Proposed General Export Requirements for Bee Products

For all exporters of bee products from New Zealand

SUBMISSION FORM

Consultation document 2017

The Ministry for Primary Industries (MPI) proposes to consolidate, clarify, and introduce export requirements for all bee products intended for export.

You are invited to have your say on the proposed changes, which are explained in the discussion document and specified in the draft Animal Products Notice: General Export Requirement for Bee Products notice.

Consultation closes on **13 June 2017.**

How to have your say

Have your say by answering the questions in the discussion document, or commenting on any part of the proposals outlined in the draft Animal Products Notice: General Export Requirements for Bee Products. This submission form provides a template for you to enter your answers to the questions in the discussion document and email your submission back to MPI.

Please include the following information in your submission:

☐ the title of the discussion document 'Proposed General Export Requirements for Bee Products';

☐ your name and title;

☐ your organisation's name (if you are submitting on behalf of an organisation), and whether your submission represents the whole organisation or a section of it; and

☐ your contact details (such as phone number, address, and email).

MPI encourages you to make your submission electronically if possible. Please email your submission to: manuka.honey@mpi.govt.nz

If you wish to make your submission in writing, these should be posted to the following address:

General Export Requirements for Bee Products Submission
MPI Food Assurance Team
PO Box 2526
Wellington 6140

The following points may be of assistance in preparing comments:

☐ where possible, comments should be specific to a particular section in the document. All major sections are numbered and these numbers should be used to link comments to the document;

☐ where possible, reasons and/or data to support comments should be provided;

☐ the use of examples to illustrate particular points is encouraged; and

☐ as a number of copies may be made of your comments, please use a legible font and quality print, or make sure hand-written comments are clear in black or blue ink.

Submissions are public information

Everyone has the right to request information held by government organisations, known as "official information". Under the Official Information Act 1982, information is to be made available to requesters unless there are good or conclusive grounds under the Official Information Act for withholding it.

If you are submitting on this discussion document, you may wish to indicate any grounds for withholding information contained in your submission. Reasons for withholding information could include that information is commercially sensitive, or that the submitters wish personal information such as names or contact details to be withheld. MPI will consider such grounds when deciding whether or not to release information.

Any decision to withhold information requested under the Official Information Act 1982 may be reviewed by the Ombudsman.

For more information please visit http://www.ombudsman.parliament.nz/resources-and-publications/guides/official-information-legislation-guides

Your details

Your name and title:	s 9(2)(a)
Your organisation's name (if you are submitting on behalf of an organisation), and whether your submission represents the whole organisation or a section of it:	s 9(2)(a)
Your contact details (such as phone number, address, and email):	s 9(2)(a)

General questions: getting to know you

1. What part of the supply chain do you operate in:

   ☐ beekeeper

   ☐ extractor

   ☐ processor

   ☒ packer

   ☒ exporter

   ☐ retailer of bee products

   ☐ other – please specify

   How long have you been involved in the apiculture industry:

   ☐ 0-5 years

   ☐ 5-10 years

   ☒ 10 + years

   ☐ not applicable

2. Do you operate under:

   ☒ an RMP under the Animal Products Act 1999

   ☐ the Food Act 2014 (Food Control Plan or National Programme)

   ☐ the Food Hygiene Regulations

   ☐ none of these

   ☐ not applicable

3. If you are a beekeeper how many hives do you currently have:

   ☐ 0 – 5

   ☐ 6 – 50

   ☐ 51 – 500

   ☐ 501 – 1000

   ☐ 1001 to 3000

   ☐ More than 3000

4. What region of New Zealand do you operate in?

South Canterbury, however we purchase honey from beekeepers across the country

5. If you export bee products please tell us a little about your business. How many people do you currently employ?

   ☐ 0

   ☐ 1 – 5

   ☒ 6 – 19

   ☐ 20 or more

6. What are the roles of your employees and how many are:

   ☐ beekeepers

   ☒ processors

   ☒ packers

   ☒ other – please specify – marketing, export management, office management, quality/safety

Impact of compliance costs for beekeepers, processors and exporters

7. Table 4.1.1 of the Discussion Document provides a summary of the estimated costs of the proposals. What do you think the overall impact of the new proposals will be on your business?

Compliance costs associated with the proposed GREX will exceed $300k annually for our business, the majority of which is related to laboratory testing for the Manuka honey standard. There will however be higher costs in other areas, passed on by beekeepers and extractors throughout the industry.

8. In order to estimate the total cost to industry of the proposals contained in the draft GREX, it would be useful for MPI to understand how many beekeepers, operators and exports of bee products will be affected by the proposals. Please specify which of the proposals listed in the table at 4.1.1 will affect you and how.

GREX Clause 4.1 Pre-processing traceability requirements. The cost of indelibly marking each honey super with a unique form of identification will be significant and potentially far outweigh any benefits, given the way that supers are extracted. Industry estimates up to $10M added compliance costs including additional staff, audits and materials to comply with the proposed traceability requirements. This cost will be spread across the industry and potentially passed onto consumers, which will likely have the effect of reducing demand for NZ honey internationally. **Part 6 of the GREX** The costs of proposed new testing to identify whether a honey is Manuka or not will be substantial. In the case of s 9(2)(a) it will more than double the current testing spend and add approximately $250k of cost. Total industry cost is likely to increase by more than $5M per annum, based on the fact that each batch of honey will be

tested multiple times as it makes its way through the supply chain. In addition to potentially impacting on demand, the increased cost will be particularly damaging to beekeepers with a lower grade of honey, given the lab tests will form a higher percentage of their honey value per kg.

9. Do you foresee any other costs that will arise from the proposals contained in the draft GREX which are not contained in the table at 4.1.1? If so, how significant do you think these will be (e.g. administration costs such as time to fill in forms, and time to learn about the new requirements)?

There will be other costs incurred primarily around training (e.g. new technology, testing) and increased administration to deal with the higher level of compliance/reporting.

No additional substances to be present in New Zealand honey

10. To ensure additional substances are not present in New Zealand honey, MPI proposes to prohibit the feeding of bees when honey supers are present on hives for the purpose of collecting honey, with an exception if it is necessary for the survival of the bees. Do you agree or disagree with this proposal?

☒ I agree because:

The absence of additional substances in New Zealand honey is a key selling point internationally and should be protected.

☒ I disagree because:

However, this particular directive may be too restrictive for beekeepers who have supers on hives for reasons such as managing swarming, yet they may still need to feed sugar to keep the hive alive. Problems with C4 sugars in high active Manuka honey appears to be related to chemical interaction and this should be considered separately to the issue of sugar feeding. Outside of Manuka honey, we are not aware of issues concerning C4 sugar levels in NZ honey which would necessitate further compliance requirements such as documenting the circumstances when bees are fed with anything other than honey. The proposed documentation, as suggested by MPI, will not enhance any purposeful outcomes and in practice would be virtually impossible to regulate. This would most likely prove to be a case where a compliance cost would achieve no added value. We recommend that clause 3.1 (2) be deleted from the GREX.

Please suggest any alternatives to this approach that would ensure additional sugars and synthetic chemicals are not present in the honey:

It is suggested that beekeepers declare in the Harvest Declaration that industry best practice has been adhered to. Simple definitions of what constitutes industry best beekeeping practices can be outlined in the Guidance box at the end of the Declaration.

11. To prevent the contamination of honey with varroacide residues, MPI proposes honey is only harvested from honey supers that do not contain honeycomb previously part of a brood nest. Do you agree or disagree with this proposal?

☒ I agree because:

It is important that NZ honeys do not contain any traces of varroacide residue and can legitimately make claims as to the purity of local honey. It is good beekeeping practice to lift brood into the honey super in a slow season otherwise the bees pack the brood chamber with honey, restricting the ce ls available for the queen to lay eggs. What we don't want to see is beekeepers stripping/extracting all honey from the brood nest at the end of the season.

☐ I disagree because:

Please suggest any alternatives to this approach that would ensure varroacide residues are not present in the honey.

Processors of bee products to operate under a risk based measure

12. MPI proposes that processors of bee products for export under the Food Hygiene Regulations must move to a risk-based measure (either an RMP under the Animal Products Act 1999, or Food Control Plan or National Programme under the Food Act 2014). Do you agree or disagree with this proposal?

☒ I agree because:

All bee products intended for export must be processed and remain within an RMP system to ensuring that consumers can have confidence in the traceability of their honey. All operators should be responsible for the integrity of traceability which ultimately depends on the accuracy of all documentation within the supply chain.

☐ I disagree because:

Please suggest any alternatives to this approach that would provide MPI with oversight of these processors:

Bee products to be sourced from listed beekeepers

13. MPI proposes to extend listing requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☒ I agree because:

Beekeepers supplying bee products for export must be listed so they are known to both MPI and the RMP operator. It is important that contact details are available to both the operator and MPI so that relevant information may be confirmed.

☐ I disagree because:

Can you think of any alternatives to this approach that would address this gap in the traceability chain?

Pre-processing traceability requirements

14. MPI proposes beekeepers keep additional records. Do you agree or disagree with this proposal?

☐ I agree because:

☒ I disagree because:

The proposed system of indelibly marking and tracing each honey super with a unique marker will not work for the majority of beekeepers. A more practical approach such as tagging stacks of honey as harvested and loaded onto the truck at the apiary, as currently widely practised, will be more suitable and likely to result in the desired outcome.

We also support the suggestion of industry to add the inclusion of a bullet point within the Guidance section found in PART 3 3.1 - Honey to be fit for purpose.

This bullet point could be written as a requirement pertaining to best industry practice to maintain bee product integrity as related to traceability.
Perhaps this could be written as;

- That beekeepers must maintain the integrity of product traceability by employing a practice that ensures each stack of honey loaded onto the truck at harvest is clearly marked and identified to its originating apiary along with the date of harvest, during both transit and storage through to process.

Can you think of any alternatives to this approach that would address gaps in the traceability chain?

15. The costs for businesses associated with implementing the proposed traceability requirements are likely to vary depending on their existing systems and processes. What impact do you think these proposals are likely to have on your business?

It could be expected that there would be significant additional cost on industry if the proposed traceability requirements were implemented. This will likely be passed onto consumers and may result in reduced demand for NZ honeys on the global market.

Traceability from beekeepers to operators – harvest declarations

16. MPI proposes to introduce harvest statement requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☒ I agree because:

All bee product harvested for export should be declared on a Harvest Declaration. Key information includes the date and location of harvest, for compliance with the Tutin in Honey Standard, as well as the declaration of compliance to the AFB Pest Management Plan.

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

17. MPI considers, for most businesses, the costs associated with these proposals are unlikely to be onerous. Do you agree or disagree and why?

☐ I agree because:

☒ I disagree because:

The costs of complying with proposed process changes will be substantial. Added focus of traceability on each individual honey super creates huge added compliance costs which will not deliver any value gain, as the process will not achieve any added benefit around traceability or product value.

Traceability between operators – transfer documentation in AP E-Cert and reconciliation

18. MPI proposes to introduce transfer documentation requirements to all bee products intended for export. Do you agree or disagree?

☒ I agree because:

This is essential to ensure a clear chain of custody relating to honey for export

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

We would suggest that the transfer documentation concerned with traceability should be equally applied across all honey products, regardless of whether the intended market requires official assurances. This will ensure all export-bound honey is managed to the same high standard.

Labelling of monofloral and multifloral mānuka honey

19. MPI proposes to implement the mānuka honey definition for export using the GREX. Do you agree or disagree?

☒ I agree because:

It is critical for the long-term sustainability of the industry, as well as protection of NZ Inc., that we are able to provide a clear standard for what constitutes Manuka honey.

☐ I disagree because:

Can you think of any alternatives to this approach that ensures mānuka honey is true to label?

20. MPI considers there are likely to be options available to businesses to support compliance with the proposed definition (e.g. relabelling, changes to blending practices etc.). Do you agree with this assessment or do you have concerns about ability of some businesses to comply?

☒ I agree because:

Packers and exporters will be able to comply with the definition, provided testing protocols are robust and there is adequate time to implement the changes.

☐ I disagree because:

☐ I have concerns because:

21. MPI's proposal may have an impact on existing rights associated with using the word "mānuka" on labels, including registered trademarks. Do you agree with MPI's assessment of the impact on existing rights?

☒ I agree because:

Some product that is currently labelled as Manuka honey will no longer comply and therefore won't be able to utilise that name. This is to be expected and is the objective of ensuring only genuine Manuka honey is able to be labelled as such.

☐ I disagree because:

22. MPI does not propose to make changes to the current use of grading systems. Do you agree or disagree with this position?

☒ I agree because:

The grading systems are commercially-focused and influence how the value of Manuka honey is communicated to consumers. The new definition should identify what can be labelled as Manuka honey, however it should not impact on commercial grading systems.

☐ I disagree because:

23. What do you think the impact of the mānuka honey definition will be on the current use of grading systems?

The current grading systems should be maintained, however the type and value of honey that makes up those grades may change. For example, UMF® 5+ should be retained as a rating but the components (such as level of Methylglyoxal) may alter to reflect the new definition. The determination of what constitutes monofloral vs. multifloral Manuka honey will have the greatest impact on the market. It is important that this determination is robust, otherwise we risk market damage through inferio honey being labelled as Manuka.

24. Do you have any comments on the summary science report?

Yes. Please see our separate submission, titled: **Proposed General Requirements for Bee Products** **Submission by** s 9(2)(a) **on MPI's Mānuka Honey Definition**

25. Do you have any further comments regarding the definition of mānuka honey?

It is critical that overseas regulators are engaged proactively and understand the proposed definition for Manuka honey. Given this is an export standard, there is a risk that markets will either not apply it to all product (i.e. honey labelled overseas but claimed to be Manuka) or will insist on other import requirements, which will add further cost and complexity to industry.

Laboratory Tests

26. Do you support the proposed requirements for sampling and testing mānuka honey set out in Part 6 of the draft GREX?

☒ I agree because:

Yes.

☐ I disagree because:

27. The costs associated with these proposals are likely to vary depending on the size and volume of samples being tested. What impact do you consider these proposals will have on your business?

See earlier comments in Section 8. We would expect substantial additional cost to result from implementation of these measures as they are currently proposed.

Do you have any suggestions for minimising any impacts?

As above, various suggestions including changes to proposed super traceability and Manuka definition.

Transitional provisions

28. MPI proposes a lead in time of **six weeks** between when the GREX is notified and when it comes into effect. Do you agree or disagree with this proposal?

☐ I agree because:

☒ I disagree and propose an alternative timeframe:

The proposed transition time is impractical and will add further cost. The standard period for amendments to the Australia New Zealand Food Standards Code is 12 months and at times this period is extended. A transition period of 12 months does not prohibit earlier uptake by industry should that prove commercially advantageous or

commercially feasible. However, it does provide relief for those operators with extensive stock in hand and for smaller operators.

29. MPI proposes stock in trade provisions for honey exported between the date of commencement until six months after the date of commencement. Do you agree or disagree with this proposal?

☒ I agree because:

Yes, however the same provision should apply regardless of whether the export destination requires official assurances. Having different provisions will result in unnecessary complexity and cost, while adding no value to the markets.

☐ I disagree because:

Any other feedback

30. Are there any other parts of this discussion document or the draft GREX that you would like to provide feedback on? (Please indicate which part of the discussion document or draft GREX you are providing feedback on).

If complications arise from any uncertainty regarding the robustness of the Manuka honey definitions, we believe the notification of the GREX should be delayed until such time that both MPI and industry are confident with any strengthening amendments. It is very important that the definitions are robust enough to satisfy all the original objectives. Those include such things as; • Will the definitions protect consumers and producers from fraud? • Will they also provide markets with confidence and assurances? • And will they protect our reputation as a supplier of safe and authentic food? If these basic cri eria are not met then the honey industry will suffer significant damage.

PROPOSED GENERAL REQUIREMENTS FOR BEE PRODUCTS

s 9(2)(a)

s 9(2)(a)

EXECUTIVE SUMMARY

- s 9(2)(a) . is a honey packer and exporter, supplying NZ honey to international markets since 1996. We work with independent beekeepers across the country and process a full range of honey types. This provides us with access to a large range of honeys and the various regional variations that occur naturally within honey.
- We support a Government regulated and robust definition of New Zealand mānuka honey - one that gives consumer's confidence in the integrity and authenticity of the product.
- We share MPI's stated objectives that "the science definition is essential to maintain New Zealand's premium position in overseas markets and for the continued growth of our export honey industry."
- We have reviewed MPI's science definition with that objective in mind and welcome the overall approach MPI has taken with the incorporation of chemical markers as part of the ID test.
- There are however a number of serious issues which industry has identified and we support, which mean we are unable to endorse the definition as it is currently proposed.

SELECTION OF ATTRIBUTES – CHEMICAL MARKERS AND DNA (POLLEN)

- MPI's proposed definition includes testing for a combination of 5 attributes (4 chemical markers and 1 DNA marker from mānuka pollen) to distinguish mānuka honey from other honey types and to identify monofloral and multifloral mānuka honey.
- s 9(2)(a) supports using science to identify monofloral from multifloral mānuka and establish its distinctiveness against other honey types.
- Regarding the science, we have concerns in three key areas:
    - DNA pollen test failing for high grade mānuka honeys
    - chemical markers
    - multifloral mānuka definition is too generous.

DNA pollen test

- Industry testing shows that a significant proportion of high-grade mānuka honey is not meeting the current DNA definition. In many cases the results are 'Not detectable'. These samples typically show an abundance of the chemical markers characteristic of mānuka honey. The failures appear to be in proportion to the methylglyoxal content and HMF levels, suggesting a reaction over time that adversely affects the recovery of mānuka DNA. It should be noted that much of mānuka honey packed for retail consumption would have been produced the previous season, so is likely a minimum of 12 months old.
- A sample requires only one or more grains of mānuka pollen to qualify as mānuka, regardless of any other po len source identified and in any quantity. Tests with traditionally low levels of known and acknowledged mānuka characteristics or non mānuka honey passed the DNA pollen test
- We do not believe the DNA test offers any value, either alone or in combination with the nominated chemical markers, and we suggest that additional chemical markers (namely leptosperin and methylgyoxal) may provide an alternative and more cost-effective solution. Selecting an appropriate and 'fit for purpose' suite of chemical markers that effectively differentiate mānuka honey from other honeys in first instance would:

s 9(2)(a)

- Avoid the redundant requirement for the DNA pollen test
- Avoid the incremental complexity and much higher cost of DNA analysis
- Integrate better with parallel industry initiatives to implement portable hand-held fluorescence technology based devices that would enable stakeholders throughout the supply and value chain to readily measure whether a honey is mānuka or not mānuka.

- We appreciate that MPI is already looking into a refinement of the DNA test and method. However, there remains a fundamental question as to whether the DNA pollen test is required at all?

Chemical Markers

- s 9(2)(a) does not believe that the proposed markers accurately discriminate mānuka honey. The markers proposed are new to consumers and scientists and will therefore take time to become established and for the scientific publication/challenge process to conclude. There are already two established markers (leptosperin and methylglyoxal) within the industry and we recommend that these be added to the definition, potentially in place of the DNA test.

4/

  - We recommend the addition of leptosperin ≥ 63mg/kg to the definition for multifloral and ≥ 100mg/kg for monofloral mānuka honey. The dynamics of leptosperin are well understood and the compound is stable over the shelf life of the product. Leptosperin is also established as a marker within the industry
  - We recommend the addition of methylglyoxal ≥ 100mg/kg be added to the definition for monofloral mānuka honey. Because:
    - The addition of methylglyoxal will support the transition from the 'interim labelling guide' to the new GREX much easier – the compound will be included in both versions.
    - It is indicated that one of the reasons why methylglyoxal was not selected as a marker is that the levels are 'unstable' and that it can be artificially added.
    - The dynamics of methylglyoxa are well understood and the compound is, in effect, stable over the shelf life of the product. The industry effectively manages this currently.
    - With respect to the risk of potential adulteration – this applies equally to the chemical markers proposed in the new definition. PLA can be purchased and added to honey. We understand that the government is putting in screens for the importation of the at risk chemicals; the same could be done for DHA and MGO, if this is not already in place.
- The addition of methylglyoxal and leptosperin to the definition would have minimal impact to the timeframe of introducing the definitions; the accredited assays are already in place at many laboratories and frequently used as a part of grading systems, so are already measured.
- The addition of methylglyoxal and leptosperin will also address the concern that two non-mānuka honeys could be blended to meet the proposed definition.
- Importantly, consumers understand the role of methylgyoxal within mānuka honey (i.e. its role in creating non peroxide activity) and actively purchase honey based on varying levels of methylglyoxal (note it is estimated that over 90% of genuine mānuka honey sold globally uses a rating system that includes MGO).
- Due to a proportion of high grade manuka honeys failing to meet the PLA level for monofloral mānuka (400mg/kg), it is the recommendation of ApiNZ that methylglyoxal and leptosperin markers are added to the definition and that the PLA levels be reduced to 300mg/kg for a monofloral mānuka honey.

s 9(2)(a)

Multifloral mānuka

s 9(2)(a) believes the criteria for defining product as multifloral mānuka are too broad:

- We believe that the definition as currently proposed provides opportunities for unethical blending of non-mānuka honeys to upgrade them to multifloral mānuka and potentially monofloral mānuka.
- In addition, there is the CODEX requirement that any monofloral honey should be 'wholly or mainly' from a defined floral source.
- Like others in the industry, we have examples of honey that meets the proposed definition for multifloral mānuka that do not reasonably resemble mānuka honey from a sensory perspective. There is nothing in the definition that speaks to the consumers' experience, i.e. the observation of organoleptic values such as colour, flavor, and aroma. For example, we have honey samples that taste predominantly of Kamahi but qualify as multifloral mānuka. This honey should not be categorised as mānuka.
- We recommend adding leptosperin and methylglyoxal to the definition to significantly reduce this risk.

Potential impact on international reputation and consumer confidence

- The current definition as it stands has serious potential implications for the reputation of the New Zealand honey industry and New Zealand Inc. and the trust of our international markets and consumers.
- Our concern relates to the potential of the current science definition and markers inadvertently opening the door to legitimising opportunistic blending of multiple honey types to produce New Zealand Government specification mānuka honey, offshore.
- This also risks New Zealand mānuka honey being devalued and commoditised, undermining its premium position in global markets.
- We support the New Zealand apiculture industry in highlighting this risk and requesting Government shares in "ensuring overseas regulators have confidence in the assurances we give them about New Zealand mānuka honey and that consumers are confident they are getting the real deal."
- Of critical importance to the success of the definition will be the need for overseas regulators/markets to accept and implement, and if required enforce in their own jurisdictions.
- Additionally, we cannot afford to lose sight of our consumers' want – the unique properties of New Zealand mānuka and confidence that they 'get the real deal'.

Next steps

- In light of these issues, we believe the proposed definition has the potential to compromise consumer and international partner confidence in the integrity and authenticity of New Zealand mānuka honey.
- These concerns have been raised with the industry body and directly with MPI during the consultation process and we acknowledge MPI's ongoing review of the definition.
- We urge MPI to continue to work with industry to implement a workable solution that delivers the best outcome for apiculture and NZ Inc.
- We support the Apiculture NZ recommendation to establish an agreed industry/government process to achieve this, one that considers industry and MPI input to date; sets clear and agreed parameters for what we want to achieve, and resets the timetable to achieve an industry/government solution.

s 9(2)(a)

s 9(2)(a)

12 June 2017

Ministry of Primary Industries

Wellington

Tena koutou

Please find attached our submission regarding the report on the Manuka Science Programme. If you have any queries regarding our submission please email as I will refer your queries on to our advisor s 9(2)(a) who has prepared this submission on our behalf.

Please note that we also support the submission prepared by Apiculture NZ on our behalf of its members, of which we are one. We are part of the beekeeping and honey industry through our brand Manawa Honey.

Many thanks for the opportunity to make this submission.

Heoi ano, naku na

s 9(2)(a)

s 9(2)(a)

Submission prepared by:

s 9(2)(a)

Submission on Mānuka Honey Science Programme

Comments on the programmes "Science Summary Report".

The report states it is "not intended to be a full scientific document". But as some of the detailed information underpinning the report is not available to stakeholders it is difficult to assess the veracity of the report. In this submission I will focus my comments on one area that exemplifies this – the sampling design. It doesn't matter what statistical methods are applied or what attributes are quantified a weak sampling design will lead to bias in the distribution of attribute values. Concerns about the sampling design include:

1. The intent of the report was to present robust science-based criteria identifying mānuka honey from New Zealand. As a consequence the whole of New Zealand should be the sampling universe. A representative sampling design for the whole of New Zealand is essential for the plant reference collection and the honey reference collection.
2. Little information was contained in the report on where specifically these collections were made and why. The report does give summarised information about the number of collections made in 12 large geographic regions but there is no rationale given why regions were the strata used. To be unbiased the plant reference collection and the honey reference collection would need to representatively (e.g., randomly) sample each region.
3. In the Christchurch presentation it emerged the data from collections were also analysed using habitats. A stakeholder is left wondering what were the habitats and why were they selected as strata? Were all habitats containing mānuka sampled? To be unbiased the plant reference collection and the honey reference collection would need to representatively (e.g., randomly) sample each habitat.
4. If the science programme randomly sampled (this is not adequately explained in the report) honey currently being produced by beekeepers this would not represent the whole of New Zealand.
5. Plant species attributes can reflect factors such climate, soil fertility and, importantly, their interactions (e.g., Simpson, A.H.; Richardson, S.J.; Laughlin, D.C. 2016. Soil–climate interactions explain variation in foliar, stem, root and reproductive traits across temperate forests. *Global Ecology and Biogeography 25*: 964-978). The reader is left wondering whether the sampling design robustly and representatively sampled the full range of important factors such as soil fertility.
6. For the qPCR analysis to be valid the collections need to represent all of the variability in the plant species under consideration. Species like mānuka can contain considerable genetic variability reflecting, in part, factors such as environment and geographic isolation. The report must justify how it has sampled these dimensions in a representative way.
7. In the literature it is emerging just how variable nectar can be due to pollinator visits (e.g., Vannette, R.L.; Fukami, T. 2016. Nectar microbes can reduce secondary metabolites in nectar and alter effects on nectar consumption by pollinators. Ecology

97(6): 1410-1419. Roy, R.; Schmitt, A.J.; Thomas, J.B.; Carter, C.J. 2017. Nectar biology: from molecules to ecosystems. Plant Science: in press). Certainly a robust sampling design would need to account for biochemical changes that take place in the nectar while in the nectaries due to the introduction of bacteria and yeasts by visiting pollinators.

