Ministry for Primary Industries
Manatū Ahu Matua

Explanatory Note for Draft Labelling Guide for Manuka Honey

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Requests for further copies should be directed to:

Publications Logistics Officer
Ministry for Primary Industries
PO Box 2526
WELLINGTON 6140

Email: brand@mpi.govt.nz
Telephone: 0800 00 83 33
Facsimile: 04-894 0300

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Introduction

This document accompanies the Ministry for Primary Industries' (MPI) *Draft Labelling Guide for Manuka Honey*. It provides an explanation of the main parameters of the definition and summarises the information and analysis that MPI has used to determine these.

Purpose of the draft labelling guideline

The purpose is to provide clear guidance on what constitutes authentic monofloral manuka honey and clear parameters for content claims. This is important to ensure that all New Zealand manuka honey is true to label and that consumers are not misled.

The draft guideline is a voluntary tool and cannot be legally enforced. MPI anticipates that New Zealand businesses involved in manuka honey production and export will use the guideline to assist them in labelling their honey.

MPI is also considering whether regulation is needed to implement the guideline.

Timeline for finalising the guideline

MPI is issuing the guideline as a draft to allow time for further comment and testing by beekeepers, honey producers, packers and exporters to determine how it could be practically implemented. There is scope to refine a number of the parameters if additional data or research becomes available.

Feedback

MPI welcomes comment on the draft guideline until 1 May 2014. Feedback should be sent to:

Manuka Honey Project
Ministry for Primary Industries
PO Box 2526
Wellington 6011
or emailed to manuka.honey@mpi.govt.nz

Background

On 10 September 2013 MPI issued a discussion paper *Options for Defining Monofloral Manuka Honey*. This paper outlined the need to develop a definition for manuka honey in order to ensure that all New Zealand manuka honey meets the authenticity expectations of a reasonable consumer.

The way some honey is currently labelled causes confusion and misunderstanding for consumers. It is important to address this to protect both New Zealand's international export reputation and the long-term future of the New Zealand honey industry.

SUMMARY OF DISCUSSION PAPER

The paper identified that there are two widely used methods for identifying monofloral manuka honey in New Zealand: by pollen count and by the level of methylglyoxal (MG), and that there was no consensus about which method is best. Based on this, three broad options for defining what constitutes monofloral manuka honey were proposed:

- Option 1 proposed defining manuka honey based on a specified level of pollen;
- Option 2 proposed defining manuka honey based on MG content;
- Option 3 proposed combining both MG and pollen.

New Zealand is a signatory to Codex Alimentarius (Codex), the international food standards-setting system. Codex standards are the foundation for global honey trade. The intent is that the MPI guideline sets clear expectations for applying Codex requirements for New Zealand manuka honey.

In the discussion paper MPI provided criteria for assessing the above options. To be credible and ensure authentic manuka honey labelling, the chosen option should:

- minimise the potential for false or misleading label statements;
- minimise the potential for fraud;
- be practical and feasible to implement;
- be backed by robust, evidence-based science; and
- involve reasonable cost and sustainable benefit.

The discussion paper listed fourteen questions seeking particular feedback and a request for data-sets and other information that could usefully contribute to the analysis.

MPI received 72 submissions. These came from businesses and individuals in the manuka honey industry, industry bodies and collective groups, scientists and laboratories. One response was also received from an overseas regulator. MPI has reviewed the information and data in these submissions (see *Summary of Submissions on Options for Defining Monofloral Manuka Honey* for further details).

ADDITIONAL ANALYSIS

MPI completed other work to assist in determining an appropriate definition for monofloral manuka honey:

1. Convened a manuka honey science workshop to confirm what is currently known and identify any gaps;

2. Commissioned the New Zealand Institute for Plant and Food Research to complete an independent review of relevant scientific literature. This examined what, if any,

published scientific evidence would support a definition based on pollen count or methylglyoxal;

3. Enlisted the Allan Herbarium[1] to provide a botanical analysis of manuka and kanuka plants and their geographic spread. The aim of this work was to determine if there were regional differences that could assist in identifying distinguishing attributes.

