



AUSTRALIAN HONEY BATCH NUMBERING SYSTEMS

DESKTOP REVIEW

February 2022



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FOR HONEY BEE PRODUCTS

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Foreword

This work was commissioned by the CRC for Honey Bee Products for B-QUAL Australia to link the honey bee product traceability, and product assurance work from hive to packer, with the traceability of the packaged product. Recognised was the weak link of the batch number and this project explores present use of the batch number and outlines the value of standardising this batch number to place Australian honey into the fine food market.

This project conducted between October 2021 - January 2022, reviews batch numbering systems currently employed primarily by Australian and New Zealand honey packers, and presents the viable options aimed at supporting enhanced traceability of packaged honeybee products for the Australian industry. Honey is the focus, as presently, this is the only honeybee product currently being exported in a packaged form from Australia.

Present technologies, their use to trace packaged honeybee products and offer marketing information, as well as the potential value enhancement with the use of Geographic Indication, was included in this report.

Dr Liz Barbour
CEO
CRC for Honey Bee Products Limited

B-QUAL Australia and B-Trace Australia



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About the Authors



Sharon Purchase is currently a Professor at the UWA Business School. Sharon worked for 13 years within the engineering sector for both private and public organizations. During this time Sharon worked in marketing, sales and consulting while completing her MBA part-time.

Sharon began working in academia on a part-time basis as she was studying for her PhD from 1996-1999. Her PhD research investigated the internationalization process of Australian Engineering consultants through their business networks and relationships. On completing her PhD she has worked in academia on a full time basis.

Sharon has published academic papers in international journal and leading conferences in the area of business networks and relationships. She has been invited to join 4 editorial boards and has been voted onto the membership committee for the Australian and New Zealand Marketing Academy(2007 - 2013). At the same time, she hasn't lost her roots with industry and has published commercial pieces with CIPS (Chartered Institute of Purchasing) and other representative organizations.

Dr **Zeenat Abdoolakhan** completed her post-graduate studies at the University of Western Australia in Transport Modelling.

Her expertise includes analysis of consumer preferences and attitudes through quantitative data analysis and estimation using discrete choice modelling and measuring market responsiveness via demand elasticities.

EXECUTIVE SUMMARY

The 'Made in Australia' logo is highly valued and internationally appreciated, as Australia is a country known for a high level of food-safety regulation. Authenticating and visualising a location, with a link to quality control, is the new level of expectation for a fine food product.

Honey falls into the category of a fine food product, and easily accessible for Australian beekeepers producing some of the rarest wild-collected honeys in the world. Unfortunately, honey can be adulterated, with claims to be the third most adulterated food product in the world. The challenges this brings to the industry are illustrated from New Zealand data, where internationally, more 'New Zealand manuka honey' was sold than produced.

Increasing concerns around trusted food sources, and the global fight against counterfeiting in the food industry, has led to an array of technological developments and innovations in traceability and brand protection.

For the Australian honeybee industry, the digitisation of B-QUAL and development of B-Trace was the first step to provide a honeybee product traceability system. By adding the reference databases created from the Australian honey library, an additional layer of quality control is being added that aligns with international standards. The protection of the packaged product from packer to customer is the next step, and key to this being successful, is a clearly presented, standardised batch numbering system.

Based on the case studies in this report, currently it is difficult for consumers to make sense of batch number systems due to the non-standard approach to batch numbering and access honeybee product information. To fully explore the potential and opportunity afforded to the Australian honey industry, not only will it be necessary to belong to B-QUAL or B-Trace for traceability to packer and quality control, but standardisation on the batch number that identifies the product within the container will be required. A national approach to a standard Australian honey batch numbering system will likely benefit the industry and lay the foundation for other technologies to be used for Australian honeys to be promoted into the high value, fine food international markets.

Options to accelerate Australia's presence in the fine food international markets has been discussed in this report. Of significance was the power of Geographic Indication, connected with the latest technologies, to build a story for Australian honey.

Key recommendations

- ❖ Standardisation of the Batch Code in its form and placement on the packaging is agreed upon for easy discovery and use.
- ❖ The use of Geographic Indicators is explored for use for honey bee products within Australia
- ❖ A workshop is provided to inform the honey bee industry on packaging protection

AUSTRALIAN FOOD LABELLING REGULATIONS

Australia New Zealand Food Standards Code

Food sold in Australia is subject to labelling laws. According to the Australia New Zealand Food Standards Code (the Code), the following information must appear on a label:

- Name and/or description of the food – ‘Honey’
- Identification of the lot (batch) number for recall purposes – typically the harvest, extraction or packing date in the case of honey
- Business name and street address
- List of ingredients e.g., ‘100% Australian Honey’
- Nutrition information panel
- Country of origin – kangaroo logo, bar chart and text (law introduced in 2016)
- Weight
- Presence of allergens (as from February 2021)

Pure honey, having a shelf life of more than two years, is not required to have a best before date if another batch code for recall purposes is being used. On 25 February 2021 the Code was amended to introduce new requirements for the labelling of allergens in food. In accordance with the Code, allergen information must be declared using the required name of the food or substance in simple, plain English terms. However, honey without pollen does not require any health or allergy statements. This is not the case for royal jelly or bee pollen (bee bread) as an ingredient. Royal jelly must have a warning statement such as “This product contains royal jelly which has been reported to cause severe allergic reactions and, in rare cases, fatalities, especially in asthma and allergy sufferers.” Bee pollen presented as a food, or a food containing bee pollen as an ingredient, such as some raw honeys, can also cause severe allergic reactions and is therefore subject to the allergen warning statement.

Country of Origin Statement

In 2016, the “Country of Origin Food Labelling Information Standard of 2016” (Standard) law was introduced, requiring most food suitable for retail sale in Australia to carry country of origin information. Labelling requirements for individual food items vary depending on whether the food:

is a ‘priority’ or ‘non-priority’ food

was grown, produced, made or packed in Australia or another country.

Honey is classified as a “priority food” and labels must comply with the country of origin labelling standards. Therefore, Australian honey labels need to include a box containing three elements – the kangaroo in a triangle symbol to identify the food’s Australian origin, a bar-chart to indicate the proportion of Australian content, and explanatory wording (Table 1).

Table 1: Australian country of origin labelling formats

<p>THREE COMPONENT LABEL</p> <p>LOGO</p> <p>BAR CHART</p> <p>EXPLANATORY TEXT</p> <p>Made in Australia from at least 60% Australian ingredients</p>	<p>TWO COMPONENT LABEL</p> <p>BAR CHART</p> <p>EXPLANATORY TEXT</p> <p>Packed in Australia from less than 10% Australian ingredients</p>	<p>Non-priority food Made in USA</p> <p>Priority food Made in USA</p>
<p>Three component standard mark</p> <p>A graphic and text-based label which is mandatory for priority food items grown, produced or made in Australia. The label includes:</p> <ul style="list-style-type: none"> - The kangaroo in a triangle symbol so consumers can easily and quickly identify the food is of Australian origin - The minimum proportion, by ingoing weight, of Australian ingredients, shown in a shaded bar chart - A statement identifying whether the food was grown, produced or made in Australia and in the case of 'made in' claims, the percentage of Australia ingredients in the food. 	<p>Two component standard mark</p> <p>A graphic and text-based label which is mandatory for most priority food items packed in Australia.</p> <p>It may also be used for imported foods to show they contain Australian ingredients.</p> <p>The label includes:</p> <ul style="list-style-type: none"> - The minimum proportion, by ingoing weight, of Australian ingredients, shown in a shaded bar chart - A text statement with an origin claim for the food and identifying the percentage of Australian ingredients in the food. 	<p>Country of origin statement</p> <p>A text-only label which is used for non-priority food items.</p> <p>Imported priority foods must also, as a minimum, carry a country of origin statement in a clearly defined box (a box is not require if the food is unpackaged).</p>

Typically, for honey extracted from hives in Australia and packaged locally with no other ingredients, the online tool provided by the Australian government will create an element containing the Australian kangaroo symbol, a bar chart showing 100% filled in, and provides a range of short descriptions to select from. The words “Australian Honey”, “Produce of Australia”, “Product of Australia” or “Produced in Australia” are all acceptable. The label must be displayed in its entirety in English, be legible and prominent.

The nutrition information panel can be produced using the Food Safety Australia New Zealand (FSANZ) online tool . Alternatively, both the kangaroo symbol and the nutrition information stickers can be bought from beekeeping suppliers.

Failure to comply with the Standard is likely to contravene the Australian Consumer Law (ACL). The maximum financial penalty for a breach from the ACL is up to the greater of either \$10 million; three times the value of the benefit received; where the benefit cannot be calculated, 10 per cent of annual turnover in the preceding 12 months for corporations; or up to \$500,000 for an individual.

Current Honey Labelling Practice in WA

Pictures of honey containers captured at various Western Australian stores in October 2021 (Appendix 1) revealed that while most honey brands sold at larger retailers (such as Woolworths and Coles) comply with the Australian labelling requirements, similar standards are not met when sold at smaller grocers. The labelling elements on forty-three different honey brands were compared against the Australian food labelling standard (Appendix 2) and the method used to apply the batch number (Table 2) was shown to vary widely between the honey jars. Across the different brands, the batch number used consisted of one or a combination of three formats: batch code, packing date and best before date.

Table 2: Batch number usage across forty-three honey brands

Position of batch number	Total	%
Printed on label	12	28%
Handwritten	4	9%
Printed on lid	6	14%
Printed on container	3	7%
Printed on peel-off sticker	9	21%
No batch code	9	21%

The location of the batch number is not standardised as it can be found anywhere on the container (Table 2). Whilst the most common was a batch number printed on the label (28%), the rest had a batch number applied separately (51%) and no batch number could be found on 21% the brands. Five of the brands that did not carry a batch code number were being sold at small grocers or health food shops while two were found at Aldi and two were Coles home brand. Those honey products using batch code numbers applied as peel-off stickers, although complying with the labelling regulations, these stickers can easily fall off at any stage of the supply chain, even before the product reaches the consumer. This would be problematic for traceability purposes and especially if a recall was required for health purposes.

The above observations indicated that despite the heavy penalty for breaching ACCC's labelling regulations, non-conformance with the regulations is still occurring. Non-standardisation makes it difficult for consumers to find this information. Current practices indicate that honey sold in Australia does not use the batch number system to assure customers of product quality assurance and may potentially deter a purchase.

Honey Testing - Australia and New Zealand

It is not a legal requirement for honey sold in Australia to be tested for its composition. However, increasingly honey producers are voluntarily providing laboratory test results to consumers as proof of authenticity and product quality. Batch codes are being used as a marketing tool in the Australian and New Zealand honey industry.