8. In the plant species collections the four chemical attributes are from the nectar itself whereas the DNA attribute is from the pollen. A simple expectation is that the mānuka DNA attribute value in a honey sample will scale positively with the four mānuka chemical attributes. However, processes that reduce pollen flow such as moist conditions or bees actively foraging for other types of pollen can decouple this positive scaling and create variability. The report reader is left wondering how the science programme obtained and used data to incorporate this decoupling in setting criteria.

In summary a report reader is left wondering how much sampling bias there is in the data. These biases might be spatial, temporal or reflect taxa selected. Bias in sampling has important consequences for variability in the attribute values measured and currently used to define thresholds.

12 June 2017

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Wellington 6140

The following points may be of assistance in preparing comments:

☐ where possible, comments should be specific to a particular section in the document. All major sections are numbered and these numbers should be used to link comments to the document;

☐ where possible, reasons and/or data to support comments should be provided;

☐ the use of examples to illustrate particular points is encouraged; and

☐ as a number of copies may be made of your comments, please use a legible font and quality print, or make sure hand-written comments are clear in black or blue ink.

Submissions are public information

Everyone has the right to request information held by government organisations, known as "official information". Under the Official Information Act 1982, information is to be made available to requesters unless there are good or conclusive grounds under the Official Information Act for withholding it.

If you are submitting on this discussion document, you may wish to indicate any grounds for withholding information contained in your submission. Reasons for withholding information could include that information is commercially sensitive, or that the submitters wish personal information such as names or contact details to be withheld. MPI will consider such grounds when deciding whether or not to release information.

Any decision to withhold information requested under the Official Information Act 1982 may be reviewed by the Ombudsman.

For more information please visit http://www.ombudsman.parliament.nz/resources-and-publications/guides/official-information-legislation-guides

Your details

s 9(2)(a)

General questions: getting to know you

1. What part of the supply chain do you operate in:

   beekeeper

   extractor

   processor

   packer

   exporter

   retailer of bee products

   other – please specify

2. How long have you been involved in the apiculture industry:

   0-5 years

   5-10 years

   10 + years

   not applicable

3. Do you operate under:

   an RMP under the Animal Products Act 1999

   the Food Act 2014 (Food Control Plan or National Programme)

   the Food Hygiene Regulations

   none of these

   not applicable

4. If you are a beekeeper, how many hives do you currently have:

   0 – 5

   6 – 50

   51 – 500

   501 – 1000

   1001 to 3000

   More than 3000

5. What region of New Zealand do you operate in?

   Bay of Plenty. Manuka exported comes from Coromandel, Waikato and Bay of Plenty mainly

6. If you export bee products please tell us a little about your business. How many people do you currently employ?

0

1 – 5

6 – 19

20 or more

What are the roles of your employees and how many are:

beekeepers

processors

packers

other – please specify

Impact of compliance costs for beekeepers, processors and exporters

7. Table 4.1.1 of the Discussion Document provides a summary of the estimated costs of the proposals. What do you think the overall impact of the new proposals will be on your business?

All costs need to be kept to a minimum

8. In order to estimate the total cost to industry of the proposals contained in the draft GREX, it would be useful for MPI to understand how many beekeepers, operators and exports of bee products will be affected by the proposals. Please specify which of the proposals listed in the table at 4.1.1 will affect you and how.

Part 6 of GREX The costs of the new proposed testing to verify whether a honey is mānuka or not is an added cost, considering the current grading system which to date, determines whether your honey is GENUINE mānuka or not, through CODEX criteria and its MGO/Leptosperin testing, will still be continuing. Adding unnecessary cost needs to be avoided

9. Do you foresee any other costs that will arise from the proposals contained in the draft GREX which are not contained in the table at 4.1.1? If so, how significant do you think these will be (e.g. administration costs such as time to fill in forms, and time to learn about the new requirements)?

Once again the lab tests of honey with the proposed NEW definition **will incur greater cost.** In addition to this cost, the traditional grading costs will still be continuing with or without inclusion in the GREX. For most of those exporting manuka honey, they are content with the MGO/leptosperin test along with meeting the rest of the CODEX criteria to determine just what is a **GENUINE MONOFLORAL** manuka honey derived 'wholly or mainly' from the Leptosperemum scoparium species.

It is of significant concern that **MPI proposes to drop, as part of the GREX, the already accepted MGO/Leptosperium markers** – KNOWN markers of the Leptospermum scoparium species, and **markers that create the VALUE and INVESTMENT in manuka honey for New Zealand**, by replacing it with a pollen DNA derived from manuka and kanuka et al pollen. Not only is the expensive DNA test proving problematic, **it is proving problematic with the VERY chemical that has created the VALUE and INVESTMENT in Manuka honey in the first instance!**

Pollen never has and never will be the marker that creates the value in genuine Leptosermum scoparium based monofloral manuka honey. Therefore we believe that adding cost via a DNA test before the problems have been fully researched, **kanuka and manuka pollen split so they are independent of the other**, and then pollen stability proven for the length of the honey's shelf life, is unnecessary as part of proving if the honey is monofloral manuka or not!

No additional substances to be present in New Zealand honey

10. To ensure additional substances are not present in New Zealand honey, MPI proposes to prohib t the feeding of bees when honey supers are present on hives for the purpose of collecting honey, with an exception if it is necessary for the survival of the bees. Do you agree or disagree with this proposal?

I agree because:

It is expected that MPI would be monitoring, or putting procedures in place that address this

I disagree because:

Please suggest any alternatives to this approach that would ensure additional sugars and synthetic chemicals are not present in the honey:

11. To prevent the contamination of honey with varroacide residues, MPI proposes honey is only harvested from honey supers that do not contain honeycomb previously part of a brood nest. Do you agree or disagree with this proposal?

I agree because:

MPI to work with industry on this

I disagree because:

Please suggest any alternatives to this approach that would ensure varroacide residues are not present in the honey.

Processors of bee products to operate under a risk based measure

12. MPI proposes that processors of bee products for export under the Food Hygiene Regulations must move to a risk-based measure (either an RMP under the Animal Products Act 1999, or Food Control Plan or National Programme under the Food Act 2014). Do you agree or disagree with this proposal?

I agree because:

Agree with RMP protocols which are monitored and updated as required and worked on in conjunction with industry

I disagree because:

Please suggest any alternatives to this approach that would provide MPI with oversight of these processors:

Bee products to be sourced from listed beekeepers

13. MPI proposes to extend listing requirements to all beekeepers providing bee products for export. Do you agree or disagree?

I agree because:

Agree

I disagree because:

Can you think of any alternatives to this approach that would address this gap in the traceability chain?

Pre-processing traceability requirements

14. MPI proposes beekeepers keep additional records. Do you agree or disagree with this proposal?

I agree because:

I disagree because:

Any proposed system needs to be worked out in meetings with beekeepers and ratified by the industry before compliances are put in place

Can you think of any alternatives to this approach that would address gaps in the traceability chain?

15. The costs for businesses associated with implementing the proposed traceability requirements are likely to vary depending on their existing systems and processes. What impact do you think these proposals are likely to have on your business?

This is something to work with industry on, and to reach agreement with, before implementing

Traceability from beekeepers to operators – harvest declarations

16. MPI proposes to introduce harvest statement requirements to all beekeepers providing bee products for export. Do you agree or disagree?

I agree because:

Yes we believe all bee products harvested for export must be declared on a Harvest Declaration. Terms and Conditions of which need to be worked in harmony with the industry

I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

17. MPI considers, for most businesses, the costs associated with these proposals are unlikely to be onerous. Do you agree or disagree and why?

I agree because:

I disagree because:

Reading through the GREX and through discussions with beekeepers and other interested parties, it appears that adding cost when there is no value gain, is not achieving anything for anyone. More costs dicussion required with industry.

Traceability between operators – transfer documentation in AP E-Cert and reconciliation

18. MPI proposes to introduce transfer documentation requirements to all bee products intended for export. Do you agree or disagree?

agree because:

Agree

I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

Labelling of monofloral and multifloral mānuka honey

19. MPI proposes to implement the mānuka honey definition for export using the GREX. Do you agree or disagree?

I agree because:

I disagree because:

I disagree with the GREX in its current form. In its current form there is the likehood of ten to forty times more honey labelled manuka, either through mono or multi options, than New Zealand has ever had before, let alone produces! **Flooding the international market with multi, mono and blended manuka's under the present GREX will do more damage to our manuka and overall honey industry than has ever been done before.**

Can you think of any alternatives to this approach that ensures mānuka honey is true to label?

Unt l the current proposed GREX eliminates other honeys (ie kanuka et al) from being in a position **to become expanded manuka by default** (and therefore flood the international market), **the DNA pollen test needs to be adjusted – or re done - to the point it can distinquish between manuka and kanuka pollen.** Once that is done, it then needs to be adjusted so that the MGO content does not destabilise it. Until this happens, we believe the GREX in its current form, not be put into play.

We also believe that to safeguard the GREX for its genuine 'manukaness' MGO and Leptosperin (both key markers for Leptospermum scoparium) need to become AN INTEGRAL part of the GREX with a **bottom line being MGO100 and Leptosperium at the UMFHA recommendated levels.** To retain the INTEGRITY for New Zealand Manuka from the Leptospermum scoparium species, we do not believe **that multi manuka should**

be allowed to have any form of grading on it whatsoever. This includes a pollen count. Please see attached Submission to extend this response. This response is designed to HONOUR manuka and to retain is VALUE. The GREX in its current form, unfortunately has the potential to devalue manuka down to its lowest common denominator.

The VALUE and INVESTMENT in manuka has always come from the MGO component and latterly Leptopserin. **It has never and never will come from DNA pollen**. This is a very valid point to make and why we strongly recommend that MGO (and leptosperin) be within the adjusted GREX. **The INTEGRITY of the New Zealand Manuka industry depends upon that happening.**

20. MPI considers there are likely to be options available to businesses to support compliance with the proposed definition (e.g. relabelling, changes to blending practices etc.). Do you agree with this assessment or do you have concerns about ability of some businesses to comply?

I agree because:

I disagree because:

The definition in its current form has the potential to FLOOD the world market with sub standard manuka both multi and mono thus reducing manuka down to the lowest common denomiator in a commodity market place. In fact it has the potential to be a manuka disaster in the making

I have concerns because:

The Manuka price is already softening in mature manuka markets off shore. Australian competition is very real (which many put their head in the sands over) and suddenly New Zealand, under the proposed definition in its current form, gives a GREEN LIGHT to all honey packers both in New Zealand and off shore – both scrupulous and unscruplouous to blend away to their hearts content: both mono and multi manuka!

The potential to flood the world market with sub-standard manuka either from New Zealand honey packers or from bulk off shore purchasers of manuka, is HUGE under the new definition. **We do not think this aspect has been thought through deeply enough**. The reason the New Zealand manuka is sought after is BECAUSE of its MGO content. It is NOT because of its pollen content, or the DNA in pollen. And it is time for MPI and industry to know and accept this and address it within the GREX (by adding MGO/Leptosperin) before the bottom drops out of the manuka market.

We believe that only MONOFLORAL manuka should have a grading system on it – and that that grading system be made up of UMF/MGO – nothing else. Multi manuka should never leave this country with a grading system on it. And consumers buy Manuka because of the MGO component – not a pollen count under some guise or another pretending to be a UMF brand!

We believe that MPI needs to put this grading specification FOR MONOFLORAL manuka into its GREX. That is if integrity is to reign in our off shore markets.

21. MPI's proposal may have an impact on existing rights associated with using the word "mānuka" on labels, including registered trademarks. Do you agree with MPI's assessment of the impact on existing rights?

I agree because:

We understand this and little by little this can be addressed further as and when it comes up

I disagree because:

22. MPI does not propose to make changes to the current use of grading systems. Do you agree or disagree with this position?

I agree because:

I disagree because:

We believe that the ONLY grading systems that should be allowed on Manuka Honey are that of the already accepted UMF/MGO systems. And then, only on MONOFLORAL manuka. We also believe that thus needs to be part of 'labelling specifications' under the GREX,

We say this because manuka has risen to its current value specifically owing to the MGO content of the manuka. This aspect needs to be fully acknowledged then strengthened out in the market place if New Zealand wants to maintain INTEGRITY for its Manuka Leptospermum Scoparium brands.

New Zealand does not want to continue weakening its star brand with a myriad of different grading systems that bear no relationship to MGO, at a time we have the spot light on us as well as having rising competition from monofloral MG manuka in Australia.

By allowing other grading systems on lables that have no relationship or bearing to the MGO component, New Zealand risks weakening its position and devaluing its star player.

We have one opportunity to get this right. Lets do it!
The single star that rose Manuka to its current value and investment position is MGO.

23. What do you think the impact of the mānuka honey definition will be on the current use of grading systems?

The manuka definition as it stands currently has the srong potential to risk damaging the high value manuka market for New Zealand via low grade, blended, inferior blended manuka honeys that all have some form of grade on them! A complete disaster in the making acutally. Again, we believe this aspect has not been thought through deeply enough.

Rather we believe that MPI were trying to have something for everyone when it came to manuka. Unfortunately if we want to retain credibility with off shore customers – a hard line needs to be taken. That way we eliminate all mavericks out of the industry.

We also encourage new STARS to rise: like Kanuka. This has to be the next STAR to shine in value for New Zealand. But it will not shine while hiding under a manuka bush via MPI's Manuka Definition!l

We need to be taking weak manuka brands OFF the market – not flooding it – and getting rid of grading systems that do not relate to UMF/MGO.

We also need to be encouraging new high value rising starts to come onto the market – not hiding them behind manuka's coat tales.

24. Do you have any comments on the summary science report?

MGO and Leptosperin need to be added to the GREX to create double security PLUS uphold the ingredity of our manuka indsutry in international markets

We believe that the DNA pollen test needs to be re thought in that manuka and kanuka pollen need to be separated before a manuka DNA pollen test can HONESTLY become a genuine verifier.

Additionally, the DNA pollen test, once it is only manuka pollenneeds to be re calibrated so that it does not react to the MGO!

Then, genuine Manuka pollen DNA needs to be tested for its shelf life for five (5) years in various places in situ around the world before its stability in conjunction with the MGO component can be assured.

25. Do you have any further comments regarding the definition of mānuka honey?

Please see s 9(2)(a) accompanying Submission Dlocument

Our Submission is about STRENGTHENING the VALUE and GROWING the value of Manuka Honey for New Zealand. Our concern being that the Definition in its current form could well have the opposite effect.

Laboratory Tests

26. Do you support the proposed requirements for sampling and testing mānuka honey set out in Part 6 of the draft GREX?

I agree because:

I disagree because:

27. The costs associated with these proposals are likely to vary depending on the size and volume of samples being tested. What impact do you consider these proposals will have on your business?

Do you have any suggestions for minimising any impacts?

Transitional provisions

28. MPI proposes a lead in time of **six weeks** between when the GREX is notified and when it comes into effect. Do you agree or disagree with this proposal?

I agree because:

disagree and propose an alternative timeframe:

The standard time period for integrating new rules and regs is usually 12 months. We also believe that the current GREX needs adjusting and adding to, and this takes time.

29. MPI proposes stock in trade provisions for honey exported between the date of commencement until six months after the date of commencement. Do you agree or disagree with this proposal?

I agree because:

I disagree because:

Any other feedback

30. Are there any other parts of this discussion document or the draft GREX that you would like to provide feedback on? (Please indicate which part of the discussion document or draft GREX you are providing feedback on).

Please see attached Submission on MPI's Manuka Honey Science Definition by s 9(2)(a)

Its main concentration is on retaining the INTEGRITY and VALUE of the manuka brand for New Zealand and the impact the proposed new Manuka Definition could well have on the interntational market place.

While overall we are in agreement with national standards, we believe there is room for additions and tightening up of the definition so that Manuka WITH A GRADING SYSTEM ON ITS LABEL, can continue to enjoy its current international value position while at the same time encouraging new rising stars such as kanuka.

If the definition and grading systems in their current form requires additional conversations with various industry players and additional scientists, we believe these conversations need to take place prior to any definition being put into play

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Proposed General Export Requirements for Bee Products

SUBMISSION

BY

s 9(2)(a)

ON

MPI'S MĀNUKA HONEY SCIENCE DEFINITION

s 9(2)(a)

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Is kanuka (*kunzea ericoides*) et al, the new mānuka (*Leptospermum scoparium*)?

EXECUTIVE SUMMARY

It is the DHA/MGO component in mānuka derived 'wholly or mainly' from the species Leptospermum scoparium and discovered by dedicated and passionate pioneers, **that has created the international VALUE and on-going INVESTMENT for the mānuka industry.**

It is the DHA/MGO value and latterly Leptosperin found 'wholly or mainly' in mānuka Leptospermum scoparium (NOT kunzea ericoides), that gives importers, distributors, retailers and consumers **confidence** in the **integrity and authenticity of mānuka**, particularly when it is packed and labelled in New Zealand.

For credibility to be maintained in our mānuka industry, s 9(2)(a) believes this history (as already scientifically proven and accepted on world markets) **MUST be retained as bottom line** components **within** any updated or expanded scientific definition for mānuka.

POLLEN determination, derived via DNA or via traditional pollen counts has NEVER at any time been part of, or considered, until now, as part of the definition in mānuka honey, primarily because:

a. **it's the DHA/MGO component in mānuka wholly or mainly derived from Leptospermum scoparium, that creates the VALUE in mānuka honey**
b. There needs to be accepted peer reviewed science that splits mānuka and kanuka pollen before a mānuka pollen can be an acceptable part of any sound or robust definition
c. Currently there is no acceptable peer reviewed science available to determine the affect that the DHA/MGO component has on the pollen derived wholly or mainly from the mānuka (Leptospermum scoparium) – or any other pollen for that matter.

Immediate Questions Raised:

"There is currently twice as much mānuka on the world market than New Zealand produces"

Under the proposed MPI definition for mānuka, is kanuka *(kunzea ericoides)* et al, set to become the new mānuka *(Leptospermum scoparium)* – **thus creating ten to forty times more mānuka (multi and mono) than New Zealand produces?**

As the scientifically proven VALUE markers (methylglyoxal / Leptosperin) have been dropped from the proposed definition, is the proposed MPI Scientific Definition **designed to strip the TRUE value (and subsequent investment) out of mānuka (the genuine Leptospermum scoparium), by reducing it to its lowest common denominator** so it can become 'just another honey commodity' to be traded on the world market?

Under the proposed definition in its present form which is set to produce ten to forty times more mānuka, via multi/mono options than New Zealand produces, and therefore create utter confusion and chaos on world markets, has it been considered that the value will gradually drop out of the mānuka market causing prices to slump?

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Under the new proposed definition what is likely to happen to other potentially high value New Zealand 'wholly or mainly' mono honeys in their own right: ie kanuka, kamahi, rewarewa and others?

Why have the accepted VALUE and INVESTMENT markers, ie methylglyoxal (and Leptosperin) been dropped from the definition?

SUBMISSION HIGHLIGHTS

- s 9(2)(b)(ii) does support a Government regulated and robust definition of New Zealand mānuka honey – **but only one that is absolutely clear the definition is based 'wholly or mainly' (by Codex rules), on the specific attributes of Leptospermum Scoparium**. The attributes that primarily create the value and investment in Manuka Honey for New Zealand: ie methylglyoxal (MG) and latterly Leptosperin.
- From information gathered by attending one of the public meetings, the MPI science definition currently appears to **favour the species' Kunzea ericoides (kanuka) et al, as the wide base for the new mono and multi mānuka with no reference to acknowledging the chemicals or compounds that make up its TRUE value base!**
- As the proposed definition came about, in part, because of international complaints, ie **'twice as much mānuka on world markets than New Zealand produces'**, does this mean **we are now going to have ten (10) to 40 (forty) times more mānuka (between mono and multi) on world markets than New Zealand actually produces** – all with goodness knows how many (often pseudo) 'grading' systems on them.
- In its present form, it strongly appears the proposed MPI mānuka science definition – whether it be mono or multi, has the potential of creating a confused mānuka market generally (with many different types of grading systems on labels). A chaotic shambles.
- **Within this mounting confusion, OVER SUPPLY will be created in an ALREADY overloaded mānuka market place in many countries.**
- Resulting in gradually slumping mānuka prices, wiping out the value (across all grades) in the mānuka industry. The gold rush would be over.
- s 9(2)(a) agrees, "a science definition is essential to maintain New Zealand's premium value position in overseas markets and for the continued growth of our export honey industry." But **only** if this science definition **is based 'wholly or mainly' on attributes known and scientifically proven as belonging specifically to the species Leptospermum scoparium such as methylglyoxal (MG) and leptosperim**. Plus all attributes that fit the CODEX parameters for honey.
- **Without including methylglyoxal (MG) and Leptosperin** – both known and accepted value markers of the mānuka species Leptospermum scoparium and **the very attributes that have created the value and investment for mānuka, New Zealand's mānuka integrity and reputation is likely to be questioned and sorely compromised, as will MPI's reputation: here is an excerpt from MPI's Manuka website:**

s 9(2)(a) [redacted]

Mānuka honey

Mānuka honey is a premium product that's growing steadily as a high-value export for New Zealand. Find out some of the ways we're working with industry to ensure the integrity of mānuka when sold as a food.

What is mānuka honey?

New Zealand mānuka honey is produced by bees collecting nectar from the mānuka plant (*Leptospermum scoparium*).

Mānuka plants can be found growing throughout New Zealand.

Making sure it's authentic NZ mānuka honey

Our reputation for honey production and export rests on the integrity of our products and the credibility of our systems.

The Ministry for Primary Industries (MPI) has developed a robust and sophisticated scientific definition that can be used to authenticate whether or not a particular honey is New Zealand mānuka honey. The science definition is essential to maintain New Zealand's premium position in overseas markets and for the continued growth of our export honey industry.

It's important:

- that overseas regulators have confidence in the assurances we give them about New Zealand mānuka honey
- consumers in export countries are confident they are getting the real deal.

If not, our access to markets could be put at risk or we may lose the premium price our bee products command overseas.

RETAINING CREDIBILITY

To retain genuine mānuka credibility, It is s 9(2)(a) [redacted] **belief that MPI need to focus its scientific definition on the key attributes of the species Leptospermum scoparium such as methylglyoxal (MG) and Leptosperin, as the key base components before adding other largely unknown markers or markers that clearly also belong to many other honey species – even other honeys from around the world.**

Methylglyoxal and Leptosperin have created the VALUE and INVESTMENT in the industry for New Zealand. It would seem imperative to retain this integrity by ensuring these two markers are the bottom line of MPI's scientific definition.

s 9(2)(a) [redacted]

A reminder here that it was **NEVER pollen count, or pollen of any kind, that created the VALUE or INVESTMENT** in mānuka honey. **It was the compound DHA/MGO.** This needs to be quite clear within any definition, as **it differentiates mānuka from every other honey type. It also CLASSIFIES – together with the CODEX criteria - whether it is a 'MONO' or a 'Multi' mānuka!**

RED FLAGS

Pollen DNA Test

- It was of significant concern to learn at one of the public meetings, that DNA pollen – one of the key proposed markers in MPI's science definition for mānuka honey was a **combination of mānuka and kanuka pollen,** along with other pollens **and that this pollen DNA is designed to replace** the VALUE marker methylglyoxal (MG) and also Leptosperin (two key Leptospermum scoparium markers). **Pollen never created the value in mānuka honey!**
- Even more concerning is the fact that science exists – **through GNS Science - that can differentiate mānuka and kanuka pollens,** yet this research does not appear to have been used or sought in the development of MPI's scientific definition for mānuka. Perhaps this is an oversight.
- Because two of s 9(2)(a) [redacted] suppliers had genuine high value mānuka honey failing the DNA test (but flying through the MG test), it occurred to us that the **methylglyoxal or MG component** (the component that everyone buys mānuka for) **could be tripping the DNA, like it did (or does) for a false/positive C4 sugar test.** s 9(2)(a) [redacted] had the experience many years ago with a load of mānuka honey that went to Canada (before the days we knew about MG). Thanks to scientists here in New Zealand and in Ottawa, they did get to the bottom of it and found exactly that scenario – that an 'active' component in mānuka was the cause. We now know that component to be its DHA/MG and the key VALUE component!.
- s 9(2)(b)(ii) [redacted] understands that MPI are looking into this DNA aspect, but even so, because DNA of pollen is a relatively new concept, **can NEVER replace methylglyoxal as a VALUE marker**, is largely untried at this point, very expensive per batch to test and not fully researched for the full length of a five (5) year shelf life in situ throughout the world in different climates and countries across all MG strengths, we recommend that this DNA aspect be set aside meanwhile for on-going research and replaced with the more cost effective VALUE markers we have already in **methylglyoxal and perhaps Leptosperin (provided the UMFHA are good with this for the wider industry, for a small fee). 'Value' markers the world accepts and are comfortable with and which ADD the VALUE to Manuka honey.**

Chemical Markers

- s 9(2)(a) [redacted] understands the use of chemical markers can support an accurate and cost-effective method to determine just what is in mono-floral honeys.
- However, we do not believe that the current nominated markers are specific enough to truly identify Leptospermum Scoparium (genuine mānuka honey) as 'wholly or mainly' as they appear to be widely available in other honeys – **and in some honeys which are not even available in New Zealand!** **As a result, some of these markers could well question the integrity and validity of a 'wholly or mainly' mānuka honey.** Additionally the markers proposed are new to just about everyone – including all of us - and therefore will create far

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- more upset and confusion (particularly because they are also widely available in other honey types and honey types around the world), than we already have.
- We believe, the two established value markers (Leptosperin and methylglyoxal) within our industry (both of which are fully accepted around the world) need to be an integral part of the definition whether DNA is used or not.
- To be absolutely CLEAR New Zealand retains mānuka honey integrity, we believe **that methylglyoxal MG (the key ingredient that is the raison d'être (reason for being)** for mānuka honey), needs to be the bottom line in any scientific definition for mono mānuka. So we recommend:
    - the addition of methylglyoxal $\geq$ 100mg/kg be added to the definition for **monofloral** mānuka honey as the bottom line.
    - the addition of leptosperim as per the recommendations of the UMFHA Association for **monofloral** mānuka honey.
- Said another way, we believe that ALL New Zealand packed and labeled Manuka Honey with a UMF or MGO grading systems starting from 5+ or MG100+ should be the starting point for MONOFLORAL mānuka.
- **We do NOT believe that any multi mānuka classification should carry any grading system as this will THREATEN the current value of mānuka across the board**

Mono/multi mānuka: A potential can of worms in the making.

