

Manuka Honey Helps Combat Antibiotic Resistant Lung Infection

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✓ Fact Checked

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STORY AT-A-GLANCE

- › The nectar from manuka flowers contains dihydroxyacetone, a precursor to methylglyoxal (MGO), an antimicrobial compound not found in most other honey
- › The presence of MGO is credited for much of manuka honey's medicinal prowess, which includes the ability to combat complex antibiotic-resistant respiratory infections
- › All four varieties of manuka honey tested showed antimicrobial activity against *Mycobacterium abscessus*, a type of mycobacteria that often cause aggressive lung infections
- › When manuka honey was combined with antibiotics to treat *Mycobacterium abscessus*, the drug dosage was able to be cut by eightfold
- › Manuka honey is used for a variety of medical-grade applications, including honey gel, honey for wound dressings and nebulized honey used to treat asthma

Honey has been valued for its antimicrobial properties for thousands of years. Made from flower nectar, honey contains sugars, amino acids, phenolics and other compounds that combine to exert a wealth of medicinal properties. When it comes to broad-spectrum antimicrobial activity, however, manuka honey deserves top billing.

Produced from certain manuka plants — also known as tea trees — of the *Leptospermum* species native to New Zealand and Australia,¹ manuka is used for a

variety of medical-grade applications, including honey gel, honey for wound dressings and nebulized honey used to treat asthma.²

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Manuka Honey Treats Aggressive Lung Infection

Mycobacterium abscessus is a type of mycobacteria that often cause aggressive lung infections in people with cystic fibrosis, bronchiectasis and other preexisting lung conditions. Conventional treatment often involves more than 12 months of antimicrobial chemotherapy, which still doesn't get rid of the infection in many cases.⁴

According to researchers with the U.K.'s Aston University, patients often stop taking the drugs due to severe side effects, including nausea, vomiting, liver damage, low platelet levels and low white blood cell count. Even among those who do stick with the intensive drug treatment, it's only successful 30% to 50% of the time.⁵

"New and novel strategies are urgently required to combat these infections," the researchers wrote. "One such strategy thus far overlooked for mycobacteria is manuka honey."⁶

The Aston University team conducted a study using samples of *Mycobacterium abscessus* from 16 infected patients with cystic fibrosis to determine the effectiveness of manuka honey against it.⁷ All four varieties of manuka honey tested showed antimicrobial activity against the bacteria, including 16 drug-resistant clinical isolates.⁸

The researchers used a nebulizer and lung model to test the results of manuka honey with the drug amikacin, which is used to treat bacterial infections. A typical dosage of amikacin used in the treatment of *Mycobacterium abscessus* is 16 micrograms per milliliter.

When combined with manuka honey, however, not only was the duo effective but far less amikacin – just 2 micrograms per milliliter – was needed.⁹ According to study author Jonathan Cox, a senior lecturer in microbiology at Aston University:¹⁰

"By combining a totally natural ingredient such as manuka honey with amikacin, one of the most important yet toxic drugs used for treating Mycobacterium abscessus, we have found a way to potentially kill off these bacteria with eight times less drug than before. This has the potential to significantly reduce amikacin-associated hearing loss and greatly improve the quality of life of so many patients – particularly those with cystic fibrosis.

I am delighted with the outcome of this research because it paves the way for future experiments and we hope that with funding we can move towards clinical trials that could result in a change in strategy for the treatment of this debilitating infection."

Honey Works for Upper Respiratory Tract Infections

Upper respiratory tract infections (URTIs), otherwise known as the common cold, are a common reason why people are prescribed antibiotics unnecessarily, exacerbating antimicrobial resistance.¹¹ Honey makes a suitable option for symptom relief, working better than usual care, according to a systematic review and meta-analysis published in BMJ Evidence-Based Medicine.¹²

After reviewing 1,345 records from 14 studies, the researchers found that, compared with usual care, honey improved cough frequency and cough severity, as well as the combined symptom score. They noted:

"Honey was superior to usual care for the improvement of symptoms of upper respiratory tract infections. It provides a widely available and cheap alternative to antibiotics. Honey could help efforts to slow the spread of antimicrobial resistance, but further high quality, placebo controlled trials are needed."

The results support previous studies with similar results. In one Italian study involving 134 children with a nonspecific cough, researchers compared the use of multiple doses of honey to the use of dextromethorphan and levodropropizine, two commonly prescribed over-the-counter cough medications in Italy.¹³

The children were given either a mixture of milk and wildflower honey or a dose of one of the medications, based on the group they were assigned to. The researchers found that the milk and honey mixture was at least as effective as the medications. Similar results were found by a study published in the Cochrane Database of Systematic Reviews that looked into honey for the treatment of acute cough in children. It concluded:¹⁴

“Honey probably relieves cough symptoms to a greater extent than no treatment, diphenhydramine, and placebo, but may make little or no difference compared to dextromethorphan. Honey probably reduces cough duration better than placebo and salbutamol.”