New Zealand Manuka Honey

Given the high export value of manuka honey, in December 2017, New Zealand's Ministry for Primary Industries (MPI) introduced a scientific definition to authenticate New Zealand manuka honey¹ to sustain New Zealand's premium position in overseas markets. As a result, all New Zealand honey labelled as manuka for export must be tested by an MPI-recognised laboratory to ensure that it meets the manuka honey definition.

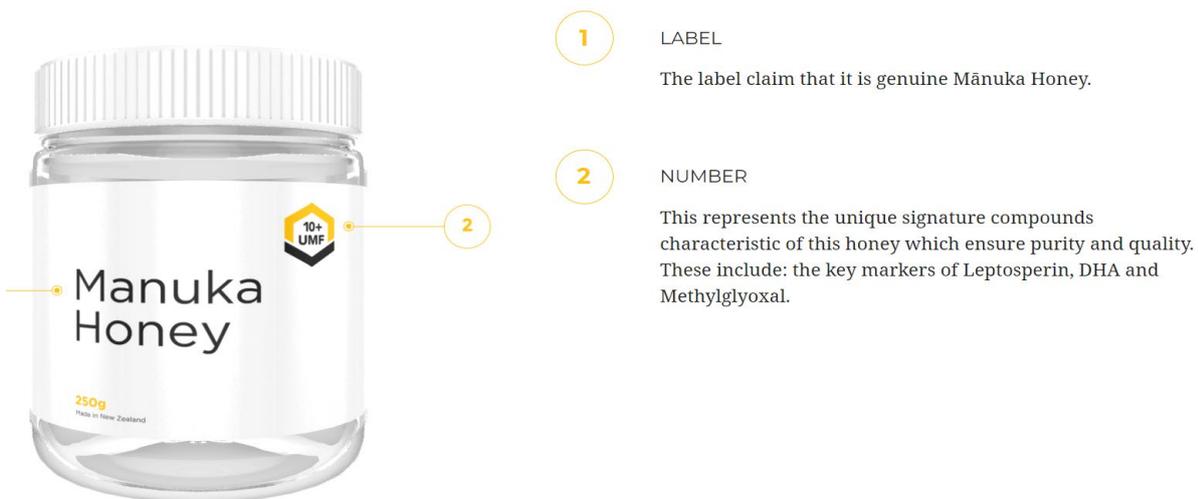
¹ <https://www.mpi.govt.nz/food-business/honey-bee-products-processing-requirements/manuka-honey-testing/>

The New Zealand MPI definition is made up of a combination of five attributes, four chemicals from the nectar and one DNA marker from the pollen (Figure 1), allowing the industry to:

- separate manuka honey from other honey types
- identify it as either monofloral or multifloral Manuka honey

New Zealand's Unique Manuka Factor Honey Association (UMF) is an independent body, also providing quality assurance to New Zealand manuka honey producers. Its UMF mark (Figure 2) is an indication that the honey meets three criteria: quality standards, grading and rating tests. The UMF rating value is assigned by an independent laboratory that tests and measures levels of key markers: Leptosperin, dihydroxyacetone (DHA) and Methylglyoxal (MGO). Its laboratory results also ensure that the MPI manuka scientific definition² is satisfied. It is noted that not all packers of manuka Honey belong to the UMF.

Figure 1: Unique Manuka Factor Honey Association mark



Australian Manuka Honey

Currently, there is no Australian standard that defines Australian manuka honey.

The Australian Manuka Honey Association (AMHA) is the independent body for the production and promotion of manuka honey in Australia. According to the AMHA, honey that carries the AMHA's Mark of Authenticity must be pure, natural manuka honey, produced entirely in Australia, and be tested by an independent, approved laboratory to ensure it meets minimum standards of naturally occurring methylglyoxal (MGO), and dihydroxyacetone (DHA)³. AMHA authentic mark criteria for manuka honey differ from those of New Zealand's MPI and UMF, with only two markers required to pass its manuka test:

- ≥ 85 mg/kg (or ppm) MGO
- ≥ 170 mg/kg (or ppm) DHA

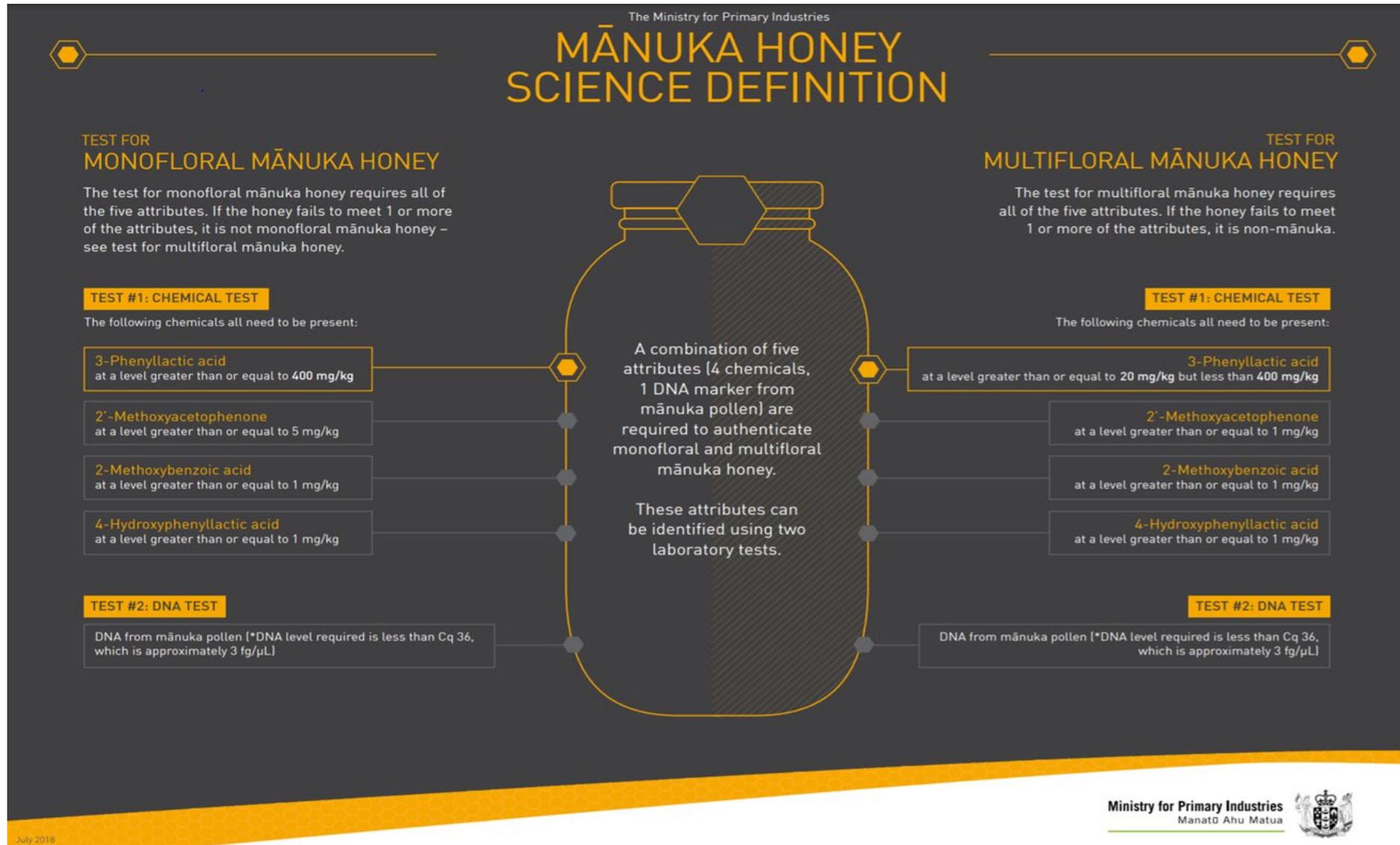
The association also offers certification called the AHMA Authorised Mark, suitable for Australian manuka honey that does not meet the AHMA Authentic mark criteria. The AMHA Authorised Mark certification is granted based on honey producers' expertise and conditional upon their honey meeting the following set of minimum levels:

- ≥ 30 mg/kg (or ppm) methylglyoxal (MGO)
- ≥ 60 mg/kg (or ppm) dihydroxyacetone (DHA)

² <https://www.umf.org.nz/grading-system-explained/>

³ <https://manukaaustralia.org.au/mark-of-authenticity/>

Figure 2: New Zealand Ministry of Primary Industries manuka honey definitions for export



TRACEABILITY IN THE HONEY INDUSTRY

Traceability is the ability to follow the movement of a product through each stage of production, processing and distribution (ISO 22005:2007). Traceability provides information to consumers and trading partners who want to know more about the product they are buying, including:

- food safety
- animal and plant pest and disease status
- provenance
- authenticity
- social matters such as sustainability and animal welfare practices.

Honey has been classified as the third most adulterated food by U.S Pharmacopeia⁴. Finding solutions at both the macro and micro level to prevent this issue with Australia honey is increasingly becoming a priority when capturing high-value export opportunities.

An example of a macro level intervention is Argentina. Being the third largest honey exporter in value after New Zealand and China⁵, the Argentinian Ministry of Agriculture developed a traceability system⁶ to simplify and optimise the beekeeping tracking through a system that manages and records the traceability of honey. This system connects all stakeholders into a supply chain from beekeeper to exporter. This adds value to the product through streamlining, transparency and real-time control of the events that occur in the marketing of honey.

In America, the U.S Pharmacopeia's Honey Expert Panel is developing a food fraud mitigation guidance document specific to honey. This document will include a detailed description of the various contributing factors to honey fraud and guidance on developing a fraud mitigation plan specific to honey⁷.

At the micro level, Australian and New Zealand beekeepers and packers are independently adopting their own traceability systems to provide quality assurance to their consumers.

Aligning with consumers' values and enhancing trust has been found to positively impact purchase intentions and price premiums independently, resulting in increased sales volume and marginal profits. Producers of high export value commodities such as wine and coffee are leveraging marketing tools that offer the dual advantage of gaining consumer trust while attracting a price premium. For instance, many Australian wines use Geographic Indication labelling.

Coffee producers in some countries operate under the fair-trade coffee program. Studies on fair-trade coffee show that consumers are willing to pay, on average, a 10 percent price premium for fair-trade coffee while supporters of fair-trade program are willing to pay up to 25 percent more⁸. Purchasers of fair trade-labelled coffee tend to be less price sensitive.

With geographic labelling, many consumers are willing to pay up to 21 percent more for their coffee.

These findings suggest that by adopting a reliable honey traceability system for Australian honey that tracks from hive to jar, opens marketing opportunities. Producers may address consumers' concerns around the provenance of the product, align with their values, enhance consumer trust and potentially unlocking new profitable markets.