It strongly appears that within the new proposed definition non-mānuka can be up graded to multi or mono with relative ease through unethical blending. A situation no one will be able to do anything about under the proposed new definition

Simply, the current definition/s **provide wide windows for this type of unethical blending by unscrupulous honey packers. And worse from the unscrupulous honey packers off shore who purchase bulk honey but who are under no obligation whatsoever to fit into New Zealand's mānuka laws and definitions** – whatever they may be - so they can label how they like:

This will likely create:

- The potential to FLOOD the international and even home market ten / forty fold with either mono or multi mānuka will sky rocket under the new proposed definition.
- **Seeing a myriad of grading systems gracing labels crossing mono and multi, will likely have unprecedented consumer confusion as well as likely unwanted economic consequences.**
- This **golden opportunity for the unscrupulous** comes at a time when genuine mānuka sales are softening in some markets owing to price and to **off shore competition from Australian mānuka** and from 'healing' honeys from other countries.
- This is a very real threat that something people do not want to hear or see or believe could actually be happening (in the same way that the Tory's thought they would win with a landslide, until the results came flooding in!)
- These are very real threats to our genuine mānuka industry and if **MPI** creates the potential for these floodgates to open via their multi/mono mānuka definition and by allowing multiple grading systems across them, instead of **JUST ON MONOFLORAL**, then s 9(2)(b)(ii) believes New Zealand is asking for the potential collapse of our currently high value industry.
- Again we say that we believe MPI should be focusing its criteria on the attributes specific to a monofloral Leptospermum scoparium **(MG and Leptosperin) – the VALUE markers in the mānuka industry**

s 9(2)(a)

- Additionally, these opportunities to mix all New Zealand honeys together to create a 'mono or multi' mānuka likely violates the CODEX requirements that insist on 'wholly or mainly' from a specific floral source.
- We also believe that the definition in its current form also takes away innovation because, on the coat tails of mānuka, New Zealand has the GOLDEN OPPORTUNITY to develop other HIGH VALUE New Zealand monofloral honeys like: kanuka, kamahi, rewarewa etc. Currently those honeys would likely go into weakening or DILUTING the current high value mānuka brand's – that is while there is still value in them!
- **Again, to retain high value for our mānuka industry, s 9(2)(b)(ii) does not believe that any MULTI mānuka should be allowed to have any grading system on its label. The potential for international market confusion and overload is huge here.**
- s 9(2)(b)(ii) **believes that any grading system MUST belong ONLY to MONO labels so as to retain both INTEGRITY and the VALUE in our mānuka and honey industry**

Adulteration

With respect to the risk of potential adulteration – this applies equally to the chemical markers proposed in the new definition. **PLA can be purchased and added to honey, as can pollen**. It is understood MPI is putting in screens for the importation of the 'at risk' chemicals; and it is understood that there are already checks and balances in place with regard to DHA/MGO and MGO.

New Zealand Honey Varieties – PLEASE PROTECT THEIR RIGHTS

New Zealand needs to be **PROTECTING the MONOfloral RIGHTS** of each and every individual species (ie kanuka, kamahi, honey dew, rewa rewa, tawari, pohutukawa, rata) and many others that have the potential to create **increasing ADDED value for the New Zealand honey industry.**
Sadly, the proposed mānuka definition has the potential to wipe these rights out from under them!

Current Grading Systems

- s 9(2)(b)(ii) believes that to **PROTECT New Zealand's value and investment into mānuka** and in turn other MONO floral varieties of honey, **that 'grading systems' should ONLY be allowed on MONO varieties NOT on any multi brand, as the dilution is too great to be a mono in any event.**
- The reason for this is as said above to **PROTECT the current value and investment** in mānuka (leptospermum scoparium)
- It also believes that any MPI approved grading system needs to be clear and easily understandable to the consumer and to relate specifically to a variety: ie the **UMF rating and MGO rating** are BOTH equally internationally known and acceptable as GENUINE mānuka markers. **Pollen is not seen as a value marker for mānuka, because it isn't! It could be a definition of MONO mānuka, but ONLY if it is differentiated from kanuka!**

Grading Systems Using Pollen on the label

s 9(2)(b)(ii) believes that any grading system that uses pollen, should be clear about this on the label: ie a pollen count, in the manner a consumer can understand it, usually comes as a percentage: ie 50% - 70% 80%

Again, s 9(2)(b)(ii) does not believe that a 'multi' classified product should carry any pollen or other chemical marker grading system: for obvious reasons

s 9(2)(a)

THREATS

Not realising the very real threat from off shore competition for the mānuka dollar. Many supermarkets and pharmacy chains in mature mānuka markets are now rationalizing their ranges of mānuka honey because sales are softening off owing to too:

- many New Zealand brands on the market
- many Total Activity brands still on the market that New Zealand can do nothing about
- price becoming too high and consumers questioning that price – even the wealthy
- Australian competition with MONOfloral mānuka brands at 10-20% less in price.
- Competition from other countries 'healing' honeys

Again, New Zealand must not put its head in the same like the Tory's!

In addition to the above, if the current definitions goes ahead unchecked, we can expect:

- New Zealand flooding the market with four times the mānuka it has already
- **New Zealand flooding the market with multi and mono options under the same grading systems**
- **Mass confusion between mono and multi if all grading systems on them**
- **Price wars and dropping of price**

It would be very unwise to think that a New Zealand's MULTI option could ever take the place of an Australian MONO option or another country's 'healing' mono floral honey!. Asian markets in particular LOVE to offer many different options from many different countries. At the end of the day it will all come down to VALUE for the price! Manuka is still up there – but for how long under the proposed definition. Here is one of just many Australian opportunities opening up for mānuka honey: https://thewest.com.au/business/agriculture/wa-company-manukalife-aims-to-be-right-on-the-honey-ng-b88491914z

The Industry needs to come together to ACT now top STRENGTHEN the monofloral mānuka brand out of New Zealand.

Next steps

- In light of the concerns raised above, s 9(2)(a) believes the current definition between mono and multi mānuka has the potential to **compromise consumer and international partner confidence in the integrity and authenticity of New Zealand mānuka honey.**
- **We also believe it has the potential to cause disastrous economic consequences for not just the mānuka industry, but the New Zealand honey industry as a whole**
- We urge MPI to continue to work with industry to implement a workable solution that delivers **the best VALUE outcome for ALL New Zealand MONO floral honeys** – not just mānuka honey
- We need to be **working on a Definition that RETAINS and GROWS the VALUE of genuine monofloral mānuka (Leptospermum scoparium)**
- **We recommend that MPI works with s 9(2) science to research further the splitting of mānuka and kanuka pollens**
- We recommend establishing an agreed industry/government process to achieve this, one that considers industry and MPI input to date; sets clear and agreed parameters for what we want to achieve, and resets the timetable to achieve an industry/government solution

s 9(2)(a)

CONCLUSIONS

IDENTIFY the key VALUE / INVESTMENT Components of MONOFLORAL Manuka Honey

- Before opening the floodgates to tip multi and mono mānuka on the world market in ever increasing numbers under a myriad of different sku's and differing grading systems, it would seem **imperative to FIRST establish just what a monofloral mānuka is based on the fact that it is derived 'wholly or mainly' from Leptospermum scoparium and how and why honey from this particular species has created the VALUE and INVESTMENT for New Zealand**

STRENGTHENING MONOFLORAL Manuka Industry with MGO/Leptosperin within Definition

- **If STRENGTHENING the New Zealand mānuka industry is a focus, then the Grading systems of UMF or MGO – the only TWO grading systems that create the genuine VALUE and INVESTMENT in New Zealand mānuka, should be seen as part of the definition for MONOFLORAL MANUKA and the ONLY grading systems seen on labels that are packed in New Zealand. The grading system should ONLY be sanctioned on MONOfloral mānuka. There should be no grading systems of any kind allowed on any multi options.**
- **It is recommended that MONOfloral mānuka classification start at a minimum of MG100 and Leptosperin at the UMFHA's recommendation**

Severely Weakening Manuka Industry by offering a Multi-mānuka with a Grading System

- s 9(2)(b)(ii) **sees a WEAKENING of our greatest honey asset by offering multi mānuka choices derived from many different species that are labelled under either UMF/MG0 grading systems or pseudo pollen based grading systems simply because this very real issue has not been thought through or considered as a serious threat to our mānuka industry. And it is a serious threat.**

Pollen Based Grading Systems

Grading systems with prominent numbers on the front of their labels which are based on pollen only because they cannot get a sufficient MG rating, are considered pseudo grading systems trying to hang onto the coat tails of genuine mānuka. These brands weaken the genuine mānuka story overall. These pollen based grading systems confuse the market and consumers, and in some cases, this is exactly what they are designed to do.

If companies want to do pollen count it is believed this test result should be put where the batch number or HMF number is usually put.

The mānuka/kanuka pollen debate

We all understand the topography of our country. We also know that honey flows are likely to carry more than one species in them. HOWEVER there is enough solid science now to know that the

s 9(2)(a)

DHA/MGO and Leptosperin levels when put against the CODEX criteria for 'wholly or mainly' can determine a genuine 'MONOFLORAL mānuka! If additional markers are added to this, then that is great – but new markers should never take away or REPLACE the tried and true basics: the DHA/MG Leptosperin and other codex criteria.

To assist this pollen debate further, we know science is available at GNS Science that can spit mānuka and kanuka pollen. We know this science is in its infancy, but also believe that this science along with how pollen is affected by the DHA/MG component – can take this industry forward.

We need scientists involved who know this industry scientifically and who have had a lot to do with the MG levels and how they react to certain other aspects within the honey, such as C4 sugars.

Other New Zealand Honeys

The proposed definition, as it stands at present, seriously risks the growth of other New Zealand honeys from coming into their own monofloral maturity to continue adding value and investment into New Zealand honeys. Kanuka being a key player here. **Kanuka (*kunsea ericoides*) should be the next value added player on our block! Not hidden under the mānuka mantel!**

s 9(2)(a)

s 9(2)(a)

[Not relevant to request]

From: s 9(2)(a)
Sent: Wednesday, 7 June 2017 4:10 p.m.
To: s 9(2)(a) mpi.govt.nz>
Cc: s 9(2)(a)
Subject: Pollen analysis results from "manuka" honeys

Hello s 9(2)(a)

We have obtained our customer's permission to forward the attached information to you.

The spreadsheet contains our pollen analysis results from honeys that customers have submitted to us in the last month or so - only the manuka and kanuka pollen percentages and concentrations are given here (there will have been other pollen determined in our detailed results).

The chemical and DNA analysis results are from the sources given in column D, and are as sent to us by our customers. The s 9(2)(a) samples were analysed by s 9(2)(b)(ii) -accredited lab. Most of the honeys, but not all, would have failed the proposed MPI manuka honey monofloral or multifloral criteria on the manuka DNA test results as given.

Yours faithfully
s 9(2)(a)

s 9(2)(a)

Proposed General Export Requirements for Bee Products

For all exporters of bee products from New Zealand

SUBMISSION FORM

Consultation document 2017

The Ministry for Primary Industries (MPI) proposes to consolidate, clarify, and introduce export requirements for all bee products intended for export.

You are invited to have your say on the proposed changes, which are explained in the discussion document and specified in the draft Animal Products Notice: General Export Requirement for Bee Products notice.

Consultation closes on **23 May 2017.**

How to have your say

Have your say by answering the questions in the discussion document, or commenting on any part of the proposals outlined in the draft Animal Products Notice: General Export Requirements for Bee Products. This submission form provides a template for you to enter your answers to the questions in the discussion document and email your submission back to MPI.

Please include the following information in your submission:

☐ the title of the discussion document 'Proposed General Export Requirements for Bee Products';

☐ your name and title;

☐ your organisation's name (if you are submitting on behalf of an organisation), and whether your submission represents the whole organisation or a section of it; and

☐ your contact details (such as phone number, address, and email).

MPI encourages you to make your submission electronically if possible. Please email your submission to: manuka.honey@mpi.govt.nz

If you wish to make your submission in writing, these should be posted to the following address:

General Export Requirements for Bee Products Submission
MPI Food Assurance Team
PO Box 2526
Wellington 6140

The following points may be of assistance in preparing comments:

☐ where possible, comments should be specific to a particular section in the document. All major sections are numbered and these numbers should be used to link comments to the document;

☐ where possible, reasons and/or data to support comments should be provided;

☐ the use of examples to illustrate particular points is encouraged; and

☐ as a number of copies may be made of your comments, please use a legible font and quality print, or make sure hand-written comments are clear in black or blue ink.

Submissions are public information

Everyone has the right to request information held by government organisations, known as "official information". Under the Official Information Act 1982, information is to be made available to requesters unless there are good or conclusive grounds under the Official Information Act for withholding it.

If you are submitting on this discussion document, you may wish to indicate any grounds for withholding information contained in your submission. Reasons for withholding information could include that information is commercially sensitive, or that the submitters wish personal information such as names or contact details to be withheld. MPI will consider such grounds when deciding whether or not to release information.

Any decision to withhold information requested under the Official Information Act 1982 may be reviewed by the Ombudsman.

For more information please visit http://www.ombudsman.parliament.nz/resources-and-publications/guides/official-information-legislation-guides

Your details

Your name and title:	s 9(2)(a)
Your organisation's name (if you are submitting on behalf of an organisation), and whether your submission represents the whole organisation or a section of it:	s 9(2)(a)
Your contact details (such as phone number, address, and email):	s 9(2)(a)

General questions: getting to know you

1. What part of the supply chain do you operate in:

   ☒ beekeeper

   ☒ extractor

   ☐ processor

   ☒ packer

   ☒ exporter

   ☒ retailer of bee products

   ☒ other – please specify - Pollination

2. How long have you been involved in the apiculture industry:

   ☐ 0-5 years

   ☒ 5-10 years

   ☐ 10 + years

   ☐ not applicable

3. Do you operate under:

   ☒ an RMP under the Animal Products Act 1999

   ☐ the Food Act 2014 (Food Control Plan or National Programme)

   ☐ the Food Hygiene Regulations

   ☐ none of these

   ☐ not applicable

4. If you are a beekeeper, how many hives do you currently have:

   ☐ 0 – 5

   ☐ 6 – 50

   ☐ 51 – 500

   ☐ 501 – 1000

   ☐ 1001 to 3000

   ☒ More than 3000

5. What region of New Zealand do you operate in?

Northland, Waikato, Hawkes Bay, Wairarapa, Taranaki, Marlborough

6. If you export bee products please tell us a little about your business. How many people do you currently employ?

☐ 0

☐ 1 – 5

☐ 6 – 19

☒ 20 or more

What are the roles of your employees and how many are:

☒ beekeepers - 20

☐ processors

☒ packers - 3

☒ other – please specify – 5 administration staff

Impact of compliance costs for beekeepers, processors and exporters

7. Table 4.1.1 of the Discussion Document provides a summary of the estimated costs of the proposals. What do you think the overall impact of the new proposals will be on your business?

We should ensure wherever and whenever that any Compliance costs should always be balanced to ensure they are kept realistic when measured against the value of the outcomes so long as those outcomes are worthwhile.

8. In order to estimate the total cost to industry of the proposals contained in the draft GREX, it would be useful for MPI to understand how many beekeepers, operators and exports of bee products will be affected by the proposals. Please specify which of the proposals listed in the table at 4.1.1 will affect you and how.

GREX Clause 4.1 Pre-processing traceability requirements.

Based on our expected number of hives held going from our current numbers of 12000 to a predicted 20000 over the next three years we have estimated the cost to s 9(2)(a) to indelibly mark each honey super with a unique form of identification as below:

- 3 supers per hive - Unique identifying tag estimated @ $1.00 each = s 9(2)(b)(ii)
- Cost of Labour circa $ 1.50 per super = s 9(2)(b)(ii)
- Handheld scanner units (1 per beekeeper team basis 1000 hives) at say $1000 each = s 9(2)(b)(ii)
- Technology system for management s 9(2)(b)(ii)
- Repairs & Maintenance Annually - s 9(2)(b)(ii)

- Technology systems for AFB or traceability - $10,000
- Increased Costs for compliance – additional staff, RMP and Compliance audits, AFB audits.

There will be a considerable increase in Operating costs for all Beekeeping entities, the implementation and establishment for regular beekeepers would be very frustrating.

s 9(2)(b)(ii)

There would likely be a time delay as technology stocks will not be at hand, non-compliance will be considerable and ongoing for a considerable period.

We consider this will cause a major impact on our ability to trade

Part 6 of the GREX

The new testing to verify whether a honey is Manuka, Manuka Blend or other honey will add a considerable burden to already high testing costs.

9. Do you foresee any other costs that will arise from the proposals contained in the draft GREX which are not contained in the table at 4.1.1? If so, how significant do you think these will be (e.g. administration costs such as time to fill in forms, and time to learn about the new requirements)?

The additional costs that will be incurred will include but not limited to the following:

- Additional field and office administration costs to produce accurate records.
- Extensive and expensive beekeeper training at the hive locations will need to be required to be able to use the new technology.
- Inevitably errors will be made that will result in additional extra administration and therefore an increase in costs.
- The smaller beekeeping entities that don't have the required skills to maintain the required records would need to employ added administrative staff with additional costs incurred.
- The laboratory testing of honey required if this new Manuka standard is implemented will add a greater financial burden to an already expensive operation for many export Markets.

No additional substances to be present in New Zealand honey

10. To ensure additional substances are not present in New Zealand honey, MPI proposes to prohibit the feeding of bees when honey supers are present on hives for the purpose of collecting honey, with an exception if it is necessary for the survival of the bees. Do you agree or disagree with this proposal?

☒ I agree because:

The team at s 9(2)(a) believe MPI's intention with this statement is to ensure the purity and integrity of New Zealand Honey is not open to question when entering overseas Market.

☒ I disagree because:

Unfortunately, our team also has good reasons to disagree with the way that this could be interpreted as giving directives that could interfere with standard beekeeping practices as this we disagree with any restrictive directives regarding standard beekeeping practice including but not limited to the following: • Beekeepers would have honey supers on hives when managing swarm control by simply giving the bees some space in the hive to help prevent swarming. s 9(2)(b)(ii) make the suggestion that clause 3.1 (2) be deleted from the GREX.

Please suggest any alternatives to this approach that would ensure additional sugars and synthetic chemicals are not present in the honey:

It is suggested that beekeepers declare in the Harvest Declaration that industry best practice has been adhered to. Simple definitions of what constitutes industry best beekeeping practices can be outlined in the Guidance box at the end of **PART 3: 3.1** Any bee feeding method referred to in clause 3.1(1)(a) should be a recommendation to adhere to industry best practice that will achieve a harvest outcome of pure unadulterated honey.

11. To prevent the contamination of honey with varroacide residues, MPI proposes honey is only harvested from honey supers that do not contain honeycomb previously part of a brood nest. Do you agree or disagree with this proposal?

☒ I agree because:

The s 9(2)(a) team agree that this needs addressing but would comment as in the following response.

☒ I disagree because:

The team think the approach being suggested does not align with current practices as beekeeping has some complex and varied methods of operation within the hive. We consider best practice outcomes should be encouraged rather than having undefinable prescriptive beekeeping methods written in to the GREX which would be impossible to audit for compliance.

Please suggest any alternatives to this approach that would ensure varroacide residues are not present in the honey.

We would prefer to see beekeepers to be using better infield skills and recording their steps of hive management in a location that external auditors can make part of their audits at extraction facilities i.e On the harvest dec.

Processors of bee products to operate under a risk based measure

12. MPI proposes that processors of bee products for export under the Food Hygiene Regulations must move to a risk-based measure (either an RMP under the Animal Products Act 1999, or Food Control Plan or National Programme under the Food Act 2014). Do you agree or disagree with this proposal?

☒ I agree because:

The reason we ensure traceability is to give the global market confidence in the product. NZ's RMP operators, prepare and maintain accurate auditable record-keeping systems in the workplace and are audited at a minimum six monthly intervals to ensure their professional approach is maintained. All bee products compliant for export must be processed and remain within an RMP system.

☐ I disagree because:

Please suggest any alternatives to this approach that would provide MPI with oversight of these processors:

Bee products to be sourced from listed beekeepers

13. MPI proposes to extend listing requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☒ I agree because:

All Beekeepers supplying bee products for export must be listed so they are known to the RMP operator and any regulatory/controlling body.

We do suggest that this listing incurs a once only registration fee, that would assist the smaller beekeepers to comply and not drive them underground.

☐ I disagree because:

Can you think of any alternatives to this approach that would address this gap in the traceability chain?

Recommendations from the industry as a whole have been voiced to push for the AFB Apiweb system to be completely overhauled and upgraded as its functionality is now outdated.

We suggest that during this process the apiary registration system is designed to accommodate a l the regulatory functions that MPI and Biosecurity may need to provide apiary registration and beekeeper information. This could also include, for example, locations of RMP premises, Honey houses and other storage facilities etc. This would also assist in the traceability chain.

Pre-processing traceability requirements

14. MPI proposes beekeepers keep additional records. Do you agree or disagree with this proposal?

☐ I agree because:

☒ I disagree because:

The amount of additional work required would make it unworkable for the majority of beekeepers and therefore lead to an unsatisfactory traceability outcome with some real issues of non-compliance.

Can you think of any alternatives to this approach that would address gaps in the traceability chain?

We don't consider our systems have any traceability issues and cannot see why any alternatives need to be offered.

15. The costs for businesses associated with implementing the proposed traceability requirements are likely to vary depending on their existing systems and processes. What impact do you think these proposals are likely to have on your business?

As we have had no traceability issues at any recall test during all quality audit since we developed and implemented a Apiary Management system through our Enterprise Resource Planner we do not expect any impact unless the individual hive approach is taken.

Traceability from beekeepers to operators – harvest declarations

16. MPI proposes to introduce harvest statement requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☒ I agree because:

As an industry we require a unified system that ensures the date and place of harvest is recorded by all beekeepers to comply with the Tutin standard and the equally important AFB pest management plan.

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

We can only add a request that the Harvest Dec be available in an electronic format for companies that have the ability to add this step into a fully electronic system of traceability.

17. MPI considers, for most businesses, the costs associated with these proposals are unlikely to be onerous. Do you agree or disagree and why?

☐ I agree because:

☒ I disagree because:

The requirements been suggested in the draft GREX are very onerous as focussing the traceability to each super would add huge compliance costs and not add any benefit to the traceability process.

Traceability between operators – transfer documentation in AP E-Cert and reconciliation

18. MPI proposes to introduce transfer documentation requirements to all bee products intended for export. Do you agree or disagree?

☒ I agree because:

Totally agree.

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

We have developed a fully integrated ERP system that with the exception of an electronic harvest dec can provide very high level traceability back to hive sites.

Labelling of monofloral and multifloral mānuka honey

19. MPI proposes to implement the mānuka honey definition for export using the GREX. Do you agree or disagree?

☒ I agree because:

We have required a unified Manuka Honey Standard for many years, it's a great step forwards.

☐ I disagree because:

Can you think of any alternatives to this approach that ensures mānuka honey is true to label?

No

20. MPI considers there are likely to be options available to businesses to support compliance with the proposed definition (e.g. relabelling, changes to blending practices etc.). Do you agree with this assessment or do you have concerns about ability of some businesses to comply?

☒ I agree because:

It will be welcomed and embraced by all parties

☐ I disagree because:

☐ I have concerns because:

21. MPI's proposal may have an impact on existing rights associated with using the word "mānuka" on labels, including registered trademarks. Do you agree with MPI's assessment of the impact on existing rights?

☒ I agree because:

We can see the long term benefits to us and the industry as a whole.

☐ I disagree because:

22. MPI does not propose to make changes to the current use of grading systems. Do you agree or disagree with this position?

☒ I agree because:

This is how the market evaluates and purchases Manuka Honey and we don't want to cause any confusion that could dilute its value.

☐ I disagree because:

23. What do you think the impact of the mānuka honey definition will be on the current use of grading systems?

Where we eventually draw the line between Manuka, Manuka blend and Other Honey's it will affect the $/kg that it can achieve in the market place.

It is critical that we get this right, the wrong call could send us either over production or short of stocks in certain levels Manuka Honey.

24. Do you have any comments on the summary science report?

We haven't had the resource to add any individual comments in this area but have had the ability to add weight to the APINZ focus group submission recently produced.

25. Do you have any further comments regarding the definition of mānuka honey?

Not at this stage.

Laboratory Tests

26. Do you support the proposed requirements for sampling and testing mānuka honey set out in Part 6 of the draft GREX?

☒ I agree because:

Total agreement

☐ I disagree because:

27. The costs associated with these proposals are likely to vary depending on the size and volume of samples being tested. What impact do you consider these proposals will have on your business?

As per section 8's response.

Do you have any suggestions for minimising any impacts?

Not at this stage.

Transitional provisions

28. MPI proposes a lead in time of **six weeks** between when the GREX is notified and when it comes into effect. Do you agree or disagree with this proposal?

☒ I agree because:

Once the world market is introduced to the new GREX it will expect the industry to ensure Manuka meets this standard, so we cannot afford to try and have an extended roll out.

☐ I disagree and propose an alternative timeframe:

29. MPI proposes stock in trade provisions for honey exported between the date of commencement until six months after the date of commencement. Do you agree or disagree with this proposal?

☒ I agree because:

We need to carry out any transitions in a timely manner and whilst we agree this may even be too long a time frame as per our answer to section 28.

☐ I disagree because:

Any other feedback

30. Are there any other parts of this discussion document or the draft GREX that you would like to provide feedback on? (Please indicate which part of the discussion document or draft GREX you are providing feedback on).

We would just like to add a general comment around the whole process, that this is once only attempt to put in place a Manuka definition that we as an industry and MPI can have a very high level of confidence in – have we got it right?????????

