



## WOUND HEALING ACTIVITY OF TRADITIONAL HERBAL FORMULATION

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### ABSTRACT

An indigenous herbal formulation containing, *comphora officinarum* (Kafoor), *Shorea robusta* (Raal), *Beeswax* (*Apis mellifera*), *Acacia catechu* (Katha safeed), *Sesamum indicum* (Til oil), and *Azadirachta indica* (Neem oil) was evaluated for wound healing activity in excision and incision wound models in albino rats. The activity was compared with that of the control and framycetin sulfate cream 1 % w/w as standard drug.

The formulation showed a significantly higher contraction rate and shortened epithelization period in both the models. In excision model, the healing was 99% ( $p < 0.001$ ) on 16<sup>th</sup> day compared to 85 % and 75% of healing with framycetin sulfate cream and control, respectively. In incision wound model, there was significant increase in tensile strength ( $p < 0.001$ ). Thus, it is concluded that the formulation has got potential wound healing activity for both the types of wounds; justifying its use in the traditional practice.

**Key words :** Traditional herbal formulation, Wound healing activity.

### INTRODUCTION

Wound is a physical trauma where the skin is torn, cut, burn or punctured<sup>1</sup>. Wound often possesses problems in clinical practice. A lot of research has been envisaged to develop the better healing agents. The rapidity of wound healing depends to a considerable extent on the contraction that begins a few days after injury and continues for several weeks<sup>2</sup>.

World Health Organization (WHO) has been promoting traditional medicine as a source of less expensive, comprehensive medical care, especially in developing countries. Eight percent of the world's population relies on medicinal plants for their primary health care. WHO also recognized the importance of traditional medicine and has treated

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strategies, guidelines and standard for botanical medicines<sup>3-6</sup>.

In the present study, an indigenous herbal formulation containing *comphora officinarum* (Kafoor), *Shorea robusta* (Raal), *Beeswax* (*Apis mellifera*), *Acacia catechu* (Katha safeed), *Sesamum indicum* (Til oil), and *Azadirachta indica* (Neem oil)<sup>7-9</sup> which claims to have the potential in the treatment of wounds, burns, fistula inflammation etc; was selected for the evaluation of wound healing activity in excision and incision wound models in albino rats.

## EXPERIMENTAL

### Materials and method

The formulation was obtained as a gift sample from a traditional practioner Mr. Abdullah K. Hyderabad.

### Experimental animals

Male wistar rats weighing 150-225 g were used after approval of the institutional ethics committee. The animals were maintained at a temperature-controlled, well ventilated animal room for a period of 7 days prior to the experimental period. They were kept on standard pellet diet and water *ad libitum*.

### Wound healing activity

The investigation was carried out in two different wound models in rats such as the excision and incision wound model to evaluate the wound healing activity.

### Excision wound

The rats were inflicted with excision wounds under light ether anaesthesia. A circular wound of about 2.5 cm diameter was made on depilated dorsal thoracic region of rats<sup>10</sup>. The animals were divided into three groups, each group containing six animals. Group-I was considered as control and received simple ointment base (B.P), Group-II served as reference standard and received framycetin sulfate cream 1% w/w. Group-III received the test formulation. The ointments were applied topically once in a day, till the epithelization was complete starting from the day of experiment. The parameters studied were wound closure and epithelization time. The formulation was applied until complete wound healing. The percentage of wound closure and the period of epithelization were calculated. The period of epithelization was calculated as the number of days required for wound healing.

## Incision wound

In incision wound model, 6 cm long paravertebral incisions were made through full thickness of the skin on either side of the vertebral column of the rat<sup>11</sup>. The wounds were closed with interrupted sutures of 1 cm apart. The animals were divided into three groups, each group containing six animals. The categorization and treatment of experimental animals was similar to that of excision wound model. The ointment containing the test formulation was applied topically once in a day. The sutures were removed on 8<sup>th</sup> post wound day and the tensile strength of the healed wound was measured on 10<sup>th</sup> day following continuous water flow technique<sup>12</sup>.

## Statistical analysis

The data is expressed as mean  $\pm$  SEM and subjected to students 't' test and the level of significance was set at  $p < 0.001$ .

**Table 1. Excision wound model**

Treatment	Percent contraction (cm <sup>2</sup> )					Epithelization period (days)
	4 <sup>th</sup> day	8 <sup>th</sup> day	12 <sup>th</sup> day	16 <sup>th</sup> day	20 <sup>th</sup> day	
Simple ointment base (B.P) Control	8.760 $\pm$ 0.8124 (35.1%)	10.800 $\pm$ 0.6042 (42.1%)	15.340 $\pm$ 1.042 (61.4 %)	18.700 $\pm$ 0.6156 (74.8%)	24.25 $\pm$ 0.0402 (97.1%)	21.72 $\pm$ 0.26
Framycetin sulfate cream 1 % w/w	10.886 $\pm$ 0.4920 (43.5%)	13.420 $\pm$ 0.6800 (53.6%)	18.980 $\pm$ 0.6386 (75.9%)	21.140 $\pm$ 0.4140 (84.5%)	24.840 $\pm$ 0.640 (99%)	19.24 $\pm$ 0.036
Reference standard						
Test formulation	10.470 $\pm$ 0.8148 (41.9%)	14.82 $\pm$ 0.6688 (59.2%)	20.366 $\pm$ 0.8188 (81.42%)	24.68 $\pm$ 0.2432** (98.16%)	-	17.56 $\pm$ 0.26

Values are mean  $\pm$  S.E.M of 6 animals in each group. Numbers in parenthesis indicates percentage of wound contraction. \*\*  $p < 0.001$  vs respective control by students 't' test.

**Table 2 : Incision wound model**

Group	Treatment	Tensile strength in g $\pm$ SEM
1	Simple ointment base (BP) control	423 $\pm$ 14.6
2	Framycetin sulfate cream 1 % w/w Reference standard	590 $\pm$ 14.8**
3	Test formulation	592 $\pm$ 12.2**

Values are mean  $\pm$  S.E.M of 6 animals in each group.  
\*\* p < 0.001 vs respective control by student "t" test.

## RESULTS AND DISCUSSION

The effect of traditional herbal formulation was screened on excision and incision wound models with the control (simple ointment base B.P) and reference standard (framycetin sulfate cream 1% w/w). The measurements of the progress of the wound healing induced by the control (simple ointment base B.P), reference standard (framycetin sulfate cream 1% w/w) and test formulation in the excision wound model are shown in Table I. It is observed that the wound contraction ability of the test formulation was significantly greater than that of the control and reference standard ( $p < 0.001$ )

In the incision wound model, there was a significant increase in tensile strength of the 10 d old wound due to treatment with test formulation (592  $\pm$  12.2). Measurements of the tensile strength are shown in Table 2.

From the results obtained, it is evident that the traditional herbal formulation has significant wound healing activity in both models of wound healing and hence, justifying its use in traditional practice.

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