How Do Manuka Honey’s Antibacterial Properties Work?

Different types of manuka honey have varying levels of antibacterial potency, which is related to its Unique Manuka Factor (UMF) rating. UMF is correlated to a particular honey’s content of MGO and total phenols. While some types of manuka honey may be more potent than others, no bacterial resistance to honey has been identified to date, possibly because it’s made up of such a complex mixture of MGO and other substances.¹⁵

Honey may also affect bacterial cell morphology and growth by altering its shape and size, according to an overview published in AIMS Microbiology.¹⁶ It also noted that manuka honey can stimulate macrophages to release mediators such as interleukin 6 and tumor necrosis factor α , which are necessary for reducing microbial infections and promoting tissue healing.¹⁷ Other active compounds in honey that may affect its antibacterial activity include:¹⁸

- Hydrogen peroxide (especially in non-manuka honey)
- Acidic pH level
- Hyper-osmolality effect
- Bee defensin-1, an antimicrobial bee-derived peptide¹⁹

“Manuka honey can be safely used as an alternative natural antibiotic,” the researchers noted, adding, “Finally, the conclusion is that honey is a natural and safe antibiotic, since no literature published has reported bacterial resistance for honey, which is attributed to the complexity of honey components working solely or in a synergistic manner with other components.”²⁰

Manuka Honey’s Wound-Healing Powers

Manuka honey has been widely explored for wound healing, in part due to its ability to wipe out bacteria living in biofilms, which often adhere to wound surfaces. Manuka honey is capable not only of disrupting existing biofilms, which can cause persistent infections, but also of preventing their formation.²¹

In addition to inhibiting the growth of all bacterial pathogens it’s been tested against, researchers noted, “Treatment with manuka honey results in a unique signature of differential gene expression with down-regulation of stress response and virulence-related genes.”²² When combined with antibiotics, it also works synergistically or enhances their effects, while preventing the development of resistance and even making resistant bacterial strains more susceptible to treatment.²³

In the case of wound healing, honey has been used for this purpose for thousands of years, and in the U.S. the use of medical grade honey for wound care is approved by the Food and Drug Administration.²⁴ Manuka honey has immunomodulatory properties that enhance wound healing and tissue regeneration.²⁵

Even in cases of chronic, nonhealing wounds, such as diabetic leg ulcers, manuka honey dressings have been found to mostly heal the sores within three months. “The

antibacterial component of manuka honey is a small water-soluble molecule that diffuses easily, which explains why manuka honey has also exhibited efficacy against bacteria contained in biofilms,” according to a review published in *Wounds*.²⁶ The researchers explained:²⁷

“The manuka honey used in wound-care products can withstand dilution with substantial amounts of wound exudate and still maintain enough activity to inhibit the growth of bacteria. There is good evidence for honey also having bioactivities that stimulate the immune response (thus promoting the growth of tissues for wound repair), suppress inflammation, and bring about rapid autolytic debridement.”

Choosing High-Quality Honey

Medical grade honey is now widely available and used by some hospitals for wound healing and wound infection control. Medicinal honey products are also available over the counter for home use. However, keep in mind that the health benefits of honey do not extend to the processed honey you find on grocery store shelves, which is often little more than fructose syrup.

Contamination with chemicals, including glyphosate, most commonly known as the active ingredient in Roundup herbicide, is also a concern. In their National Chemical Residues Program Report released January 2020, it’s noted that 300 raw extracted archival and retail packed honey samples were tested for glyphosate residues during 2017/2018, while another 60 retail packed Manuka honey samples were tested for the herbicide during 2018/2019.²⁸

Out of the 300 samples, 22.3% contained glyphosate residues above the laboratory limit of reporting, with clover or pasture floral types testing positive more often than other varieties. About 1.7% of the unblended or unprocessed (raw extracted) honey samples contained glyphosate residues at levels above the regulatory limit.

Among the 2018/2019 retail samples tested, 18.3% contained glyphosate residues, though they were below the regulatory maximum. Beekeepers are, unfortunately, at the mercy of their neighbors' glyphosate usage, as they can't control which plants their bees choose to visit. Some beekeepers, however, are carefully managing where they put their hives to minimize pesticide exposure and keep track of when spraying occurs to help reduce exposures.²⁹

If you see the Detox Project's glyphosate-residue-free certification on Manuka honey, it means the product has no glyphosate residues down to government-recognized limits of detection (usually 0.01 parts per million), and lower levels than the default government Maximum Residue Limits in the European Union and Japan.³⁰

For manuka honey, also keep an eye out on the UMF rating, which can range from UMF5+ to UMF30+. The higher the rating, the more MGO and other beneficial compounds it contains, so for medicinal purposes, generally the higher the UMF, the better.

Sources and References

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