⁴ <https://www.economist.com/united-states/2018/08/30/the-scurge-of-honey-fraud>

⁵ <https://oec.world/en/profile/hs92/honey#exporters-importers>

⁶ <https://www.apimondia.com/en/2-all/106-apimondia-2019-montreal-canada-proceedings>

⁷ <https://foodsafetytech.com/column/why-is-honey-fraud-such-a-problem/>

⁸

https://www.researchgate.net/publication/349384827_Designing_a_Smart_Honey_Supply_Chain_for_Sustainable_Development

Australian Honey and the B-QUAL Quality Assurance

In the case of Australian honey, B-QUAL Australia Pty Limited has been established by the Australian Honey Bee Industry Council (AHBIC) as an independently audited food safety program for Australian beekeepers. B-QUAL certification is a HACCP-based program proving compliance with FSANZ food standards required for the sale of honey bee products as a food product. The B-QUAL system also develops and sets Australian beekeeping standards which includes biosecurity.

The CRC for Honey Bee Products digitised the B-QUAL system⁹. This digitisation enabled the traceability of honey products from hive to jar.

The CRC for Honey Bee Products has also provided to B-QUAL Australia, B-TRACE, a lower-level app-based program that will provide all data required to conform to HACCP and the National Biosecurity Code of Practice and basic traceability for smaller scale producers.¹⁰

BATCH NUMBER – AUSTRALIA & NEW ZEALAND

Food traceability is becoming increasingly important in the global market as a tool against counterfeits and adulterated products and offers a means of providing quality assurance to consumers on the provenance and authenticity of their products. Although honey is recognized as high-quality food, it is vulnerable to adulteration, mislabelling, and unethical mixing with cheaper and low-grade honey, sugars, and other substances. Moreover, due to its limited availability, perceived therapeutic and healing properties, there is a rising demand for honey, particularly bio-active honey and this is reflected in price increases. This increased value makes honey a vulnerable adulteration target.

Honey producers in Australia and New Zealand are already adopting traceability systems allowing consumers to verify the authenticity of their products. Using a batch number, allows various information to be made accessible to consumers, such as laboratory results for specific markers, nutritional information, and the hive to jar story.

Currently, batch numbering system in the Australian honey industry is not standardised and presented in different formats across brands as a number code, alphanumeric code, best before date, packing date or a QR code with different methods of application (Appendix 1).

CASE STUDIES - Honey Batch Number Across Australia and New Zealand

In this section, six Australian and New Zealand honey brands are presented to understand the application of batch numbers to communicate information about the provenance, authenticity, quality and legal compliance to local honey to consumers.

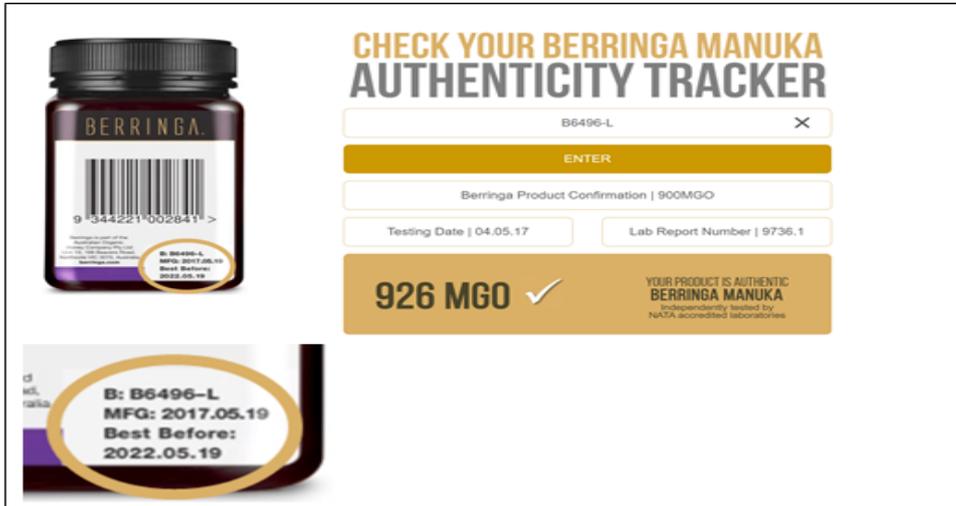
⁹ <https://honeybee.org.au/wp-content/uploads/2021/09/B-Qual-Sept-2021-Newsletter.pdf>

¹⁰ <https://honeybee.org.au/wp-content/uploads/2021/06/B-Qual-June-2021-Newsletter.pdf>

Case Study 1: Berringa Manuka Honey (Australia)

Australian Berringa manuka honey prints its batch number on the label as an alphanumeric code. Consumers can check the authenticity of their product by entering the alphanumeric batch number on their website at <https://berringa.com/authenticity-tracker/> which reveals the Methylglyoxal (MGO) level and a copy of the laboratory honey analysis report (Figure 3). Berringa is not a member of Australian Manuka Honey Association.

Figure 3: Berringa Manuka Honey batch number result

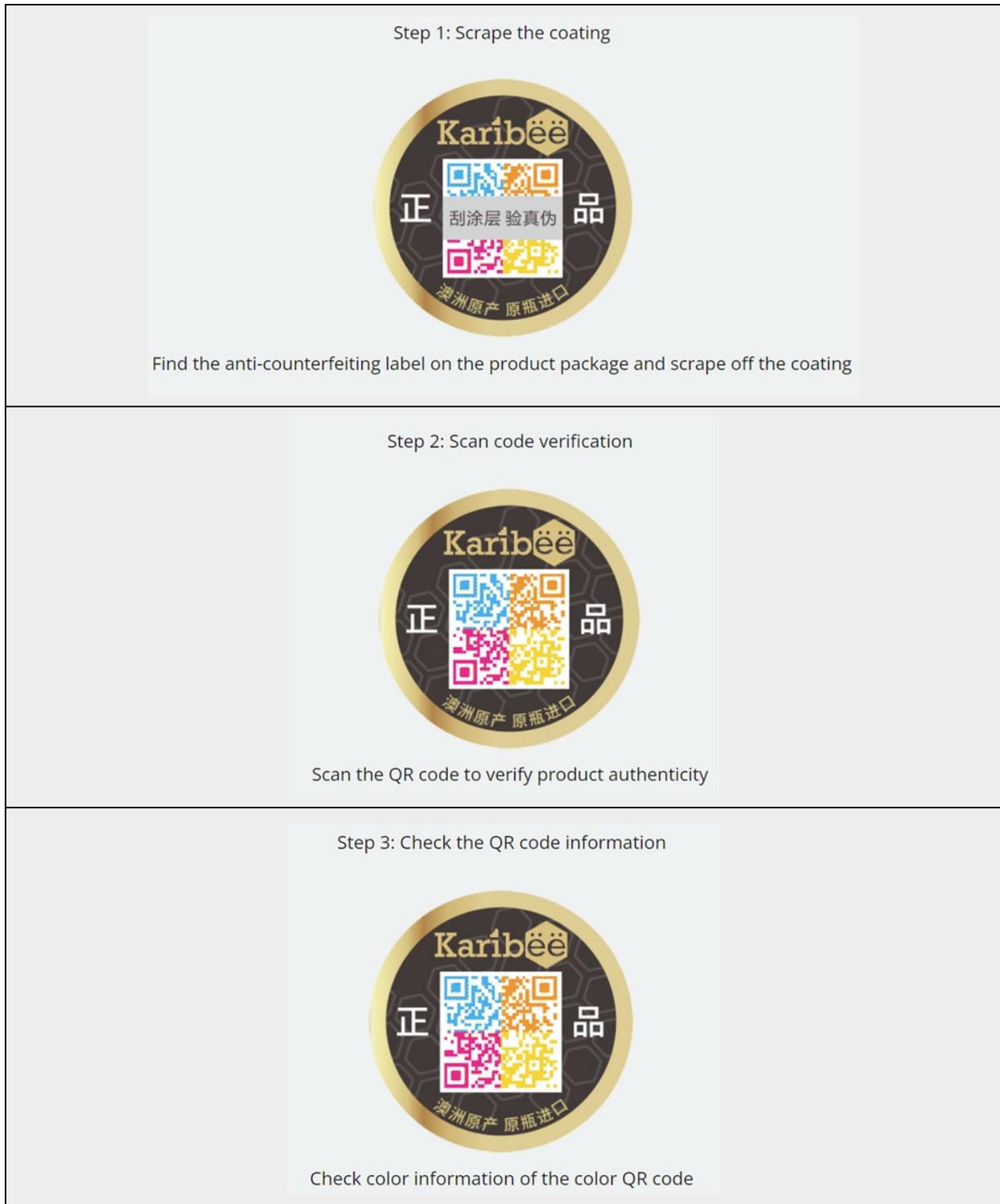


Honey Analysis Report			
Report Number:	9736_1	Quote No:	
			
Submitter Details BERRINGA 10/198 BEAVERS RD NORTHCOOTE VIC 3070 Fax: 0394564178			
Samples Submitted	Honey x 1		
Test Requested	Methylglyoxal and Hydroxymethylfuraldehyde Analysis		
Date Sampled		Date Analysed	4/05/2017
Date Received	2/05/2017		
Lab Reference Numbers	BQ17772		
Method	AB043/044		
 NATA Accredited Laboratory Number 5066 Accredited for compliance with ISO/IEC 17025 - Testing			
Lab Ref No:	Sample Descriptor:	Chemical:	Result:
BQ17772	B6496	Methylglyoxal	928 mg/Kg
Signed:  12/05/2017 Dennis Webber Residue Analyst			
# NATA accreditation does not cover the performance of this service Results reported on an "as received" basis. Results pertain only to the samples submitted.			
Department of Agriculture and Fisheries Chemical Residue Laboratory 39 Kessels Road Coopers Plains QLD 4108 Ph. (07) 3276 6124			
This document may not reproduced except in full.			Page 1 of 1

Case Study 2: Karibee Honey (Australia)

Karibee honey carries a QR code with a scrape off coating on the lid for its export market to China (Figure 4). Once scanned using a smartphone, the QR code redirects the consumer to a web page with relevant information about the honey.

Figure 4: Karibee Honey (Australia) QR code with scrape-off coating



Case Study 3: Airborne Honey (New Zealand)

New Zealand's Airborne Honey has been using a QR code since 2014. Consumers have a choice of scanning the QR code found on the label on their smartphone or manually entering the batch number on their website at <https://www.airborne.co.nz/pages/traceme>.

Information provided in a visually appealing format and include pollen content, HMF factor, a map of the apiaries where the honey is sourced, as well as colour, moisture, glucose, fructose, sucrose and maltose content (Figure 5). Only manuka pollen count is used to define their manuka honey as well without any additional markers.

The test results provided give no laboratory analytical standard information, that is whether the test processes are accredited.

Figure 5: Airborne Creamed Thyme Honey (New Zealand) batch Number



Creamed Clover Honey
Batch #143231



Clover honey is light in colour with a delicate floral bouquet and flavour. As a creamed honey with a thick creamy texture it's great as a spread.

