

Honey based wound ointment for wound healing and skin disorders with animals

Dr. Tineke Creemers and Dr. Willem Jan Bosma

Summary

Honey is effectively used for treatment of wounds and skin disorders that occur with animals. However, not all honey types are effective. It is important that the applied honey contains the correct components, has a consistent composition, and does not contain residues from herbicides or pesticides. Only such honey can treat wounds effectively and safely. This article discusses the product *Vetramil®*, a wound ointment with honey and essential oils, developed exclusively for use on animals. Except for the additional functionality, the essential oils are responsible for a bitter taste, and for keeping insects away from the wound. The product is tested by veterinaries in the Netherlands, and its users are positive to extremely positive about the functionality and use of this honey wound ointment.

Introduction

Historically, honey is known for effective treatment of wounds with humans. Based on clinical research and case studies, the interest in honey as a serious antibacterial wound product has increased significantly (Molan, 2001). Recently, various honey-based wound management products have entered the market for human wound treatment. Also in veterinary health care, there is clearly a demand for a product that combines antibacterial activity with wound healing stimulating properties (Overgaauw and Kirpensteijn, 2005). Honey's low pH and the presence of honey enzymes play an important role in wound healing. The interaction of the enzymes with honey sugars causes an acidic environment which inhibits many harmful micro-organisms. A low pH also enhances the resistance of the skin. If honey is applied in a moist environment, the honey enzymes are activated and a small amount of antibacterial hydrogen peroxide is produced.

The composition of honey can vary significantly in time and place, and is dependent on a large number of factors that are difficult to control in the natural environment. The level of active enzymes in consumption honey is low with a strong variation (Kerkvliet et al., 1996). The use of any honey from a retail store for wound healing must therefore be discouraged. Also, it is very likely that consumption honey contains traces of pesticides or herbicides that can cause toxic reactions in open wounds.

Based on years of research at the University of Wageningen, Bfactory has developed a method to produce medicinal honey under controlled conditions in green houses. This has resulted in a standardized honey with high enzyme levels and a high acidic content. In the last year, several hospitals have experienced the use of *Revamil®*, a product based on 100% pure and standardized honey. A clinical case study carried out at Bronovo Hospital included more than 80 patients with difficult to heal wounds that were treated with *Revamil®*. The main conclusions of the research were that *Revamil®* is effective in cleaning (disinfecting) the wound and stimulating the healing process. The results will be published shortly (Van Eijk en Groenhart, 2006)

Antimicrobial activity

Honey is produced by honeybees that collect nectar from flowers and concentrate the sugars until it is honey (Figure 1). Honey consists mainly of sugars, water and very small amounts of organic compounds and enzymes. The enzyme glucose-oxidase is added to the honey by the bees and is, together with other compounds, responsible for the honey's antibacterial functionality:

- *Hydrogen peroxide*. When honey comes in contact with the wound and mixes with wound fluids, the enzyme glucose-oxidase is activated. The enzyme glucose-oxidase in *Revamil®* is responsible for slow release production of low concentrations of hydrogen peroxide



Figure 1. The ordinary honeybee (*Apis mellifera*)

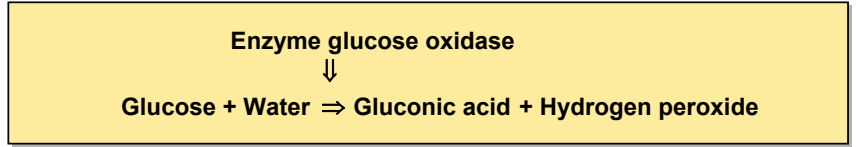


Figure 2. Transformation of honey sugars (glucose) into gluconic acid and hydrogen peroxide, by the enzyme glucose oxidase

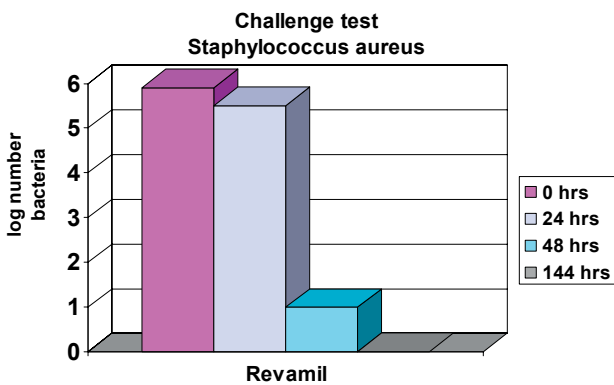


Figure 3. Antibacterial activity of standardized honey, one of the compounds in Vetramil®

