

The use of medical-grade honey in wound care

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Question

What is the best available evidence regarding the use of medical-grade honey for wound care?

Clinical bottom line

Medical-grade honey that is used in wound care refers to honey that:¹

- has been sterilised by gamma radiation to remove impurities, synthetic pesticides and microbes
- has standardised antibacterial activity
- is regulated by pharmaceutical standards
- is registered for medical purpose.

The use of medical-grade honey in wound care is supported by clinical research demonstrating effectiveness in the following applications:² (Level IV)

- as a topical antibacterial/anti-inflammatory treatment with broad application
- as a debriding/desloughing agent
- as a deodoriser of malodorous wounds
- as a non-adherent agent that leaves newly granulating tissue intact when an outer dressing is removed
- as an agent that maintains a moist wound healing environment^{1,3} (Level IV)
- as an agent with low to negligible resistance properties, including documented effectiveness against antibiotic-resistant strains of *in vitro* and wound samples of Methicillin-resistant *Staphylococcus aureus* (MRSA); *Pseudomonas aeruginosa*; *Escherichia coli* and *S. epidermidis*⁴ (Level II).
- The antibacterial potency of medical-grade honey differs according to the plant source from which the nectar is derived. Honeys from different species can vary by as much as 100-fold in the potency of their antibacterial activity^{2,5} (Level IV).
- The most widely used medical honeys are those sourced from New Zealand and Australian bees feeding on the *Leptospermum scoparium* bush (*L. scoparium*); these contain high levels of phytochemicals which is associated with antibacterial activity¹ (Level IV).
- Honey-containing dressings vary in the amount of honey that they contain and, therefore, the antibacterial potency; concentrations can range between 20% and 100% honey

with other carriers accounting for the difference. For example, an alginate or a hydrogel dressing with a lower percentage of honey may be selected for a particular wound problem such as ease of application or exudate absorption¹ (Level IV).

- In some wounds, honey with lowered antibacterial potency is purposively selected. Wound assessment guides the health care practitioner in the honey selection process^{1,5} (Level IV).
- Antibacterial potency and the amount (or volume) of honey that is used are not necessarily correlated; for example, the use of a medical-grade honey with a low antibacterial potency may contribute to a wound being slow, or failing to heal, and a higher potency honey may be indicated⁵ (Level IV).
- The minimum inhibitory concentration (MIC) is the lowest concentration to which honey can be diluted by wound exudate (or by other factors) and still prevent bacterial growth. The MIC differs from product to product of medical-grade honeys; for example, a literature review reported the MIC of *Leptospermum* honey against a range of bacteria as follows:^{4,5} (Level II & IV respectively).
 - 2% to 3% for *Staphylococcus aureus*
 - 3.3% to 4% for coagulase-negative staphylococci
 - 5.5% to 9% for *Pseudomonas* species
 - 2.7% to 3% for MRSA
 - 3.8% to 5% for vancomycin-resistant enterococci (VRE).
- The potential for bacteria to develop resistance to Manuka honey that has met with regulatory approval that classifies it as a sterile medical device for use on wounds was tested in continuous and stepwise experimental conditions. A temporary resistance to Manuka honey was observed under long-term stepwise resistance testing but no lasting mutations were detected. The study concluded that the risk of bacteria acquiring resistance to honey will be low if high concentrations of this medical-grade honey are maintained clinically^{4,5} (Level II & IV respectively).
- Hydrogen peroxide, derived from the glucose acid in honey produces a broad spectrum antibacterial activity, clearing or protecting the wound from infection⁵ (Level IV).