RESULTS FOR BATCH #143231

 Honest	 Undamaged	 Traceable
------------	---------------	---------------

83%
CLOVER POLLEN

Clover Honey should contain over 45% Clover to be considered a mono floral honey.

5.6
HMF

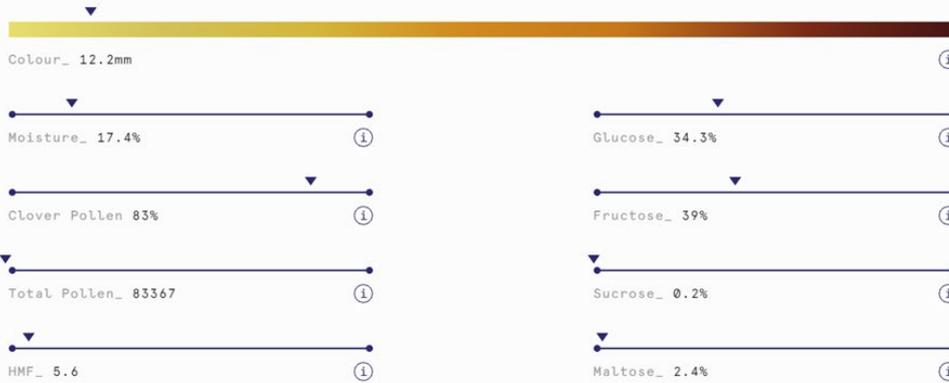
Verify the honey is undamaged by heat. HMF below 10mg/kg is best.

NZ
LOCATION MAP

See the apiaries where the honey comes from.



We analyse the following parameters for every batch of honey to ensure it meets the identification claim on the label.

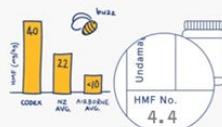


The Airborne Standard



Honest

UNFILTERED HONEY: WE MEASURE THE POLLEN PERCENTAGE AND TOTAL POLLEN PER 10G.



Undamaged

VERIFYING THE HONEY IS UNDAMAGED BY HEAT: WE MEASURE THE HMF LEVEL AS MG/KG.



Traceable

SCAN OUR TRACEME QR CODE TO CHECK THE VARIETY, QUALITY AND ORIGIN OF THE HONEY IN YOUR JAR.

Case Study 4: Pure New Zealand Honey (New Zealand)

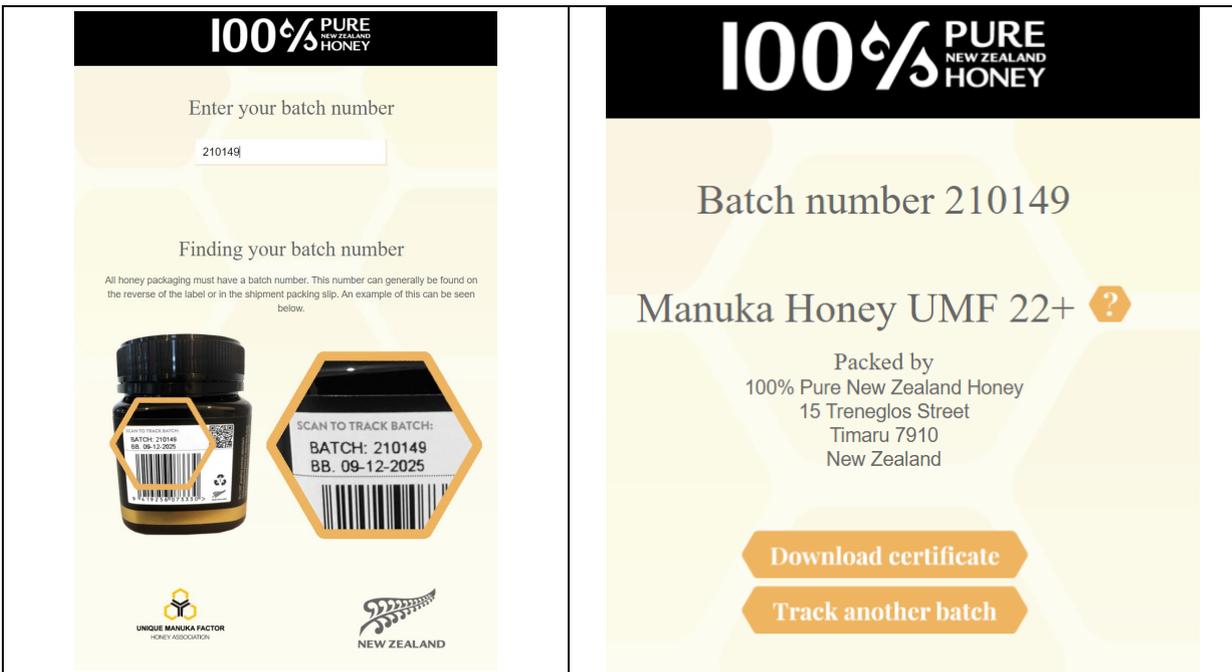
Consumers can check Pure New Zealand Honey manuka honey’s authenticity on their website at <https://www.pnzh.honeyid.com/batch-search/> by manually entering the batch number or by scanning the QR code found on the label via a smartphone. The results for batch number 210149 (Figure 6) include the certificate provided by a UMF-approved laboratory with test results for Leptosperin, Dihydroxyacetone (DHA), Methylglyoxal (MG) and Hydroxymethylfurfural (HMF) as well as floral descriptor and UMF grade. There is no indication that this laboratory or the test is accredited. The UMF certificate also informs the consumer that the honey complies with the New Zealand’s MPI manuka definition.

Case Study 5: Zealandia Manuka Honey (New Zealand)

New Zealand’s Zealandia honey started using QR codes on their packaging from January 2021. Their Track & Trace system (<https://zealandiahoney.com/track-trace/>) uses QR code stickers on the top of their jars, and through which various information is provided. This includes a detailed certificate of the laboratory results and a business licence certificate made accessible to consumers on their smartphone (Figure 7).

Unlike Pure New Zealand Honey, Zealandia is not a member of UMF Honey Association. However, it provides detailed laboratory results for its manuka honey as defined by New Zealand’s MPI. This definition requires the analysis and results for DNA and four other markers: 4-Hydroxyphenyllactic acid (4-HPLA), 2-Methoxybenzoic acid (2-MBA), 2'-Methoxyacetophenone (2'-MAP), 3-Phenyllactic acid (3-PLA). This is undertaken by a laboratory that has International Accreditation New Zealand.

Figure 6: Pure New Zealand Honey QR code result





THE UMF GRADING SYSTEM
APPRAISES NATURAL MARKERS
FOUND IN MANUKA HONEY AND
ASSURES PURITY AND QUALITY



Unique Mānuka Factor[™]
Honey Association

UMF[®] CERTIFICATE

www.umf.org.nz

UMF LICENSEE

100% Pure New Zealand Honey Limited
PO Box 2155
Timaru, 7910
License No: 1037

TESTING LABORATORY

Analytica Laboratories Ltd
Ruakura Research Center
10 Bisley Road
Hamilton, 3214



**ANALYTICA
LABORATORIES**

Lab Ref: 21-00795-1
Date Received: 12.01.2021
Date Reported: 18.01.2021

BATCH INFORMATION

SAMPLE ID	BATCH NO.
210149	210149

UMF GRADING BASED ON LABORATORY TEST RESULTS

FLORAL DESCRIPTOR <small>PER CODEX ALIMENTARIUS</small>	UMF GRADE
Manuka	23.3

LABORATORY TEST RESULTS

Leptosperin mg/kg	Dihydroxyacetone (DHA) mg/kg	Methylglyoxal (MG) mg/kg	Hydroxymethylfurfural (HMF) mg/kg
802	2020	1070	27

ANALYSTS COMMENTS

100% Pure New Zealand Honey Limited

Scan to view certificate and information on UMF grading to interpret your report results.

<https://umfha-certification.org/C173425673>



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The laboratory identified above is approved and licenced to issue this report by the UMF Honey Association

Figure 7: Zealandia Honey QR code result





TRACK & TRACE



Zealandia Honey Experience
20200910-5AUS-00000-4DE

Thanks for using our unique Zealandia Honey[®] **Track & Trace** system. By scanning the QR code on your product you will be able to guarantee the **quality, purity, authenticity** and **potency** of your honey all by one simple action.

Scroll down for more about this product
↓

Item Check Passed

MORE INFORMATION

- Zealandia Honey Ltd investor cert
- Certificate of Analysis
- Certificate of License
- COA
- Zealandia Honey- A little history _ Zealandia Honey.pdf



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Certificate of Analysis

Lab Reference: 20-28468
 Submitted by: N/A
 Date Received: 5/08/2020
 Testing Initiated: 5/08/2020
 Date Completed: 6/08/2020
 Order Number: TORD5025
 Reference: N/A

Report Comments

Samples were received by Analytica Laboratories in acceptable condition unless otherwise noted on this report.

Results Summary

MPI Manuka Classification*

Laboratory ID	Sample ID	MPI Manuka Classification*
20-28468-1	20214M550004/5	MONOFLORAL MANUKA
20-28468-2	20211M850001	MONOFLORAL MANUKA

MPI Manuka Classification* Approver:

Doreen Ignacio, B.Sc. (Tech)
 Technician

MPI Manuka DNA

Laboratory ID	Sample ID	Manuka DNA
		Units
		Reporting Limit
		Cq
20-28468-1	20214M550004/5	27.20
20-28468-2	20211M850001	24.60

MPI Manuka DNA Approver:

Doreen Ignacio, B.Sc. (Tech)
 Technician

MPI Manuka Markers

Laboratory ID	Sample ID	4-Hydroxyphenyllactic acid (4-HPLA)	2-Methoxybenzoic acid (2-MBA)	2'-Methoxy acetophenone (2'-MAP)	3-Phenylactic acid (3-PLA)
		mg/kg	mg/kg	mg/kg	mg/kg
		Reporting Limit	Reporting Limit	Reporting Limit	Reporting Limit
		0.80	0.80	0.80	20
20-28468-1	20214M550004/5	9.1	8.5	37	1,000
20-28468-2	20211M850001	9.5	13	32	850

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited.
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 Report ID 20-28468_MPI_5Attributes-[R00] Page 1 of 2 Report Date 6/08/2020



MPI Manuka Markers					
Laboratory ID	Sample ID	4-Hydroxyphenylacetic acid (4-HPLA)	2-Methoxybenzoic acid (2-MBA)	2'-Methoxyacetophenone (2'-MAP)	3-Phenylacetic acid (3-PLA)
		Units mg/kg Reporting Limit 0.80	mg/kg 0.80	mg/kg 0.80	mg/kg 20

MPI Manuka Markers Approver:

Hannah Crossan, M.Sc (Hons)
 Technician

Method Summary

MPI Manuka Classification
 For classification as monofloral manuka, the following chemicals all need to be present and at these levels (Animal Products Notice - General Export Requirements for Bee Products, 2018):

- 4-hydroxyphenylacetic acid at a level greater than or equal to 1mg/kg
- 2-methoxybenzoic acid at a level greater than or equal to 1mg/kg
- 2-methoxyacetophenone at a level greater than or equal to 5mg/kg
- 3-phenylacetic acid at a level greater than or equal to 400mg/kg

And the DNA level from manuka pollen is less than Cq 36, which is approximately 3fg/µL.