Submission to:

MPI manuka.honey@mpi.govt.nz

Title of discussion document:

"Proposed General Export Requirements for Bee Products"

Submission from: s 9(2)(a)

Contact details:

Introduction:

s 9(2)(a) has been operating as beekeepers, pollinators and extractors for 19 years. We have held an RMP since it became a requirement for honey exports to countries requiring official assurances – 2006.

The bee industry is about more than bee products. The impact of bees to the New Zealand economy is well documented however constantly underestimated. MPI have a role to play in both import and export to protect this industry and therefore should engage on a practical level with the wider industry to ensure practical regulation using quality science wherever possible. Inappropriate regulation will lead to a tarnishing of the "New Zealand" reputation for quality, safe and unique products.

Currently Official Assurances apply to 31.1% of our honey exports which presumably means that the other 68.9% are able to be exported using only the importing countries requirements (which can be updated as required by the importing country). Should we really be trying to be all things to all markets when clearly this is not essential. We live in a world where markets dictate requirements, not the exporting country. Yes, MPI should be proactive with other countries officials however not at the expense of ruining their own reputation and enforcing regulation where it is not adding value. The end aim is safe, authentic, high quality honey (of all floral types). All parts of the value chain must have sensible systems which add value to their product while meeting market requirements.

There are two parts to this submission.

Firstly, The Manuka Honey Definition

Secondly, The General Export requirements for Bee Products.

Manuka Honey Definition:

DNA testing of pollen is an excellent idea however having a Cq36 is a problem. This test is at the limit of measurement and creates too great a margin of error, creating a situation of uncertainty and debate plus the potential for importing countries to lose confidence in product and the MPI standard.

The CART modelling chosen by MPI scientists has its flaws, and by MPI's own admission – "Summary of MPI response to international peer review of the classification modelling methodology (CART) used to produce identification criteria for manuka honey" May 2017- 4.3.3 page 6 **- one non-manuka honey was classified as monofloral manuka** – can create totally incorrect classification.

This is at the very heart of what must be avoided.

This science is ground breaking for the honey industry and as such should be considered a start with further work required. There has been no account taken of the interaction aging, seasonal and regional variation will have on pollen or its interaction with Manuka activity.

For market acceptance of a standard there also needs to be a grading system, as currently MGO or UMF provide, and some means of ensuring mainly or wholly as per the codex. Perhaps leptosperin at 100mg/kg could be used. These measures should be classed as complimentary to the MPI proposed markers and DNA. This would make a more robust classification of Manuka so long as the proposed tests are validated and robust.

Before bringing in a standard both the industry and MPI must have confidence in one another which is not there yet. Markets need confidence that the standard is accurate, repeatable and has an extremely low margin of error to give assurance that product is genuine. More work is required and it would be great to see a more collaborative approach taken whereby industry and MPI work together to produce a meaningful standard for Manuka honey.

General Export Requirements for Bee Products

Part 3

3.1 Honey fit for Purpose:

Yes of course we agree that honey should be fit for purpose.

3.1 1a **Sugar feeding.**

Should a beekeeper feed sugar during the honey flow C4 sugars will be detected in the end product.

This clause should be removed.

3.1 1b **Brood Comb.**

Having regulation at the level of what frames can or can not be used adds no value. It would be impossible to ascertain and or audit this and for what gain. The market is now becoming discerning regarding microbial levels and residues of not just varroacides but an array of agrichemicals.

There is already a clause on the "Apiarist and Beekeeper Statement for the Harvest of Honey and other Bee Product for Human Consumption" which covers veterinary medicines and agricultural compounds. Clause "b".

There is no need for this clause it is already covered by the current Harvest Declaration.

3.1 1c **Free from Clinical signs of AFB**

Every beekeeper aims to have hives free from AFB

There is already a clause on the "Apiarist and Beekeeper Statement for the Harvest of Honey and other Bee Product for Human Consumption" which states "All apiaries are operated in compliance with the American Foul Brood Pest Management Strategy". Clause d.

The Pest Management Strategy states that when AFB is found everything is destroyed, with the exception of the boxes which may be specifically treated to eliminate AFB and hive tools which must be cleansed using specified cleansing agents.

Good practice is to check hives for AFB at each visit.

Further regulation is unnecessary.

3.2 Bee Products to be processed in premises operation under a risk-based measure.

3.2 1 Not all countries require official assurances in fact more than two thirds of honey exported do not go to countries requiring this. The importing countries set their own requirements independent of foreign government regulations.

This clause should be removed.

3.2 2 This is already the case and the reason that RMP's were introduced.

Part 4 Requirements relating to traceability

4.1 Pre-processing traceability requirements.

4.11 Currently the harvest declaration requires the number of honey supers, the beekeepers identifying code, the apiary registration number and the date of harvest to be stated. This enables traceability of the processed honey to an apiary site. The apiary registration has the global positioning location.

The requirement for individual honey supers to carry a unique identifying number, registration and recording to a site offers no value in traceability to MPI. Individual beekeepers may choose to do this for their own management, however to impose this as regulation would be extremely expensive and technically challenging to the industry, for no gain. Bees move honey around between boxes to suit themselves and it is the honey which is tracked not the box. A box is merely the vessel for carrying the honey. Tracking the individual box serves no purpose in traceability of the extracted, homogenised honey.

This clause should be removed as the current Harvest Document covers the requirement of tracing honey from the apiary site to the extraction facility.

Part 5 Labelling of monofloral and multifloral manuka honey.

It is sad to see that MPI are only interested in manuka. All NZ honey should be subject to the same labelling regulations and the definition of manuka has ye to be satisfactorily resolved.

Summary

We fully support the intention of MPI to achieve a manuka standard. At this point we can not support the standards implementation due to the questions around defining manuka honey. We believe that further work needs to be carried out to ensure a standard that is robust and gives the intended outcome of authentic manuka honey. When such a standard exists a further period of consultation is required. This is such an important issue for New Zealand's international reputation, MPI's reputation and the New Zealand beekeeping industry. MPI should not be taking the risk of getting this wrong

The GREX requirements regarding sugar feeding, brood comb and AFB management is poorly thought out and unnecessary. Markets will dictate the requirements of honey hygiene and C4 sugars therefore these clauses, 3.1.1; 3.1.2 should be removed

The requirement for all exports to come from RMP premises seems to relate more to ease of management for MPI than actual importing countries requirements and therefore clause 3.2 should be deleted from this document.

The question of traceability of honey supers shows a misunderstanding of the current regulations and the fact is the unit of measure in homogenised honey is the apiary site not a box containing moveable frames. Clause 4.1 should be removed from the document.

To ensure that the correct outcomes are achieved there should be a reviewing of the GREX with a new consultation period.

Your details

Your name and title:	s 9(2)(a)
Your organisation's name (if you are submitting on behalf of an organisation), and whether your submission represents the whole organisation or a section of it:	s 9(2)(a)
Your contact details (such as phone number, address, and email):	s 9(2)(a) s 9(2)(a)

General questions: getting to know you

1. What part of the supply chain do you operate in:

   ☐ beekeeper

   ☐ extractor

   ☒ processor

   ☒ packer

   ☒ exporter

   ☒ retailer of bee products

   ☐ other – please specify

2. How long have you been involved in the apiculture industry:

   ☐ 0-5 years

   ☐ 5-10 years

   ☒ 10 + years

   ☐ not applicable

3. Do you operate under:

   ☒ an RMP under the Animal Products Act 1999

   ☐ the Food Act 2014 (Food Control Plan or National Programme)

   ☐ the Food Hygiene Regulations

   ☐ none of these

   ☐ not applicable

4. If you are a beekeeper how many hives do you currently have:

   ☐ 0 – 5

   ☐ 6 – 50

   ☐ 51 – 500

   ☐ 501 – 1000

   ☐ 1001 to 3000

   ☐ More than 3000

5. What region of New Zealand do you operate in?

Katikati Bay of Plenty

6. If you export bee products please tell us a little about your business. How many people do you currently employ?

☐ 0

☐ 1 – 5

☒ 6 – 19

☐ 20 or more

What are the roles of your employees and how many are:

☐ beekeepers

☒ processors

☒ packers

☒ other – administration, financial

Impact of compliance costs for beekeepers, processors and exporters

7. Table 4.1.1 of the Discussion Document provides a summary of the estimated costs of the proposals. What do you think the overall impact of the new proposals will be on your business?

The extra estimated costs for testing which will need to be done per drum and per production batch will result is a necessary increase in wholesale pricing. With wholesale prices currently at a high international clients will not bear lightly even more of an increase. Especially when they will still be receiving the same honey as they do currently. We estimate the financial cost of extra testing to the proposed GREX to cost our business upward of s 9(2)(b) per annum. The time taken to receive the new testing results back from lab also hinders production time and will result in unproductivity and cost to our factory. The extra cost to re-labelling and the manufacture of new labels for ourselves and our clients will be in the hundreds of thousands. A transitional period will not eliminate these. Another extra cost to us will be MPI expenses in the extra time verification of edecs and health certs will take

8. In order to estimate the total cost to industry of the proposals contained in the draft GREX, it would be useful for MPI to understand how many beekeepers, operators and exports of bee products will be affected by the proposals. Please specify which of the proposals listed in the table at 4.1.1 will affect you and how.

We will be affected by: Clause 3.2 Part 4 and 7 Clause 5.1-5.3 Clause 5.4 Clause 5.6 Part 6

9. Do you foresee any other costs that will arise from the proposals contained in the draft GREX which are not contained in the table at 4.1.1? If so, how significant do you think these will be (e.g. administration costs such as time to fill in forms, and time to learn about the new requirements)?

The extra labour costs needed to be spent training and updating information for our admin and process staff is an unknown. Already many hours have been spent with meetings, travel and training. We estimate it to be approx. $4,000 already

No additional substances to be present in New Zealand honey

10. To ensure additional substances are not present in New Zealand honey, MPI proposes to prohibit the feeding of bees when honey supers are present on hives for the purpose of collecting honey, with an exception if it is necessary for the survival of the bees. Do you agree or disagree with this proposal?

☒ I agree because:

This is good practice. We do wonder how it is going to be monitored.?

☐ I disagree because:

Please suggest any alternatives to this approach that would ensure additional sugars and synthetic chemicals are not present in the honey:

11. To prevent the contamination of honey with varroacide residues, MPI proposes honey is only harvested from honey supers that do not contain honeycomb previously part of a brood nest. Do you agree or disagree with this proposal?

☒ I agree because:

☐ I disagree because:

Please suggest any alternatives to this approach that would ensure varroacide residues are not present in the honey.

Processors of bee products to operate under a risk based measure

12. MPI proposes that processors of bee products for export under the Food Hygiene Regulations must move to a risk-based measure (either an RMP under the Animal Products Act 1999, or Food Control Plan or National Programme under the Food Act 2014). Do you agree or disagree with this proposal?

☒ I agree because:

I believe all bee products , whether for export or domestic sale , should be processed under a risk- based measure
Much domestic sold honey items are taken overseas with travellers. These products should have the same process/premise assurances that exported products do

☐ I disagree because:

Please suggest any alternatives to this approach that would provide MPI with oversight of these processors:

All honey product processors/packers should comply with an RMP

Bee products to be sourced from listed beekeepers

13. MPI proposes to extend listing requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☒ I agree because:

See below

☐ I disagree because:

Can you think of any alternatives to this approach that would address this gap in the traceability chain?

Tricky one… What MPI have done thus far is make beekeepers register for approval. This is seen as just a revenue collect as no auditing etc is done. The beekeeper just completes his details on a bit of paper and then pays his $178 per annum. Bit of a joke really.

Pre-processing traceability requirements

14. MPI proposes beekeepers keep additional records. Do you agree or disagree with this proposal?

☒ I agree because:

The current records kept are very minimal. No reco d is made of where/what happens to honey boxes between removal from hive and arrival at RMP extraction facility. MPI should produce generic template that can be used by beekeepers

☐ I disagree because:

Can you think of any alternatives to this approach that would address gaps in the traceability chain?

15. The costs for businesses associated with implementing the proposed traceability requirements are likely to vary depending on their existing systems and processes. What impact do you think these proposals are likely to have on your business?

Traceability from beekeepers to operators – harvest declarations

16. MPI proposes to introduce harvest statement requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☒ I agree because:

Don't they already have this?
Harvest declarations

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

17. MPI considers, for most businesses, the costs associated with these proposals are unlikely to be onerous. Do you agree or disagree and why?

☐ I agree because:

☐ I disagree because:

Traceability between operators – transfer documentation in AP E-Cert and reconciliation

18. MPI proposes to introduce transfer documentation requirements to all bee products intended for export. Do you agree or disagree?

☒ I agree because:

Most of our international clients are wanting his and it is actualy something we do.

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

Labelling of monofloral and multifloral mānuka honey

19. MPI proposes to implement the mānuka honey definition for export using the GREX. Do you agree or disagree?

☐ I agree because:

☒ I disagree because:

What will happen to UMF/MGO markers? These are what are proven and trusted internationally.? Why have they been dropped from the definition? So far the science side of it has been a joke. There is no reliable testing It makes a joke of all the hard work done by umf and the apiculture industry so far. I have sent samples away to three different labs, some marker results have come back similar some have come back very different. I have even had a DNA test on a UM 22.3 come back as NO Manuka Detected from one lab and the same sample has tested as a monofloral in another lab. POLLEN determination, derived via DNA or via traditional pollen counts has NEVER at any time been part of, or considered, until now, as part of the definition in mānuka honey. There needs to be accepted peer reviewed science that splits mānuka and kanuka pollen before a mānuka pollen can be an acceptable part of any sound or robust definition There is currently no acceptable peer reviewed science available to determine the affect that the DHA/MGO component has on the pollen derived wholly or mainly from the mānuka (Leptospermum scoparium).

Can you think of any alternatives to this approach that ensures mānuka honey is true to label?

Testing all offshore packed Manuka Honey. This is where you will find most “fraudulent” labelling/packing occurs. Offshore packing does not have enough monitoring. MPI should spend/support more time and policing off shore.

20. MPI considers there are likely to be options available to businesses to support compliance with the proposed definition (e.g. relabelling, changes to blending practices etc.). Do you agree with this assessment or do you have concerns about ability of some businesses to comply?

☐ I agree because:

☐ I disagree because:

☒ I have concerns because:

I would like to know what the options are and if any financial support will be offered.

21. MPI's proposal may have an impact on existing rights associated with using the word "mānuka" on labels, including registered trademarks. Do you agree with MPI's assessment of the impact on existing rights?

☐ I agree because:

☐ I disagree because:

22. MPI does not propose to make changes to the current use of grading systems. Do you agree or disagree with this position?

☐ I agree because:

☐ I disagree because:

23. What do you think the impact of the mānuka honey definition will be on the current use of grading systems?

24. Do you have any comments on the summary science report?

25. Do you have any further comments regarding the definition of mānuka honey?

Laboratory Tests

26. Do you support the proposed requirements for sampling and testing mānuka honey set out in Part 6 of the draft GREX?

☐ I agree because:

☒ I disagree because:

27. The costs associated with these proposals are likely to vary depending on the size and volume of samples being tested. What impact do you consider these proposals will have on your business?

Apart from a huge financial impact the production time/process will be near on impossible. A production batch is bended then a sample taken and sent to lab for testing. The turnaround time for the results needs to be 48hours. We cannot have a production batch of honey sitting in a vat for up to a week/10 days waiting for results to come in

Do you have any suggestions for minimising any impacts?

Abort the proposal!!!!

Transitional provisions

28. MPI proposes a lead in time of **six weeks** between when the GREX is notified and when it comes into effect. Do you agree or disagree with this proposal?

☐ I agree because:

☒ I disagree and propose an alternative timeframe:

This lead time of six weeks is too short. Lead time should be a minimum of twelve weeks.

With the label printers being inundated with every new label the lead time on just getting design approved and then labels printed will be excessive of 6 weeks. We also need time to change all marketing material and educate overseas customers.

29. MPI proposes stock in trade provisions for honey exported between the date of commencement until six months after the date of commencement. Do you agree or disagree with this proposal?

☒ I agree because:

☐ I disagree because:

Any other feedback

30. Are there any other parts of this discussion document or the draft GREX that you would like to provide feedback on? (Please indicate which part of the discussion document or draft GREX you are providing feedback on).

All we can ask of MPI is to PLEASE LISTEN TO THE INDUSTRY.

Proposed General Export Requirements for Bee Products

From s 9(2)(a)

Director, s 9(2)(a)

This submission represents the whole of s 9(2)(a)

s 9(2)(a)

Beekeepers and extractors (to the point of bulk drums), retailers of finished goods honey to the domestic market (honey bottled by an independent RMP operator).

10 years in apiculture.

Operate under a RMP.

400 hives located in the Wairarapa.

Employ two people presently; beekeepers.

Section	Question	Submission
4.1.1	7	The overall impact will be a monetary one. Testing costs will increase four-fold. The Verifier audit(s) after the implementation of the GREX will take longer both from an extended compliance perspective and the fact that it will be the first time they've audited under the new rules and therefore more expensive.
4.1.1	8	Clauses 3.2 and 3.3 – no impact as already operate under a RMP. Par 4 – will affect us as it will increase administration. Clauses 5.1-5.3 – will affect us unless the transition period is extended. Relabelling thousands of jars would be prohibitively expensive to an operation the size of ours.
4.1.1	9	The table shows that only packers/exporters will be affected by lab test costs; beekeepers will also be impacted as they, as now, have to get their honey tested to understand its bulk market value.
3.1	10	Disagree. The only difference between this proposed change and today is that the beekeeper will need to document their feeding regime. It will not address any issues of C4 sugar in honey.
3.1	11	Disagree. Honey supers need to be 'baited' to draw bees into the super. These bait frames come from the brood box. Removing the ability to use brood bait frames will impact honey volumes. Also, bees move honey around so there is nothing to stop them moving brood box honey into the honey supers. What evidence does MPI have that varroacides present in honey actually came from brood frames? Is it more likely that beekeepers in areas where manuka flowers early, i.e. at the same time as the spring apex of varroa, have varroa treatments

		in the hive at the same time as the honey supers being present? An alternative could be to have a withholding period from removal of the varroa treatments to the adding of supers to hives.
3.2	12	Agree. There is no point in end to end traceability, etc if there are some operators that are not included. Downside for these people will be the cost of moving to a RMP.
3.3	13	Agree. I believe this should be extended to all beekeepers who provide honey for the export and domestic markets. Beekeepers don't always know who they will be selling their honey to. The discussion document states that the ability to share beekeeper info (i.e. that submitted to the AFBPMP) is out of the scope of the GREX. This needs revisiting as beekeepers are being charged twice for the same information and all because it's in the too hard basket. MPI needs to justify how it can charge $178.25 per annum for holding the name address and contact details of beekeepers. Making all beekeepers that provide exportable honey pay this fee prov des MPI with an estimated $380k per annum (and that assumes that the 65% of beekeepers with fewer than five hives do not supply export). That's a big cost for information already held by another government department and is simply not acceptable.
4.1	14	I disagree mostly on the basis that it's a lot of work at an already busy time of year. One part of the record keeping is already performed; GPS coordinates are in the APIWEB system therefore should not need to be transposed to another recording system. The dates of honey harvested are on the Harvest Declaration forms, but we have no way of determining the *volume* of honey from a super. And why does MPI need to know this as it serves no purpose in the correction of the defined problem? We do know that it generally takes 15-20 full depth boxes to fill a 300kg drum.
4.1	15	The impact is that we will have to manually number thousands of supers as well as have the additional workload of more paperwork at an already busy time of year. Not sure I even see the point considering it's the frames within the supers that are important, not the boxes themselves. During the extraction process, frames taken from super A are highly unlikely to end up back in super A. Something that Verifiers need to be aware of if this goes ahead; there will be gaps in numbering as honey supers get used to make new hives or replace old brood boxes.
4.2	16	Agree. We have always done Harvest Declarations even though we didn't need to simply to use the one process. I disagree with the proposed requirement of using the beekeepers listing number as part of the unique identifier. The listing number is already recorded on the form so what's the point in using it again? We use the unique Harvest Declaration number (a sequential numbering system assigned by ourselves) throughout all our documentation for traceability; adding the

		beekeeper's number just further adds to the administrative burden and provides no value. PS 4.2 (6) c) should refer to para b not a.
4.2	17	Agree that the costs will be low.
4.3 and 4.4	18	Agree. All or nothing approach is required.
Part 5	19	Agree.
Part 5	20	Disagree. The transition period of six months for existing stock is too short for a long shelf-life product.
Part 5	21	Organisations that use 'manuka' as part of their name/trade mark have an unfair advantage as it is and will continue to do so regardless of the GREX changes.
Part 5	22	Agree.
Part 5	23	They will obviously have to change significantly and will be a nightmare for the consumer to understand. Presumably the level of phenyllactic acid will be the grader as all the others are largely yes/no i.e. it has one part per million or it doesn't.
Part 5	24	No
Part 5	25	No
Part 6	26	No. Beekeepers should be responsible for testing their own honey. As previously stated, all honey coming through our extraction facility will be identified as 'honey' only as it may not even get tested. So this may be a moot point as there is no requirement to test unless it has a manuka label. The sampling requirements seem to be particularly onerous; do you really believe that honey samples are going to be tampered with en route to the lab? And why send to the lab 'as soon as possible'? Extraction takes weeks to work through (approx 8-10) so what you're suggesting means multiple packages being sent to the lab – both costly and time consuming. What purpose does recording dates sent to lab/results received serve?
Part 6	27	Testing costs will be four times what they are today.
8.2	28	Disagree. Too short, propose 12 weeks.
8.2	29	No. Six months is too short a period for a long shelf-life product. It will be prohibitively expensive for us to re-label thousands of jars of honey. Propose 12 months for the export market and 18 months for the domestic market as the pressure is coming from overseas not the domestic market.
-	30	See below.
5.4	N/A	We move honey from our premises to whoever buys it/bottles it via the AP E-cert system. We may or may not know what type of honey it is at that point depending on whether it's been tested. Therefore we will just have to call it 'honey' at that stage.
5.5	N/A	At whose cost?
5.6	N/A	Honey is put into drums and tested at a later date therefore all we know at that point is that it's 'honey'. So the Verifier will be checking manuka tests against 'honey', unless the GREX expects us to update drum labels post-testing?

s 9(2)(a)

[Not relevant to request]

Ministry for Primary Industries
Food Assurance Team
P.o. Box 2526
Wellington 6140
manuka.honey@mpi.govt.nz

19 May, 2017

To Whom It May Concern,

SUBMISSION ON
PROPOSED GENERAL EXPORT REQUIREMENTS FOR BEE PRODUCTS

NAME OF SUBMITTERS:	s 9(2)(a)
SUBMITTING ORGANISATION	
CONTACT DETAILS	

1.0 RESPONSES TO GENERAL QUESTIONS

s 9(2)(a) is a privately owned company, based in s 9(2)(a) which provides independent analytical testing services to a wide range of clients. s 9(2)(a) has been providing a wide range of accredited honey tests for approximately 4 years, and undertakes the majority of honey testing in New Zealand at present. s 9(2)(a), and is also an s 9(2)(a) for the purpose of testing honey for tutin.

- s 9(2)(a) has been given Limited Approval by MPI to conduct testing for chemical markers which are proposed to be included under the definition of mānuka honey.
- s 9(2)(a) is also in the final stages of attaining IANZ accreditation for the Manuka chemical and DNA markers.

s 9(2)(a) has no other interest in other sectors of the NZ apiculture industry. This submission is made from the perspective of the provision of analytical testing services, and interactions with the industry related to provision of these services.

s 9(2)(a) operates from a single location in Hamilton, but services clients from all regions of NZ. We also receive samples from international clients, through the MPI Transitional Facility permit we hold.

2.0 LABELLING OF MONOFLORAL AND MULTIFLORAL MANUKA HONEY (Section 4.5 of MPI Discussion Paper No: 2017/11)

Problem Definition

2.1 We agree with the value of having a clear definition of monofloral and multifloral mānuka honey, and support the intention of this proposed GREX.

2.2 We note that MPI have proposed that DHA and MGO are not proposed to be used for the definition of mānuka honey, due to the fact that they change over time, and can be artificially added to honey. We do not agree with the former statement, as we believe that although they change over time, minimum levels could be set to assure the mono-floral nature of Manuka honey. The reaction rates of MGO and DNA during the maturation of Manuka honey are well characterised and can be used to accurately predict the shelf-life of Manuka honey. However, possible adulteration is an issue and unless a test can be developed to identify adulteration or auditable traceability of imported MGO and DHA can give assurance that the chemicals are not added to honey, MGO and DHA may not be appropriate at this stage.

2.3 MPI have noted that DHA and MGO are also found in other related honey types. We are unaware of examples of other pure floral varieties of NZ honey that contain DHA and MGO, nor are we aware of plants, other than *leptospermum sp.*, whose nectar contains DHA. Evidence of this is not provided in the documents made publically available by MPI, nor is there further explanation of the other honey types that MPI know to contain these chemical markers. Since Manuka is plant a commonly found throughout New Zealand, it is not surprising that there will be some MGO and DNA, derived from Manuka, found in low concentrations in other floral type honeys. However, we do agree that if a proposed chemical marker is found in other related honey types at appreciable levels, this raises doubt about its value for use in the definition of Manuka honey.

2.4 MPI have noted that leptosperin is not unique to Manuka, so cannot be used alone to provide the level of confidence needed for regulatory purposes. s 9(2)(a) undertakes testing of honey for leptosperin as part of the s 9(2)(a) requirements under its grading system. It is our understanding from s 9(2)(a) research, and other international research, that leptosperin is very useful as a chemical marker for mānuka honey both because it is found uniquely in *Leptospermum* plants (allowing honey to be distinguished from *Kunzea*), and because it occurs in concentrations which allow for robust analytical testing to be undertaken.

Our submission on this matter is that MPI's definition of mānuka honey will be strengthened through the inclusion of leptosperin, or replacing 3-phenyllactic acid with leptosperin, both because of its value for distinguishing Leptospermum-derived honey, as well as the ability for laboratories to test for it inexpensively and robustly. Because of leptosperin's uniqueness to Manuka honey, blending of Manuka honey with non-manuka honeys will be easily identified by a decrease in concentration on leptosperin to below acceptable levels. This is not the case with 3-PLA which is found in high levels in Kanuka honey.

