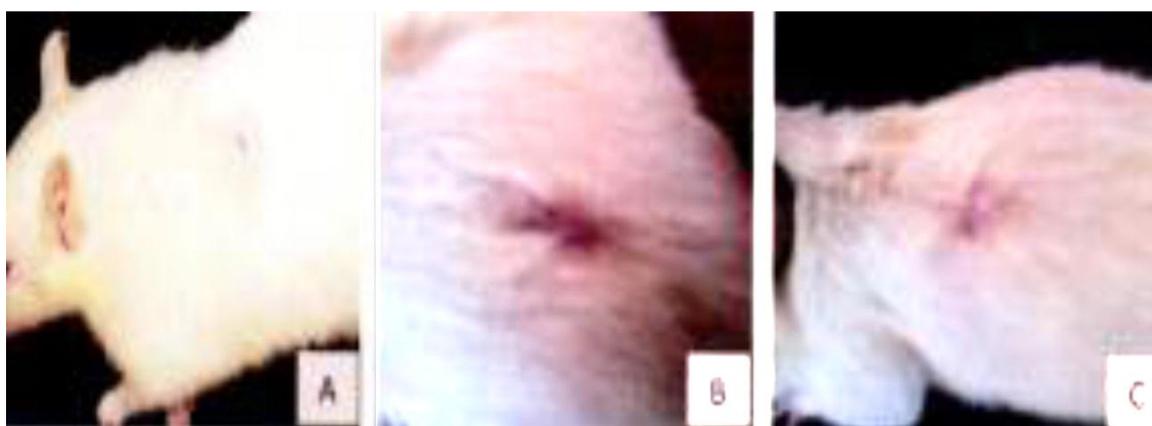


Fig. 4: Wound healing effect of control, standard and test extract on 16th day.

CONCLUSION

All the above results indicate the effectiveness of *Maerua oblongifolia* extract in enhancing wound healing activities. The herbal extract prepared from *Maerua oblongifolia* showed marked reduction in wound area in comparison to control group when examined for wound healing activity by topical application in albino rat.

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