Evaluation of Wound Healing Activity of Salvia Hypoleuca Extract on Rats

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Summary

The extract of Salvia hypoleuca was evaluated for their wound healing activity in Albino Wistar rats using chemically induced wound model. The experimental animals were chemically burned by conc HCL (80%), and then divided into four groups, control, standard (Nitrofurazone 0.2% w/w), low dose (150 mg/kg) and high dose (300mg/kg). The re-epithelialization was evaluated by the reducing width of wounds for seven days. It was observed that the alcoholic extract showed re-epithelialization faster when compared with control. The extract also showed significant wound healing activity when compared with standard. Results from this study support that the use of alcoholic leaf extract of Salvia hypoleuca in topical skin care and healing wounds.

Keywords: Salvia hypoleuca, Wound healing activity, Rat.

Introduction

The plants of the genus Salvia, which consist about 900 species (1) are generally known for their multiple pharmacological effects such as analgesic and anti-inflammatory (2), antioxidant (3), hepatoprotective (4), hypoglycemic activities (5), and antiischemia (6, 7). The results of recent studies have shown that some species of Salvia impress fertility in rat. The data obtained from previous studies clearly demonstrated that Salvia hematodes enhances the orientation of males towards the female by increased anogenital behavior and enhance licking and grooming of the genitals (8). This plant also increases the ejaculation latency. Salvia fruticosa produces adverse effects on the fertility of male and female rats (9). Estakhr and Javdan (2011) have demonstrated the existence of phenolic compounds (SH1, 3, 2 and 4) i.e. Gallic acid and ellagic acid (phenolic acids), rutin and quercitin (flavonoids) in the ethanolic extract of Salvia hypoleuca (10). The presence of these constituents may be one of the contributing factors responsible for the activities by virtue of their different properties like anti oxidant, anti inflammatory, analgesic and antimicrobial activities. Several phytoconstituents like triterpinoids, (11) tannins, saponins(12),alkaloids(13) and flavonoids(14) are known to promote wound healing process due to their antioxidant and antimicrobial activities. Since there is hardly any work reported on the effect of Salvia hypoleuca on wound, the present study was planned to evaluate effects of Salvia hypoleuca on wound using rats as an experimental animals.
Materials and Methods

Plant materials
Physalis alkekengi was collected from Guilan province, and then was identified by a botanist. Fresh plant was thoroughly washed using deionized water, separated into leaves and fruits, and mopped with tissue paper and air-dried in shade so as to prevent the decomposition of chemical constituents. One gram of the material was ground into fine powder using blender. Hundred gm of powder was suspended in 250 ml of distilled water and allowed it to stand overnight in refrigerator; it was then sieved through several layers of muslin cloth. The filtrate (water extract) was discarded. The residue was extracted with 95% ethanol using sox halation wherein ethanol was evaporated in a rotatory evaporator at 40–50 ºC. The yield was 3.2 g/100 g of powder.

Animals
Eighteen male albino rats of 6–8 weeks age, 150–200 gm of weight were procured from Razi Institute, (Karaj, Iran). The animals were housed in well ventilated, air conditional animal house at a constant temperature of 23±20c, with the relative humidity of 55-60%. The animals were housed in spacious polypropylene cages with paddy husk as bedding material. The animals were maintaining on standard pellet diet and purified water. The animals were provided with food and water and libitum except during fasting. Re-epithelisation time was observed for 1 to 7 days and measured wound healing diameter.

Induction of wound and treatments
The skin of rats were shaved mechanically and leaved for 24 hours, two or three drops of concentrated HCL (80%) were topically applied carefully on the shaved skin. Then the skin burned rats were housed separately under sterile conditions in isolated room cleaned with sterile solution. The two experimental groups (low dose (150mg/kg body weight) and high dose (300mg/kg body weight)) were treated twice a daily by extract of Salvia hypoleuca. One of these groups treated by 0.2% w/w Nitrofurazone USP (Standard), while the others are treated with vehicle (20% Tween 80) treated as Control. The areas of the burns were recorded daily to show the contracting ability of wounds and to determine the closure time. The granulations of tissues or rebuilt layers were observed. The re-epithelisation time was recorded.

Statistical analysis
Results were analyzed by one way ANOVA followed by Dunnet multiple comparisons tests. P values <0.05 were considered as significant.

Results
The table 1 shows the Mean ± SE values of wound diameter of four groups. There was a statistically significant (p<0.01) reduction in the mean wound diameter, when comparing Salvia hypoleuca 150 mg/kg body weight and 300 mg/kg body weight with Nitrofurazone 0.2% w/w. The figure 1 indicates that the extract showed significant wound healing activity at the dose of 300mg/kg body weight than 150mg/kg body weight.
In the present study the wound healing activity of alcoholic extract of Salvia hypoleuca was evaluated by chemically induced wound model in Albino Wistar rats. Several phytoconstituents like triterpenoid, tannins, saponins, alkaloids and flavonoids are known to promote wound healing process due to their antioxidant and antimicrobial activities. In addition triterpenoid reported to possess an ability to increase the collagen content, which is one of the factors promoting wound healing. Estakhr and Javdan (2011) have demonstrated the existence of phenolic compounds (SH1, 3, 2 and 4) i.e. Gallic acid and ellagic acid (phenolic acids), rutin and quercitin (flavonoids) in the ethanolic extract of Salvia hypoleuca (10). Wound healing involves different phases such as contraction, epithelialization, granulation and collagenation(15). The decreased wound diameter significantly contributes to better and effective wound healing property. During the initiation of study from “0” there was not much different in healing of wounds in all the four groups. At the end of the study (7th day) - low dose and high dose showing significant wound healing effect. When the results were interpreted in high dose, showed high significant wound healing activity as compare to low dose. High dose showed better and faster wound healing activity as compare to low dose. The induction wound study after treatment with alcoholic extract of Salvia hypoleuca on 7th day, regenerated tissue shows increase in tensile strength as compared to untreated group. Standard and extract of Salvia hypoleuca treatment increase the tensile strength and significant wound healing activity.

References

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**Table 1:** Effect of Salvia hypoleuca extract on wound diameter in low and high dose.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Day I</th>
<th>Day II</th>
<th>Day III</th>
<th>Day IV</th>
<th>Day V</th>
<th>Day VI</th>
<th>Day VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>10±0.35</td>
<td>9.63±0.074</td>
<td>9.64±0.123</td>
<td>9.17±0.023</td>
<td>8.7±0.143</td>
<td>8.3±0.023</td>
<td>7.8±0.123</td>
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<tr>
<td>High Dose</td>
<td>10±0.53ns</td>
<td>8.1±0.054**</td>
<td>6.2±0.73**</td>
<td>5.3±0.62**</td>
<td>4.5±0.52**</td>
<td>3.9±0.32**</td>
<td>2.6±0.42**</td>
</tr>
<tr>
<td>Low Dose</td>
<td>10.01±0.21ns</td>
<td>8.2±0.12**</td>
<td>7.3±0.82**</td>
<td>6.4±0.47**</td>
<td>5.7±0.33**</td>
<td>4.85±0.12**</td>
<td>4.1±0.32**</td>
</tr>
</tbody>
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**Discussion**