2.5 We are aware of other chemical markers that are useful for classifying mānuka honey, which MPI have not chosen to use in the proposed definition. These have arisen from prior work undertaken by others in NZ or internationally, such as the s 9(2)(a) An example is lepteridine, which is another compound found in mānuka that lends itself well to robust and inexpensive analysis by laboratories and offers value for this purpose.

Our submission is that the chemical marker panel used for classifying mānuka honey would be strengthened by inclusion of other markers in place of some of the existing proposed chemical markers.

Grading Systems

2.6 We note that MPI have stated that it does not propose any changes in the GREX in relation to the use of grading systems. We agree with this, and feel comfortable that the analytical testing which underpins grading systems such as UMF, Molan Gold, and labelling of honey with its MG concentration can continue to exist in addition to the requirements of the GREX.

Proposal

2.7 MPI has proposed testing for 5 attributes in support of labelling of mānuka honey. s 9(2)(a) has been undertaking testing of all 5 attributes since the proposed standards were released in April 2017 and wishes to provide information arising from that, and make comment on the methods being used for testing from our experience as experienced laboratory managers and operators.

Chemical Markers

2.8 Four of the attributes included in MPI's proposed definition are chemical markers, and we agree that chemical markers are very good things to use to classify mānuka honey. If there is a demonstrated connection between chemical compounds found uniquely in mānuka nectar and also found to be present and stable in mānuka honey, they are arguably the most powerful means of identifying honey that has been made from mānuka nectar.

2.9 For information, please see the following table which contains a summary of the concentrations of the 4 proposed chemical markers found by s 9(2)(a) in samples tested over April-early May 2017. Over 2000 samples are included in these results. It should be noted that this set of data will not be representative of the entire NZ honey crop, because people will have been most interested in submitting honey they regarded as containing mānuka.

	Range covering 90% of results [1]	**Median result**	**Maximum seen so far**
3-PLA	260 – 1110 mg/kg	664 mg/kg	1550 mg/kg
2-MAP	2 – 26 mg/kg	10 mg/kg	41 mg/kg
2-MBA	2 – 14 mg/kg	6 mg/kg	50 mg/kg
4-HPLA	2 – 9 mg/kg	6 mg/kg	17 mg/kg

[1] This range represents the values from the 5th to the 95th percentile of results observed.

The implication of the results contained in this table is that the vast majority of samples tested had concentrations of the chemical markers that were above the minimum levels specified by MPI.

2.10 In the Problem Definition section of Section 4.5 of MPI Discussion Paper No: 2017/11 MPI noted that some chemical markers (DHA, MG, leptosperin) were not considered suitable for inclusion in the definition of Manuka honey because they were:

- Unstable
- Found in other related honey types/not unique to mānuka
- Can be artificially added to honey

In the following paragraphs, we offer comment on the 4 chemical markers that are proposed by MPI for use in the definition of Manuka honey against these criteria, as well as our experience with them in a high throughput testing environment.

2.11 In general, testing for the proposed chemical markers has operated well in a high throughput environment. The test method itself is proving to be robust. There are continued opportunities for innovation to be applied to both testing procedure as well as quality control in the methods, and we recommend that MPI encourages recognized laboratories to pursue ongoing improvement in how they undertake testing (without compromising on result quality) to improve speed and cost of testing for the industry.

2.12 s 9(2)(a) has undertaken a long-term stability study of Manuka honeys stored at 20 °C and 27 °C, and at specified times, taken subsamples that were tested for dihydroxyacetone (DHA), methylglyoxal (MGO), and hydroxymethylfurfural (HMF), and then frozen at -80 °C. The stability study has been in operation for over two years. On the 7th of June 2017, aliquots of 7 representative samples from the frozen retained sub-samples were tested for MPI Chemical markers using the MPI reference methods. Leptosperin was also tested. A full summary of the findings, and raw data, of this stability study is found in Appendix 1. We make comment on a number of factors, including stability of the compounds. A marker is judged to be stable if there is no statistically significant slope in concentration against age, or if there is, the magnitude of change does not exceed 5% per annum.

2.13 3-phenyllactic acid (3-PLA):

- Stability – s 9(2)(b)(ii) stability study shows that 3-PLA is stable at both temperatures studied (Figure 1 & 2). Statistical analysis showed:
    - At 20 °C, an F-test on regression of concentration against age showed the slope was not significantly different from zero ($F(1,28)=0.131$, $P=0.72$), and is therefore stable.
    - At 27 °C, an F-test showed the slope was significantly different from zero, ($F(1,37)=6.75$, $P=0.01$), though the concentration change was only +1.6% per annum.
    - We consider this marker is stable with time and temperature, and is therefore fit for purpose.
- Uniqueness – 3 PLA is not unique to mānuka honey. It is found in significant quantities in kanuka nectar and kanuka honey, and trace levels in several other floral types. As such there is very real potential for kanuka honey to be blended with non-manuka or multifloral manuka honey, and produce a blended batch which conforms to the MPI definition. s 9(2)(b)(ii) has developed a honey blending model which shows that non-manuka honeys can be blended to produce mono-floral Manuka honey with relative ease. (The blending model can be provided to MPI on request).
  Artificially added – it is our understanding that 3-PLA is available for purchase as a commercial chemical ingredient. 120 g of 3-PLA would be required to fortify a 300 kg drum of honey, which is financially feasible.
- Uncertainly of measurement: 3-PLA is of relatively high concentration in Manuka and Kanuka honey, such that the uncertainty of measurement is acceptable (*ca.* ±10% and ±5%) at the critical cut off values of 20 and 400 mg/kg.

2.14 2-methoxybenzoic acid (2-MBA),

- Stability – s 9(2)(b)(ii) stability study shows that 2-MBA is not stable (Figure 1 & 2). Statistical analysis showed:

- At 20 °C, an F-test on regression of concentration against age showed the slope was significantly different from zero, F(1,28)=39.6, P<1x10^{-5}, and that the concentration change was +5.9% per annum.
- At 27 °C, an F-test showed the slope was significantly different from zero (F(1,37)=78.8, P<1x10^{-5}), and that the concentration change was +9.7% per annum.
- We do not consider this marker is stable with time or temperature, and is therefore not fit for purpose.

The continual increase in 2-MBA concentration over time suggests that it is a product of a chemical reaction. For example, "stores" of 2-MBA may be present in manuka honey as a glycoside, which is slowly hydrolysed throughout time. Such adducts are common in manuka honey, typified by compounds such as leptosperin. Depending on the age of the honey, it could initially fail the chemical marker test, and then subsequently pass the test after storage. s 9(2)(b)(ii) is unaware of any data published by MPI showing the effects of storage during the normal shelf-life of Manuka honey.

- Uniqueness – 2-MBA is not unique to Manuka honey, though it is found in this honey in significantly elevated concentrations.
- Artificially added – it is our understanding that 2-MBA is available for purchase as a commercial chemical ingredient. Only 0.3 g of 2-MBA would be required to fortify a 300 kg drum of honey.
- Uncertainly of measurement: 2-MBA is in significantly lower concentrations in Manuka honey than 3-PLA. The uncertainty of measurement is ± 25% at the critical cut off value of 1.0 mg/kg which means that 95% of the time, a repeat test could return a value between 0.75 to 1.25 mg/kg. This means that there is a 50/50 chance that a repeat test result could pass or fail the classification.
- We have concern that due to test variability having the cut-off values the same as the Limit of Quantification of the test would result in a high miss-classification rate when concentrations of this analyte is within the uncertainty range of 0.75 to 1.25 mg/kg.

2.15 4-hydroxyphenyllactic acid (4-HPLA)

- Stability – s 9(2)(b)(ii) stability study shows that 4-HPLA is relatively stable at 20 °C and 27 °C after about 810 days of storage. Statistical analysis showed:
  - At 20°C, an F-test on regression of concentration against age showed the slope was not significantly different from zero (F[1,28]=1.46, P=0.23),
  - At 27°C, the slope was shown to be significantly different from zero (F[1,37]=19.5, P=8.5x10^{-5}), and that the concentration change was +4.5% per annum.
  - We consider this marker is stable with time and temperature, and is therefore fit for purpose.
- Uniqueness – 4-HPLA is not unique to mānuka nectar and honey, sharing the same properties as 3-phenyllactic acid.
- Artificially added – it is our understanding that 4-HPLA is available for purchase as a commercial chemical ingredient and could be used to adulterate honey. Only 0.3 g of 4-HPLA would be required to fortify a 300 kg drum of honey.
- Uncertainly of measurement: 4-HPLA is of low concentration (median 6 mg/kg) in Manuka honey. The inter-laboratory uncertainty of measurement is ± 20% at the critical cut off values 1.0 mg/kg which means that 95% of the time, a repeat test could return a value between 0.8 to 1.20 mg/kg. This means that there is a 50/50 chance that a repeat test result could pass or fail the classification. We have concern that the cut-off value is the same as the Limit of Quantification of the test.

2.16 2-methoxyacetophenone (2-MAP),

- Stability – s 9(2)(b)(ii) stability study shows that 2-MAP surprisingly shows consistently significant instability at both 20°C and 27°C after relatively short periods. This is a major concern. Using such an unstable chemical marker as one of the chemical classifiers will cause a significant number of Manuka honeys to fail the classification within 6 months of storage. Statistical analysis showed that:
  - At 20 °C, an F-test on regression of concentration against age showed the slope was significantly different from zero, $F(1,28)=22.0$, $P=6.5x10^{-5}$, and the concentration decreased by 17% per annum.
  - At 27 °C, the slope was also significantly different from zero ($F(1,37)=37.0$ $P=2.x10^{-6}$), and the concentration decreased by 12% per annum.
  - This marker is not stable with time or temperature, and is therefore not fit for purpose. s 9(2)(b)(ii) recommendation is that 2-MAP is removed or replaced as a Manuka chemical marker.
- Uniqueness – 2-MAP is unique to mānuka nectar and honey.
- Artificially added – it is our understanding that 2-MAP is available for purchase as a commercial chemical ingredient and could be used to adulterate honey. Only 0.3 g of 4-HPLA would be required to fortify a 300 kg drum of honey.
- Uncertainly of measurement: 2-MAP is in significantly lower concentrations in Manuka honey than 3-PLA. The uncertainty of measurement is ± 20% at the critical cut off value of 1.0 mg/kg which means that 95% of the time, a repeat test could return a value between 0.8 to 1.20 mg/kg. This means that there is a 50/50 chance that a repeat test result could pass or fail the classification. We have concern that the cut-off values is the same as the Limit of Quantification of the test and the inherent variability of the test would result in a high miss-classification rate when concentrations of this analyte is within the uncertainty range of 0.8 to 1.20 mg/kg. We have concern that the cut-off value is the same as the Limit of Quantification of the test.

2.17 Leptosperin:

- Stability – s 9(2)(b)(ii) stability study shows that Leptosperin is relatively stable at 20 °C and 27 °C. After about 340 days of storage it decreased on average by 3% and 8%, respectively. The average decline is about 5% after 810 days at 20 °C and 7% at 27 °C (Figure 1 & 2). Statistical analysis showed:
  - At 20 °C, an F-test on regression of concentration against age showed the slope was significantly different from zero, $F(1,28)=54.3$, $P<1x10^{-5}$, but that the magnitude of the change was only -4.4% per annum.
  - At 27 °C, the slope was also different from zero ($F(1,37)=19.3$, $P=9.1x10^{-5}$), but the change was only -4.3% per annum.
  - We consider this marker is stable with time and temperature, and is therefore fit for purpose.
- Uniqueness – International peer reviewed studies have shown that Leptosperin is unique to Manuka nectar and Manuka honey. MPI reported trace amount of leptosperin in kanuka nectar. However, in Manuka honey, leptosperin is concentrations orders of magnitude higher than in Kanuka nectar. The contribution of Kanuka nectar-derived leptosperin would have minimal effect of miss-classifying Manuka honey. This is not the case with 3-PLA where it is found in significant, and almost equal, concentration in Kanuka and Manuka nectar.
- Artificially added – Leptosperin is a relatively complex molecule to synthesize economically on a commercial scale. Because of its uniqueness to Manuka honey, and high

concentration (hundreds to thousands of mg/kg) it is a good chemical to use as marker for Manuka honey. These two attributes will make it difficult to blend low grade honeys to produce mono-floral Manuka, as can easily be done when 3-PLA is used as a chemical marker. s 9(2)(b)(ii) recommendation is to incorporate Leptosperin as one of the Manuka chemical markers.

- Uncertainly of measurement - Leptosperin is in relatively high concentration in Manuka honey such that the uncertainty of measurement (±5%) is acceptable at the critical cut off value of 100 mg/kg.

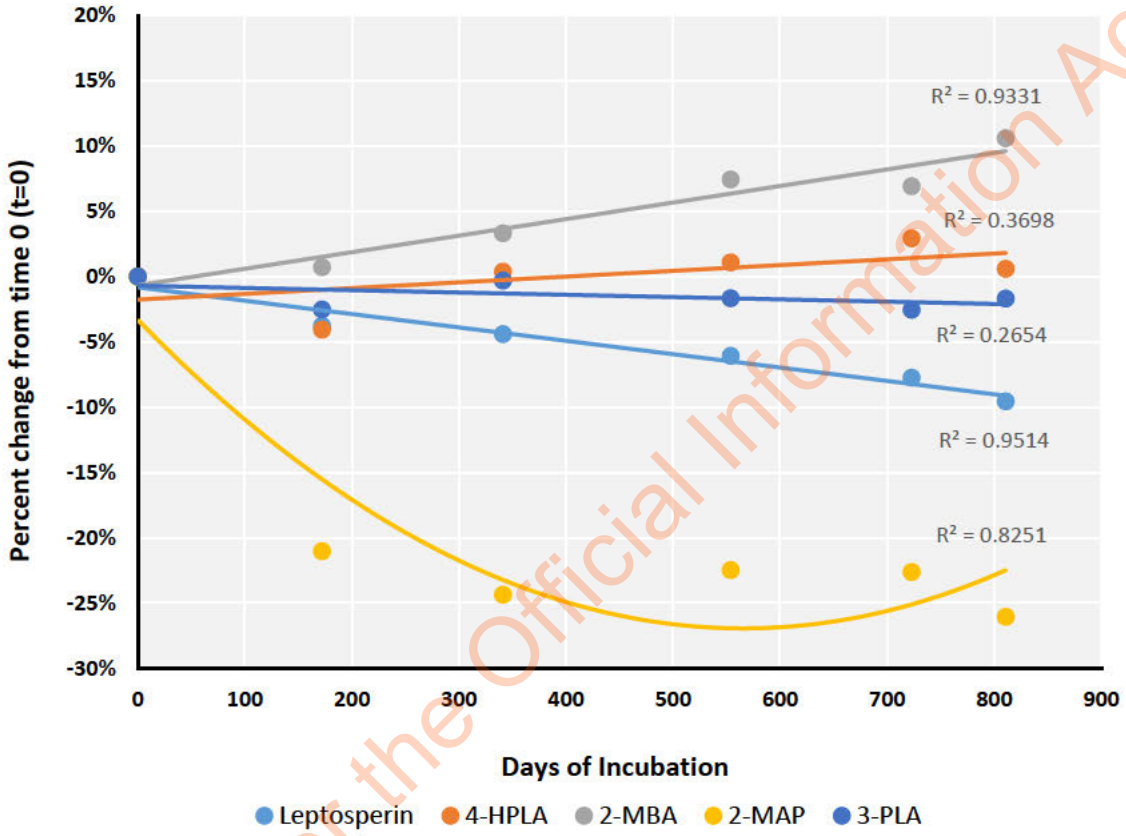

Figure 1. Average changes in concentration of 7 honey sample, relative to time zero, for Leptosperin, 4-HPLA, 2-MBA, 2-MAP, and 3-PLA during incubation at 20 °C.

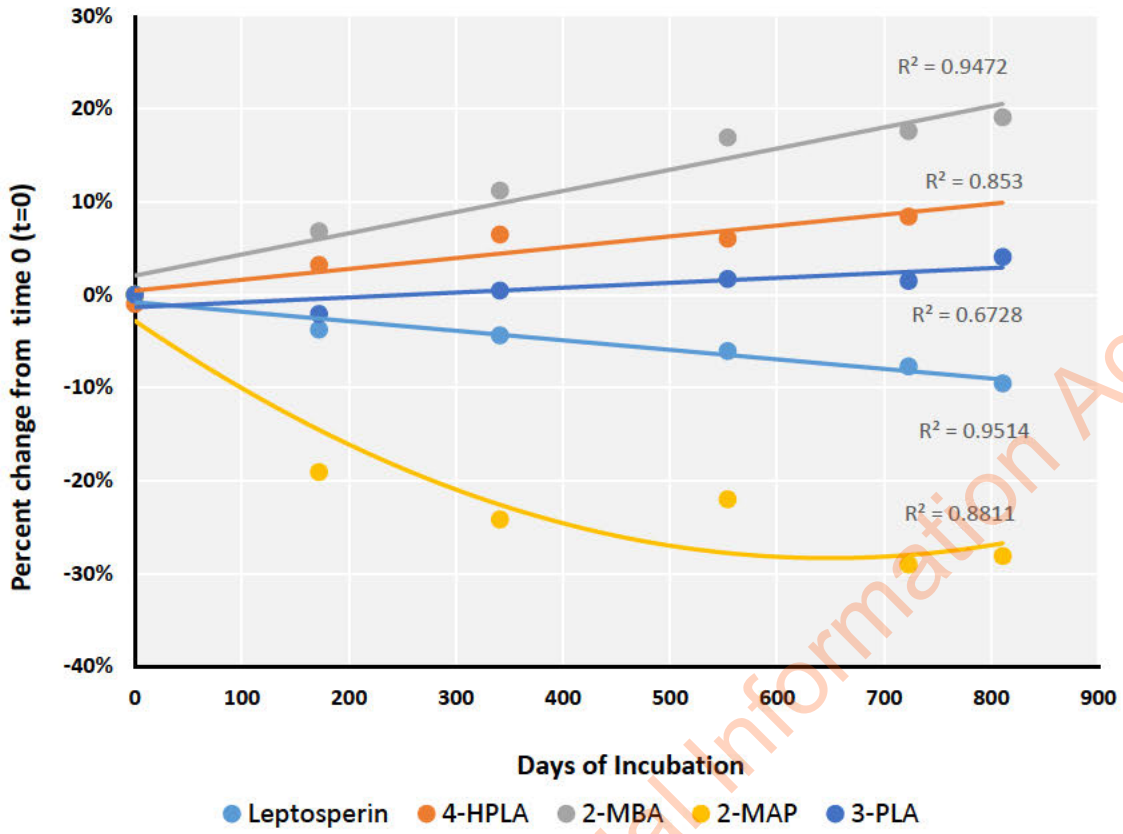

Figure 2. Average changes in concentration of 7 honey samples, relative to time zero, for Leptosperin, 4-HPLA, 2-MBA, 2-MAP, and 3-PLA during incubation at 27 °C.

2.18 By way of an overall conclusion related to the chemical markers, as a laboratory we can perform robust analysis of honey for the 4 proposed chemical markers included in the mānuka definition. However, due to the way the assays were designed, and that the thresholds are set at the limits of quantification, there is a significant risk that honeys with borderline Manuka characteristics would incorrectly fail the test. For a multivariate classification scheme the errors are multiplicative, and so for five analytes with an uncertainty of measurement of ±20%, the chance of a borderline honey passing is equivalent to 0.8^5, or as little as 33%. This risk could be mitigated by adjusting the working range of the assays, or decreasing the number of analytes used.

Additionally, the fact that 3-PLA is abundant in Kanuka honey presents a significant opportunity for non-Manuka honey to be blended with Manuka honey to create batches of honey which meet this aspect of the Manuka honey definition. Our shelf-life studies, for up to 810 days storage at 20 °C and 27 °C clearly show that 2-MAP and 2-MBA are too unstable to be reliably used as Manuka markers. In fact, our trials show they are less stable than leptosperin, which MPI has explicitly said is not sufficiently stable to be of value. The logical conclusion is to use 3-PLA and leptosperin as chemical markers for the classification of Manuka honey. However, although this would classify honeys, it would not avoid the issue of blending Kanuka honey with multi-floral Manuka honey to produce a mono-floral Manuka honey, because 3-PLA is found in Kanuka honey. s 9(2)(b)(ii) s 9(2)(b)(ii) has shown that Manuka honey can be adequately classified using leptosperin alone using the MPI data set. We submit to MPI that it seriously considers using Leptosperin as a key Manuka classifier.

DNA Pollen

2.19 s 9(2)(b)(ii) does not have MPI Limited Recognition to perform DNA testing required for the proposed mānuka definition. However, we have performed a large number of tests for clients as an unapproved laboratory. While our test results are not approved by MPI at this stage, we can provide a substantial set of QC information (including MPI ILCP sample results) that will support our ability to offer a credible view on the laboratory performance of this test. In addition, the laboratory, and chemical and DNA pollen tests, were successfully audited by IANZ for ISO 17025 accreditation. We are waiting for the official accreditation documentation to be issued. We have full confidence in the data we have produced.

2.20 While testing thousands of predominantly Manuka honey samples for bee keepers and honey producers from throughout the country, and representative of honeys collected from multiple seasons and thus honeys of wide ranging maturity, we have made observations about the affective ness of the test. The expectation was that the higher the grade of Manuka honey, based on the industry's traditional classification using Non-peroxide Activity (NPA), the less chance that Manuka honey would fail the DNA test. As test results emerged, it became obviously apparent that some high-quality Manuka honeys were surprisingly failing the MPI Manuka pollen DNA test. The degree of this failure is shown in Figure 3, where the percent frequency of honeys were classified according to the MPI chemical and DNA test criteria, showed a bell-shaped curve relative to increasing levels of NPA. This graph represents 1,136 test results that passed the MPI chemical market test and that were also tested for MGO, DHA, and HMF. Twenty-two percent of honeys with NPA levels ≥ 10 were wrongly classified as "Other" honey, particularly those of high NPA (thus MGO) levels. A correct classification should see the Manuka category reaching, and staying at 100%, rather than declining at higher NPA levels.

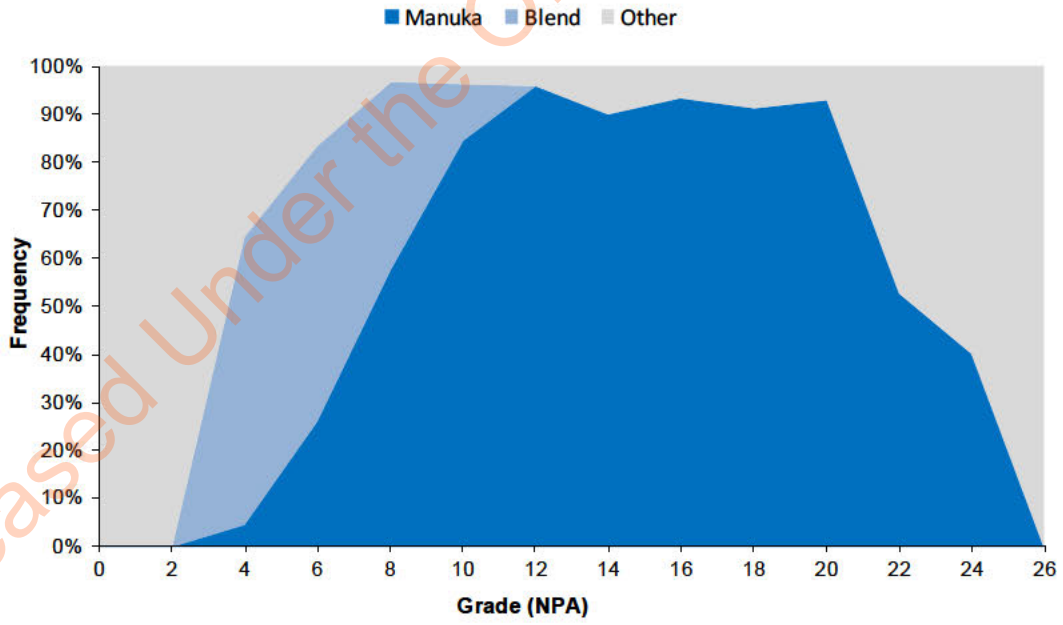

Figure 3. The percent frequency of samples that were classified according to the MPI chemical and DNA criteria, as mono-floral Manuka (Manuka), multi-floral Manuka (Blend), and non-Manuka (Other) honey; relative to increasing levels of NPA (= UMF grade).

s 9(2)(b)(ii) has also observed that there is an association between DNA results for honey, and other common characteristics of mānuka honey, which are counter-intuitive. In particular, we have observed that:

- An increasing concentration of MGO in honey is strongly associated with an increasing Cq result (and concomitant decrease in measureable DNA concentration) for that honey using the MPI mānuka DNA test (Figure 4).
- A similar association exists with HMF (Figure 5). MGO and HMF tend to be positively correlated, especially in honey with a high concentration of MGO, since their levels increase during the maturation of honey. This maturation is time and temperature dependent.
- There have been a number of examples of honey with MG concentration above 600 mg/kg that have produced a Cq result >36 in the MPI mānuka DNA test, and as a consequence have been classified as non-Manuka. In all these situations, results for the other 4 chemical marker attributes have been strong, and consistent with honey containing a large amount of mānuka nectar. Similar results have been provided by clients whose tests have been performed by s 9(2)(b)(ii) This observation cannot be attribu ed to a laboratory performance affect.