For classification as multifloral manuka, the following chemicals all need to be present and at these levels:

- 4-hydroxyphenylacetic acid at a level greater than or equal to 1mg/kg
- 2-methoxybenzoic acid at a level greater than or equal to 1mg/kg
- 2-methoxyacetophenone at a level greater than or equal to 1mg/kg
- 3-phenylacetic acid at a level greater than or equal to 20 mg/kg but less than 400mg/kg

And the DNA level from manuka pollen is less than Cq 36, which is approximately 3fg/µL.

MPI Manuka Markers
 Solvent extraction, LC-MS/MS analysis.
 Analytica Laboratories Ltd., is approved by the New Zealand Ministry of Primary Industries to conduct this analysis under the Recognised Laboratory Programme (RLP Method 10.05).

Leptospermum scoparium DNA (PCR)
 Samples were analysed as received by the Laboratory for Manuka Pollen DNA by pollen DNA extraction followed by qPCR in accordance with the MPI Technical Paper 2016/74 (modified) (96 well method with magnetic bead extraction). Analytica Laboratories Ltd., is approved by the New Zealand Ministry of Primary Industries to conduct this analysis under the Recognised Laboratory Programme (RLP Method 10.04).

The DNA component of the MPI Manuka Honey Definition requires a Cq value of less than 36 to qualify for either a monofloral or multifloral manuka honey.

Zealandia Honey Limited
 PO Box 297
 Turangi 3353
 New Zealand



Zealandia Honey Limited Certificate of Analysis (COA)

Product: Zealandia Honey® Cobalt MGO 850+
Batch Identification: 20211M850001 **Manufacture Date:** 27 July 2020
Sample Reference: 20211M850001 **Best Before Date:** 27 July 2024
Manuka Honey Definition: Monofloral Manuka

Chemistry Test	Specification	Result	Performed By	Reference
Non peroxide activity (NPA = UMF)	> than label	20.6	Agritestesting Laboratories	20-J5359-1
Methylglyoxal (MGO)	> than label mg/kg	873	Agritestesting Laboratories	20-J5359-1
HydroxyMethylfurfural (HMF)	< 40 mg/kg	7.0	Agritestesting Laboratories	20-J5359-1
Dihydroxyacetone (DHA)	As tested - mg/kg	1874	Agritestesting Laboratories	20-J5359-1
Leptosperin	> 100 mg/kg	N/T	Not tested	20-J5359-1
C4 Sugar (AOAC)	As tested - mg/kg	4.1	Analytica Laboratories	20-J5359-1
Diastase Activity	No less than 8 Schade/g	13.3	Agritestesting Laboratories	20-J5359-1
Ash	Not more than 0.6%	N/T	Not tested	20-J5359-1
Water Insoluble Solids	Not more than 0.1%	N/T	Not tested	20-J5359-1
Free Acidity	Not more than 40 mEq/Kg	N/T	Not tested	20-J5359-1
Foreign Matter	None Detected	N/T	Not tested	20-J5359-1
Tutin	<0.70 mg/kg	<0.01	Analytica Laboratories	20-J5359-1
Reducing Sugars (Total Sugars)	>65%	N/T	Not tested	20-J5359-1
Lead (Pb)	None	N/T	Not tested	20-J5359-1
Zinc (Zn)	None	N/T	Not tested	20-J5359-1
Sucrose	Not more than 5%	N/T	Not tested	20-J5359-1
Conductivity	As tested, us/cm	N/T	Not tested	20-J5359-1
Moisture Content	<20%	16.7	Agritestesting Laboratories	20-J5359-1
Colour	As tested - pfund	N/T	Not tested	20-J5359-1
Glyphosate	<50µg/Kg	N/T	Not tested	20-J5359-1
Manuka Honey Markers				
	Specification	Result	Performed By	Reference
3-phenylacetic acid (3-PLA)	≥ 400 mg/kg (monofloral) ≥ 20 mg/kg (multifloral)	1000	Analytica Laboratories	20-J5359-1
2-methoxyacetophenone (2-MAP)	≥ 5 mg/kg (monofloral) ≥ 1 mg/kg (multifloral)	37.0	Analytica Laboratories	20-J5359-1
2-methoxybenzoic acid (2-MBA)	≥ 1 mg/kg	8.5	Analytica Laboratories	20-J5359-1
4-hydroxyphenylacetic acid (4-HPLA)	≥ 1 mg/kg	9.1	Analytica Laboratories	20-J5359-1
DNA from Manuka pollen	< Cq 36	27.20	Analytica Laboratories	20-J5359-1
Microbiology Test				
	Specification	Result	Performed By	Reference
Aerobic Plate Count	<1000 cfu/g	N/T	Not tested	20-J5359-1
Escherichia coli	<10 cfu/g	N/T	Not tested	20-J5359-1
Yeast	<200 cfu/g	N/T	Not tested	20-J5359-1
Mould	<200 cfu/g	N/T	Not tested	20-J5359-1
Staphylococcus aureus	<50 cfu/g	N/T	Not tested	20-J5359-1
Salmonella	<10 cfu/g	N/T	Not tested	20-J5359-1
Total Coliform	<10 cfu/g	N/T	Not tested	20-J5359-1

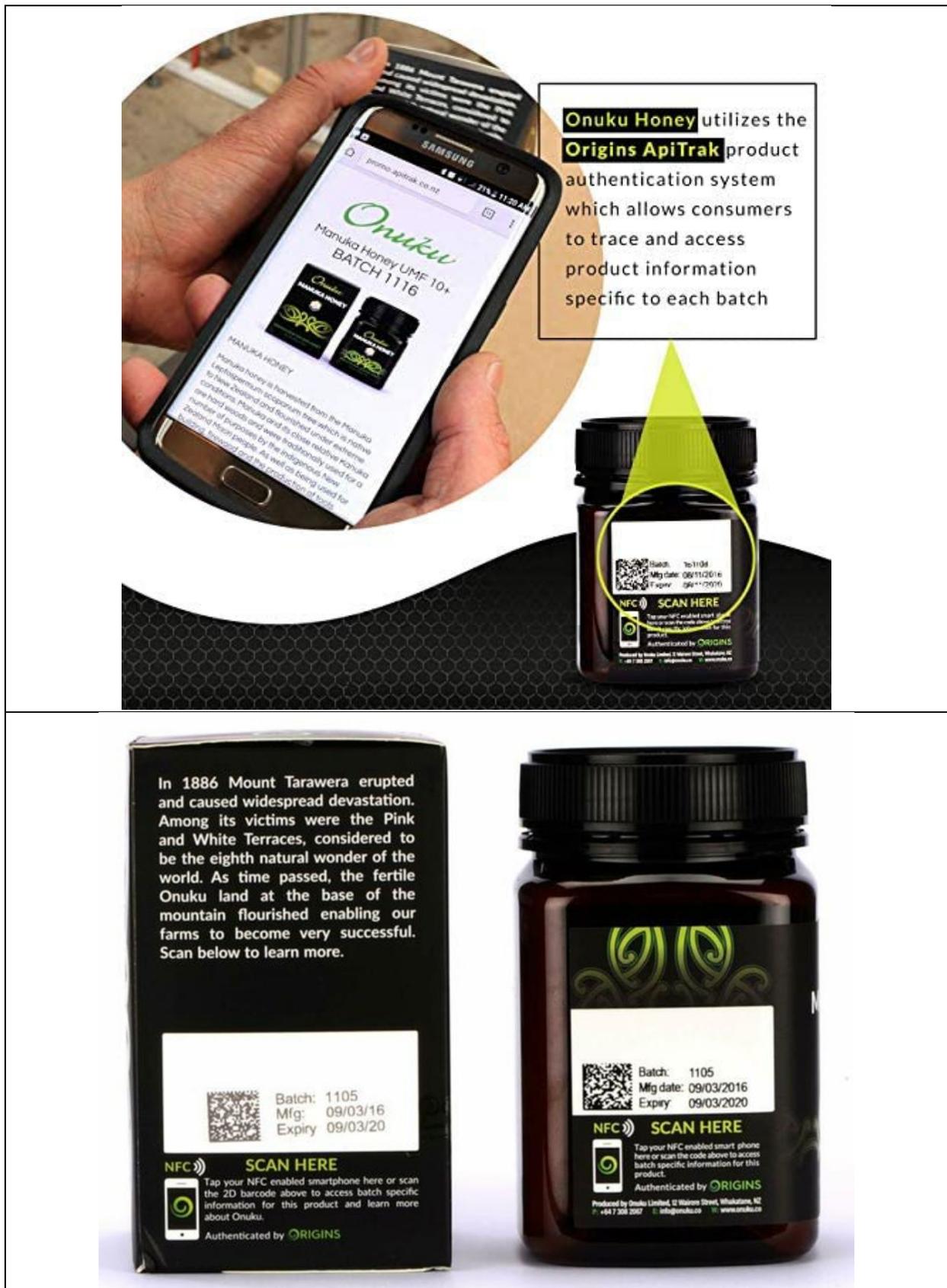
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Case Study 6: Onuku Premium New Zealand Honey

Onuku Premium New Zealand Honey goes a step further in the traceability and authentication of its products by embedding secured Near Field Communication (NFC) tags in their packaging in addition to a QR code, manufacture date and best before date (Figure 8). Each NFC tag is part of a multi-tier authentication and anti-counterfeiting system. By a simple tap of a smartphone, consumers can get confirmation that their product is authentic. The reason for using both QR code and NFC could be that older generation mobile phones do not allow for NFC tag reading. It was only in 2017 iPhone 7, and newer devices, could read NFC through a third-party app. In 2018, with the introduction of the iPhone XS, XS Max and XR, Apple opened to NFC tag reading from the home screen without having to install a third-party app. There is also the issue that the technology for NFC tags is American and therefore not easily accessed from China.

Figure 8: Onuku NFC authentication



GEOGRAPHICAL INDICATION

What is a Geographical Indication?

A 'geographical indication', or 'GI' identifies the region of the product, and this is usually linked to where a particular quality, reputation or other characteristic of the product is essentially attributable to that geographic origin¹¹.

