

Research Article



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**WOUND HEALING ACTIVITY OF *BARLERIA MONTANA*.LINN LEAVES IN RATS**

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**ABSTRACT**

Plants are a source of large variety of potent drugs to alleviate suffering from diseases. In traditional medicine the plant *Barleria montana* (*Acanthaceae*) is widely used in the treatment of diabetes, liver disorders, wound healing and it is also used in the treatment of sunstroke. In the present study ethanolic extract of *Barleria montana* leaves were used to evaluate its wound healing activity in rats. Rate of wound contraction were taken as parameters. The wound healing activity of topically applied extract of leaf of *Barleria montana* was evaluated in albino rat by excision wound model for a period of 16 days. Extract of *Barleria montana* showed marked reduction in wound area in comparison to control group from 4th day onwards. The result obtained indicates that ethanolic extract of *Barleria montana* accelerates the wound healing process by decreasing the surface area of the wound. The present study gives the evidence for wound healing activity of *Barleria montana*.

**Keywords:** *Barleria montana* (BM), Excision wound healing, contraction period.

**INTRODUCTION**

Wound healing involves a complex series of interactions between different cell types, cytokine mediators, and the extracellular matrix. The phases of normal wound healing include hemostasis,

inflammation, proliferation, and remodeling. Each phase of wound healing is distinct, although the wound healing process is continuous, with each phase overlapping the next. Because successful wound healing requires adequate blood and nutrients to be supplied to the site of damage, the overall

health and nutritional status of the patient influences the outcome of the damaged tissue.<sup>10</sup> Wounds are physical injuries that result in an opening or break of the skin. Proper healing of wounds is essential for the restoration of disrupted anatomical continuity and disturbed functional status of the skin (Begum, 2000). Healing is a complex and intricate process initiated in response to an injury that restores the function and integrity of damaged tissues<sup>5</sup> Wound healing is a complex process that result in the contraction and closure of the wound and restoration of a functional barrier<sup>1</sup> Cutaneous wound repair is accompanied by an ordered and definable sequence of biological events starting with wound closure and progressing to the repair and remodeling of damaged tissue<sup>2</sup> Repair of injured tissues includes inflammation, proliferation, and migration of different cell types (3) Inflammation, which constitutes a part of the acute response, result in a coordinated influx of neutrophils at the wound site<sup>2</sup>

*Barleria montana*, (Synonym *Barleria purpurea*) commonly known as Mountain Barleria and dongari koranti in Marathi is one of the species in the genus *Barleria* belonging to the family Acanthaceae (*Ruellia* family). Mountain Barleria is an erect herb found in the mountains of Western Ghats.<sup>9</sup> It is native to a wide area ranging from Southern China to India and Myanmar.

Cultivated as an ornamental plant in villages and gardens. The phytochemical investigation of the plant *Barleria montana*.linn revealed the presence of different chemical constituents such alkaloids, Phytosterols, Phenolics, Terpenoids, Tannins and Flavonoids Wound.<sup>9</sup> The medicinal uses of leaves of *Barleria Montana* was healing activity, anti

diabetic activity<sup>8</sup>Hepatoprotective activity  
Antioxidant activity<sup>9</sup>

## MATERIALS AND METHODS

### PLANT MATERIAL

The *Barleria montana* leaves were identified and authenticated by Dr. Madhava chetty, Department of botany, S.V. University, Tirupati, Chittoor (dist), Andhra Pradesh.

### PREPARATION OF EXTRACT:

The leaves of *Barleria montana* was collected, washed, dried in shade and pulverized to obtain a coarse powder and then was subjected to solvent extraction by soxhlet apparatus. About 100g of powdered drug was extracted successively with ethanol using soxhlet apparatus. The extraction was carried out for 72 hours until the extract becomes colourless. Then the solvent was completely removed by evaporating in rotatory flask evaporator. The dried extract thus obtained was kept in desicator and was used for further experiment. Percentage yield of ethanolic extract of leaves of *Barleria montana* was found to be 3.98% w/w.