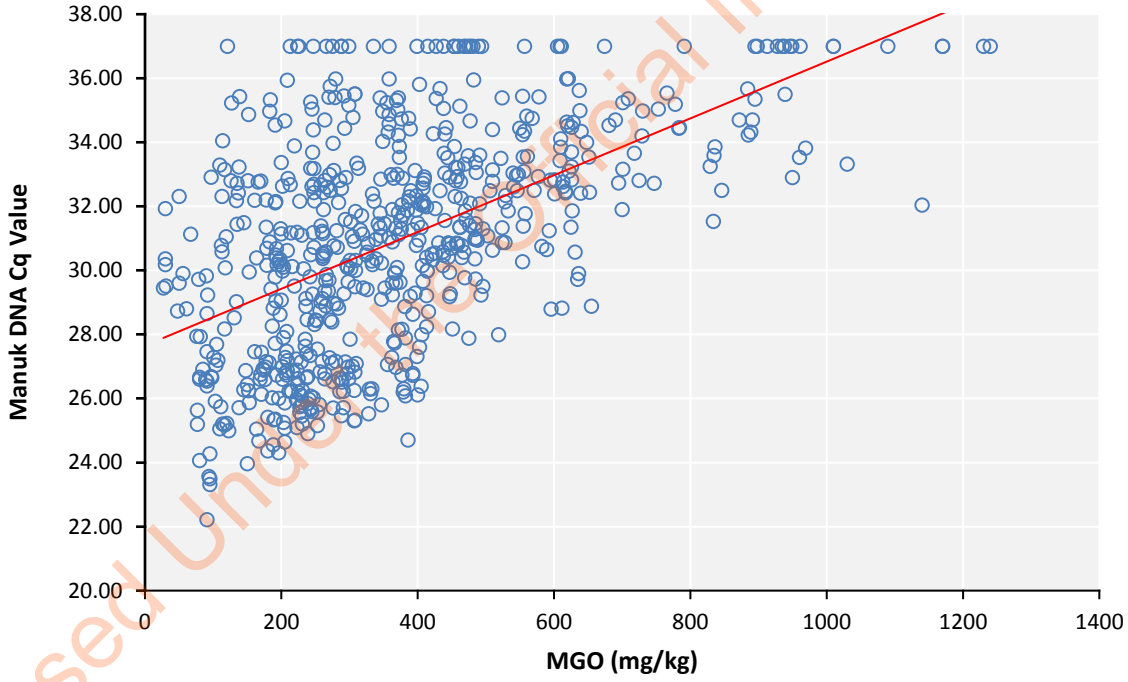

Figure 4. Relationship between DNA Cq values and MGO concentration, for honeys that pass the MPI chemical marker tests. The fit slope is statistically significant (F[1,655]=274, P<1x10^{-6}), and suggests that MGO may be affecting the pollen DNA measureable by the MPI PCR test.

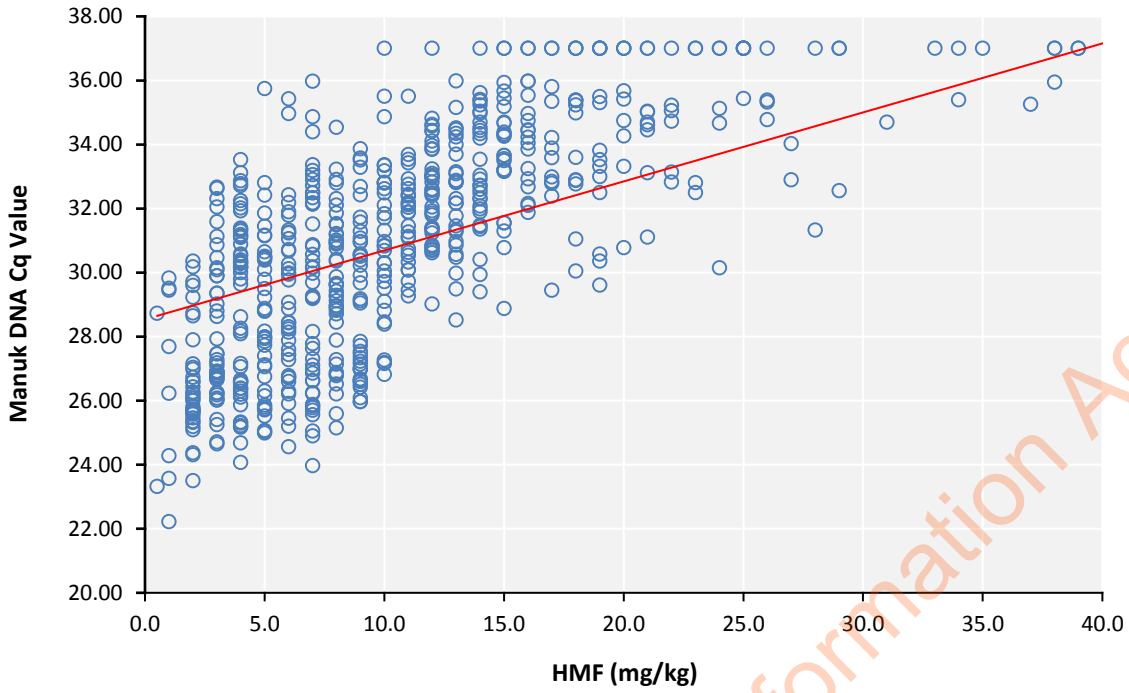

Figure 5. Relationship between DNA Cq values and HMF concentration, for honeys that pass the MPI chemical marker tests, suggesting that HMF may be affecting the pollen DNA measureable by the MPI PCR test. The fit slope is statistically significant ($F[1,655]=387$, $P<1x10^{-6}$).

2.21 We reviewed scientific literature and discovered that there are existing publications that link MGO with damage to or interference with DNA and/or protein. Examples can be found at the following links:

- 1
  Nucleic Acids Res. 2001 Aug 15; 29(16): 3433–3438.
  Methylglyoxal, an endogenous aldehyde, crosslinks DNA polymerase and the substrate DNA
  Naoko Murata-Kamiya and Hiroyuki Kamiya
- 2
  BMB Rep. 2013 Apr 46(4): 225–229.
  Oxidative damage of DNA induced by the reaction of methylglyoxal with lysine in the presence of ferritin
  Sung Ho An and Jung Hoon Kang
- 3
  Science. 1988 Apr 29;240(4852):640-2.
  Toxic DNA damage by hydrogen peroxide through the Fenton reaction in vivo and in vitro.
  Imlay JA1, Chin SM, Linn S.
- 4
  Food Research International. Available online 4 June 2017. In Press,
  Unique fluorescence and high-molecular weight characteristics of protein isolates from manuka honey (Leptospermum scoparium), Jana Rückriemen, Christoph Hohmann, Michael Hellwig, Thomas Henle

2.22 To investigate a hypothesis that MGO and/or HMF affects the results of the MPI mānuka DNA test we tested samples from the long-term stability study of Manuka honeys stored at 20 °C and 27 °C. On the 7th of June 2017, aliquots of 7 representative samples from the frozen retained sub-samples that were tested for MPI Chemical markers were also tested for Pollen DNA using the MPI reference method (these were performed after the successful IANZ audit). A full summary of the findings, and raw data, of this DNA stability study is found in Appendix 2.

The results dramatically show that in all 7 samples, Cq values for Manuka DNA, Internal Control DNA, and Kanuka DNA, increased (and Manuka DNA concentrations expressed and fg/uL, decreased) throughout the incubation period, to the point that many of the sample's Cq values became greater than the cut off value of what is considered as not Manuka honey according to the MPI classification criteria. A typical example of this change in DNA during the incubation period is pictorialized in figure 6 for 20°C and figure 7 for 27°C. Since the Cq values are log scale, to better emphasise the significance of the effect, the Cq values were converted to DNA concentration (fg/uL) and replotted (Figure 8) for the 20°C incubation. The concentration of DNA, in this example, had halved within 6 months of storage, and further diminished to 0.13% of the original concentration after 2.4 years of storage. This order of magnitude was observed in all the samples tested, and was more dramatic in samples incubated at the higher temperature (see Appendix 2).

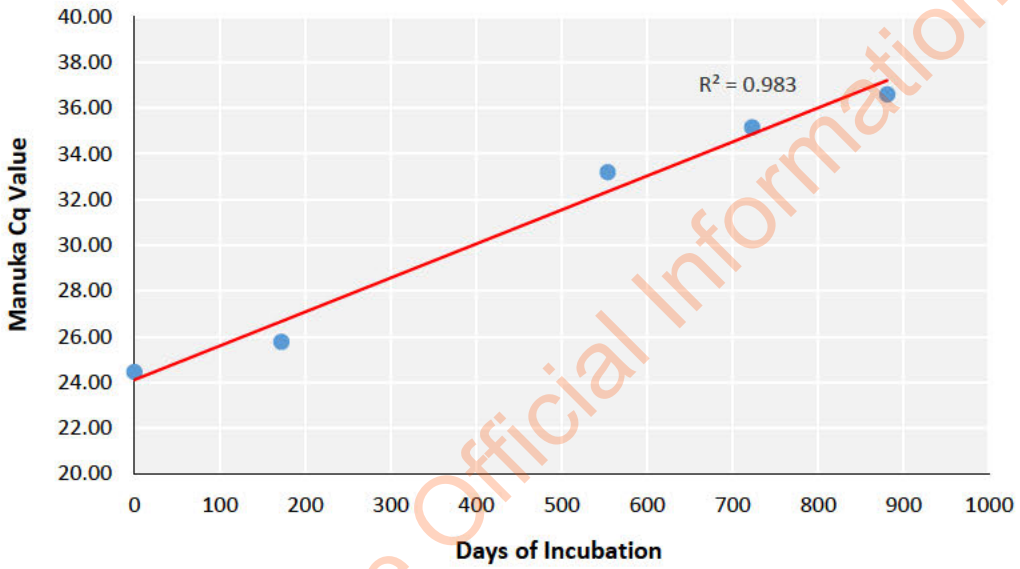

Figure 6. The increase in Manuka Cq values during the incubation of honey at 20°C for up to 810 days (example sample 141051-3). The fit was statistically significant ($F[1,3]=173$, $P=0.0009$).

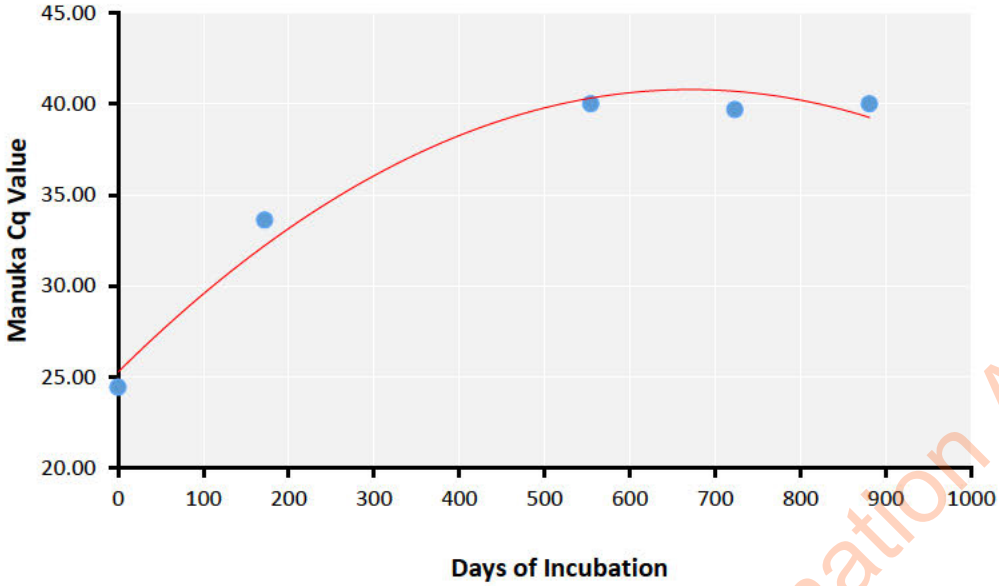

Figure 7. The increase in Manuka Cq values during the incubation of honey at 27°C for up to 810 days (example sample 141051-3).

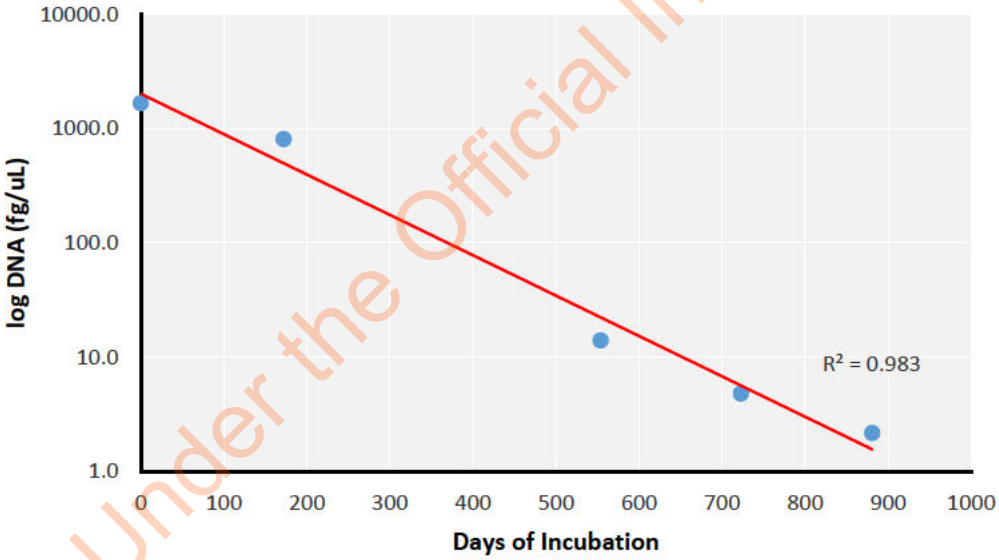

Figure 8. The decrease in Manuka DNA concentration (fg/uL) during the incubation of honey at 20°C for up to 810 days (example sample 141051-3). The slope of the fit is statistically significant (F[1,3]=173, P=0.0009).

Further investigation of the data shows that there is a strong positive relationship between MGO (Figure 9) and HMF (Figure 10) concentration, and Manuka Cq value. This effect is seen with Kanuka DNA and Internal Control DNA in all samples incubated at 20°C and 27°C (see Appendix 2).

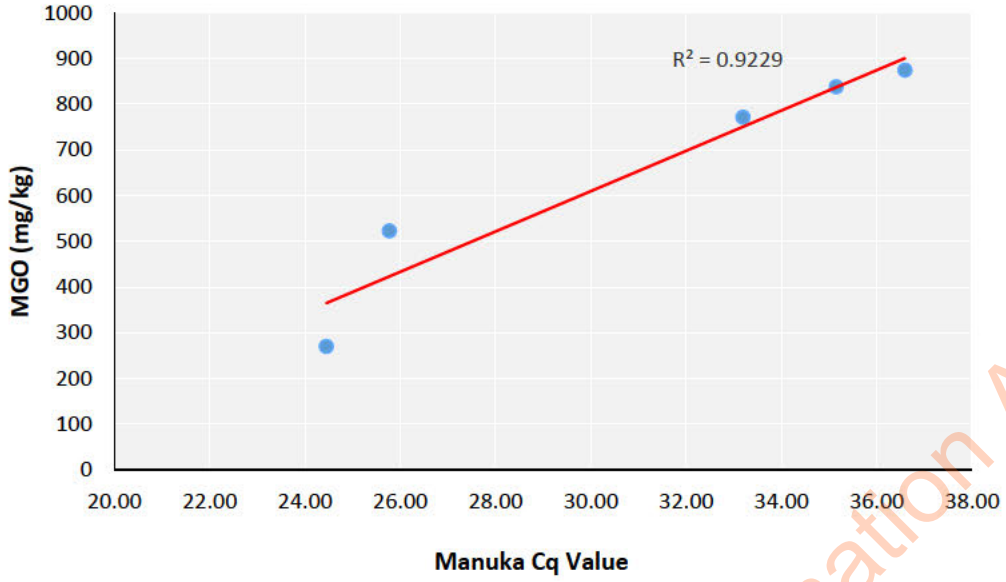

Figure 9. The relationship between MGO concentration (mg/kg) and Manuka Pollen DNA level (Cq) for honey stored at 20°C for up to 810 days (example sample 141051-3). The slope of the fit is statistically significant (F[1,3]=35.9, P=0.009)

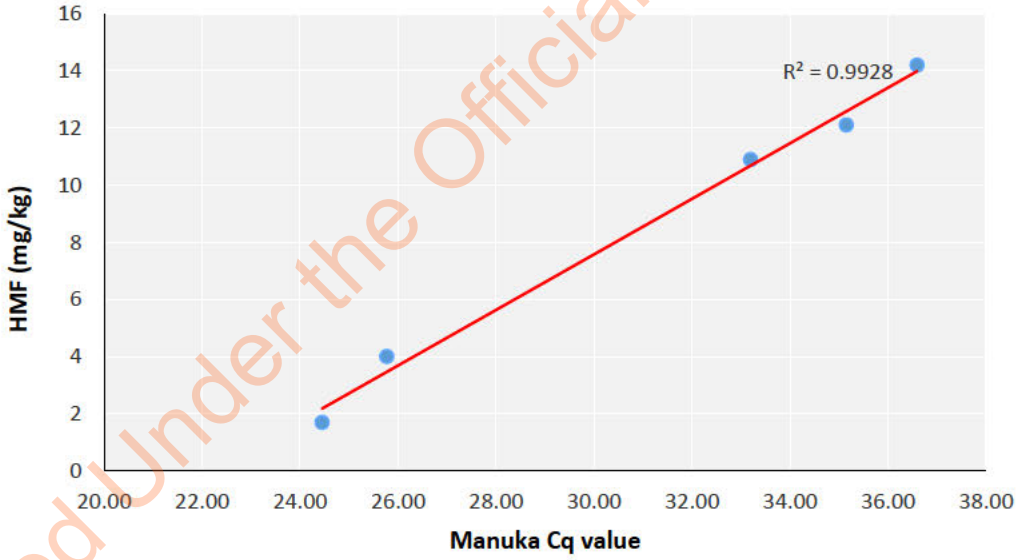

Figure 10. The relationship between HMF concentration (mg/kg) and Manuka Pollen DNA level (Cq) for honey stored at 20°C for up to 810 days (example sample 141051-3). The slope of the fit is statistically significant (F[1,3]=415, P=0.0003).

To investigate further the hypothesis that MGO affects the results of the MPI mānuka DNA test, an incubation experiment was performed where five honeys and washed pollen from the same samples, with a low Cq results for Manuka DNA and low levels of MGO (these were classified at multi-floral Manuka honeys by the MPI criteria), were incubated with 2 concentrations of MGO and DHA. The washed pollen was incubated for 12 hours and 27°C (Figure 11), while the honey solution was incubated at the same temperature for 36 hours (Figure 12). After the incubation

periods, the pollen was separated from the incubation solution, washed with the Pol buffer specified in the DNA test protocol, then the DNA extracted and analysed according to the MPI DNA test protocol. The methodology and full experimental results of this experiment are provided in Appendix 3.

These results of this experiment demonstrate that the MPI Manuka DNA test measured less mānuka DNA in washed pollen and honey after incubation with both concentrations of MGO, compared to a control samples containing no added MGO. This strongly implies that DNA is being negatively affected by MGO, which is well known to be a chemical compound found naturally, and abundantly, and like HMF, a highly reactive aldehyde, in Manuka honey.

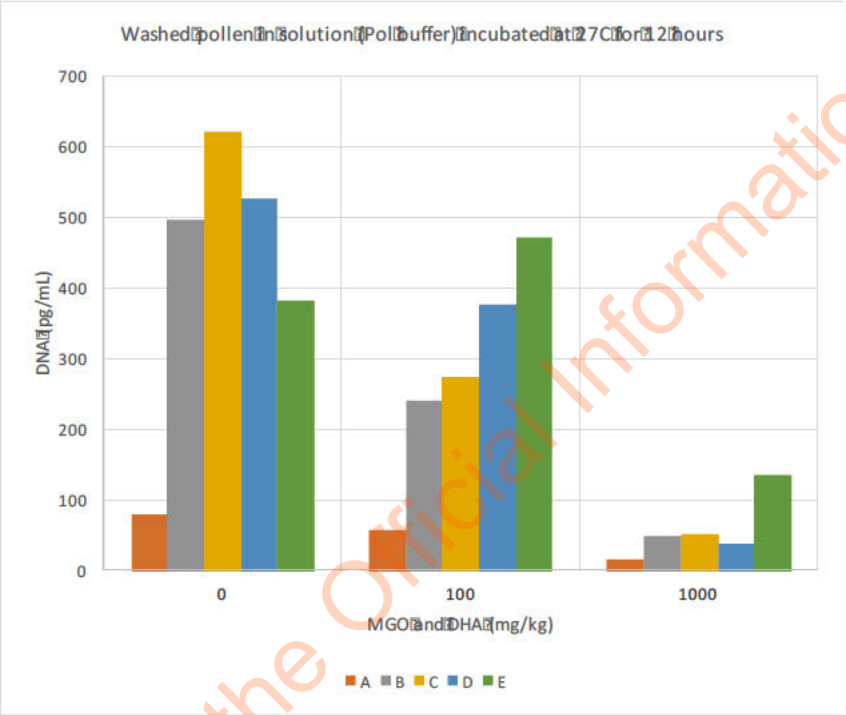

Figure 11. Concentration of Manuka DNA in washed honey pollen that was re-suspended in Pol buffer and incubated for 12 hours at 27°C, A to E represent the 5 samples incubated with 0, 100 and 1,000 mg/kg MGO and DHA.

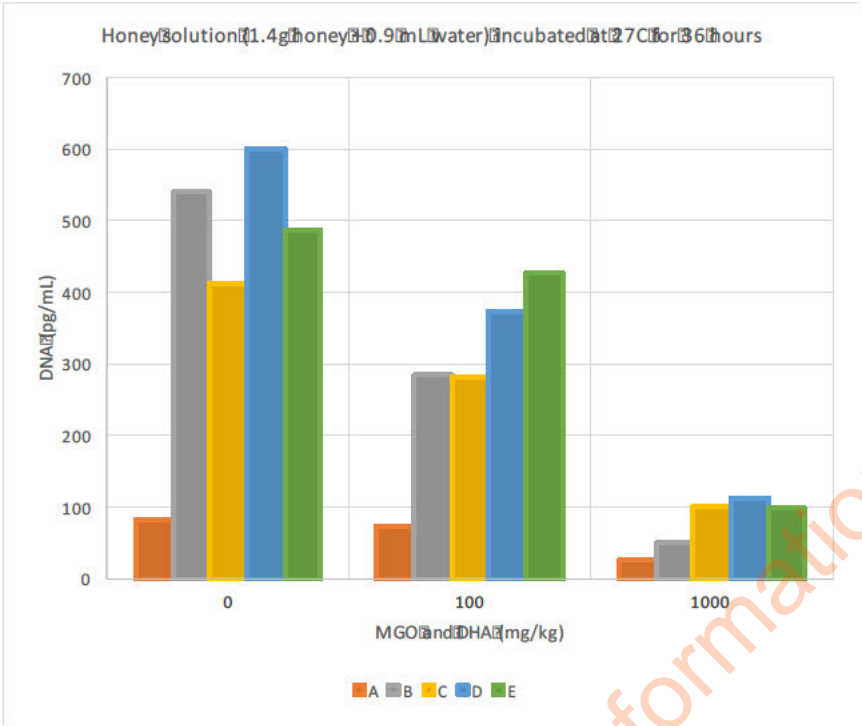

Figure 12. Concentration of Manuka DNA pollen recovered from a 1:1 solution of honey and water incubated for 36 hours at 27°C, A to E represent the 5 samples incubated with 0, 100 and 1,000 mg/kg MGO and DHA.

2.23 In summary,

1. our observation is that many high-quality Manuka honeys fail the DNA test,
2. that there is a strong negative correlation between MGO and HMF concentrations and DNA concentrations in Manuka honeys derived from commercial sources,
3. our extensive shelf-life study of the stability of pollen DNA stored at 20°C and 27°C for 2.4 years showing categorically that measureable pollen DNA decreased over time to levels of less than 1 percent of their pre-storage levels to the point that honeys ultimately fail the MPI pollen DNA criteria,
4. that there is a very strong correlation between MGO and HMF with DNA Cq values during storage at temperatures commonly experienced during commercial process and storage, and
5. incubating washed pollen and honeys solutions with synthetic MGO and DHA under controlled conditions, showing dramatic reductions in measureable DNA concentrations,

leads us to conclude, and submit to MPI that, the MPI pollen DNA test, in its current form, is grossly unsuitable as a component of MPI's manuka definition. The consequence of persisting with including the current pollen DNA test will be that good quality Manuka honey that pass the DNA test prior to export would likely fail the DNA, possibly within 6-month, when retested in overseas markets. This would have serious implications for the New Zealand honey industry and the integrity of New Zealand.

2.24 MGO, a highly reactive aldehyde, has been implicated in the phenomenon observed in the C4 Sugar test (AOAC 998.12) where honey containing high concentrations of MGO commonly return results which exceed the 7% threshold specified as indicating C4 sugar adulteration. Published

research suggests that MGO reacts with honey protein that is used as an internal standard in the C4 sugar test and elevates the calculated C4 sugar result. This is a source of great cost and frustration to members of the NZ honey industry. Perhaps there is a common link between the effects of MGO on honey protein and DNA. Possible mechanisms for MGO and HMF interfering with the DNA test could be by direct binding of MGO with nucleic acids, that construct the DNA, and/or MGO-Protein-DNA linkages. The evidence presented in this submission that identifies significant effect of MGO, and possibly HMF, on DNA viability, strongly suggests further investigation of possible mechanisms is warranted, and that quick fixes without comprehensive validation, may not solve the problem.

2.25 Uncertainly of measurement – The Manuka DNA test has a cutoff of a Cq value of 36. This happens to at about the limit of detection of the method, and below the limit of quantification. Therefore, there is an inherent uncertainty at this level. The accepted uncertainty by MPI is ± 5% Cq. This equates to a range in Cq from 34.2 to 37.8. A retest for a sample that returns a Cq of 36, could produce a value within this range 95% of the time, with a 50/50 chance of the retest either passing or failing the cutoff value. With such a high uncertainty at this level (and keeping in mind this is on a log scale), significant financial loss to the customer would result from such a highly inaccurate assessment of the Manuka pollen DNA content at such low concentrations. It would seem prudent, at least, to revise the reporting of the Cq values that are greater than 34.2 and less than 36. Perhaps a statement on the report "that because of the high level of uncertainty of the test, your sample may not comply with the MPI requirements on a retest" is included. Similarly, another statement explaining the reverse would be required for honeys that return a Cq value between 36 and 37.8. Although, I struggle with the latter statement since anything greater than 36 is below detection limit.

There has been some discussion that to avoid inter-laboratory variation in reporting Cq values, that DNA should be reported as concentrations (e.g. pg/mL) which would account for any variation in instrument sensitivities in different laboratories. The counter argument has been put forward that it is expensive to run a standard curve with each batch of samples. However, this could easily be solved by negotiating a reasonable price for the reagents and standards used. The method would be more robust if standards were routinely used.