MPI has analysed all this information and held discussions with other regulatory bodies, scientists and industry to assess how well the proposed options meet the identified criteria. The draft guideline for labelling manuka honey is based on this analysis and is explained in further detail below.

LIMITATIONS OF CURRENT SCIENCE

A main finding from the scientific literature review is that in most research to date the provenance of the honey samples used is not known and survey samples are generally not random. There is also a lack of a 'pure honey' (known to have only manuka) for use as a reference material.[2]

Without adequate reference material, it is possible that research that refers to manuka honey samples may actually be based on manuka/kanuka honey. Researchers and industry groups have tended to make assumptions about what is 'genuine manuka', and then used such samples as a base for analysis. These assumptions tend to vary depending on how companies have been producing and marketing their own product. In addition, there are a number of properties of manuka honey (for example thixotropy or conductivity) where robust published research has not been completed, or is only very limited.

The result is that to date there is no consistent, verifiable, repeatable method for analysing honey to determine that it is monofloral manuka. By issuing the guideline as a draft there is an opportunity for industry and scientists to provide additional data that can help to clarify these parameters.

CODEX (SEE LABELLING GUIDE 1.2)

Codex (6.1.6) states that "Honey may be designated according to floral or plant source if it comes wholly or mainly from that particular source and has the organoleptic,[3] physicochemical[4] and microscopic[5] properties corresponding with that origin."

The term 'wholly or mainly' is not specifically defined in Codex. Bees typically roam over large areas of countryside to collect pollen and nectar. It is not practically possible to create honey wholly (100 percent) from a particular floral source (unless the bees are caged or contained to areas where there is only one species of plant growing). In MPI's view a reasonable consumer would expect that a honey claiming to be mainly from a particular floral source would be, at minimum, more than 50 percent from that source.

Codex does not specify the particular organoleptic, physicochemical and microscopic properties that should be used. The most appropriate properties for providing confidence that

[1] A botanical collection held by Land Care Research in Christchurch
[2] *Leptospermum scoparium* (Manuka) and *Kunzea ericoides* (Kanuka) are botanically distinct species, but their pollens cannot be differentiated under a microscope
[3] Organoleptic properties are those experienced by the senses (eg the taste, colour, aroma and flavour of the honey).
[4] Physicochemical properties relate to the chemical composition of the honey (eg sugar levels, moisture content).
[5] Microscopic properties relate to those elements that can be observed by a microscope (eg pollen count and pollen concentration)

a honey is monofloral, and for practical testing and analysing, may vary between countries and honey types.

It is important that the elements of Codex are used in combination. No single characteristic of a honey can determine a monofloral claim, but if a honey meets a range of identified parameters then these collectively give greater confidence that the honey is authentically from the particular plant origin.

Scope

The draft Labelling Guide applies to all manuka honey for food that is extracted, produced or packed in New Zealand. It applies to both manuka honey sold domestically and exported. It does not apply to other bee products such as royal jelly or pollen, or to medical or therapeutic products made from manuka honey.

Businesses are responsible for ensuring that their products meet all the relevant existing legal requirements. For business at present preparing honey for sale in New Zealand, the requirements of the Food Standards Code apply to the labelling of that honey. Appendix 1 of the draft Labelling Guide highlights relevant sections of the Food Standards Code, the Food Act 1981, the Animal Products Act 1999 and the Fair Trading Act 1986 relating to labelling and misleading conduct. Manuka honey exporters are also required to meet any regulatory requirements specified of the countries they export to.

Definition of Monofloral Manuka Honey (See Labelling Guide 2.2.1)

The definition of manuka honey is made up of a number of parameters, each one explained below.

COLOUR, AROMA AND FLAVOUR

Submitters presented a variety of views about the appropriate colour, aroma and flavour parameters for manuka honey and noted the wide variation that they have observed in different honey samples. There is very little published scientific evidence that can be used to clarify these aspects of the definition. We welcome any further information or feedback that can help refine these parameters.

