TECHNICAL SUMMARY

WHAT DO WE KNOW ABOUT KĀNUKA HONEY?

Kate Robertson, Market Development Specialist, Analytica Laboratories

The unique antibacterial properties of mānuka honey have had a lot of attention in the past few decades, with mānuka honey garnering a high value in the international market and drawing global attention to New Zealand and this unique honey variety. Kānuka *(Kunzea ericoides),* a distant relative of mānuka *(Leptospermum scoparium),* has received less attention, despite this honey too having unique health properties.

Identification of kānuka and mānuka

Both belonging to the Myrtaceae family, mānuka and kānuka are scrub-type trees found throughout New Zealand. Visually these plants are remarkably similar—both with small white or pink flowers, long elliptical leaves, and woody seed pods. Kānuka can be distinguished from mānuka as it has softer leaves and smaller seed pods, its flowers grow in groups, and generally the trees are much larger and have a longer lifespan (T.E.R:R.A.I.N., 2017).

In 1832 when Achille Richard, a French botanist, collected specimens of mānuka and kānuka in a visit to New Zealand, he determined that mānuka and kānuka belonged to the same genus, *Leptospermum.* It wasn't until the early 1980s that an Australian botanist, Joy Thompson, established that these two plants were more distant relatives than first thought, and promptly changed kānuka from the *Leptospermum* genus *(Leptospermum ericoides)* to the genus *Kunzea (Kunzea ericoides)* (Thompson, 1983).

Differentiating kānuka honey from mānuka honey

The visual similarities between mānuka and kānuka plants have led many to believe that honey from these nectar sources has the same antibacterial properties; however, ongoing research has identified a number of distinct differences in the chemical properties of these honeys. Historically, the lines have been blurred between mānuka and kānuka honeys as they are often harvested from similar geographical areas, so nectar from

Kānuka in flower.

Mānuka flowers. Photos: Frank Lindsay.

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both plants can be present at variable levels in an individual honey (Stephens et al., 2010). The nature of bees' foraging patterns means it's difficult to obtain a truly monofloral honey (i.e., where all the nectar is from a single floral origin), so it has been common for honey to be labelled as mānuka, kānuka, or mānuka–kānuka type honey. (Note that to the trained eye there are visual differences in the honeys' characteristics, such as viscosity and colour).

Pollen counting is a technique that has been used historically to identify floral types of a honey but in the case of mānuka and kānuka, the visual likeness extends even to the pollen of these two plants. Mānuka and kānuka pollen grains appear visually to be almost identical to each other when viewed under a light microscope, so this technique is a poor option for floral classification of mānuka or kānuka (Stephens et al., 2010).

Advancements in laboratory techniques are making it easier to identify kānuka honey. It is well known that mānuka has unique non-peroxide antibacterial activity (NPA) as a result of the chemical methylglyoxal (MGO) being present in high concentrations in the honey. MGO can be measured as part of the mānuka 3-in-1 test available commercially at laboratories in New Zealand and abroad (Stephens et al., 2010). Numerous studies have demonstrated that MGO is not present in kānuka honey, so the presence/absence of MGO can be used as an initial indicator of whether a honey is (mostly) mānuka or another floral type such as kānuka.

Although kānuka does not exhibit non-peroxide activity, it does have antibacterial properties due to high levels of hydrogen peroxide in the honey (Fingleton et al., 2014). Hydrogen peroxide activity can be measured in a lab using a Total Activity test, which uses a technique called a well-diffusion assay to measure the honey's ability to inhibit the growth of bacteria grown in an agar plate (Lu et al., 2013). The higher the total activity, the greater the antibacterial properties of the honey.

Other floral types also contain hydrogen peroxide, sometimes at very high levels such as the Jarrah honeys found in Western Australia. For this reason, testing total activity is not a fool-proof way to confirm if a honey is kānuka. An in-house laboratory test is available that looks for chemical markers that are unique to kānuka as a way to authenticate kānuka honey. Kānuka has a unique profile of chemicals that can be used to distinguish it from mānuka and other floral types (Stephens et al., 2010). By measuring these chemicals in the honey, and then comparing those to the expected 'kānuka profile', the honey can be classified as either kānuka or 'other'. Kānuka testing is separate from the MPI 5 Attributes (MPI Mānuka Honey Science Definition) and is currently not endorsed by MPI. The MPI 5 Attributes test is used to determine if the honey is a monofloral or multifloral mānuka honey.

Health applications for kānuka honey

Research into the health benefits of kānuka honey is still in early stages. The hydrogen peroxide activity of kānuka, as mentioned earlier, is beneficial for antibacterial use. It is important to note, however, that hydrogen peroxide is inactivated by an enzyme called catalase, which is found throughout the body including in human skin. When applied topically, the hydrogen peroxide present in kānuka honey can gradually degrade and the antibacterial properties will decline. Non-peroxide activity (caused by MGO) is not affected by this enzyme, which is why mānuka is considered as a more favourable, 'broad-spectrum' honey for wound healing and topical use.

Research has shown that even when hydrogen peroxide is inactivated, kānuka continues to maintain some degree of antibacterial activity (Lu et al., 2013). This indicates that there are other chemicals in kānuka that are acting in an antibacterial manner. Kānuka contains high levels of phenolic compounds that are thought to be a major contributor to the health applications of kānuka including immune stimulation, anti-inflammatory effects, and use in wound dressings (Stephens et al., 2010; Fingleton et al., 2014). Further investigation is required to quantify these chemicals and their activity but there is great potential for this research to lead to more established medical applications of kānuka.

Often viewed as mānuka's less well-understood cousin, kānuka is a unique honey variety with great potential. As research into the health benefits continues and lab testing evolves to better authenticate this honey variety, the future of kānuka is promising.

Kānuka in flower in NZ native bush. Photo: Adobe Stock

References

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