Attributes may be derived from:

- production method
- ingredients used
- environmental or agricultural features of the region which give the product its distinctive qualities
- a strong reputation that may have developed for producing a particular good of a certain quality over time within the region

GIs have rules, and these set out the qualities or characteristics a product must meet before 'GI' can be used. These rules provide assurance to consumers that they are purchasing a product with specific qualities.

Across the world, GIs are applied to a wide range of goods, from cheese and meats to wines, silk and pottery. GIs indicate a specific product region (e.g. Barossa for wine, or Parma for ham). Some GIs registered in Australia are:

- Darjeeling for tea
- Parmigiano Reggiano for cheese
- Scotch Whisky for spirits and spirit based beverages
- Mount View for wine

Because each of the above terms are registered as GIs, these terms cannot be used in Australia unless the products originate from the specified region and are produced in line with the GI rules.

For example, in countries where the term 'Scotch Whisky' is protected as a GI, that term can only be used if the whisky is distilled in Scotland and using the specified recipe and process set out in the rules governing the GI.

Australia's GI system

Australia has two systems for GI registration:

GIs for all goods can be registered using the certification trade mark system (CTM).

GIs for wines can also be registered under a separate system, administered by Wine Australia.

The CTM system is provided under the Trade Marks Act 1995, while the Wine Australia Act 2013 provides the legislative framework for the wine GI system.

¹¹ <https://www.ipaustralia.gov.au/trade-marks/understanding-trade-marks/certification-trade-mark>

Using the certification trade mark (CTM) system to register a GI

A CTM shows that goods or services meet specified standards. The standards are contained in a set of rules that must be provided during the application process to Intellectual Property Australia (IP Australia). The rules can specify:

- quality
- content or
- production methods.

In the case of GIs, the rules will relate to at least the geographical origin of the goods and may contain additional quality or processing standards. The rules could state, for example, that a type of honey must be harvested in a specific geographic location to benefit from using the GI.

Applications for CTMs including for GIs, are first examined by IP Australia to ensure they meet trademark requirements. The rules are then provided to the Australian Competition and Consumer Commission (ACCC) for assessment under competition and consumer laws. After examination and assessment by the ACCC, the application is opened for public comment and published for opposition.

If there is no opposition and a CTM is successfully registered, the owner has the right to use it and allow other producers to use the CTM, as long as they comply with all the requirements.

A CTM owner need not use the CTM but must control the use of the CTM by others, including ensuring the CTM is applied only to goods that possess a quality or meet a specified standard.

Difference between a place name and a GI

While many Australian businesses use location names to promote their goods, this does not mean they are GIs. A GI is intellectual property and provides its owner/s with exclusive rights over its use. A geographical place name:

- simply describes the place a business is based in or where a good is sourced.
- As mentioned above a GI must indicate goods which possess a special characteristic attributed to the geographic location where they are produced.

There are also occasions where over time a region has developed a strong reputation for produce of a certain quality. For example, a banana grower in Brisbane may wish to promote his fruit as Brisbane bananas. Even if these bananas are actually grown in Brisbane, this alone does not make 'Brisbane' a GI. The bananas would also need to have some special characteristic or reputation (such as sweeter, or larger, or thinner) that is attributable to the Brisbane area. The link between the special characteristics of the bananas and the geography or reputation of the region is what creates a GI.

Examples of Australian GIs

Case Study 1: Margaret River Wine

In the case of Saracen Estates, Grace Farm and Watershed, they all indicate the trade source of the wine, while MARGARET RIVER is a registered GI that indicates its geographical origin (Figure 9). Only wines made in the Margaret River region can legally use this GI.

Figure 9: Margaret River GI mark



Case Study 2: Australian Wild Abalone (AWA)

The Australian Wild Abalone (AWA) GI is protected under the CTM system. To use the trade mark (Figure 10), producers must wild catch abalone from Australian waters, and must comply with the AWA Quality Assurance Code of Practice¹². Using this mark:

- prevents free riders from capitalising on or diminishing the reputation of Australian abalone by passing off poorer quality abalone as Australian.
- gives consumers confidence they are purchasing abalone that has been sustainably caught and processed under quality standards.

¹²

https://www.ipaustralia.gov.au/sites/default/files/certification_rules/1371492_180525_rules.pdf

Figure 10: Australian Wild Abalone GI mark



Case Study 3: Hilltops Wine

Hilltops, a region in Cootamundra NSW is a GI for wine registered under both the CTM and wine GI systems. Only wines consisting of a grape content of at least 85 percent grapes sourced from within the region defined as Hilltops are legally able to use the GI mark (Figure 11).

By preventing others inappropriately leveraging on the valuable reputation of the region, the GI:

- protects the investment of winemakers in the region
- provides a guarantee to consumers that the wine does indeed come from the Hilltops region and that it meets the quality standards.

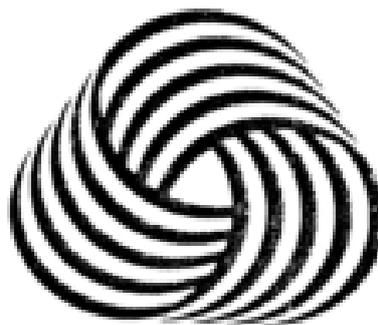
Figure 11: Hilltops Wine GI mark



Case Study 4: Woolmark

The Woolmark trademark was established by the Australian Wool Research and Promotion Organisation. The Woolmark trademark denotes that products bearing this trademark (Figure 12) are made according to guidelines set out by the Australian Wool Research and Promotion Organisation that include the material content, mode of manufacture, treatment, quality, technical performance, style or other characteristics.

Figure 12: Woolmark GI mark



Benefits of GIs

When well managed and promoted, GIs:

- can be a powerful marketing tool - their value increasing as consumer recognition grows create expectations and assurances about the quality or characteristics of products and may attract a price premium
- benefit producers because it can be easier to stop others from free-riding and undermining the valuable reputation of a region

Who can apply for a GI?

Although a GI can be owned by any legal entity, management, control and enforcement of a GI are the responsibility of the owner and can be complex. Sometimes it is best that these issues be managed by:

- a group of producers within a region that form an incorporated association to register and manage the GI
- another central organisation or
- a local or state authority with the power to preserve the right of all producers in the GI region and protect against misuse of the GI
- If forming an incorporated association, producers in the relevant region need to agree on standards and collaborate to develop, maintain and promote the GI. Before drafting the rules, producers should determine:
 - the geographic boundaries for production
 - techniques and standards that apply
 - how to promote the GI.

GI Rules to be provided

An application for a GI CTM must be supported by a set of certification rules. The rules specify the requirements that goods must meet for the GI to be applied. These requirements could relate to:

- geographical origin
- quality
- reputation
- production methods or
- a combination of all these

The rules will be independently assessed by the ACCC to ensure:

- competition principles
- adherence to fair trading policies
- that there is no detriment to the public interest.

The rules must specify the:

- certification requirements that goods must meet for the CTM to be applied
- process for determining whether goods meet the certification requirements
- attributes that a person must have to become approved to assess whether goods meet the certification requirements
- the requirements that an owner or approved user of the certification trade must meet to use the certification trademark
- other requirements about the use of the certification trademark by the owner or approved user of the certification trademark

- procedure for resolving a dispute about whether goods meet the certification requirements
- general procedures for resolving a dispute

Once the rules have been assessed and approved by the ACCC the owner of the GI is responsible for ensuring compliance. It is critical to the success of a GI that compliance with the rules is monitored to ensure quality is maintained.

Examples of Honey GIs

There are several GIs in place within the honey industry around the world. In Indonesia, the “Sumbawa Forest Honey” from Sumbawa Island is a registered GI for its traditional technique of obtaining and preserving its forest honey¹³. Bulgaria’s “Strandzhanski manov med” honey is protected under Europe’s Protected designation of origin (PDO) label. Product names registered as PDO are those that have the strongest links to the place in which they are made where every part of the production, processing and preparation process must take place in that specific region¹⁴. In Brazil, the Ortigueira honey is certified denomination of origin (DO) based on the characteristics and the history of local beekeeping in that area¹⁵. One of the first three products to have been registered as a GI in Africa is the Oku white honey from the Republic of Cameroon, produced in the nationally protected forest of Kilum Ijim near Mount Oku¹⁶.

Australian Honey and Geographical Indication

GI could be a valuable marketing asset to the honey industry. There is currently no GI registration for Australian honey. The definition for honey GI could be based on honey descriptors as defined by the Honey Library project, the area of a specific flora from which the honey is made or the region where it is sourced from.

An independent GI quality assurance body like Wine Australia could be set up for the Australian honey industry to oversee the implementation and monitoring of its honey GIs. While GI application cost is the same as that of a standard trademark, there would be additional costs if legal advice is required.

TRACEABILITY SYSTEMS

There is an ever-increasing array of traceability technologies available on the market. This section provides information on the traceability systems currently being used by different industries and the features to consider when choosing one.

Traceability System Overview

Most traceability systems available can be adapted to different industries according to the level of complexity of their supply chains. In the case of the honey industry, the supply chain can be as simple as the beekeeper who is also the packer, processes, packs and sells honey directly to the public. The more complex honey supply chains involve various stakeholders from beekeeper to extraction plant, to packaging facilities along with transportation, laboratory testings and export partners involved at different stages before the jar reaches the consumer.

¹³ <http://nopr.niscair.res.in/bitstream/123456789/45823/1/JIPR%2023%284-5%29%20174-193.pdf>

¹⁴ https://ec.europa.eu/info/food-farming-fisheries/food-safety-and-quality/certification/quality-labels/quality-schemes-explained_en#pdo

¹⁵ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7171034/pdf/13197_2019_Article_4225.pdf

¹⁶ https://www.wipo.int/ipadvantage/en/articles/article_0205.html

Companies that operate more complex supply-chains and more stringent regulations typically adopt blockchain technology for management and traceability. Blockchain systems tend to be more costly to implement and often unaffordable to smaller-scale companies.

NFC tags technology is gaining popularity among retail brands and typically adopted by luxury and premium product brands. NFC has been long used for payments but increasingly brands are using these tags as a modern marketing and anti-counterfeit solution.

As seen in the case studies, Onuku Premium New Zealand Honey is already using this technology. NFC tags transmit information wirelessly over small distances, providing a bridge between a brand and its consumers. NFC tags can be embedded into physical products that would otherwise have no digital connectivity. Brands can deliver a range of consumer loyalty and upselling experiences within a tag the size of a coin by a simple tap of a smartphone without the need of specialised apps. Like basic QR codes, NFC tags are not completely counterfeit-proof. However, as greater sophistication is required to copy the tags compared to QR codes, many companies are choosing NFC tags with their offer of the additional benefit of brand protection and product authentication features.