3.0 LABORATORY TESTS (Section 4.6 of MPI Discussion Paper No: 2017/11)

3.1 We agree that robust processes need to be in place for laboratory testing of honey in support of the requirements of the GREX, and that the MPI Recognised Laboratory Programme in addition to ISO 17025 accreditation is an essential framework to use for this.

3.2 The sampling requirements of the proposed GREX are high trust. Samples are not required to be provided to laboratories in sealed containers with final packaging and labelling in place. As a consequence, laboratories will only ever be able to test samples 'as received' in generic sample containers, and will not be in a position to verify that final packaging of the submitted sample was consistent with the sample identification provided by the submitter.

This does create a greater risk that honey being submitted for testing can differ from honey that is exported on the basis of the test results arising from that testing than if finished packs of sample are submitted, with an obligation for the laboratory to confirm that the sample ID and the submitted sample match each other.

However, given manufacturing practices in common use, it would greatly increase testing costs to require this, and we full accept that MPI needs to find the right balance in this.

4.0 CONCLUDING COMMENTS

4.0 s 9(2)(b)(ii) is proud of the role we play in supporting the growth and development of the NZ honey industry. We look forward to the opportunity to continue with this in future, both as an MPI Recognised Laboratory as well as an ISO 17025 accredited laboratory for the broad scope of tests required by honey producers and processors.

4.1 We strongly support MPI's initiative to strengthen the definition of mānuka honey, and for a component of this to be based on robust laboratory testing using stable markers.

4.2 Chemical marker testing is an approach we believe has strong merit. We have offered a view that current proposed MPI chemical markers are able to be tested for robustly in the laboratory, but there is risk they will not support MPI's wider intentions due to the low thresholds in place for 3 of the markers, the instability of two of these, and the fact that 3-PLA is found in abundance in kanuka honey. There are other candidate chemical markers, such as leptosperin and lepteridine, that have been discovered by NZ and overseas researchers which offer good potential for inclusion, or replacement of unstable chemicals, in the final definition.

4.3 We believe that the proposed mānuka DNA test should not be included in the final definition, due to negative effects of naturally occurring chemicals found in mānuka honey on the test. Comments made by clients, and results of testing numerous samples, and our own experiment covered in this submission, lead us to hypothesise that the results of mānuka DNA testing are being adversely affected by MGO and/or HMF.

Yours sincerely,

s 9(2)(b)(ii)

s 9(2)(b)(ii)

Appendix 1

Raw Data: Honey incubated for up to 810 days at 20°C and tested for MPI chemicals and Leptosperin

				Concentrations						Percent change from Day 0				
Job	Sample	Day	Temp	Leptosperin (mg/kg)	4-HPLA (mg/kg)	2-MBA (mg/kg)	2-MAP (mg/kg)	3-PLA (mg/kg)		Leptosperin	4-HPLA	2-MBA	2-MAP	3-PLA
141051	2	0	20	357	5.97	6 88	16 9	786		0%	0%	0%	0%	0%
141051	2	172	20	355	6.4	7 05	13.1	807		-1%	7%	2%	-22%	3%
141051	2	341	20	345	6.45	6 9	12.6	803		-3%	8%	0%	-25%	2%
141051	2	554	20	331	6.33	7 29	13.4	758		-7%	6%	6%	-21%	-4%
141051	2	723	20	320	6.55	7.19	14	750		-10%	10%	5%	-17%	-5%
141051	2	811	20	316	6.24	7 58	12 8	760		-11%	5%	10%	-24%	-3%
141051	3	0	20	610	10.1	7.1	27.6	1210		0%	0%	0%	0%	0%
141051	3	172	20	594	9.45	7 25	20 9	1160		-3%	-6%	2%	-2 %	-4%
141051	3	341	20	562	9.29	7 35	21.4	1120		-8%	-8%	4%	22%	-7%
141051	3	554	20	575	10.1	8 56	21 2	1180		-6%	0%	2 %	-23%	-2%
141051	3	723	20	566	10.3	7 81	21.7	1170		-7%	2%	10%	-21%	-3%
141051	3	811	20	555	9.96	7.71	20 3	1160		-9%	-1%	9%	-26%	-4%
141051	4	0	20	232	5.24	2 87	13.7	579		0%	0%	0%	0%	0%
141051	4	172	20	229	5	2 85	11.15	565		-1%	-5%	-1%	-19%	-2%
141051	4	341	20	217	5.25	2.805	10 8	579		-6%	0%	-2%	-21%	0%
141051	4	554	20	218	5.03	3	10.6	580		-6%	-4%	5%	-23%	0%
141051	4	723	20	215	5.39	3.16	11.1	569		-7%	3%	10%	-19%	-2%
141051	4	811	20	208	5.13	3 27	10 5	580		-10%	-2%	14%	-23%	0%
141051	5	0	20	335	6.43	2 02	9.31	566		0%	0%	0%	0%	0%
141051	5	172	20	289	5.73	1 94	6.9	507		-14%	-11%	-4%	-26%	###
141051	5	341	20	315	6.15	2 27	6.7	596		-6%	-4%	12%	-28%	5%
141051	5	554	20	304	6.29	2 26	7 55	583		-9%	-2%	12%	-19%	3%
141051	5	723	20	298	6.09	2.19	7.76	578		-11%	-5%	8%	-17%	2%
141051	5	811	20	287	6.45	2 39	7.46	581		-14%	0%	18%	-20%	3%
141051	10	0	20	561	7.51	4.48	8.32	571		0%	0%	0%	0%	0%
141051	10	172	20	539	7. 6	4 52	6.16	572		-4%	-5%	1%	-26%	0%
141051	10	341	20	540	7 7	4.42	5.45	560		-4%	3%	-1%	-34%	-2%
141051	10	554	20	521	7.32	4.72	5.28	554		-7%	-3%	5%	-37%	-3%
141051	10	723	20	504	7.31	4.64	4.39	541		-10%	-3%	4%	-47%	-5%
141051	10	811	20	503	7.64	4.78	4.61	550		-10%	2%	7%	-45%	-4%
141051	11	0	20	325	5.66	2 35	5.88	528		0%	0%	0%	0%	0%
141051	11	172	20	311	5.15	2.45	4.11	510		-4%	-9%	4%	-30%	-3%
141051	11	341	20	314	5.9	2.6	3.58	527		-3%	4%	11%	-39%	0%
141051	11	54	20	302	6.24	2.44	3.8	498		-7%	10%	4%	-35%	-6%
141051	11	723	20	299	6.45	2.63	3.7	501		-8%	14%	12%	-37%	-5%
141051	11	811	20	288	5.72	2.74	3.29	510		-11%	1%	17%	-44%	-3%
142107	3	0	20	718	6.97	7 39	12 3	794		0%	0%	0%	0%	0%
142107	3	130	20	722	7.15	7.76	10 8	794		1%	3%	5%	-12%	0%
42107	3	299	20	713	6.9	7 8	9.5	795		-1%	-1%	6%	-23%	0%
142107	3	554	20	669	7.17	7 93	6.27	799		-7%	3%	7%	-49%	1%
142107	3	723	20	658	7.1	8 38	2.58	782		-8%	2%	13%	-79%	-2%
142107	3	839	20	654	6.74	8.62	1.67	792		-9%	-3%	17%	-86%	0%
										Leptosperin	4-HPLA	2-MBA	2-MAP	3-PLA
									0	0%	0%	0%	0%	0%
									172	-4%	-4%	1%	-21%	-3%
								Average	341	-4%	0%	3%	-24%	0%
									554	-6%	1%	7%	-22%	-2%
									723	-8%	3%	7%	-23%	-3%
									811	-10%	1%	11%	-26%	-2%

Note: data for sample 142107-3 was not included in the averaged data because the days of storage were different to the other samples.

Raw Data: Honey incubated for up to 810 days at 27°C and tested for MPI chemicals and Leptosperin.

				Concentrations						Percent change from Day 0				
Job	Sample	Day	Temp	Leptosperin (mg/kg)	4-HPLA (mg/kg)	2-MBA (mg/kg)	2-MAP (mg/kg)	3-PLA (mg/kg)		Leptosperin	4-HPLA	2-MBA	2-MAP	3-PLA
141051	2	0	27	357	5.97	6.88	16.9	786		0%	0%	0%	0%	0%
141051	2	172	27	329	5.85	7.4	13.3	780		-8%	-2%	8%	-21%	-1%
141051	2	341	27	323	6.39	7.43	12	767		-10%	7%	8%	-29%	-2%
141051	2	554	27	319	6.13	7.73	13.9	779		-11%	3%	12%	-18%	-1%
141051	2	723	27	310	6.43	7.7	12.6	760		-13%	8%	12%	-25%	-3%
141051	3	0	27	610	10.1	7.1	27.6	1210		0%	0%	0%	0%	0%
141051	3	172	27	555	9.2	7.15	21.65	1130		-9%	-9%	1%	-22%	-7%
141051	3	341	27	552	10.05	8.1	19.4	1160		-10%	0%	14%	-30%	-4%
141051	3	554	27	546	10.6	8.65	21.2	1190		-10%	5%	22%	-23%	-2%
141051	3	723	27	551	10.9	8.72	19.3	1180		-10%	8%	23%	-30%	-2%
141051	3	811	27	552	11	9.39	18.5	1240		-10%	9%	32%	-33%	2%
141051	4	0	27	232	5.24	2.87	13.7	579		0%	0%	0%	0%	0%
141051	4	172	27	205	5.66	3.07	11.4	561		-12%	8%	7%	-17%	-3%
141051	4	341	27	200	5.15	3.19	10.6	591		-14%	-2%	11%	-23%	2%
141051	4	554	27	202	5.58	3.47	10.9	602		-13%	6%	21%	-20%	4%
141051	4	723	27	202	5.38	3.47	9 99	606		-13%	3%	21%	-27%	5%
141051	4	811	27	196	5.65	3.5	10.1	628		-16%	8%	22%	-26%	8%
141051	5	0	27	335	6.43	2.02	9 31	566		0%	0%	0%	0%	0%
141051	5	172	27	297	6.14	2.29	7 85	565		-11%	-5%	13%	-16%	0%
141051	5	341	27	291	6.37	2.34	7 29	588		-13%	-1%	16%	-22%	4%
141051	5	554	27	282	6.51	2.51	7.41	599		-16%	1%	24%	-20%	6%
141051	5	723	27	273	6.58	2.57	7 34	601		-19%	2%	27%	-21%	6%
141051	10	0	27	561	7.51	4.48	8 32	571		0%	0%	0%	0%	0%
141051	10	172	27	531	7.17	4.53	5.74	577		-5%	-5%	1%	-31%	1%
141051	10	341	27	552	8.05	5	5.75	586		-2%	7%	12%	-31%	3%
141051	10	554	27	539	8.26	5.0	5 38	583		-4%	10%	13%	-35%	2%
141051	10	723	27	545	7.75	5 1	3.385	585		-3%	3%	14%	-59%	2%
141051	10	811	27	542	8 77	5.47	3 89	601		-3%	17%	22%	-53%	5%
141051	11	0	27	325	5 66	2.35	5 88	528		0%	0%	0%	0%	0%
141051	11	172	27	296	5.93	2.77	4 27	502		-9%	5%	18%	-27%	-5%
141051	11	341	27	304	6.3	2.76	3.795	533		-6%	11%	17%	-35%	1%
141051	11	554	27	312	6.78	2.96	3.71	541		-4%	20%	26%	-37%	2%
141051	11	723	27	313	6.7	2.97	3 51	542		-4%	18%	26%	-40%	3%
142107	3	0	27	729	6.96	7.75	12.2	809		0%	0%	0%	0%	0%
142107	3	130	27	682	7.13	8.14	9 55	817		-6%	2%	5%	-22%	1%
142107	3	299	27	652	7.05	8.25	8.9	817		-11%	1%	6%	-27%	1%
142107	3	554	27	616	7.04	8.6	10.6	792		-16%	1%	11%	-13%	-2%
142107	3	723	27	599	7.38	8.76	9 82	789		-18%	6%	13%	-20%	-2%
142107		839	27	601	7.51	8.98	9 23	815		-18%	8%	16%	-24%	1%
									0	0%	0%	0%	0%	0%
									172	-8%	-1%	7%	-19%	-2%
								Average	341	-8%	3%	11%	-24%	0%
									554	-8%	6%	17%	-22%	2%
									723	-9%	6%	18%	-29%	1%
									811	-7%	8%	19%	-28%	4%

Note: data for sample 142107-3 was not included in the averaged data because the days of storage were different to the other samples.

Appendix 2

Raw Data: Honey incubated for up to 810 days at 20°C and tested for DNA

Job	Sample	Day	Temp	IC Cq	Manuka Cq	Kanuka Cq	Manuka DNA (fg/uL)	MG (mg/kg)	HMF (mg/kg)
141051	2	0	20	26.84	23.52	28.14	2763.0	230	2.4
141051	2	172	20	27.14	24.69	29.25	1458.6	368	5.2
141051	2	554	20	30.35	32.42	31.98	21.3	498	10.9
141051	2	723	20	31.11	33.27	32.94	13.3	543	12.7
141051	2	881	20	32.71	34.50	36.51	6.8	570	15.6
141051	3	0	20	27.04	24.45	ND	1658.9	270	1.7
141051	3	172	20	26.84	25.77	ND	805.5	523	4
141051	3	554	20	29.77	33.20	ND	13.9	771	10.9
141051	3	723	20	30.76	35.15	ND	4.8	838	12.1
141051	3	881	20	32.55	36.60	ND	2.2	874	14.2
141051	4	0	20	27.06	26.77	39.21	466.7	146	1.6
141051	4	172	20	28.61	27.28	ND	353.8	256	3.7
141051	4	554	20	28.54	31.93	35.78	27.8	343	10.5
141051	4	723	20	29.39	33.43	37.83	12.3	345	12.6
141051	4	881	20	33.27	33.92	ND	9.4	351	14.2
141051	5	0	20	27.16	27.36	ND	337.6	132	1.5
141051	5	172	20	27.61	28.68	ND	164.5	256	3.7
141051	5	554	20	28.95	33.12	ND	14.5	380	11.8
141051	5	723	20	30.78	36.51	ND	2.3	378	14.2
141051	5	881	20	31.88	35.00	ND	5.2	399	17.5
141051	10	0	20	28.11	26.62	28.37	505.4	185	2.2
141051	10	172	20	27.45	26.11	27.98	671.1	288	5
141051	10	554	20	28.40	32.34	27.95	22.2	345	10.2
141051	10	881	20	33.21	35.64	35.09	3.7	327	7.7
141051	11	0	20	26.75	26.08	26.71	680.8	117	2.3
141051	11	172	20	25.96	26.45	25.96	554.3	162	4.4
141051	11	554	20	28.25	32.09	28.54	25.5	175	9.8
141051	11	723	20	28.91	34.34	29.22	7.5	154	8.5
141051	11	881	20	31.85	34.34	34.61	7.4	151	8.4
142107	3	0	20	29.75	30.93	ND	48.0	588	5.6
142107	3	130	20	30.54	30.47	ND	61.5	736	9.1
142107	3	554	20	32.66	ND	ND	0.0	813	11.5
142107	3	723	20	31.37	39.84	ND	0.4	868	12.2
142107	3	839	20	33.97	38.16	ND	0.9	909	15.5

Appendix 2 continued
Raw Data: Honey incubated for up to 810 days at 27°C and tested for DNA

Job	Sample	Day	Temp	IC Cq	Manuka Cq	Kanuka Cq	Manuka DNA (fg/uL)	MG (mg/kg)	HMF (mg/kg)
141051	2	0	27	26.84	23.52	28.14	2763.0	224	2.4
141051	2	172	27	31.26	32.31	32.97	22.6	580	29.4
141051	2	554	27	36.23	39.02	38.58	0.6	650	78.9
141051	2	723	27	34.39	ND	ND	0.0	627	124.3
141051	3	0	27	27.04	24.45	ND	1658.9	282	1.5
141051	3	172	27	32.20	33.63	ND	11.0	806	25.9
141051	3	554	27	35.86	40.00	ND	0.0	1014	80.4
141051	3	723	27	36.23	39.68	ND	0.4	899	115.1
141051	3	881	27	35.87	40.00	ND	0.0	887	136
141051	4	0	27	27.06	26.77	39.21	466.7	160	1.9
141051	4	172	27	30.84	31.79	ND	30.0	335	24.6
141051	4	554	27	34.68	ND	ND	0.0	270	77.7
141051	4	723	27	33.01	ND	ND	0.0	236	110.4
141051	4	881	27	37.41	ND	ND	0.0	232	125.6
141051	5	0	27	27.16	27.36	ND	337.6	133	1.6
141051	5	172	27	30.13	32.50	ND	20.3	355	27.1
141051	5	554	27	38.26	ND	ND	0.0	350	85.9
141051	5	723	27	37.57	ND	ND	0.0	274	132
141051	10	0	27	28.11	26.62	28.37	505.4	186	2.4
141051	10	172	27	28.56	29.46	28.82	107.0	351	26.1
141051	10	554	27	31.11	36.01	31.65	3.0	355	73.7
141051	11	0	27	26.75	26.08	26.71	680.8	113	2.3
141051	11	172	27	28.37	29.78	27.81	89.8	157	25.5
141051	11	554	27	32.13	37.00	31.94	1.7	146	77.1
142107	3	0	27	29.57	30.32	36.72	67.1	583	5.5
142107	3	130	27	33.09	33.97	ND	9.1	891	34.5
142107	3	554	27	37.41	ND	36.96	0.0	835	106.6
142107	3	723	27	ND	ND	ND	0.0	806	151
142107	3	839	27	ND	38.28	ND	0.9	797	192.5

Appendix 3

Incubation of washed pollen and honey with methylglyoxal and dihydroxyacetone

s 9(2)(b)(ii)

13 May 2017

Background

While testing honey samples for MPI's chemical manuka markers and manuka DNA, s 9(2)(b)(ii) has observed that many honeys with high levels of methylglyoxal (UMF 15+) have failed the Manuka DNA test (Cq > 36).

We have also observed a statistically significant negative correlation between decreasing concentrations of DNA with increasing concentrations of (a) methylglyoxal (MGO), and (b) hydroxymethylfurfural (HMF).

To better understand what may be the cause of this phenomenon, we selected 5 multi-floral honeys with low manuka Cq values (high concentrations of DNA) that passed the multi-floral classification criteria stipulated by MPI. These samples also selected because they had low concentrations of naturally-occurring MGO and DHA.

Methodology

Five honeys that were classified as multi-floral manuka by the MPI chemical test and the DNA test were selected for the incubation experiment (Table 1). These samples were selected because they had high concentrations of manuka DNA which were necessary to observe any changes that may occur in the DNA during incubation with MGO and DHA.

Table 1. Samples used for the incubation experiment and their chemical marker concentrations and DNA Cq values

Sample ID	HPLA (mg/kg)	2MBA (mg/kg)	2MAP (mg/kg)	3PLA (mg/kg)	DNA (Cq)
A	1.6	2.0	2.3	225	29.54
B	2.7	1.4	5.9	360	27.73
C	2.7	1.7	7.4	337	27.94
D	3.1	2.0	7.8	353	26.77
E	3.1	2.3	7.8	376	26.44

Incubation of washed pollen

1.4 ±0.05g of each honey was added to 0.9 mL of water, mixed, and centrifuged to separate the pollen pellet according to the MPI reference method. The pollen pellet was

washed with Pol buffer according to the MPI reference method, and then resuspending in Pol buffer containing the equivalent of 0, 100 and 1,000 mg/kg of methylglyoxal (MGO) and 0, 100 and 1,000 mg/kg of dihydroxyacetone (DHA) to mimic typical levels that these chemicals are found in Manuka honey.

The solutions were well mixed and incubated in a temperature-monitored forced-air oven at 27 °C for 12 hours. The samples were then removed and centrifuged at 15,000 rcf for 5 minutes and the pollen processed though the full MPI DNA reference test protocol, and the concentration of DNA was determined against and standard curve of concentration (pg/mL) vs. Cq values. Appropriate negative and positive controls were run to ensure that method performed to an acceptable level.

Incubation of Honey

A fresh 1.4 ±0.05g of each sample honey was added to 0.9 mL of water containing the equivalent of 0, 100 and 1,000 mg/kg of methylglyoxal (MGO) and 0, 100 and 1,000 mg/kg of dihydroxyacetone (DHA) to mimic typical levels that these chemicals are found in Manuka honey. The mixed samples were then incubated in a forced-air oven at 27 °C for 36 hours. After incubation, the samples were centrifuged at 15,000 rcf for 5 minutes and the pollen washed and processed though the full MPI DNA reference test protocol, and the concentration of DNA was determined against and standard curve of concentration (pg/mL) vs. Cq values. Appropriate negative and positive controls were run to ensure that method performed to an acceptable level.

Results

Both the washed pollen incubation (Figure 1) and the honey incubation (Figure 2 and 3) showed that as the concentrations of MGO and DHA increase, the amount of measurable DNA decreases. When the data is plotted as Cq vs. MGO and DHA concentration, the Cq values increase as the MGO and DHA concentrations increase. This was observed for the Internal Control DNA (figure 4), Manuka DNA (figure 5), and Kanuka DNA (figure 6) for honey and pollen (data not shown). Since the pollen was washed before being lysed and the DNA extracted, the probable cause of decreased DNA measureable by the test is not because MGO and DHA are directly affecting the PCR reaction, but rather that the MGO (and possibly DHA) are interacting with the DNA in the pollen.

This suggests that whatever the mechanism, MGO and/or DHA affects all DNA measured rather than being specific to Manuka DNA. The short incubation time required to affect a significant decrease in DNA is a concern and may explain why many mature Manuka honeys with high UMF (and MGO) levels, particularly those also with high hydroxymethylfurfural (HMF), fail the DNA test. These honeys, some up to 3 to 5 years old, would have ample time for the naturally-occurring MGO to possibly find its way into the pollen and react with the DNA. MGO has been shown to react with DNA (ref.1 &2). Hydrogen peroxide, which is present in honey, has been shown to damage DNA (ref 3), may also play a role in the observed decrease in measurable DNA.

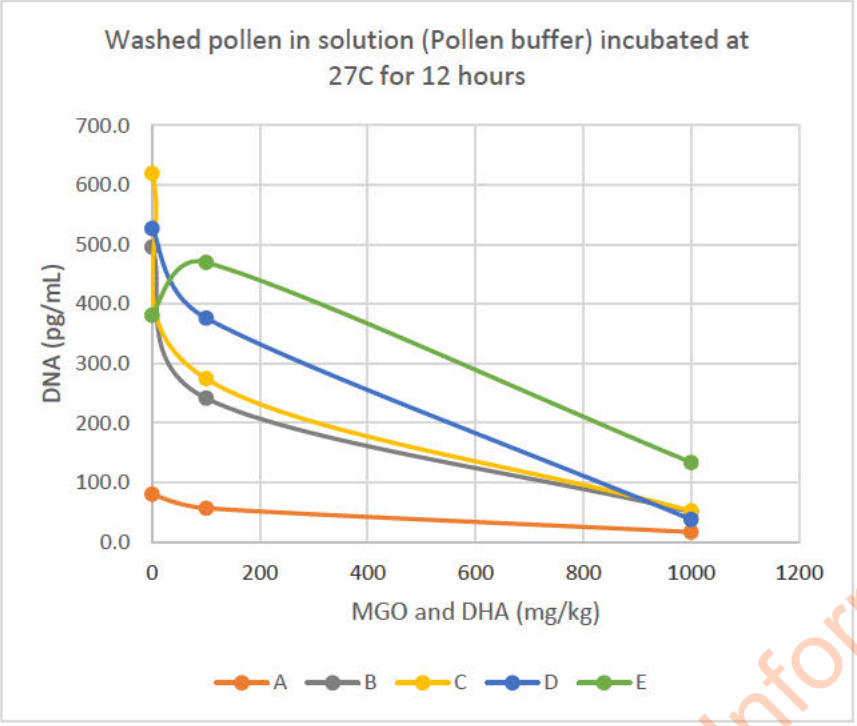

Figure 1. Concentrations of Manuka DNA for 5 pollen samples incubated at 27C for 36 hours with 0, 100, and 1,000 mg/kg MGO and DHA.

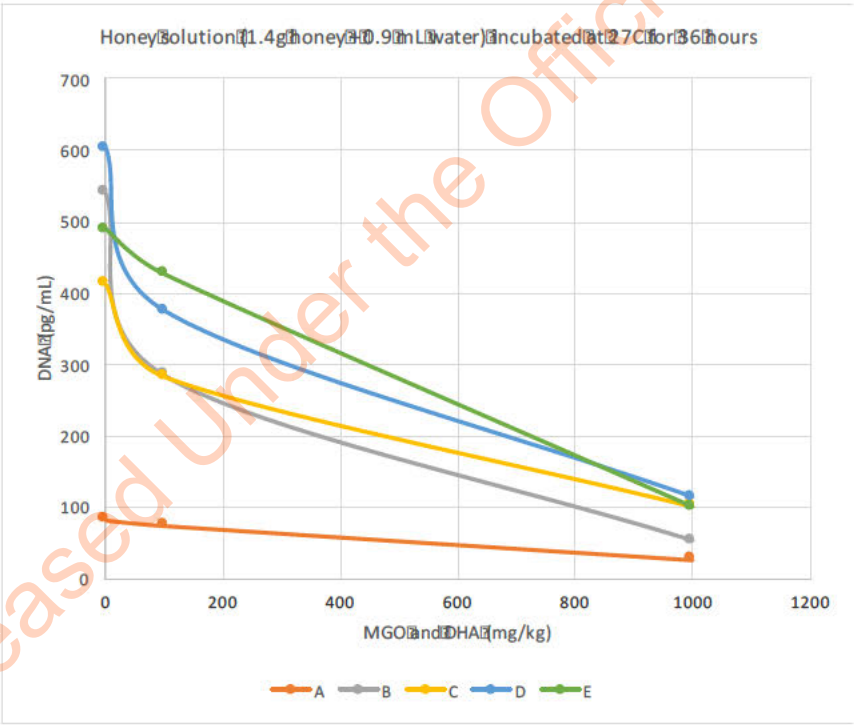

Figure 2. Concentrations of Manuka DNA for 5 honey samples incubated at 27C for 36 hours with 0, 100, and 1,000 mg/kg MGO and DHA.