In the absence of any better evidence, MPI suggests the parameters of the Bee Products Standards Council, which are currently in use within parts of the New Zealand industry:

- Colour – (Pfund mm) 84mm s.d. 11.8;
- Aroma – damp earth, heather aromatic;
- Flavour – mineral, slightly bitter, tangy.

For the reasons outlined above, these colour, aroma and flavour parameters are indicative only. It may be possible to rule out certain honeys that clearly do not meet the standard (for example a white honey would not be manuka), but in order to be certain that honey was wholly or mainly manuka, these should be used only in conjunction with the other parameters.

POLLEN

The draft guideline provides for a minimum percentage of 70% *leptospermum* type pollen (and the colour, aroma and flavour parameters noted above) in order for a honey to be considered a monofloral manuka honey. MG content is not included in the definition of manuka honey, but it is an acceptable label claim. The main reasons for using pollen are:

- it fits best with the Codex standard for defining honey;
- although it would be preferable to be able to distinguish manuka and kanuka pollen, it is not precedent-setting to use a definition based on pollen. This is because there are numerous honeys traded internationally where multiple genera or species are present but the honey is marketed under a common name;
- a pollen-based option is not misleading to consumers, provided that the honey clearly states that kanuka as well as manuka may be present (except where there is verification that kanuka was not present when the honey was collected);
- a definition based on MG would be significantly more problematic because of the variability of the chemical (between plants, between regions of New Zealand and over time). Some manuka plants do not produce dihydroxyacetone (DHA) so the honey from these plants will not contain MG. It would be difficult to justify excluding such honey from a monofloral definition as it is still from manuka plants;
- the risk of pollen fraud can be managed. If pollen is added to honey samples to increase the manuka pollen count this can be detected under a microscope;
- it is not possible to detect the adulteration of honey with added MG or DHA;
- the internationally accepted practice is to define honey based on Codex standards, which uses the organoleptic, physicochemical and microscopic properties of honey. There would need solid scientific evidence to justify New Zealand departing from this approach. This does not exist for MG;
- there are feasible and practical methods for verifying pollen counts for honey and these can be implemented relatively easily.

More detailed analysis of why MPI has arrived at using pollen as a parameter can be found in Appendix 1.

OTHER PARAMETERS CONSIDERED

Thixotropy

A number of submitters commented that thixotropy appears to be a property of manuka honey.[6] There are other honeys overseas that are also thixotropic (such as Ling Heather honey), but these could be distinguished from manuka on taste and appearance. MPI considers that there is the potential to include thixotropy in a definition at a later date, but verified evidence is needed to confirm that the current findings are applicable to commercially-produced manuka honey.

[6] Thixotropy is the property exhibited by certain gels that become fluid when stirred or shaken and return to the semisolid state upon standing.

Conductivity

There is an indication that conductivity may be a useful parameter for manuka honey, but there is insufficient evidence currently to include this in the guideline.

Chemical Fingerprinting

There is a body of research underway trying to establish a chemical fingerprint for manuka. This could potentially identify whether or not manuka was present in a honey. MPI notes that, while this work may be useful for a definition in the future, current research is insufficient for this purpose.

To use a chemical fingerprint as part of a definition there would need to be robust evidence to quantify the various chemical components in manuka honey. This requires honey samples to be collected over multiple years and from different parts of New Zealand to allow for seasonal and regional variation in the level of the chemicals. It also requires a sample of pure honey (known to only contain manuka) as a reference, and this has not yet been determined. Once additional research is completed, the potential for chemical markers can be examined further.

In the shorter term, the chemical markers research may be useful in determining whether kanuka is either present or absent in a honey sample. This may help support a monofloral claim based primarily on pollen count.

POLLEN CONCENTRATION

Manuka pollen grains are very small and tend to be over-represented in honey. This is because bees can collect more of the small pollen grains for the amount of nectar they are carrying, so the proportion of this pollen appears greater than the actual manuka content. A further issue is that it may be possible to filter out larger pollen grains to increase the apparent manuka/ kanuka percentage. In order to reduce this potential the draft guideline specifies a total pollen count as well as a pollen percentage.

