Honey for veterinary wound management

Honey isn’t just good to eat – it has great wound-healing properties for humans and animals alike!

Bees manufacture honey as a way to store sugar-rich nectar harvested from flowering plants. We use this yummy, sticky substance as an ingredient in many recipes, or enjoy it on its own. However, did you know that honey has excellent wound-healing properties? Its usefulness for wounds has been documented for centuries in Greek, Egyptian and Roman medicine.

What is special about honey?
Bees have an incredible system for harvesting and storing nectar to preserve it as solely as a food source. The properties bees add to it not only help decontaminate wounds, but also aid in debridement.

Bees not only carry their own weight in nectar, but also a huge array of bacteria, yeasts and fungi picked up from the soil and plants within their three-mile territories. Found in their intestines, this array of bugs can include dangerous species such as Clostridium botulinum, E. coli, Klebsiella, Proteus and Pseudomonas species -- the latter being particularly detrimental to wound healing. Without some form of processing, therefore, the nectar would be a death trap to both bees and humans.

Bees harvest nectar from flowers and store it in a specialized stomach. As they store the nectar, they transfer in a special enzyme called glucose oxidase to lower the pH, and add an antimicrobial. Once the stomach is full, the honey solution (of around 70% water) is delivered to worker bees at the hive, who pass it on from mouth to mouth until it reaches the bees at the comb. Each bee will add its own enzymes and reduce the water content. Once placed in the comb, the honey will be fanned to evaporate any residual moisture and bring the water content to below 20%. This supersaturated sugar is now honey.

The secret of glucose oxidase
Throughout its storage, despite the bacterial and fungal spores within it, honey remains airtight and safe, sealed in the comb. The glucose oxidase deserves further explanation; it is an effective antimicrobial enzyme that is activated upon dilution. As the moisture content increases, glucose oxidase reacts and releases tiny levels of hydrogen peroxide and gluconic acid. This process has an antimicrobial effect on local microbes, including many common wound pathogens.

Amazingly, the levels of hydrogen peroxide released by this glucose oxidase reaction are close to those produced by neutrophils at wound beds in our own bodies’ defense against microbial proliferation.

Unfortunately, as with all enzymes, glucose oxidase is denatured by heat. Any benefit will be lost during the pasteurization process used as a standard method to reduce contamination of food grade honey. Even if we can source unpasteurized honey to be sure we have preserved the glucose oxidase enzyme, the residual bacteria and spores may become viable in wounds due to rapid dilution through osmosis. The best option when searching for honey to use in wound care is to opt for cold (gamma sterilized medical grade honey that guarantees sterility while maintaining the functionality of beneficial enzymes.

The Manuka effect
A lot of attention has been given to Manuka honey for its special abilities as an antimicrobial. This is because nectar from the Manuka plant contributes its own antimicrobial chemistry on top of that provided by the glucose oxidase effect.

Professor Peter Molan of the University of Waikato in New Zealand led research that found honey derived from the Manuka plant (Leptospermum scoparium) exhibited an exceptional antimicrobial profile comparable to topical gentamycin. A compound called methylglcoxal has since been identified that enables a sustained antimicrobial effect even upon dilution by up to ten times volume for volume. The concentration of methylglcoxal present in Manuka honey has been found to be directly proportional to its antimicrobial effect.

This means that it can be used reliably to test large batches of honey for antimicrobial potency for commercial use.

Each batch of honey is tested for its methylglcoxal concentration and tested for antimicrobial effect against phenol as a control. If the compound is as effective as a 10% phenol solution, then it is given a +10 rating. The test increases to +15 against a 15% phenol solution and so on and so on. For wound management a +10 rating is sufficient to combat most pathogens.

Honey is a natural miracle. With antibiotic resistance in the news and home health a booming industry, its demand has quickly begun to outstrip supply. Medical grade honey, although potentially higher in price per gram, is the only way to guarantee efficacy for use in open wounds. Clinically harvested, prepared and filtered, it is gamma sterilized to preserve the essential plant compounds and enzymes that guarantee its antimicrobial effect. Combined with the osmotic power and low pH of honey, the Manuka factor adds what is becoming a valuable tool to help clean up wounds while defeating both regular and resistant species of bacteria.

By Georgie Hollis
Some common pathogens sensitive to Manuka honey include *E-Coli*, *Staphylococcus aureus* (both methicillin sensitive and resistant strains), *Pseudomonas aeruginosa*, *Candida* sp, and *Dermatophilus congolensis* (R Cooper (2008), EM Chandler (2014), Molan (1992)).

Infected equine carpal wound. Manuka AD 10 x 12.5 cm dressing applied.

Improvement after 4 days with a single dressing.

About Georgie: Georgie Hollis, BSc is an independent specialist in wound management and dressing technologies working closely with the British Veterinary Nursing Association and the British Equine Veterinary Association. Author of many articles and a frequent speaker at national and international conferences at both veterinary and nursing level, Georgie is a member of the European Wound Management Association and is past secretary of the Veterinary Wound Healing Association. Georgie’s day-to-day role involves running an evidence based support service for vets and nurses treating challenging wounds in practice. She is currently working towards an MRes in Veterinary Medicine at Nottingham Vet School reviewing wound-healing outcomes in clinical practice.

References:


