

Honey versus superbugs

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The use of honey as an alternate therapy to combat infection by antibiotic resistant organisms is gaining ground with new research confirming the medicinal benefits of the natural product.

University of Sydney researcher Julie Irish said in vitro data showed that honey was effective against a range of microorganisms responsible for severe infections, including those that were not susceptible to conventional antimicrobial therapy.

Ms Irish will present her findings at the 8th Asian Apiculture Conference in Perth on 20-24 March. The conference brings together international, national and local scientists involved in honey bee research including Dr Shona Blair, an expert on the medicinal use of honey.

"The rapidly escalating problem of antibiotic resistance among pathogenic microorganisms is arguably one of the most urgent issues facing modern medicine," Ms Irish said.

"As our antimicrobial arsenal dwindles, people are considering alternate therapies to combat infection by antibiotic resistant organisms.

"Honey has been used therapeutically by many different cultures since ancient times. But despite the broad-spectrum antimicrobial activity of honey, it is largely ignored by Western medicine."

Ms Irish said remarkably, multiply-resistant *Staphylococcus aureus* (Golden Staph) was particularly sensitive to honey, with minimum inhibitory concentrations (MIH) of five per cent (w/v) or less. The MIH is the lowest amount of honey it takes to stop the growth of the microorganism.

She said various members of the bacterial family Enterobacteriaceae, one of the most commonly implicated groups in wound infection, were inhibited by honey at concentrations of 15 per cent (w/v) or less.

Similar concentrations inhibited the growth of *Propionibacterium acnes*, an anaerobic bacterium implicated in the pathogenesis of acne.

In addition, several species of the pathogenic yeast *Candida*, which is responsible for wound infections and thrush, were also tested. Minimum inhibitory concentrations ranged from 10 to 47 per cent (w/v), depending on the type of honey used.

"Importantly, honey inhibited all these drug resistant organisms at concentrations that are easily achievable in the clinical setting," Ms Irish said.

Ms Irish said additional research investigated the effect of honey on biofilm formation by *Staphylococcus aureus* (Golden Staph).

"Biofilms, comprising one or more bacterial or fungal species, are often found adhering to surfaces such as teeth, medical implants, and catheters," Ms Irish said "Biofilms form a protective layer over cells, making them more resistant to antimicrobial attack. As such, infections involving biofilms are difficult to eradicate, and pose a particular problem for patients with indwelling medical devices such as catheters. "

Ms Irish said four honeys were tested: Jarrah honey, Medihoney, a *Leptospermum* honey, and an artificial honey. All three floral honeys significantly reduced biofilm formation at a concentration of one per cent (w/v), and completely prevented biofilm formation at five per cent (w/v).

She said the current study argued for the clinical use of honey as prophylaxis against biofilm formation, particularly for indwelling medical devices.