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Research Article

Evaluation of wound healing activity of leaves of *Mirabilis jalapa* L in experimentally induced diabetic rats

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ABSTRACT

To evaluate the wound healing activity of leaves of *Mirabilis Jalapa* L in experimentally induced diabetic rats using Excision wound model, Incision wound model, Dead space wound model. Healthy albino wistar rats (200-250gm) of either sex, were divided into three groups (n=6). Group I (control) receives plain drinking water. Group II (diabetic control-receives plain drinking water) and Group III (diabetic group- receives 1000mg/kg b.wt of *Mirabilis Jalapa*. In excision wound model percentage of wound contraction was measured on 3rd, 6th, 9th, 12th, 15th, 18th, 21st day. In Incision wound model the wound breaking strength was measured on the 10th day. In dead space wound model the wet and dry weights of granulation tissue was recorded from the animals after 10days of wounding. The hydroxyproline content was measuring absorbance at 540nm using colorimeter. The data was analyzed by one way ANOVA followed by Dunnet's test. The values were expressed as Mean±SEM. **P<0.01 was considered as significant. *Mirabilis Jalapa* showed significant increase in wound contraction, wound breaking strength, wet and dry weight of the tissue, and amount of hydroxyproline in extract treated groups of the animals. The *Mirabilis Jalapa* showed significant wound healing activity in an experimentally induced diabetic rat.

Keyword: Excision wound model, Incision wound model, Dead space wound model, Wound contraction, Wound breaking strength.

INTRODUCTION

A wound can be defined as a cut or break in the continuity of any tissue caused by injury or operation. In medicine a wound is a type of injury in which skin is torn, cut or punctured or where blunt forces causes a contusion. Wound healing is complex and dynamic process of restoring cellular structure and tissue layers in damaged tissue. Diabetic wound healing is an enigmatic and

debilitating complication and poses a serious challenge in clinical practice. Slowed wound healing mainly due to damage to blood vessels can be a serious complication of diabetes. People with diabetes often notice that their skin gets itchy, dry and is easily injured. People with diabetes have poor blood circulation, which means the body is slower to heal wounds. *Mirabilis Jalapa* L belongs to the family Nyctaginaceae. In herbal medicine,

part of the plant may be used as an aphrodisiac as well as diuretic and purgative. *Mirabilis Jalapa* L is an herb that has number of traditional uses on which work has to be done, so the present study has been designed.

MATERIALS AND METHODS

Collection of leaves

The leaves of the plant were collected from forest of Tirupati district and authenticated by Dr.K.Madhava Chetty, The leaves were shade dried, powdered and stored in air tight container for further studies. The extract was prepared by soxhlet extraction method.

Methodology

Healthy albino wistar rats (200-250gm) of either sex, were divided into three groups (n=6). Group I (control) receives plain drinking water. Group II (diabetic control-receives plain drinking water) and Group III (diabetic group-receives 1000mg/kg b.wt of *Mirabilis Jalapa*. In excision wound model percentage of wound contraction was measured on 3rd, 6th, 9th, 12th, 15th, 18th, 21st day. In Incision wound model the wound breaking strength was measured on the 10th day. In dead space wound model the wet and dry weights of granulation tissue was recorded from the

animals after 10days of wounding³. The hydroxyproline content was measuring absorbance at 540nm using colorimeter. The data was analyzed by one way ANOVA followed by Dunnet`s test. The values were expressed as Mean±SEM. **P<0.01 was considered as significant.

RESULTS

Excision wound model

The mean rate of wound closure was calculated on 3rd, 6th, 9th, 12th, 15th, 18th, and 21st day *Mirabilis Jalapa* L showed significant wound contraction from 9th day to 18th day as compared with normal control and diabetic control(Table 1).

Incision wound model

The group treated with ethanolic extract of *Mirabilis Jalapa* L showed significant increase in wound breaking strength as compared with normal control and diabetic control groups (Table 2).

Dead space wound model

Mirabilis Jalapa L treated groups showed significant increase in dry tissue weight when compared to normal control and diabetic control animals, and increased hydroxyproline content when compared to normal control and diabetic control animals. (Table 3).

Table 1: Percentage of wound contraction

Groups	Percentage wound contraction on Post wounding day						
	3 rd day	6 th day	9 th day	12 th day	15 th day	18 th day	21 st day
Normal control	16.39±2.72	39.9±1.59	59.30±3.9	75.35±2.03	87.69±0.33	98.86±0.07	100
Diabetic control	14.39±3.21	35.97±1.59	49.90±1.95	63.86±1.94	72.61±1.95	87.93±0.62	97.95±0.03
Treated With Extract 1000mg/kgb.wt	18.99±2.58	42.19±3.66	72.88±4.78	86.40±2.1*	96.64±0.13*	100*	100

Results were analyzed by One-way ANOVA followed by Dunnet`s t-test.

The value were expressed as mean±SEM Normal control v/s extract treated group **P<0.01 Significant.

Diabetic control v/s extract treated group **P<0.01 Significant.

Table2: Period of epithelialization

Sl.#	Group	Treatment	Period of epithelialization Mean ±SEM (days)
1.	GROUP I	Normal control	18.5±0.28
2.	GROUP II	Diabetic control group	23.25±0.47
3.	GROUP II	Extract treated group (1000 mg/kg b.wt)	15.5±0.28**

Results were analyzed by One-way ANOVA followed by Dunnett's t-test. The value were expressed as mean±SEM

Normal control v/s extract treated group **P<0.01 Significant.

Table 3: Wound breaking strength.

Sl.#	Group	Treatment	Wound breaking strength Mean ±SEM (days)
1.	GROUP I	Normal control	227.25±4.289
2.	GROUP II	Diabetic control group	168.25±3.119
3.	GROUP III	Extract treated group (1000 mg/kg b.wt)	370.456±4.564**

Results were analyzed by One-way ANOVA followed by Dunnett's t-test.

The value were expressed as mean±SEM Normal control v/s extract treated group **P<0.01 Significant.

CONCLUSION

Mirabilis jalapa L. is an ornamental herb which is traditionally used for various biological properties. In present study, acute toxicity study, phytochemical screening and wound healing activity of ethanolic extract of leaves of *Mirabilis jalapa* L. has been evaluated in allxan induced diabetic rats by excision, incision and dead space wound model. Phytochemical screening indicates presence of flavonoids, proteins, amino acids, steroids and alkaloids. Wound healing activity of

leaf extract has been evaluated by excision, incision and dead space models, which shows significant activity comparable with normal and diabetic control groups. Presence of amino acids and alkaloids indicates that plant could serve for development of novel agents having good biological activity in coming years. Thus it is concluded that the *Mirabilis Jalapa* showed significant wound healing activity in an experimentally induced diabetic rat.

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