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How sweet it is: Honey shows promise in eradicating bacteria, speeding wound healing

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 By: [Bob Roehr](#)
 Dermatology Times



Dr. Kirsner

International report — Medical-grade honey kills antibiotic-resistant bacteria — including *Staphylococcus* — in the test tube, and eradicates colonies on the skin of healthy volunteers, Dutch researchers report.

Meanwhile, Irish researchers say the use of honey dressings for wounds is associated with a statistically significant decrease in surface pH and a reduction in wound size.

The new studies are providing a deeper look into the science of how honey can promote healing. But while results are promising, much more work remains to be done before honey becomes a standard part of the pharmacopeia, researchers say.

Honey has been used to treat wounds since ancient times, but its use was eclipsed by the rise of modern antibiotics. Concerns about resistance to those drugs and the desire for more natural alternatives for healthcare have led to a renewed interest in the older therapy.

The literature shows large variation in the antimicrobial properties of honey produced in different geographic locations, and even in differing batches from the same location.

The Dutch company Bfactory has tried to standardize the natural product with its Revamil, a medical-grade honey produced by bees in the controlled environment of a greenhouse.

Bacteria reduced

Researchers at the Free University Medical Center in Amsterdam, led by Sebastian A.J. Zaat, M.D., conducted an *in vitro* assessment of 11 batches of Revamil at various dilutions of 10 percent to 40 percent pure honey, and found less than twofold variation in activity against a panel of common skin bacteria.

"The killing rate at 24 hours varied by concentration and pathogen, but 40 percent by volume honey proved to be completely lethal to antibiotic-susceptible and -resistant isolates of the pathogens," Dr. Zaat says.



Dr. Gethin

The bacteria examined were *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Enterococcus faecium*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterobacter cloacae* and *Klebsiella oxytoca*.

Researchers next measured the efficacy of Revamil in controlling skin colonization over 48 hours in 42 healthy volunteers.

"The median level of skin colonization was reduced 100-fold at the honeyed sites compared with the control sites on patients," Dr. Zaat says.

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Median colonization at the treated patches of skin declined from 26.5 to 1 colony-forming unit (cfu), while the control areas showed an increase from 21.5 to 110 cfu over the same time period.

It was impossible to culture any bacteria from 81 percent of the honey-treated sites and 21 percent of the control sites.

The research was conducted at the university under a grant from the Dutch government to Bfactory. It was published in the June 1 issue of *Clinical Infectious Diseases*.

Dressings effective

Elsewhere, researchers at the Royal College of Surgeons in Dublin, Ireland, focused on wound healing. Investigators used Medihoney (Derma Sciences), a brand of Manuka honey from New Zealand that is cleared for medical use in the United States and Canada.

The study recruited 17 patients with 20 nonhealing ulcers of various etiologies that had shown no improvement over the previous three weeks of treatment. Manuka honey dressings were applied to the wounds for two weeks.

The endpoints were change in surface pH and size of the wound.

"The use of honey dressings was associated with a statistically significant decrease in wound pH and a reduction in wound size," says lead author Georgina T. Gethin, Ph.D.

Wounds with a pH of 8.0 did not decrease in size, while wounds with pH 7.6 had a 30 percent reduction in size.

An elevated pH at baseline was associated with minimal healing, and each reduction of 0.1 pH was associated with an 8.1 percent reduction in wound size.

The study is scheduled for publication in the *International Wound Journal*.

More study needed

There is a general movement toward antimicrobial dressings in woundcare to help reduce the gross number of bacteria or the formation of biofilms that may inhibit healing, University of Miami dermatologist Robert Kirsner, M.D., Ph.D., tells **Dermatology Times**.

"Honey is a natural approach that is attractive to a number of patients," he says. Its antibacterial properties are thought to be the result of low water content that is not conducive to bacterial growth; low-level, continuous production of hydrogen peroxide through interaction with bodily fluids; and high acidity.

Dr. Kirsner sees the production of a medical grade of honey in a controlled setting as a possible sign that the field is maturing.

He calls the Dublin study intriguing, but says its small size makes it "more of hypothesis generating rather than a definitive study; clearly, more research is necessary."

While there is an association between a decrease in wound size and lower pH, "It is unclear which is cause and which is effect," he says. "It could be that reducing the pH brought about the clinical change, or that the clinical improvement normalized pH.

"The skin's acid mantle is about 5.5; that seems to be a pH that allows the skin to function without bacterial overgrowth and infection," says Dr. Kirsner, who wonders if simply restoring skin pH to that level would be sufficient for wound healing.

Given the multiple mechanisms of action attributed to honey, it is important to establish the causal link of pH to wound healing, he says.

The study also suggests that pH may be a surrogate for a nonhealing wound. Screening a patient at entry could be a simple, low-cost way to help direct the intervention. It may also be a useful in evaluating if a therapy is not working and another approach should be tried, Dr. Kirsner says.

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