- The literature suggests that the anti-inflammatory activity of honey results from the presence of high levels of antioxidants, thereby indicating that the removal of infection is in direct response to its use^{1,4} (Level IV & II respectively).
- Honey dressings provide a moist environment and, thereby, encourage autolytic debridement of sloughy and necrotic wounds, allowing the area to contract, decrease bacterial burden and promote healing³ (Level IV).
- The anti-inflammatory properties of medical-grade honey contribute to a reduction in oedema and exudate as well as a reduction or prevention of hypertrophic⁵ (Level IV).
- Following debridement of the wound, honey promotes the formation of granulation and epithelial tissue, encouraging the creation of collagen and angiogenesis³ (Level IV).
- Wound malodour, which causes distress to patients and relatives, may be reduced through honey's bactericidal effects on the anaerobic bacteria causing the wound odour³ (Level IV).
- An effective, inexpensive and easy to apply agent⁸ (Level III).
- Honey when compared with silver sulphadiazine (SSD) cream was found to be significantly more effective in the treatment of superficial and partial-thickness burns⁹ (Level II).
- An RCT that compared medical-grade Manuka honey with standard hydrogel therapy reported that significantly more venous leg ulcers healed at 12 weeks when treated with medical-grade Manuka honey than those treated with standard hydrogel therapy (44% versus 33% respectively; $p=0.03$). At four weeks, a reduction in wound slough from baseline was also reported; an overall reduction of 56% for wounds treated with honey and 35% for wounds treated with standard hydrogel therapy was reported; however, these outcomes were not statistically significant ($p=0.06$)¹⁰ (Level II).

Medical-grade honey use in clinical practice

- A Cochrane systematic review assessed the benefit of honey on wound healing in both acute and chronic wounds. Nineteen trials including 2,554 participants were included; however, 11 of these were conducted by the same author. Only seven trials of the 19 reported the type of honey that was used; however, the antibacterial potency of these honeys was not reported. Overall the trials were generally small and there was very obvious clinical and methodological heterogeneity in the included trials, making it difficult to draw any conclusions with confidence. The authors stated that honey may improve healing times in mild to moderate superficial and partial thickness burns compared with conventional dressings; however, it could not be determined which honey and at which potency the authors refer to. Further research with standardised protocols was recommended by the authors⁶ (Level I).
- Due to honey's osmotic effects (drawing fluid from surrounding tissues producing a moist wound interface) increased levels of exudate may increase the risk of maceration of the surrounding skin; ongoing wound assessment practices are of importance to prevent or minimise any such adverse events^{2,7} (Level IV).
- The effectiveness of medical honey as an agent in skin graft fixation was confirmed in an observational study. The study reported the following benefits attributed to the use of honey:
 - The prevention of graft loss through infection and mobilisation.
 - A diminished need for graft saturation.
- Expert opinion^{1,2,3,5,7}.
- A study which examined the potential for bacteria to develop resistance to medical-grade (Manuka) honey through a series of continuous and stepwise experimental conditions; the minimum inhibitory concentrations (MIC) concentrations of medical-grade (Manuka) honey were determined⁴.
- A Cochrane systematic review⁶.
- Observational study with 11 participants⁸.
- A randomised comparative clinical trial including 150 patients⁹.
- A prospective, open label, 12-week, multicentre, randomised controlled clinical trial including 156 participants¹⁰.

Characteristics of the evidence

This evidence summary is based on a structured search of the literature and selected evidence-based health care databases. The evidence in this summary comes from:

Best practice recommendations

- Antibacterial potency of medical-honey can vary from product to product; wound assessment guides the health care practitioner in choosing the appropriate application and potency required (Grade B).
- Honey may be used to improve healing in mild to moderate superficial and partial-thickness burns (Grade B).
- Heavily exudating wounds require more regular dressing changes as the exudate dilutes the antibacterial effectiveness of the medical-grade honey (Grade B).

- Medical-grade honey may be used to assist in skin graft fixation (Grade B).
- Manuka honey may be considered by clinicians for use in sloughy venous ulcers as it has a beneficial therapeutic effect (Grade B).

Contraindications

- Honey dressings should be avoided in patients with a known history of allergy to either honey or bee venom³ (Grade B).

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