Australian Manuka Fact Sheet

Key points:

- Manuka honey is produced by bees from the flowers (nectar) of *Leptospermum* species plants, native to Australia and New Zealand.
- Australia is home to over 80 species of Leptospermum, while New Zealand has only one species (*Leptospermum scoparium*), which is believed to have originated from Tasmania, Australia.
- Since beekeeping was introduced into Australia, we have had a long history of producing Manuka honey.
- The special properties of Manuka honey were first identified by Professor Peter Molan in the 1980s while he was studying *L. scoparium* honey from New Zealand, and we have since discovered many sources of Australian Manuka with exceptionally high levels of activity.
- Manuka honey is one of the most famous honeys in the world because of its medicinal properties, including:
    - Antimicrobial activity – that is, the ability to kill superbugs (antibiotic-resistant bacteria and other difficult to treat microbes) that cause serious infections
    - Wound healing and anti-inflammatory activity.

The science behind the medicinal properties of Australian Manuka honey:

Humans have used honey for its healing properties for thousands of years, and now with on-going research scientists are able to explain the reasons behind its medicinal power. We are also starting to understand that some honeys are hundreds of times more powerful than others. The medicinal power of honey all comes down to which plant flowers bees visit to collect the nectar that they turn into honey.

Manuka honey (from *Leptospermum* species plants) is one of the most famous honeys in the world because there have been numerous scientific studies showing that this honey kills superbugs and stimulates wound healing.

The special properties of Manuka honey were first found in New Zealand in the 1980s (Molan & Russell, 1988) and since then we have discovered many sources of active Manuka honey in Australia stemming from the *Leptospermum* species (Cokcetin *et al.* 2016). This isn't surprising as Australia is home to the largest diversity of *Leptospermum* plants in the world, and we have more than 80 species compared to New Zealand's one! Our native *Leptospermum* plants are found throughout Australia, and grow in some of the most pristine natural environments in the world.

What makes Manuka honey so special?

A natural compound called methylglyoxal (MGO) is responsible for much of the unique activity of Manuka honey. The MGO comes from a component, called dihydroxyacetone (DHA), which occurs organically in the nectar of flowers of some *Leptospermum* plants.

Various species of the Manuka plant produce different levels of DHA that give rise to the varying antibacterial potencies of this special honey. Scientists looking at Australian honeys have found a number of sources of Manuka with exceptionally high levels of activity. (Cokcetin *et al.* 2016; Windsor *et al.* 2012).

One of the most amazing things about the antibacterial activity of Manuka honey is that although bacteria that cause serious infections can develop resistance to our modern antibiotics (which is how they become superbugs), they cannot develop resistance to the activity of Manuka honey (Blair *et al.* 2009).

Some more facts about Australia's Manuka honey:

- Manuka honey is produced from the *Leptospermum* species of plants. *Leptospermum scoparium* is one of more than 80 species found in Australia, but the only one found in New Zealand, with the NZ species originating in Australia (Fleming 1975, Thompson 1989, Van Eaton 2014).
- The New Zealand Maori have at least six terms for NZ's *Leptospermum scoparium*, not just the word Manuka (Van Eaton, 2014).
- Manuka honey was not produced in Australia or New Zealand until the European honey bee (*Apis mellifera)* was introduced. This happened in 1822 for the Australian mainland, 1831 for Tasmania (Watson), and in 1839 for New Zealand (Mary Bumby).
- Australia has been using the word Manuka since European settlement for naming places, property and of course the plant. In 1880, there is documented evidence of the term Manuka being used in reference to the plant, it is included in maps held in the Tasmanian archives, and there have been many other references in newspapers, titles and other documents since then.
- Australia also has a long history of calling *Leptospermum* honey Manuka. For example, in 1935 in the *South Australian Chronicle* there is mention of the production of Manuka honey, including it being described as "the repulsive honey" by a beekeeper from Border Town, and discussing how to avoid ending up with Manuka honey in hives, its strong flavour and the effects it would have on the flavour of other Australian premium honey, such as eucalypt.
- Sometimes the term 'tea tree' and Australian Manuka are interchanged as a consequence of the similar appearance of the plants, but tea trees (famous for their oils) are from the *Melaleuca* genus within the Myrtaceae family, while Manuka is from the *Leptospermum* genus within this family.
- The suggestion that only honey from New Zealand can be described as Manuka is clearly ridiculous, and strongly refuted by the Australian honey industry.

Antibacterial potency testing of Manuka honey explained:

For commercially competitive reasons, there have been a number of symbols introduced into the market aiming to represent the antibacterial strength of active honey. These include NPA (Non-Peroxide Activity), UMF® (Unique Manuka Factor) and MGO (methylglyoxal).