Pollen percentage – 70% *Leptospermum type pollen*

MPI recommends that a minimum of 70% manuka pollen be used. At a 70% pollen level there is reasonable confidence that the honey would be at least 50% manuka, (given manuka pollen's tendency to over represent) and therefore meet the 'mainly' criteria of Codex. A 70% pollen figure is in use by some parts of the New Zealand industry and formed part of the Bee Products Standards Council definition. MPI has received no compelling evidence for any alternative percentage to date, but welcomes additional data.

Pollen count – 100,000 pollen grains/10g

This figure is based on the statistical variation reported in submissions, and analysis of datasets provided by submitters. For samples where both the total pollen count and the percentage of manuka pollen were available, those samples with values of over 70% pollen were above 100,000 grains per 10 grams.

Processing and extraction can impact on the level of pollen in a tested honey and practices vary within the industry. MPI is not proposing standard methods for these and expects that the industry will identify best practices.

POLLEN COUNT METHODOLOGY

Limited ring trials performed in New Zealand showed variability in results for pollen testing. This indicates that counting methods need to be standardised in order to provide accurate and verifiable results. One factor critical to getting an accurate pollen number is to count a minimum number of pollen grains. The draft guideline suggests a pollen count method based on Louveaux et al (1978) eg DIN 10760 and counting a minimum of 500 pollen grains. This methodology is currently used by GNS Science.

LABEL TO INDICATE THAT KANUKA MAY BE PRESENT

If the honey meets the parameters in 2.2.1 of the guide, its label can make the monofloral claim 'manuka honey'. Given that manuka and kanuka pollen cannot be differentiated, MPI considers that the most appropriate way to ensure that consumers are fully informed is for the label to also contain wording that will clearly indicate that kanuka as well as manuka may be present in the honey.

If the beekeeper can provide good evidence that kanuka is either not present in the collection area or, if present, was not flowering at the time of nectar collection then this wording would not be required. Alternatively it might be possible to use chemical markers to confirm the presence or absence of kanuka in the honey.

It is technically possible that a honey could meet the 70% pollen specification and in fact contain wholly kanuka. MPI considers that this is unlikely to occur, due to current industry practice of placing hives near manuka plants and actively removing kanuka plants from nearby land. In the north part of the North Island kanuka and manuka also have different flowering periods which also makes it less likely that wholly or mainly kanuka honey would be produced.

Definition of Manuka Honey Blend (See Labelling Guide Section 2.2.2)

MPI considered whether it is appropriate to specify a minimum percentage of manuka pollen required for a manuka blend definition. However, it would be possible for a honey to meet a manuka percentage requirement, but to have a greater proportion of another floral species. This could be considered misleading. For example, if the minimum percentage for a manuka blend was 20% manuka pollen, a honey that had 25% manuka pollen and 40% clover pollen would fit the definition, but would more appropriately be called a clover blend.

The suggested approach is therefore to specify that if a honey is a manuka blend, manuka pollen will be less than 70%, but will be one of the two most abundant pollen types in the honey.

Nutrition, Health and Related Claims (See Labelling Guide Section 3)

MPI assessed possible content claims against the following criteria:

- the claim must fit with existing regulation (the Food Standards Code);

- the claim must be true and must clearly state what is being referred to (it must relate to an identified, testable element in the honey);
- what is stated on the label must be able to be demonstrated throughout the shelf life of the honey.

As noted in the draft Labelling Guide, *Food Standards Code (Standard 1.2.7)* comes into force from 18 January 2016 and sets out requirements in relation to nutrition, health and related claims. Although the industry has the option of complying with a current transitional provision, MPI considers that it would be inappropriate, and potentially misleading, to include labelling claims in the draft guideline that will not be valid under this regulation. One reason for this is that there are no 'stock-in-trade' provisions in Standard 1.2.7. Given that honey can have a shelf-life of two years or more, businesses may need to consider appropriate labelling from 2014 to ensure that all products on the shelves at the start of 2016 meets the standard.

