



## Benefits of Honey Extract Against Wound Healing

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### ABSTRACT

The use of honey in wound care was widely used since ancient times. Honey has been shown to have antibacterial properties, and low pH levels create environmental conditions and are not supportive for bacterial growth. Clinical observations from human trials report that honey helps granulated tissue formation, increases epithelization, and reduces inflammation, which affects the acceleration of wound healing. The purpose of this study is to find out the effect of honey on wound healing. Research takes the form of literature review. Literature is taken from one database, PubMed. The key word used is honey and wound healing, and selected with the criteria of inclusion and exclusion obtained ten literature to be reviewed. Honey gives good results and affects the healing of skin wounds, among which there are several types of honey studied in experimental animals and in trying people. In conclusion, honey has an influence on the healing of skin wounds.

### 1. Introduction

Wound healing is a physiological process that is important for maintaining the integrity of post-traumatic skin, either by accident or intentionally. Wounds are circumstances in which there is damage to normal anatomical functions and structures, while to produce improvement of function and continuity of anatomy must pass through the wound healing process which is a complex dynamic process.<sup>2</sup> The wound healing process is classically divided into four stages: hemostasis (seconds to minutes), inflammation (3-5), proliferation.<sup>1</sup> and remodeling occurs (8 days to 1 year).<sup>3</sup> there are various types of wounds including, acute wounds (i.e.; scratch wounds, burns, trauma, needle, and surgical incisions obtained at the place of health) and

chronic wounds (diabetic foot ulcers or pressure ulcers).<sup>4</sup> layers of human skin are divided into three different layers: epidermis, dermis, and hypodermis that vary degrees of specialization in each layer.<sup>1</sup>

Consuming honey has a very long history among humans.<sup>6</sup> honey is also widely used for various types of foods and drinks as sweeteners and flavorings. In ancient times, honey has been known, for its nutritional and therapeutic value, honey is produced all over the world. Global honey production is approximately 1.20 million tons per year. China, Turkey, Argentina, Ukraine, Mexico, and the United States are the main countries in producing honey. Honey is commonly used as an anti-inflammatory, anti-oxidant and antibacterial agent.<sup>2</sup>

Since ancient times as found in the tomb of King Tut (14th century BC), honey bee has occupied a very important place in traditional medicine and has often been used as a medicinal product in countless works. Honey bee was first mentioned as the treatment of wounds by the "Edwin Smith Papyrus" (2600–2200 BC).<sup>2</sup>

The ancient Greeks and Egyptians used honey bee to treat skin wounds and burns by topical smearing on the skin. Preoccupied honey can improve a wide variety of skin conditions but the focus of this review is on the therapeutic properties of honey bee in the treatment of wounds on the skin. Many countries in the world describe honey bee as beneficial in the treatment of various skin disorders. In Malaysian tradition, honey bee is used as a remedy for furuncles, ulcers, diabetic wounds and wounds. Traditional Persian medicine documents honey bee more effective on the treatment of wounds, eczema, as well as inflammation. In the treatment of Ayur-veda, a traditional Indian medicine, honey bee is used to treat wounds, eczema, dermatitis, burns, skin diseases, as well as Fournier's gangrene. In Burkina Faso, Africa, it has been reported that indigenous people use honey bee as a skin-cleaning ingredient as well as a treatment for measles rash. The use of honey bee in traditional medicine is quite significant to date, especially in reviewing the fact that most of today's developing country population relies on native medicines as a primary health care source. Honey bee is also famous as an

ingredient in skin care cosmetic products both past and present.<sup>1,2</sup>

The skin healing ability of honey bee has been noted as an antimicrobial property, its ability to modulate the skin's immune system and improve tissue repair. This review explores clinical and scientific research investigating honey bee's efficacy in the treatment of wounds and various other skin disorders. The main goal is to use the scientific literature to evaluate the potential efficacy of honey bee in the treatment of various dermatological disorders.<sup>3,4</sup>

## **2. Methods**

The research method is in the form of literature review. The data search in this study used one database, PubMed. The key word used is honey and wound healing. Based on the results of the literature on the database, researchers found 434 articles using PubMed (n = 10). Furthermore, the search results found were screened based on fulltext preparations and then obtained as much as (n = 40). Then, as many as 30 articles in exclusion because it does not fit the criteria of inclusion and exclusion and obtained (n = 10).<sup>3,4</sup>

## **3. Results**

Based on the results of the literature selection obtained as a research with experimental methods, and one review study (Table 1)