The antibacterial strength can be measured and is often shown as a number on the labels (i.e. NPA 10+; UMF® 10+; MGO 263+). The higher the activity rating the higher the antibacterial properties and strength of the honey.

There is currently no widely accepted gold standard for measuring the activity of honey, making deciding on a particular honey complex for consumers and the marketplace. However, we will explain the varying techniques:

1) ***Non-peroxide activity (NPA):*** In 1981, Professor Peter Molan (MBE), University of Waikato in New Zealand, was researching the hydrogen peroxide activity in honeys from around the world when he found that when he deliberately destroyed this activity only one honey type still showed strong antibacterial activity. This activity became known as "non-peroxide activity" (NPA). Professor Molan went on to research this activity over many years and found that it was very stable and unique to Manuka honey. This Manuka NPA could withstand both heat and light exposure and still remain highly active and effective.

   Further research by Professor Molan, his team, and others has revealed that Manuka honey is very effective against many strains of bacteria, including deadly strains of *Staphylococcus aureus*, such as the superbug MRSA (a.k.a. 'golden staph'). Professor Molan's team also found that Manuka honeys had different levels of NPA, so a test was developed to measure the strength of this activity in each batch. The rating for NPA is measured by comparing the activity of the honey to a known antimicrobial, phenol. So, for example, a NPA 5+ Manuka honey has the same non-peroxide antibacterial activity as 5% phenol.

   Note – Since Professor Molan's pioneering work, Manuka honey containing the unique non-peroxide activity (NPA) has been found to occur naturally in both New Zealand and Australia.

2) ***UMF® is a registered trademark of the Active Manuka Honey Association New Zealand:*** In 1995, a small New Zealand bee industry group met to discuss and investigate the best way to trade mark and protect the unique antibacterial activity (i.e. NPA) that Professor Molan had found in some New Zealand Manuka honeys. In 1998, Professor Molan announced that a new trade mark for the Unique Manuka Factor "UMF®" had been registered for licence holders to use as a quality mark for describing the strength of the NPA activity.

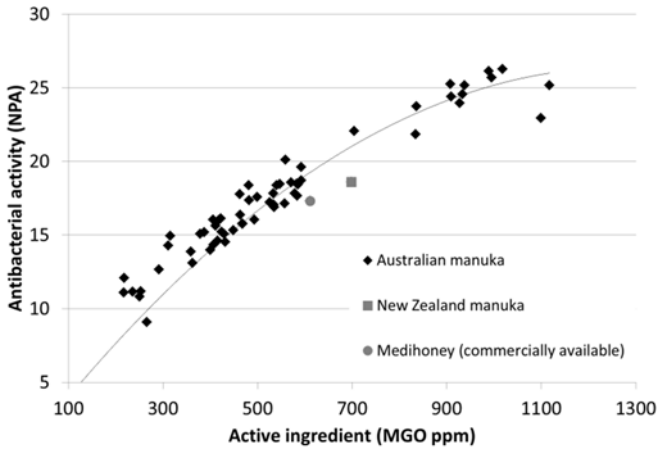
   Note – NPA and UMF® antibacterial activity ratings are measured the same way and are equivalent to one another.

3) ***Methylglyoxal (MGO) content***: In 2008, two laboratories showed that one of the major components that is responsible for the unique activity in Manuka honey is the presence of the naturally occurring compound methylglyoxal (MGO) (Adams *et al.* 2008; Mavric *et al.* 2008). The MGO is produced from a conversion of dihydroxyacetone that is present in nectar from the Manuka flower (Adams *et al.* 2009). The quantity of MGO in Manuka honey is now commonly used as an indicator of the strength of the antibacterial activity, as it correlates strongly with the NPA. MGO can be accurately measured in parts per million (ppm).

   The following are estimates of the equivalence between NPA and MGO measurements:

   NPA 5+ ~ MGO 100 ppm
   NPA 10+ ~ MGO 260 ppm
   NPA 15+ ~ MGO 450 ppm
   NPA 20+ ~ MGO 800 ppm

   Note – Care should be taken to check the actual system being used to report activity as the NPA/UMF® and MGO numbers are derived from completely different types of tests.



Graph derived from the scientific research on Australian *Leptospermum* honey by Cokcetin, Pappalardo *et al.* 2016

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For more information on the research into Australian Manuka:

https://ozhoneyproject.wordpress.com/

https://theconversation.com/science-or-snake-oil-is-manuka-honey-really-a-superfood-for-treating-colds-allergies-and-infections-78400

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