



## Wound healing with Apitherapy

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Honey is a viscous substance derived from nectar and modified by honey-bees. It has wound-healing and antibiotic properties that shows promise as an inexpensive option for moist wound-dressings for a variety of wounds. Throughout history, there have been records of many civilizations such as those in ancient Egypt, India, and Greece that have utilized honey as medicine and current medical literature indicates that there may be benefits in treating burns or wounds with honey. This article will review and discuss the literature pertaining to the use of honey in wound management, to determine whether there is a place for honey in the treatment of this condition.. The broad spectrum antimicrobial activity of honey has been demonstrated in various studies. A systematic review by Vandamme et al in 2013, concluded that evidence is strong for antibacterial and healing properties. Honey reportedly exerts both bacteriostatic and bactericidal activities and it inhibits bacterial growth. Honey has been shown to have antibiotic properties to a wide range of bacteria, including MRSA, without causing injury to the wound tissue Honey's antibacterial properties are multifactorial, so resistance to its effect is not highly probable. It is believed that the properties of honey with its high osmolarity, low pH (3.5-5), and hydrogen peroxide, are effective in wound healing and inhibiting bacterial growth[6]. The hyperosmolarity of honey appears to inhibit bacterial growth by drawing fluids from wounds and causing bacterial dehydration and death. The presence of phenolic acid and flavonoids in honey may also contribute to the antibiotic properties of honey and offer anti-oxidant effects.

Besides having antibacterial properties, honey has been shown to decrease inflammation, bring about rapid autolytic debridement, and stimulate the immune response for healing[8]. Studies have shown that manuka honey upregulates tumor necrosis factor-alpha, interleukin-1b, interleukin-6, and prostaglandin E2 production, which in turn stimulate the production of monocytes, leading to wound healing with the removal of debris and formation of blood vessels While there is a good

action, the mechanisms in how honey modulates deal of evidence in regards to honey's antibacterial research article published by Majtan in 2013, showed that honey can stimulate or inhibit certain immune factors such as proinflammatory cytokines and matrix metalloproteinase-9 during the inflammatory and proliferative wound healing phase. However, it can also prolong healing if the wound environment is infected and inflamed as well by suppressing the same immune modulators Long exposure to light or the heating of honey above 37°C should generally be avoided since its enzyme content is easily destroyed by exposure to both heat and light. It is suggested to avoid storage of honey at a cool temperature and to avoid the use of plastic containers as chemicals may diffuse and contaminate the honey According to expert recommendations, when using honey as a wound dressing, honey should be evenly applied on the dressing pad rather than directly onto the wound[13]. If a non-adherent dressing is used, it should be porous enough to allow the diffusion of honey into the wound[15].To debride hard eschar, dressings soaked in diluted honey can be applied to allow better diffusion of honey until debridement is achieved The required dosage of honey on the wound depends on the amount of exudates present. The frequency of dressing change is also generally determined by the amount of exudates and there is little evidence available to suggest an optimum frequency of dressing changes. The beneficial effects of honey will be reduced if it is diluted by exudates. Therefore, the dressing must be changed whenever it is moist with exudate, which is typically multiple times per day. However, when the amount of drainage decreasesacids such as octanoic or dodecanoic acid and pinobanksin illustrates a schematical representation of the royal jelly composition and the main functional activities of its compounds.