Under the Food Standards Code a 'claim' is an express or an implied statement relating to the food or property of the food:

- ***Therapeutic claims*** refer to claims that a product can prevent, cure or alleviate a disease, disorder or condition. Food Standards Code *Standard 1.1A.*2 states that therapeutic claims are not permitted on any food products.

  MPI considers that terms relating to the activity level of the honey (such as 'total activity', 'non-peroxide activity', 'peroxide activity') may imply that the honey has some form of antibacterial effect when it is eaten, and therefore may be an implied therapeutic claim.

- ***Health claims*** are claims that a product has a biochemical, physiological or other health effect on the human body. Under Standard 1.2.7 health claims are permitted on food labels, provided that the criteria outlined in the standard are met.

  Because manuka honey is largely sugar, it does not meet the nutrient profile scoring criteria to make a health claim.

- ***Nutrition content claims*** relate to the presence or absence of certain properties of food, such as a particular biologically active substance (or vitamins, minerals etc). These are permitted provided they meet the criteria in the standard.

  Methylglyoxal (MG) could be considered a biologically active substance in manuka honey. A claim relating to MG is acceptable in the draft guideline as it refers to a chemical component of the honey that can be tested using an agreed and verifiable test method. The guideline requires that the honey meets the level of MG stated on the label throughout its shelf life.

There was agreement among most submitters that some currently used label and content claims were confusing for consumers. In particular submitters identified labels where a generic term such as 'bioactive' or 'activity' is used, and where numbers accompany these generic terms or are used without any qualification. MPI agrees and suggests in the labelling guide that these terms are not appropriate.

Appendix 1: Analysis of pollen or methylglyoxal as a definitional parameter

Scientific evidence to support a definition based on either pollen or MG

Leptospermum scoparium (manuka) and *Kunzea ericoides* (kanuka) are botanically distinct species, but their pollens cannot be differentiated under a microscope. This means that a definition of manuka honey based on a minimum pollen percentage will include some kanuka pollen. In New Zealand significant quantities of dihydroxyacetone (DHA), the precursor substance to MG have been found in manuka plants, but not in kanuka.

MPI investigated the geographic spread of manuka and kanuka to see if it was possible to determine that honey from a particular region was predominantly from one species or the other. The analysis showed that the two plants have very similar habitat and location across New Zealand, although there are some areas in the lower South Island and Stewart Island where there appears to be little to no kanuka. This means that geographic parameters are not useful for a definition.

Some scientists and industry submitters have questioned the relationship between the level of pollen in a honey and the level of manuka nectar present. They suggested that bees preferentially collect nectar from manuka plants and pollen from other sources and that this explains how a honey can have a low level of pollen but a high non-peroxide activity. Other submitters have stated an alternative explanation, which is that such honey could have a small amount of very high activity manuka and low overall manuka/ kanuka pollen.

MPI notes that, as there are no reference samples of known 100% manuka honey, these different explanations have not been fully tested. In addition, the issue with understanding the relationship between pollen levels and nectar is true for all honeys, not just manuka.

The main alternative to a definition based on pollen count is a definition that includes specified MG levels. MG is the component that gives manuka honey its non-peroxide activity. In New Zealand to date, MG has only been found in significant quantities in some manuka honey. Scientists have confirmed with MPI that:

- DHA and MG change over time, with DHA levels starting high and declining rapidly while MG levels increase for about three years and then decline;
- DHA levels vary considerably from region to region, and between plants, there are some manuka plants that appear to produce little to no DHA;
- DHA and MG can be added to honey as an adulterant, and this cannot be easily detected.

MPI also examined the datasets provided by submitters where DHA/ MG and pollen counts had been measured for the same samples of honey, to determine if there is a correlation between the two factors and whether this could usefully be used in a definition. The data provided indicated that there is not a strong correlation. This could be explained by the very wide variation in DHA levels that have been recorded in nectar (from 0 to 13,000 mg/kg).