Evaluation of Vetramil by veterinaries

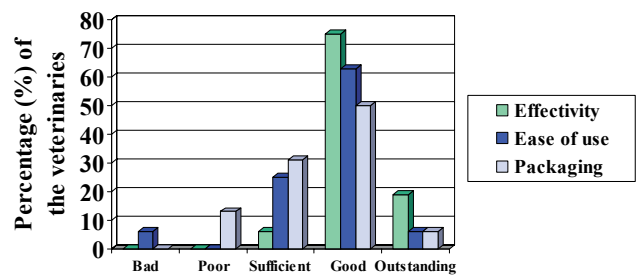


Figure 4. Satisfaction of veterinaries with the use of Vetramil®

Table 1. Reactions of veterinaries following the use of Vetramil® on various wounds and skin disorders with small and large animals

Indication	Rodents	Dogs and Cats	Horses	Birds
Old, difficult healing wounds	Good	Super		
After drainage of abscesses	Very effective with, a.o. rabbits			
Wet wound	Satisfactory	Satisfactory		
Infected wounds		Very satisfied		
Superficial wounds		Good		
Dry wounds	Good	Good	Good	
Skin laesies	Good	Good	Good	
Injuries/open wounds	Good	Good	Good	
Dermatitis between toes		Good		
Scratches		Nice, softening product		
Sensitive skin/locations		Nice, softening product		
Skin irritations, rash				Very positive
Eczema, decubitus areas	Good	Good		
Granulating wounds		Good		

(Figure 2). The concentration peroxide is high enough to kill pathogenic bacteria, but does not harm the healing tissue.

- **Slow release.** The hydrogen peroxide is produced gradually, and continues as long as there is honey present in the wound. The amount of time that the honey is effective depends on the level of exudation of the wound.
- **Low pH.** The activity of glucose-oxidase also causes production of gluconic acid. This acid is the major organic acid in honey and regulates that acidic environment (low pH). The amount of acid in honey is an important measure for the anti-bacterial functionality (Bogdanov, 1997).
- **Low water activity.** The low water activity of honey causes an environment in which most bacteria cannot live.
- **Essential oils.** Vetramil® consists, among others, *Tymus Vulgaris* (Tyme) and *Ocimum basilicum* (Basilicum). Tyme has a broad spectrum activity against bacteria, whereas basilicum has a broad spectrum activity against several fungi (Price, 1999).

The antibacterial activity of standardized medicinal honey is tested against various different kind of bacteria that can cause wound infections with animals. Figure 3 shows results of a Challenge Test where 1 million *Staphylococcus Aureus* were added to 1 gram medicinal honey. After 48 hours only 10 bacteria survived, after 144 hours all bacteria were killed. Antibiotic resistant *Staphylococcus Aureus* (MRSA) are shown to be evenly vulnerable to medicinal honey as antibiotic sensitive staphylococcus. Comparable results were obtained with *Pseudomonas Aeruginosa*.

The product Vetramil®

Vetramil® was developed based on demands from practice. The product combines a solid anti-bacterial activity with enhanced wound healing and has a positive effect on damaged skin. Further, ease of use (easy to apply, non-stickiness) and a bitter taste for the animals are important features. Vetramil® contains the same standardized antibacterial honey as the human product, Revamil®.

Moreover, Vetramil® contains a base cream and several essential oils which have positive effects for the skin. The essential oils enhance the resistance of the skin and work against fungi (*Ocimum basilicum*) and bacteria (*Tymus vulgaris*). Furthermore, the essential oils have a bitter taste and work as insect repellent. In time, a number of veterinaries has gained experience with treatment of pets with Vetramil®. With a survey, the experiences of the veterinaries are combined. The results of 16 responses are summarized in Table 1 and Figure 4.

Results survey

Table 1 shows that Vetramil® was used on dogs, cats, horses, rabbits, hamsters and birds. Vetramil® was successfully applied on several wound types, i.e. infected wounds, non-healing wounds, scratches, but also on skin problems (skin laesies, irritated skin, sensitive skin, eczema and rash) Vetramil® showed to be successful and pleasant. Figure 4 shows that more than 90% of the veterinaries judged the effectiveness of Vetramil® as “good” to “very good”. Approximately 40% of the vets were not satisfied about the package size and requested a larger package. Some vets mentioned that some animals were still able to lick the ointment.

Clinical study

Recently, a clinical study was started in the animal clinic “De Vallei” in Woudenberg, the Netherlands, to assess the effectiveness of Vetramil® on treating wounds with horses. The first results are positive, an example of the treatment of an infected leg wound is shown in Figure 5. After five weeks, the wound was practically closed.

Conclusions

Vetramil® can be used for the treatment of non-healing, infected and acute wounds and of skin disorders of pets and larger animals. Veterinaries were very positive in their judgment about the effectiveness of Vetramil®. In the meantime, a small and a large packaging size (10 gr and 30 gr) are available. The Vetramil® formulation made less attractive for animals to lick it.

Literature

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* Revamil® is a hydrophilic wound gel for human application. Revamil® and Vetramil® are trademarks of the company Bfactory BV (www.bfactory.nl)