### ACUTE ORAL TOXICITY STUDY:

Acute oral toxicity study was followed by using OECD 423 (Acute Toxic Class Method) and was done in rats (150-200g) which were fasted overnight. They were divided into 5 groups of three animals each. The ethanolic extract of leaves of *Barleria montana* was administered orally through the feeding tube to the pair of rats of each group in ascending and widely spaced doses viz., 10,30,100,300,1000,2000mg/kg. The animals were observed continuously for 2 overnight mortality was recorded. No signs of toxicity were observed even with

2000mg/kg of *Barleria Montana*. So, the dose of the extract chosen for the study was 250mg/kg, 500mg/kg. This is corresponding to the 1/10th of the maximum tolerated dose (2000mg/kg).

### EXPERIMENTAL ANIMALS:

Abino wistar rats (150-200g) of either sex were obtained from the animal house in Krishnateja pharmacy college, Tirupati. The mice were maintained in a well-ventilated room with 12:12 hour light/dark cycle in polypropylene cages. Standard pellet feed (Hindustan Lever Limited., Bangalore) and drinking water was provided *ad libidum through* out experimentation period. Mice were acclimatized to laboratory conditions one week prior to initiation of experiments. Ethical committee clearance was obtained from IAEC (Istitutional Animal Ethics Committee) of CPCSEA (Committee for the Purpose of Control and Supervision of Experiments on Animals).

### WOUND HEALING ACTIVITY BY EXCISION WOUND MODEL

Adult albino rats of either sex, weight weighting between 160-200gm were used for evaluation of wound healing activity. The animals were divided into two groups. Group I: Control and Group II: Plant Extract of Barleria Montana. The animals were anaesthetized by giving ether and hairs were removed from the dorsal thoracic region of the rats. A circular wound of approximately 5 sq cm area was made and animal were kept as such individually in separate cage. Group I received ointment I.P. and Group II were treated with ointment containing extract every day topically for a period of 16 days respectively. The areas of the wound were measured by tracing the wound on to a graph paper. The area of the wound contraction was measured in different treated and control group on 1st, 4th 8th, 12th and 16th day

$$\text{Percentage Wound Closure} = \frac{(\text{Initial area of Wound} - N^{\text{th}} \text{ day area of wound})}{(\text{Initial area of Wound})} \times 100$$

### STATISTICAL ANALYSIS

The relative wound area results were compared using one- way analysis of variance (ANOVA) followed by Dunnet's tests. *P* values less than 0.05 were considered as indicative of significance.

### RESULTS

The percentage of wound contraction includes by recording the changes in wound area at fixed intervals of time, Viz., 4th, 8th, 12th, and 16th day after treated with ethanolic extract of BM. However, on 16<sup>th</sup> post wounding day,

Group I animal showed 74.98% of healing, which may be due to self immunity of animal whereas the extract treated group (Group II) showed 90.76% healing, the obtained result compared with control, the activity of the extract was found to be highly significant ( $P < 0.001$ ).

Group	Percent wound contraction on different days			
	4 <sup>th</sup>	8 <sup>th</sup>	12 <sup>th</sup>	16 <sup>th</sup>
control	15.34±1.53	29.58±3.26	47.69±3.57	74.98±7.16
Ethanol extract of BM	23.06±3.06	54.72±4.04	80.05±3.27**	90.76±0.92**

Value expressed in mean ± SEM, n=6, not significant (P>0.005), \* significant (P>0.01), \*\* significant (P>0.001).

## DISCUSSION

Wounds could happen through several causes like physical injuries resulting in opening and breaking of the skin. The most common symptoms of wounds are bleeding, loss of feeling or function below the wound site, heat and redness around the wound, painful or throbbing sensation, swelling of tissue in the area and pus like drainage. The enhanced capacity of wound healing with the plant could be explained on the basis of anti-inflammatory effects of the plant that are well documented in the literature. Study on animal models showed enhanced rate of wound contraction and drastic reduction in healing time than control, which might be due to enhanced epitheliasation. Many studies indicate that plant products are potential agents for wound healing and are largely preferred because of the absence of unwanted side effects and their effectiveness. In this study, we analyzed the wound-healing

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activity of ethanol extract of *Barleria Montana*. Wound healing activity of *Barleria montana* extract showed significant results when compared with control group and control. The treated wound itself exhibit marked dryness of wound margins with tissue regeneration.

## CONCLUSION

In the present research, extract of *Barleria montana* showed marked reduction in wound healing in comparison to control group when examined for wound healing activity by topical application in albino rat. Promising results appeared from 4th day onwards in a 16 days study using excision wound model on rats. The result obtained indicates that ethanolic extract of *Barleria montana* accelerates the wound healing process by decreasing the surface area of the wound.

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