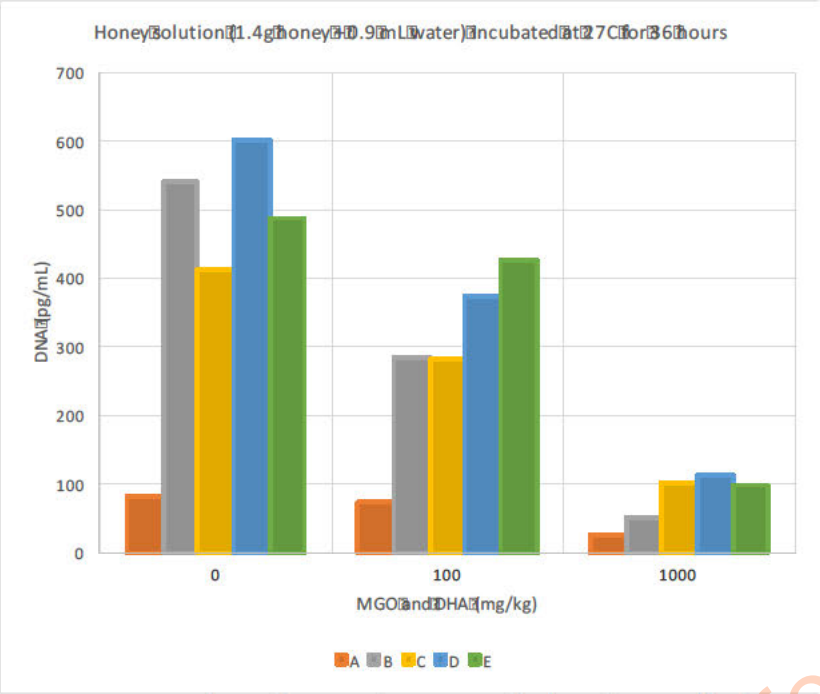

Figure 3. Data plotted as a column graph, (see figure 2) of concentrations of Manuka DNA for 5 honey samples incubated at 27C for 36 hours with 0, 100, and 1,000 mg/kg MGO and DHA.

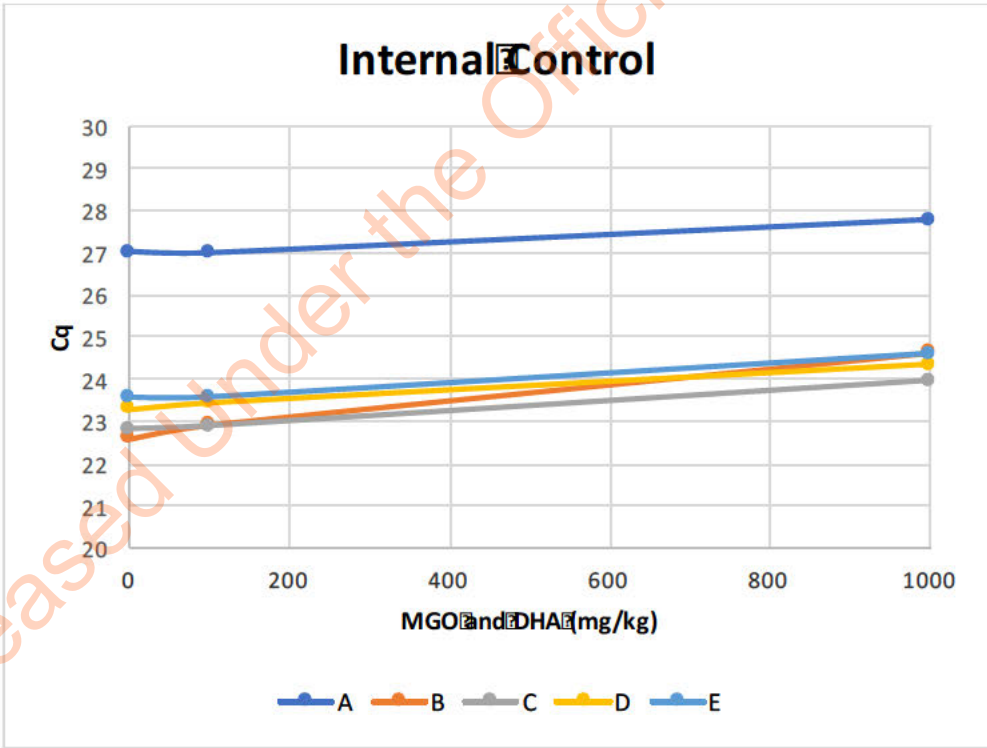

Figure 4. Cq values for the Internal Control DNA for 5 honey samples incubated at 27C for 36 hours with 0, 100, and 1,000 mg/kg MGO and DHA.

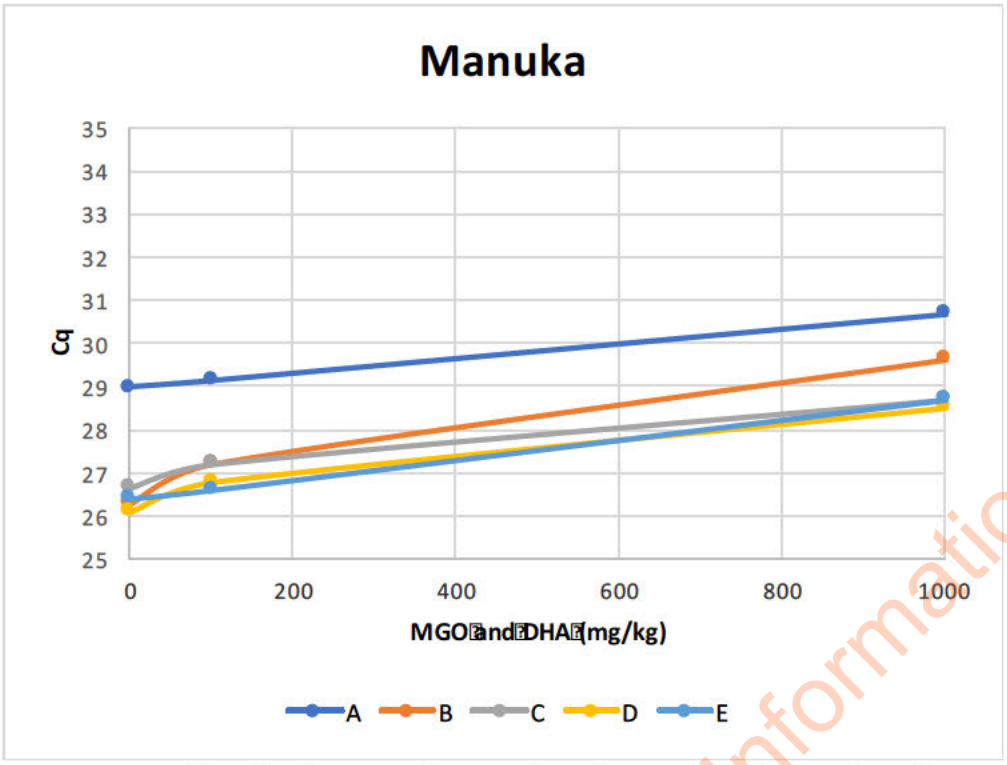

Figure 5. Cq values for the Manuka DNA for 5 honey samples incubated at 27C for 36 hours with 0, 100, and 1,000 mg/kg MGO and DHA.

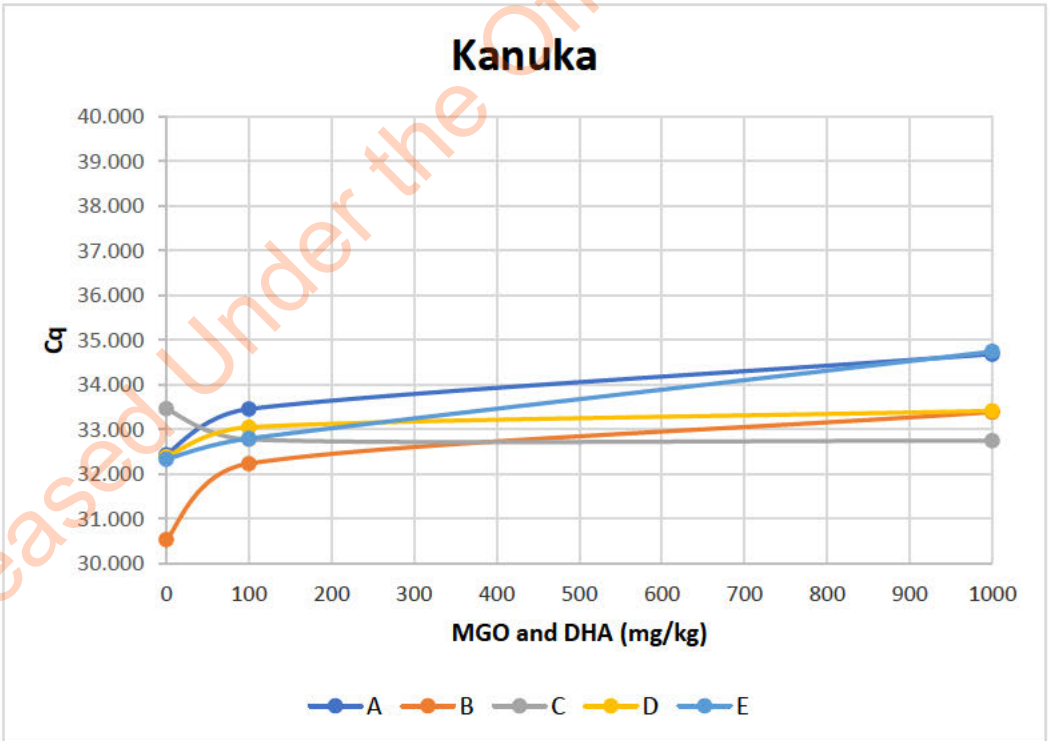

Figure 6. Cq values for the Kanuka DNA for 5 honey samples incubated at 27C for 36 hours with 0, 100, and 1,000 mg/kg MGO and DHA.

References

(1) Methylglyoxal, an endogenous aldehyde, crosslinks DNA polymerase and the substrate DNA. Naoko Murata-Kamiya and Hiroyuki Kamiya. Nucleic Acids Res. 2001 Aug 15; 29(16): 3433–3438.

Abstract

Methylglyoxal, a known endogenous and environmental mutagen, is a reactive α-ketoaldehyde that can modify both DNA and proteins. To investigate the possibility that methylglyoxal induces a crosslink between DNA and DNA polymerase, we treated a 'primed template' DNA and the exonuclease-deficient Klenow fragment (KF^{exo-}) of DNA polymerase I with methylglyoxal *in vitro*. When the reaction mixtures were analyzed by SDS–PAGE, we found that methylglyoxal induced a DNA–KF^{exo-} crosslink. The specific binding complex of KF^{exo-} and 'primed template' DNA was necessary for formation of the DNA–KF^{exo-} crosslink. Methylglyoxal reacted with guanine residues in the single-stranded portion of the template DNA. When 2'-deoxyguanosine was incubated with *N*α-acetyllysine or *N*-acetylcysteine in the presence of methylglyoxal, a crosslinked product was formed. No other amino acid derivatives tested could generate a crosslinked product. These results suggest that methylglyoxal crosslinks a guanine residue of the substrate DNA and lysine and cysteine residues near the binding site of the DNA polymerase during DNA synthesis and that DNA replication is severely inhibited by the methylglyoxal-induced DNA–DNA polymerase crosslink.

(2) Oxidative damage of DNA by the reaction of amino acid with methylglyoxal in the presence of Fe(III). Kang JH. Int J Biol Macromol. 2003 Nov;33(1-3):43-8.

Abstract

Methylglyoxal (MG) is an endogenous metabolite which is present in increased concentrations in diabetics and reacts with amino acids to form advanced glycation end products. DNA cleavage induced by the reaction of MG with lysine in the presence of Fe3+ was investigated. When plasmid DNA was incubated with MG and lysine in the presence of Fe3+, DNA strand breakage was proportional to MG and lysine concentrations. The formation of superoxide anion was detected during this reaction, and catalase, hydroxyl radical scavengers and iron chelator, desferrioxamine inhibited DNA cleavage. Deoxyribose assays showed that hydroxyl radicals were generated during the MG/lysine/Fe3+ reaction. These results suggest that superoxide anion and H2O2 may be generated from the glycation reaction between lysine with MG, and that Fe3+ probably participates in a Fenton's type reaction to produce hydroxyl radicals, which may cause DNA cleavage. This mechanism, in part, may provide an explanation for the deterioration of organs under diabetic conditions.

(3) Imlay J. A., Chin S , Linn S. Toxic DNA damage by hydrogen peroxide through the Fenton reaction in vivo and in vitro. Science. (1988); 240:640–642.

Exposure of Escherichia coli to low concentrations of hydrogen peroxide results in DNA damage that causes mutagenesis and kills the bacteria, whereas higher concentrations of peroxide reduce the amount of such damage. Earlier studies indicated that the direct DNA oxidant is a derivative of hydrogen peroxide whose formation s dependent on cell metabolism. The generation of this oxidant depends on the availability of both reducing equivalents and an iron species, which together mediate a Fenton reaction in which ferrous iron reduces hydrogen peroxide to a reactive radical. An in vitro Fenton system was established that generates DNA strand breaks and inactivates bacteriophage and that also reproduces the suppression of DNA damage by high concentrations of peroxide. The direct DNA oxidant both in vivo and in this in vitro system exhibits reactivity unlike that of a free hydroxyl radical and may instead be a ferryl radical.

(4) Ruckriemen J., Hohmann C., Hellwig M., Henle T., Unique fluorescence and high-molecular weight characteristics of protein isolates from manuka honey (Leptospermum scoparium)

Abstract

This study compared the fluorescence properties (λex/em = 350/450 nm) and molecular size of proteins from manuka and non-manuka honey. The fluorescence characteristics of non-manuka and manuka proteins differ markedly, whereby manuka honey protein fluorescence increases with increasing methylglyoxal (MGO) content of the honey. It was concluded that manuka honey proteins are modified due to MGO-derived glycation and crosslinking reactions, thus resulting in fluorescent structures. The molecular size of honey proteins was studied using size exclusion chromatography. Manuka honey proteins contain a significantly higher amount of high molecular weight (HMW) fraction compared to non-manuka honey proteins. Moreover, HMW fraction of manuka honey proteins was stable against reducing agents such as dithiothreitol, whereas HMW fraction of non-manuka honey proteins was significantly decreased. Thus, the chemical nature of manuka honey HMW fraction is probably covalent MGO crosslinking, whereas non-manuka HMW fraction is caused by disulfide bonds. Storage of a non-manuka honey, which was artificially spiked with MGO and DHA, did not induce above mentioned fluorescence properties of proteins during 84 days of storage. Hence, MGO-derived fluorescence and crosslinking of honey proteins can be useful parameters to characterize manuka honey.

[Not relevant to request]

From: s 9(2)(a) .co.nz>
Sent: Monday, 12 June 2017 8:52 p.m.
To: Manuka Honey
Subject: submission

Follow Up Flag: Follow up
Flag Status: Flagged

Proposed General Export Requirements for Bee Products

For all exporters of bee products from New Zealand

SUBMISSION FORM

Consultation document 2017

The Ministry for Primary Industries (MPI) proposes to consolidate, clarify, and introduce export requirements for all bee products intended for export.

You are invited to have your say on the proposed changes, which are explained in the discussion document and specified in the draft Animal Products Notice: General Export Requirement for Bee Products notice.

Consultation closes on **23 May 2017.**

How to have your say

Have your say by answering the questions in the discussion document, or commenting on any part of the proposals outlined in the draft Animal Products Notice: General Export Requirements for Bee Products. This submission form provides a template for you to enter your answers to the questions in the discussion document and email your submission back to MPI.

Please include the following information in your submission:

☐ the title of the discussion document 'Proposed General Export Requirements for Bee Products';

☐ your name and title;

☐ your organisation's name (if you are submitting on behalf of an organisation), and whether your submission represents the whole organisation or a section of it; and

☐ your contact details (such as phone number, address, and email).

MPI encourages you to make your submission electronically if possible. Please email your submission to: manuka.honey@mpi.govt.nz

If you wish to make your submission in writing, these should be posted to the following address:

General Export Requirements for Bee Products Submission
MPI Food Assurance Team
PO Box 2526
Wellington 6140

The following points may be of assistance in preparing comments:

- ☐ where possible, comments should be specific to a particular section in the document. All major sections are numbered and these numbers should be used to link comments to the document;
- ☐ where possible, reasons and/or data to support comments should be provided;
- ☐ the use of examples to illustrate particular points is encouraged; and
- ☐ as a number of copies may be made of your comments, please use a legible font and quality print, or make sure hand-written comments are clear in black or blue ink.

Submissions are public information

Everyone has the right to request information held by government organisations, known as "official information". Under the Official Information Act 1982, information is to be made available to requesters unless there are good or conclusive grounds under the Official Information Act for withholding it.

If you are submitting on this discussion document, you may wish to indicate any grounds for withholding information contained in your submission. Reasons for withholding information could include that information is commercially sensitive, or that the submitters wish personal information such as names or contact details to be withheld. MPI will consider such grounds when deciding whether or not to release information.

Any decision to withhold information requested under the Official Information Act 1982 may be reviewed by the Ombudsman.

For more information please visit http://www.ombudsman.parliament.nz/resources-and-publications/guides/official-information-legislation-guides

Your details

Your name and title:	s 9(2)(a)
Your organisation's name (if you are submitting on behalf of an organisation), and whether your submission represents the whole organisation or a section of it:	
Your contact details (such as phone number, address, and email):	s 9(2)(a)

General questions: getting to know you

1. What part of the supply chain do you operate in:

   ☐ beekeeper

   ☐ extractor

   ☐ processor

   ☐ packer

   ☐ exporter

   ☐ retailer of bee products

   ☐ other – please specify

2. How long have you been involved in the apiculture industry:

   ☐ 0-5 years

   ☐ 5-10 years

   ☐ 10 + years

   ☐ not applicable

3. Do you operate under:

   ☐ an RMP under the Animal Products Act 1999

   ☐ the Food Act 2014 (Food Control Plan or National Programme)

   ☐ the Food Hygiene Regulations

   ☐ none of these

   ☐ not applicable

4. If you are a beekeeper, how many hives do you currently have:

   ☐ 0 – 5

   ☐ 6 – 50

   ☐ 51 – 500

   ☐ 501 – 1000

   ☐ 1001 to 3000

   ☐ More than 3000

5. What region of New Zealand do you operate in?

   Hawke s Bay

6. If you export bee products please tell us a little about your business. How many people do you currently employ?

   ☐ 0

☐ 1 – 5

☐ 6 – 19

☐ 20 or more

What are the roles of your employees and how many are:

☐ beekeepers

☐ processors

☐ packers

☐ other – please specify

Impact of compliance costs for beekeepers, processors and exporters

7. Table 4.1.1 of the Discussion Document provides a summary of the estimated costs of the proposals. What do you think the overall impact of the new proposals will be on your business?

Depending on how the very loose wording is interpreted it could be catastrophic.

8. In order to estimate the total cost to industry of the proposals contained in the draft GREX, it would be useful for MPI to understand how many beekeepers, operators and exports of bee products will be affected by the proposals. Please specify which of the proposals listed in the table at 4.1.1 will affect you and how.

9. Do you foresee any other costs that will arise from the proposals contained in the draft GREX which are not contained in the table at 4.1.1? If so, how significant do you think these will be (e.g. administration costs such as time to fill in forms, and time to learn about the new requirements)?

No additional substances to be present in New Zealand honey

10. To ensure additional substances are not present in New Zealand honey, MPI proposes to prohibit the feeding of bees when honey supers are present on hives for the purpose of collecting honey, with an exception if it is necessary for the survival of the bees. Do you agree or disagree with this proposal?

☐ I agree because:

☐ I disagree because:

It is perfectly normal to feed hives sugar after they have been supered up. It is normally only done when necessary, in a bad year I have fed hives right up till the day before Christmas.
In my own case it is occasionally necessary to feed sugar whether the hives need it or not to help alleviate the effects of karaka poisoning . In a case like that I would tell my honey buyer that there was a chance of high C4s in the honey. Bees can and do move honey\sugar that has been stored in the brood boxes up into honey supers after they have been placed on the hive.

Please suggest any alternatives to this approach that would ensure additional sugars and synthetic chemicals are not present in the honey:

There are readily available test for C4 sugars.

11. To prevent the contamination of honey with varroacide residues, MPI proposes honey is only harvested from honey supers that do not contain honeycomb previously part of a brood nest. Do you agree or disagree with this proposal?

☐ I agree because:

MPI proposes honey is only harvested from honey supers that do not contain honeycomb previously part of a brood nest.! This could mean you can't take from the brood nest when removing boxes of honey. If that's what you mean then I don't have any problem with it. It could at the other end of the spectrum be interpreted to mean that only capping wax can be used for making foundation as dark wax has previously been part of the brood nest.
For over 40 years I never used excluders however to ensure there is no brood in the honey for the last few years I have been using them but to get the bees through the excluded barrier it is essential to lift a frame or two of brood above the excluder. I normally go for the oldest brood frames and these are recycled at the end of the season.

Bees often move honey from around the brood nest into the honey supers indeed virtually all fresh nectar is processed in the brood nest. If I am unable to use dark combs for manuka production I would have to change to plastics which are not environmentally friendly.

☐ I disagree because:

Please suggest any alternatives to this approach that would ensure varroacide residues are not present in the honey.

Test the honey.

Processors of bee products to operate under a risk based measure

12. MPI proposes that processors of bee products for export under the Food Hygiene Regulations must move to a risk-based measure (either an RMP under the Animal Products Act 1999, or Food Control Plan or National Programme under the Food Act 2014). Do you agree or disagree with this proposal?

☐ I agree because:

☐ I disagree because:

Please suggest any alternatives to this approach that would provide MPI with oversight of these processors:

Bee products to be sourced from listed beekeepers

13. MPI proposes to extend listing requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☐ I agree because:

☐ I disagree because:

Can you think of any alternatives to this approach that would address this gap in the traceability chain?

Pre-processing traceability requirements

14. MPI proposes beekeepers keep additional records. Do you agree or disagree with this proposal?

☐ I agree because:

☐ I disagree because:

commercially honey is never extracted in single box amounts. It is normal to take a representative sample from each apiary lot which is fine and could be used for verification purposes along with many other things including AFB testing.

Can you think of any alternatives to this approach that would address gaps in the traceability chain?

There is already good traceability. When a beekeeper sells 50 ton of honeydew to a packer who also buys 50 ton of manuka and then proceeds to sell 100 ton of manuka it should be extremely easy to prove they have been naughty but despite all the forms but never seems to be followed up.

15. The costs for businesses associated with implementing the proposed traceability requirements are likely to vary depending on their existing systems and processes. What impact do you think these proposals are likely to have on your business?

It's impossible to work out the costs when you haven't specified how it will be done. Permanent marking can range from anything from a felt pen to electronic monitoring. Anything that takes extra time in the apiary will be a major cost especially in the robbing season. Yes I cover everything properly but even the smell can stir hives up to unacceptable levels when you are in an apiary too long.

Traceability from beekeepers to operators – harvest declarations

16. MPI proposes to introduce harvest statement requirements to all beekeepers providing bee products for export. Do you agree or disagree?

☐ I agree because:

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

17. MPI considers, for most businesses, the costs associated with these proposals are unlikely to be onerous. Do you agree or disagree and why?

☐ I agree because:

☐ I disagree because:

The costs could range from negligible to crippling depending on how the very loose wording is interpreted. You are asking the impossible.

Traceability between operators – transfer documentation in AP E-Cert and reconciliation

18. MPI proposes to introduce transfer documentation requirements to all bee products intended for export. Do you agree or disagree?

☐ I agree because:

☐ I disagree because:

Can you think of any alternatives to this approach that ensure full traceability through the bee product supply chain?

Labelling of monofloral and multifloral mānuka honey

19. MPI proposes to implement the mānuka honey definition for export using the GREX. Do you agree or disagree?

☐ I agree because:

I agreed providing you can sort out the testing problem with high UMF that has been stored for a while which appears to denature the DNA. The bee industry had its chance to bring in acceptable standards and failed.

☐ I disagree because:

Can you think of any alternatives to this approach that ensures mānuka honey is true to label?

I would like to see thixotropicy included in the standards. I can already think of several ways to potentially beat the system and there are a few people out there who will put a lot more thought into cheating the system than someone like me who will only be doing it as an academic exercise.

20. MPI considers there are likely to be options available to businesses to support compliance with the proposed definition (e.g. relabelling, changes to blending practices etc.). Do you agree with this assessment or do you have concerns about ability of some businesses to comply?

☐ I agree because:

☐ I disagree because:

☐ I have concerns because:

21. MPI's proposal may have an impact on existing rights associated with using the word "mānuka" on labels, including registered trademarks. Do you agree with MPI's assessment of the impact on existing rights?

☐ I agree because:

☐ I disagree because:

22. MPI does not propose to make changes to the current use of grading systems. Do you agree or disagree with this position?

☐ I agree because:

☐ I disagree because:

23. What do you think the impact of the mānuka honey definition will be on the current use of grading systems?

24. Do you have any comments on the summary science report?

25. Do you have any further comments regarding the definition of mānuka honey?

Laboratory Tests

26. Do you support the proposed requirements for sampling and testing mānuka honey set out in Part 6 of the draft GREX?

☐ I agree because:

☐ I disagree because:

27. The costs associated with these proposals are likely to vary depending on the size and volume of samples being tested. What impact do you consider these proposals will have on your business?

Do you have any suggestions for minimising any impacts?

Transitional provisions

28. MPI proposes a lead in time of **six weeks** between when the GREX is notified and when it comes into effect. Do you agree or disagree with this proposal?

☐ I agree because:

☐ I disagree and propose an alternative timeframe:

except for the manuka honey standards any new legislation should only apply from next season. Honey taken off the season technically will not meet the new standard and it is normal to keep at least some honey for a year or two to even out supply demands.

29. MPI proposes stock in trade provisions for honey exported between the date of commencement until six months after the date of commencement. Do you agree or disagree with this proposal?

☐ I agree because:

☐ I disagree because:

see above

Any other feedback

30. Are there any other parts of this discussion document or the draft GREX that you would like to provide feedback on? (Please indicate which part of the discussion document or draft GREX you are providing feedback on).