The case studies in section 4.1 reveal that currently most honey companies are either using batch numbering, QR codes or a combination of both for traceability and quality assurance purposes. Although NFC tags are not mainstream within the honey industry, they will most likely become increasingly used by premium honey brands given the level of security they provide.

QR Codes and Their Limitations

There are numerous free QR code generator services available online. QR codes serve various purposes such as in inventory management, to provide consumers with information about a product or as part of marketing campaigns. Since basic QR codes would link to a web URL, having a website containing the relevant information about the product would be the first step before using QR Codes.

Although basic QR codes are ubiquitous, this standard technology has one key flaw – QR codes can be copied and counterfeited if they do not have multiple levels of authentication and security. QR codes were not designed for anti-counterfeiting purposes, rather they are a convenient way to store links that easily lead a user to useful information. Basic QR codes are open source and can be created and copied by anyone. Counterfeiters can photocopy a product's basic QR code and link it to the authentic product's website without any difficulty.

In response to this issue, evolving and emerging QR brand protection technologies are offering various anti-counterfeit and brand protection solutions with the additional benefit of customer engagement. Protected QR codes have security measures embedded invisible to the eye. They are designed to outperform the basic QR codes through two-factor overt and covert authentication combined with unique serialisation and provide instant verification of a product using dedicated apps on smartphones. Unlike basic QR codes, the new types of QR codes cannot be reproduced.

QR Code and GS1 Digital Link

QR codes are typically linked to a website URL containing static information. GS1 Digital Link-formatted Uniform Resource Identifier (URI)¹⁷ allows QR codes, bar codes and other types of codes to connect to all types of business-to-business and business-to-consumer information. With the GS1 Digital Link, the same QR code or barcode provides different sets of information depending on who scans it, where it is being scanned and the tool being used to scan it. Although the GS1 Digital Link provides unique experiences to different groups of users through one code, it is not a counterfeit protection solution unless a protected code is used to link to it.

A scenario of a Digital Link URI is the case of consumers wanting more detailed nutritional information and additional recipes for a cake mix¹⁸. They can use their smartphone (no specific app required) to scan a QR code on the package that contains a GS1 Digital Link URI. The phone points them to a brand-owned web page that provides nutrition and recipe information—as well as other product information and/or brand experiences. If

¹⁷ <https://www.gs1au.org/what-we-do/standards/digital-link>

¹⁸ https://www.gs1.org/sites/default/files/digital_link_factsheet_2019.pdf

the same consumer uses a retailer app to scan the exact same QR code, they can be connected to different experiences such as ordering products, collecting loyalty points and “sharing” products with friends on social media. It is envisioned that the same QR code will be scannable at the checkout counter, thus setting the foundation for the future of codes on packaging.

The AgriFutures Australia “Consumer Trends and Storytelling Technologies” report (2020)¹⁹ details recent research about why consumers are interested in provenance stories and the technologies and platforms they are adopting to help communicate them. One of the short case studies provided is Mowi Salmon, illustrating how it is using GS1 Digital Link technologies to support its provenance stories.

Examples of GS1 Digital Link: MOWI Salmon

Figure 13: Mowi Salmon QR Code



Mowi Salmon, the world’s largest producer of Atlantic salmon, launched its end-to-end food traceability platform in May 2019, delivering full visibility into provenance of its salmon. Mowi products’ QR codes (Figure 13) carry the new GS1 Digital Link standard to provide consumers direct access and visibility to item-specific product traceability information. Consumers can get full insight into how Mowi operates and cares for its salmon, including origination, farming activities and harvesting through the product item’s unique QR-code. The GS1 Digital link allows for the linking of data from different production and supply chain systems used by Mowi allowing for detailed information such as:

- when the egg was hatched
- in which freshwater facility it was raised
- what food the salmon was fed
- when and where the fish were harvested
- the size, age and weight of the fish.

The data is grouped at batch level, which allows granular traceability back into the supply chain for quality control purposes.

¹⁹ <https://www.agrifutures.com.au/wp-content/uploads/2020/02/19-062.pdf>

Traceability Options for the Australian Honey Industry

Current practice within the Australian honey industry shows a lack of conformity to the food labelling regulations, non-standard batch numbering systems and inaccessibility of provenance information to consumers.

The digitisation of B-QUAL is designed to improve the efficiency of beekeepers' physical traceability and auditing processes for HACCP and biosecurity. Coupled with the Australian Honey library project, to build the databases against which Australian honey can be verified, this system can be leveraged by the honey industry to build a quality assurance system. Information relevant to consumers such as key honey markers and descriptors, laboratory certificate of analysis, and the story of flora from hive to jar, can all be presented on one platform to build a robust quality assurance system for Australian honey.

For honey packers who are already printing batch numbers onto their labels, adding a QR code which links to a web URL containing information about the honey, would add a new dimension. This option is not counterfeit proof and open to exploitation. Although counterfeiters tend to be a step ahead and challenge even the latest security tools and technologies, the aim is to adopt enough layers of security that would render counterfeiting non-profitable and eventually deter counterfeiting activities.

B-QUAL is a bee-industry established and trusted quality assurance program for the Australian beekeepers and packers. Products bearing the B-QUAL logo offer the opportunity to enhance consumer confidence. Potential traceability options for the honey industry (Table 3) each convey quality assurance and a product provenance story with increasing level of sophistication and counterfeit protection. In all the options provided, including GI would transform Australian honey into a high value, premium product.

Option 1 is the least costly but offers little counterfeit protection. Options 3 to 5 would require specialised printing of labels offering brand protection and provenance verification of the product. Option 6 considers the use of NFC tag technology provided by specialised companies for an extra layer of protection.

Table 3: Traceability technologies and their features

Option	Traceability technology	Features	Benefits
1	<ul style="list-style-type: none"> - Basic QR Code - Batch number - B-QUAL logo - Geographical Indication 	<ul style="list-style-type: none"> - QR code and batch number can be printed directly onto labels or on stickers - Web URL with batch number search feature which provides information about the honey - B-QUAL logo acts as the official quality assurance mark - B-QUAL & the Australian honey library data can tell the provenance story - A honey GI adds an extra level of quality assurance which can attract a premium 	<p>The batch number is continually changing. Consumers can check the time of production and if has been too long, this would raise questions.</p> <p>The labelling would need to continually change, adding a barrier to counterfeiting practices.</p>
2	<ul style="list-style-type: none"> - GS1 Digital Link - Basic QR code - Batch number - B-QUAL logo - Geographical Indication 	<ul style="list-style-type: none"> - GS1 Digital link provides more versatility than web URL by connecting all partners involved in the supply chain to deliver a provenance story - Allows for the tracking of multiple marketing campaigns through the QR code 	<p>Option 2 connects partners involved offering more trust in the hive to jar story. In addition to this, multiple marketing campaigns can be tracked which can help businesses focus their marketing efforts on the more successful ones.</p>
3	<ul style="list-style-type: none"> - Protected company logo - Batch number - B-QUAL logo - Geographical Indication 	<ul style="list-style-type: none"> - Protected code technology is used for the company logo as a verification of product authenticity. Protected QR code is more difficult to copy adding another level of security. 	<p>Option 3 uses protected QR code technology adapted to the company logo. By using specialised mobile app, consumers can check product authenticity.</p>
4	<ul style="list-style-type: none"> - Batch number - Protected B-QUAL logo - Geographical Indication (optional) 	<ul style="list-style-type: none"> - Protected code technology is used for B-QUAL logo, which acts as both a quality assurance and product authenticity mark. Protected B-QUAL logo stickers can be applied to products. 	<p>Instead of the protected company logo in option 3, option 4 uses protected QR code technology adapted to the B-QUAL logo. Through a specialised mobile app, consumers can check both quality assurance and product authenticity.</p>
5	<ul style="list-style-type: none"> - Protected QR code - Batch number - GS1 Digital link - B-QUAL Logo - Geographical Indication 	<ul style="list-style-type: none"> - Protected QR code is used to verify product authenticity before redirecting to product information - Can be linked with GS1 Digital Link for more provenance information options and running of marketing campaigns 	<p>Option 5 is the latest QR code technology to verify product authenticity.</p>
6	<ul style="list-style-type: none"> - Secured Near-Field Communication (NFC) tag - QR code -Batch number - B-QUAL Logo - Geographical Indication 	<ul style="list-style-type: none"> - Secured NFC is used to verify product authenticity without app before redirecting to product information - QR code offers another option for consumers to authenticate the product if their smartphone is not compatible with NFC tag reading 	<p>Secured NFC tags are costly and difficult to replicate. NFC tags connect consumers to various experiences and businesses can run and track marketing campaigns for each batch and increase customer loyalty</p>