Author/ Year/ Location	Research Methods/ Population	Intervention	Research Results
Febriyenti, et al (2019)/ Padang	Experimental/ 24 female rats	Four groups: 1. with honey gel treatment, 2. with treatment honey film, 3. group without treatment, 4. with marketed product B treatment	The study showed the percentage of wound closures on days 1-13 (honey film) had a significant effect on the extent of the wound with $p < 0.05$ . The inflammatory phase has occurred on days 0-5 which is characterized by inflammation in the wound. In this phase, honey film groups experienced a higher percentage of wound closure compared to the rest of the group ( $10.47\% \pm 4.38$ ). Furthermore, the proliferation phase of the group without giving had a high percentage of recovery compared to other groups as seen on day 21 ( $81.78\% \pm 9.47$ ). The last phase is the maturation phase that lasts from the day 21 until the wound heals. <sup>10</sup>
Kotian Sushma, et al (2018)/ India	Experimental/ Wistar albino adult females and males.	Seven groups: 1. No giving (control) 2. Honey be group, 3. Ghee Group, 4. GG Group (Glycyrrhiza Glabra), 5. Ni Group (Nerium Indicum), 6. Group H+G (honey+ghee), 7. Combination of all groups (Tot)	The results of this wound closure phase were better in all control groups. The combination group showed a significant increase in wound closure from day 2 to day 16 and on the Honey + Ghee kelompok from day 6 sam-pai 16 compared to group control. <sup>1,3</sup>
Paolo Governa, et al (2019)/ Italy	Experimental/ Diabetic foot ulcer patient	Five group: BL1H (acacia, lime, heather, chestnut, citrus fruits) BL2H (wild fennel, acacia, thistle, rosemary, clover, citrus, almond, cherry) BL3H (chestnut honey) BLH4 (acacia honey) BL5H (orange honey)	Evaluation of honey be Calabrian wound healing activity showed good performance results especially for BL1E (multifloral honey be from Tyrrhenian beach), able to help wounds heal at each concentration tested, compared to controls. <sup>1,4</sup>
Raman Malhotra, et al (2016)/ Inggris	Experimental/ 27 patients apply honey be on the right & 19 on the left.	Patients are instructed to apply manuka honey be twice a day and apply Vaseline 4 times a day to both sides for 6 weeks.	At 4 months, the scar assessment scale showed no difference; However, patients reported fewer scar pain on the side treated with Manuka than controls. A total of 31 out of 46 patients believed that scars were similar on both sides.
Peiman Goharshenasan, et al (2015)/ Iran	Experimental/ Patients undergoing plastic surgery.	Wounds that are usually wrapped with Wounds wrapped in honey be	The average width of scars after the third and sixth months is $3.64 \pm 0.83$ mm and $3.49 \pm 0.87$ mm on sides clad in honey be and $5.43 \pm 0.05$ mm and $5.30 \pm 1.35$ mm in the usual bandaged group there is a difference that is significant. <sup>1,4</sup>
Reham F. El-Kased, et al (2017)/ Inggris	Experimental/ 10 albino rats	Four groups: 1. Group F (Honey be 75% - kitosan formula), 2. group H (Honey be 100%), 3. group P (Positive control, standard wound healing cream, silver sulfadiazine) and 4. Group N (Negative control, normal salt)	The results of this study were divided into 2 groups, namely the male group and the female group. Experiments were conducted on mice initially sedated under anesthesia then shaved the backs of mice with electric clipper than shaving cream. Then the burn is given briefly, the cylindrical metal rod (10 mm diameter) is heated over an open fire for 30 seconds and pressed onto the surface of the skin of the rat that was shaved and disinfected for 20 seconds under mild anesthesia. Four positions of induced burns on the back of each mouse, given a discovered by each group. <sup>1,5</sup>
Seyed Mohammad Reza Javadi, et al (2018)/ Iran	Experimental/ 50 wistar	Five groups: 1. Control group (daily topical lanolin administration), 2. group honey be, 3. group N. Sativa (seed oil), 4. honey be and N. Sativa mix group (1:1), 5. group of phenytoin cream.	In this study on day 0 the surface area of the wound there was no significant difference between the five pok. On days 5, 10, 15 and 20 post excision, the surface area of the wound in the mixed group (honey be and N. Sativa) is significantly lower than the rest of the group. <sup>1,6</sup>
Nasrin Takzaree, et al (2017)/ Iran	Experimental/ 54 male wistar adult	Two groups: 1. Control group without treatment 2. Experimental group	The results of this study showed in the experimental group, wound healing from the third day to the 19th day. <sup>14</sup> treatment with honey be was significantly better on a percent-tase basis compared to the control group ( $P < 0.05$ ). On microscopic examination the number of fibroblasts, macro-phages, neutrophils and collagen fibers in the experimental group and control group had significant differences. In the honey be experiment group twice a day, collagen fibers and fibroblast counts were greater than in the control group. <sup>1,7</sup>
Turgut Deniz, et al (2018)/ Turkey	Experimental/ Male albino wistar with an average weight of 350- 450g	Four group : 1. Group MH ( <i>madhoney</i> ), 2. Group BH ( <i>blossomhoney</i> ), 3. Group N ( <i>nitrofurazone</i> ), Group C: kelompok yang tidak menerima pengobatan (kelompok kontrol).	In this study, different treatments were applied to models of infected wounds and then evaluated with levels of Hydroxypro-line groups that did not receive treatment (control group) levels (HP), Tensile strength (TS), and Intensity levels (macroscopic display). The results in HP levels increased hp levels between day 7 and day 14 significantly higher in the MH and N groups than in other groups. <sup>1,8</sup>
Benjamin A. Minden-Birkenmaier, et al (2018)	Review	-	Evidence suggests that honey be, particularly manuka honey be, can eliminate bacteria, overcome chronic inflammation, and speed up wound healing. <sup>9</sup>