International precedent

MPI examined what international precedent there is for using either a pollen-based or MG-based definition. The Codex parameters, which are accepted internationally and used to

define all other honey types around the world, specify that in order to make a monofloral claim a honey must have the organoleptic, physicochemical and microscopic properties corresponding with the plant origin source being claimed. Pollen is a microscopic property of honey.

Submitters also provided examples of internationally traded honeys that include multiple species but are marketed under a common name. Eucalyptus, Clover, Thyme, Sage and Acacia are all used as generic names for monofloral honeys even though the honey may have been created from a variety of different species (or genera) of plant with that common name. This suggests that it is not necessary to be able to differentiate the pollens in order to make a monofloral claim. New Zealand would not be setting a precedent by allowing both kanuka and manuka pollen in a definition for manuka honey.

MPI has received feedback from international regulators and scientists stating that pollen is used to characterise other honey varieties and that manuka honey should not depart from this.

MPI is not aware of any examples internationally of honey being defined based on a chemical component such as MG. Submitters and industry representatives have suggested that, because manuka honey has unique and different antibacterial properties, it needs to be treated differently from other honeys. MPI's view is that, in order to make a case that the honey should be defined differently and to be able to argue this case with international regulators, there needs to be very robust evidence to support it. At the moment, the variability of MG and DHA levels and the lack of appropriate known reference material for pure manuka honey mean that such evidence does not exist.

Feasibility and cost

Pollen counts are currently performed in several New Zealand laboratories and numerous overseas laboratories. A number of submitters commented on the relatively high cost per batch of pollen counts. Pollen testing has not been a focus for some major manuka honey exporters, as they have been marketing based on MG or non-peroxide activity. However, if a pollen count definition is implemented the demand for pollen testing would increase and MPI expects that the testing capacity would expand and costs would reduce, as has occurred in other similar situations.

An additional component of cost to industry from a pollen count definition is the impact if honey that was currently labeled and marketed as 'manuka' no longer meets the monofloral definition. Such honey would either need to be labeled as 'manuka blend', or a different type of honey. The scale of this impact depends on the proportion of product that would not have a minimum of 70% manuka/kanuka pollen. MPI does not have any robust data on this, although some limited analysis suggests that a significant amount of manuka honey with high methylglyoxal content would also have sufficient manuka pollen to meet the guideline definition.

The guideline is issued as a draft and there is an opportunity for further industry information and feedback to help quantify the specific costs and impacts to businesses. MPI welcomes detailed information from businesses that would help to identify the costs and practical implications of this option.

Potential for Fraud

Pollen can potentially be added to honey samples to falsely increase the pollen count. However, advice from pollen scientists is that such adulteration would be detectable under a microscope, as added pollen tends to clump together, while naturally-occurring pollen is distributed.

DHA or MG can both be added to honey to increase its apparent level of activity. Such adulteration cannot be detected at present. This would reduce the practicality of this option as it doesn't minimise the potential for fraud and would add to costs as some form of enforcement to prevent adulteration would likely be needed.

Impact on consumers

In order for a definition to minimise the potential for misleading statements or confusion, it should match with the expectations of a reasonable consumer and be able to be communicated clearly and unambiguously.

A definition based on pollen will mean that:

- honey that has 70% manuka pollen and meets the other parameters could be labeled manuka, regardless of its non-peroxide activity level;
- honey that has a high level of non-peroxide activity but a manuka pollen count of less than 70% could not be labeled manuka, but could potentially be labelled 'manuka blend'.

The impact on consumers is hard to quantify in the absence of strong research that shows current expectations and reasons for buying manuka honey. Some submitters stated that the main value of manuka honey to consumers is in the non-peroxide antibacterial properties. However others stated that consumers buy manuka honey because they like its taste.

MPI believes that, in light of the problems with the evidence outlined above, consumer expectations about the activity of manuka honey do not provide a conclusive argument for including MG as part of a definition rather than in associated labeling and marketing. The important consideration is ensuring that consumers can get accurate information about the contents of a jar of manuka honey, based on what is stated on the label.