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Histopathologic Evaluation of Honey-Zinc Oxide Combination on Full-Thickness Experimental Wound Healing in Rats

Saiedeh Lotfi[1], Soroush Sabiza[2*], Hadi Naddaf[3] and Annahita Rezaie[4]

[1] DVM Graduate, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran
[2] Assistant Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran
[3] Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran
[4] Associate Professor, Department of Pathobiology, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

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Abstract

Wounds are the creation of any defects and loss of connectivity of body tissues, both inside and outside the body. Researchers have always sought to find the most effective and least complicating factor to accelerate the wound healing process. The present study aimed to evaluate and compare the effectiveness of honey alone or in combination with zinc oxide on healing the experimental defect of skin full-thickness wound in rats. In this study, 48 adult male white Wistar rats were selected and randomly divided into four groups of 12 including the first group (control = C), the second group (honey = H), the third group (zinc = Z), and the fourth group (honey and zinc oxide= (ZH). A full-thickness skin defect with dimensions of 2 × 2 cm was created in the skin of the back, as well as the distance between the neck and the pelvic area. All animals received treatment appropriate to their group. Four rats from each group were prepared on histopathological samples on days 7, 14, and 21 and microscopic examination was performed. Axiovision software was used for macroscopic assessments. The highest healing rate on day 7 after wounding belonged to the Z group and the lowest to the H group. Also, the highest rate of healing on the 14th day after wounding belonged to the Z group and the lowest to the ZH group. However, no statistically significant differences were observed between the groups. On day 21 after wounding, the percentage of wound contraction in the ZH group was significantly higher than the C ($p = 0.001$), H ($p = 0.001$), and Z ($p = 0.013$) groups. Microscopic examination of the skin, 21 days after wounding, showed that the wound was completely covered by amplified keratinocytes in all rats in the ZH group. This was seen in two rats in the Z group and one in the C group. In all rats in the H group, the wound surface was still not completely covered and there was a scab on the wound. In the dermis of all ZH rats, regular clusters of collagens with a small number of fibroblasts and capillaries were observed. This study showed that the combination of zinc oxide and honey has a better effect on the wound healing process than other groups and accelerates the wound healing process. The combination of these two substances increases the formation of fleshy tissue and wound contraction and reduces inflammation and wound scarring.

Key words: Wound, Healing; Honey, Zinc oxide, Rat

[*] **Corresponding Author**: Soroush Sabiza, Assistant Professor, Department of clinical sciences, Faculty of veterinary medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran, E-mail: s.sabiza@scu.ac.ir

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