#### 4. Discussion

Based on the results of searches from several literatures reviewed, honey bee has an effect on healing on skin wounds. A 2019 study explained that the effect of honey gel has a faster effectiveness on the healing of incision wounds when compared to the group that is not given treatment (negative control).<sup>7</sup>

Then the 2018 study explained in recent years, arguing that traditional medicine has a lot of therapeutic benefits compared to allopathic drugs against wound care. Traditional medicine such as honey be, ghee, GG, and NI are famous for extracts that have a fondness for wound healing in Ayurvedic and Folk Medicine methods. Among the five honey be tested showed b11 and BL5 results that were able to increase speed.

Wound healing after six hours of treatment, compared to the group without subsequent administration, provided evidence that honey be can eliminate bacteria, as well as can overcome chronic inflammation, and speed up wound healing. The effect of manuka honey be on aesthetic results and show healing against upper eyelid blepharoplasty incision wounds. Upper eyelid scars treated with or without honey be Manuka healed and were excellent, without any significant difference if assessed by the scale of the assessment of the scars have been validated. however, some mild subjective benefits may be in the early postoperative period.<sup>3,7</sup>

Subsequent research shows the results of wound healing in terms of aesthetics also against using honey be.<sup>14</sup> According to research in 2017, the results of treatment show that honey be plays a very positive role in wound healing. Subsequent research shows the results of wound healing in terms of aesthetics also against using honey be.<sup>14</sup> According to research in 2017, the results of treatment show that honey be plays a very positive role in wound healing. Hydrogel wound dressings have been prepared to contain 75% honey be, functioning as a lid but also to provide a clean and moist environment for wound healing directly contributing also to

increased regeneration.<sup>7,8</sup>

Hydrogel wound dressings have been prepared to contain 75% honey be, functioning as a lid but also to provide a clean and moist environment for wound healing directly contributing also to increased regeneration. In a study a mixture of honey and N. sativa seed oil showed excellent results in all groups (kon-trol group, honey be group and N. Sativa group) in wound healing.<sup>12</sup>

A 2017 study showed that the rate of wound healing in the second experimental group on giving honey be twice a day was significantly higher. The experimental group on administering honey be locally twice a day improved the healing process, shortening the inflammatory phase, increasing granulation tissue, angiogenesis as well as the initial proliferation phase as well as the remodeling phase and eventually faster wound healing.<sup>7</sup>

Furthermore, in the 2018 study showed results in the evaluation using an analysis of HP, TS, and intensity levels (macroscopic display). The effect of treatment on the MH (mad honey) group is similar and even superior to the treatment in group N (Nitrofurazone) and BH (blossom honey) standards. Thus the administration of honey be as a treatment in the process of healing wounds against infection in these experimental animals against successful results. In particular, mad honey is just as effective in wound healing as nitrofurazone.<sup>9</sup>

#### 5. Conclusion

The use of honey be against wound healing, because honey be can increase the process of granulation and epitheliization, reduce the number of exudats, and sterilization of wounds against microbes, as well as the acidity and osmolarity of honey bee plays an important role. Aside from its valuable nutritional content, honey bee has anti-inflammatory activities as well as antioxidants that are suitable natural ingredients for wound healing. The authors stated that there was no conflict of interest in this the study.

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