Appendix 1: Honey containers captured at Perth stores

	Napoli Mercato		
1			
2			
3			



7	 <p>ZEEZ BEEZ Hand Crafted Raw Honey Honey Float Handcrafted Homestead 500g</p>	 <p>Ingredients: Pure Honey, Bees Wax, Pollen.</p> <p>Nutritional Information</p> <table border="1"> <thead> <tr> <th>Serving size: 20g</th> <th>Avg per 20g</th> <th>Per 100g</th> </tr> </thead> <tbody> <tr> <td>Energy</td> <td>280kJ</td> <td>1401kJ</td> </tr> <tr> <td>Protein</td> <td>0.05g</td> <td>0.3g</td> </tr> <tr> <td>Fat - Total</td> <td>0g</td> <td>0g</td> </tr> <tr> <td>- Saturated</td> <td>0g</td> <td>0g</td> </tr> <tr> <td>Carbohydrate</td> <td>12.3g</td> <td>61.5g</td> </tr> <tr> <td>- Sugars</td> <td>12.3g</td> <td>61.5g</td> </tr> <tr> <td>Sodium</td> <td>2mg</td> <td>10mg</td> </tr> </tbody> </table> <p>BEST BEFORE 8.33.2022</p> <p>Product of Australia 0 797776 156863</p>	Serving size: 20g	Avg per 20g	Per 100g	Energy	280kJ	1401kJ	Protein	0.05g	0.3g	Fat - Total	0g	0g	- Saturated	0g	0g	Carbohydrate	12.3g	61.5g	- Sugars	12.3g	61.5g	Sodium	2mg	10mg				
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8	 <p>raw food factory raw Honey certified organic</p> <p>03/2025</p>	<p>Raw Food Factory Marri Honey is gathered from ancient forests and woodlands of the south west of Western Australia. Raw Food Factory honey is not heat treated or processed, honey will crystallise (go hard) if it is natural. Please put honey in a bowl of hot water until honey returns to liquid.</p> <p>Nutritional Information</p> <table border="1"> <thead> <tr> <th>Serving Size: 21g</th> <th>Net 495g</th> <th>Per 100g</th> </tr> <tr> <th>Average Quantities</th> <th>Per serve</th> <th>100%</th> </tr> </thead> <tbody> <tr> <td>Energy</td> <td>210kJ</td> <td>0.38</td> </tr> <tr> <td>Protein</td> <td>0g</td> <td>0%</td> </tr> <tr> <td>Fat (total)</td> <td>0g</td> <td>0%</td> </tr> <tr> <td>- Saturated</td> <td>0g</td> <td>0%</td> </tr> <tr> <td>Carbohydrates (total)</td> <td>12.3g</td> <td>2.48</td> </tr> <tr> <td>- Sugars</td> <td>12.3g</td> <td>2.48</td> </tr> <tr> <td>Sodium</td> <td>2mg</td> <td>0.004</td> </tr> </tbody> </table> <p>Product of Australia</p>	Serving Size: 21g	Net 495g	Per 100g	Average Quantities	Per serve	100%	Energy	210kJ	0.38	Protein	0g	0%	Fat (total)	0g	0%	- Saturated	0g	0%	Carbohydrates (total)	12.3g	2.48	- Sugars	12.3g	2.48	Sodium	2mg	0.004	
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10	 <p>Fremantle Food Co. Queen Street 150g West Australian Raw Honey</p>	 <p>BATCH #: 13</p> <p>NUTRITIONAL INFORMATION</p> <table border="1"> <thead> <tr> <th>Servings per package: 30</th> <th>per serve</th> <th>per 100g</th> </tr> </thead> <tbody> <tr> <td>Avg Qty</td> <td>197kJ</td> <td>0.38</td> </tr> <tr> <td>Energy</td> <td>0.04g</td> <td>0%</td> </tr> <tr> <td>Protein</td> <td>0g</td> <td>0%</td> </tr> <tr> <td>Fat - Total</td> <td>0g</td> <td>0%</td> </tr> <tr> <td>Fat - Saturated</td> <td>12.3g</td> <td>2.48</td> </tr> <tr> <td>Carbohydrate</td> <td>12.3g</td> <td>2.48</td> </tr> <tr> <td>Sugars</td> <td>2.1mg</td> <td>0.004</td> </tr> <tr> <td>Sodium</td> <td></td> <td></td> </tr> </tbody> </table> <p>Fremantle Food Co.</p>	Servings per package: 30	per serve	per 100g	Avg Qty	197kJ	0.38	Energy	0.04g	0%	Protein	0g	0%	Fat - Total	0g	0%	Fat - Saturated	12.3g	2.48	Carbohydrate	12.3g	2.48	Sugars	2.1mg	0.004	Sodium			
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12

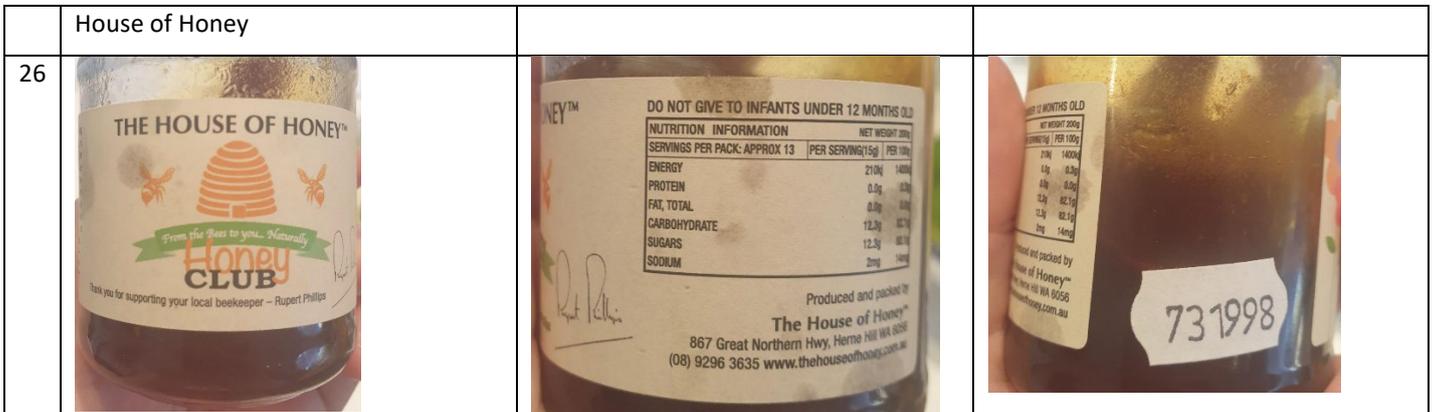


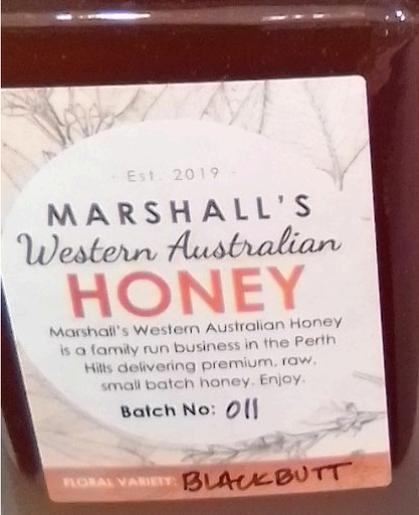
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18		 <p>BEE CAUSE www.beechworthhoney.com.au #onepercentfortheplanet.org @beechworthhoney_because</p> <p>100% AUSTRALIAN HONEY... ALWAYS!</p> <p>MOUNTAIN HONEY INGREDIENTS 100% Australian Honey. Not suitable for children under 12 months of age. Store at room temperature. If honey crystallises or becomes too thick, liquefy by standing jar in hot water. Beechworth Honey Pty Ltd 31 Ford Street Beechworth Vic 3747 Australia +61 2 6033 2322 info@beechworthhoney.com.au</p> <p>NUTRITION INFORMATION</p> <table border="1"> <thead> <tr> <th>Servings per package</th> <th>Per 25g</th> <th>Per 100g</th> </tr> </thead> <tbody> <tr> <td>14</td> <td>25g</td> <td>100g</td> </tr> <tr> <td>Energy</td> <td>362kJ</td> <td>1401kJ</td> </tr> <tr> <td>Protein</td> <td>0.1g</td> <td>0.3g</td> </tr> <tr> <td>Fat - Total</td> <td>0.0g</td> <td>0.0g</td> </tr> <tr> <td>Carbohydrates</td> <td>23.0g</td> <td>82.1g</td> </tr> <tr> <td>Sugars</td> <td>23.0g</td> <td>82.1g</td> </tr> <tr> <td>Sodium</td> <td>4mg</td> <td>14mg</td> </tr> </tbody> </table> <p>Product of Australia from 100% Australian Honey BCMGUNISD400 18 101</p>	Servings per package	Per 25g	Per 100g	14	25g	100g	Energy	362kJ	1401kJ	Protein	0.1g	0.3g	Fat - Total	0.0g	0.0g	Carbohydrates	23.0g	82.1g	Sugars	23.0g	82.1g	Sodium	4mg	14mg									
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<p>21</p>		<p>AT B HONEY IT ALL STARTS WITH A BEE. Our pure honey is sourced directly from Aussie bees. By enjoying B Honey, you're supporting the local honey industry through our Purple Hive Project - protecting Australian bees and the environment. Find out more at: PURPLEHIVEPROJECT.COM.AU</p> <p>PURPLE HIVE PROJECT B 21149 P 211931328</p> <p>Product of Australia</p> <p>HONEY INGREDIENTS: HONEY (100%)</p> <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">SERVINGS PER PACKAGE: 30</th> <th colspan="2">SERVINGS PER 100g</th> </tr> <tr> <th>PER SERVING</th> <th>% DAILY INTAKE*</th> <th>PER SERVING</th> <th>% DAILY INTAKE*</th> </tr> </thead> <tbody> <tr> <td>ENERGY</td> <td>213 kJ</td> <td>2%</td> <td>601 kJ</td> <td>12%</td> </tr> <tr> <td>PROTEIN</td> <td><1.0 g</td> <td><1%</td> <td>1.0 g</td> <td>2%</td> </tr> <tr> <td>FAT TOTAL</td> <td>0.0 g</td> <td>0%</td> <td>0.0 g</td> <td>0%</td> </tr> <tr> <td>- SATURATED</td> <td>0.0 g</td> <td>0%</td> <td>0.0 g</td> <td>0%</td> </tr> <tr> <td>CARBOHYDRATE</td> <td>12.5 g</td> <td>4%</td> <td>83.1 g</td> <td>17%</td> </tr> <tr> <td>- SUGARS</td> <td>12.4 g</td> <td>4%</td> <td>82.8 g</td> <td>17%</td> </tr> <tr> <td>SODIUM</td> <td>2mg</td> <td><1%</td> <td>14mg</td> <td>0%</td> </tr> </tbody> </table> <p>*Based on an average adult diet of 8700 kJ. < = Less than. *Sugars naturally occurring in honey.</p> <p>IT ALL STARTS WITH A BEE. PURPLE HIVE PROJECT, the B device and the PURPLE HIVE PROJECT are the trade marks of Bees & Co. Limited.</p> <p>STORE IN A COOL, DRY PLACE. IF THIS NATURAL HONEY CRYSTALLISES, PLACE THE BOTTLE IN WARM WATER.</p> <p>BECA CHEESE LIMITED, 1 VEGEMITE HWY, PORT MELBOURNE, VICTORIA 3207, AUSTRALIA CONSUMER ADVISORY SERVICE AU: 1800 671 833 NZ: 0800 632 455</p> <p>AUSTRALIAN OWNED & MADE</p> <p>9 352042 003091 ></p>		SERVINGS PER PACKAGE: 30		SERVINGS PER 100g		PER SERVING	% DAILY INTAKE*	PER SERVING	% DAILY INTAKE*	ENERGY	213 kJ	2%	601 kJ	12%	PROTEIN	<1.0 g	<1%	1.0 g	2%	FAT TOTAL	0.0 g	0%	0.0 g	0%	- SATURATED	0.0 g	0%	0.0 g	0%	CARBOHYDRATE	12.5 g	4%	83.1 g	17%	- SUGARS	12.4 g	4%	82.8 g	17%	SODIUM	2mg	<1%	14mg	0%	
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<p>29</p>	<p>Goodlife Health Foods</p> 		<p>Our honey is proudly 100% natural, cold filtered and unprocessed straight from the beehive to jar. We have kept all the goodness, maximise taste, and keep all the good enzymes untouched for natural health benefits.</p> <p>INGREDIENTS: 100% Raw Australian Honey</p> <p>NUTRITION INFORMATION SERVINGS PER PACKAGE: 19 SERVING SIZE: 1 Tbsp (21g)</p> <table border="1"> <thead> <tr> <th></th> <th>Per Serve 21g</th> <th>% Daily Value*</th> </tr> </thead> <tbody> <tr> <td>Calories (cal)</td> <td>60</td> <td></td> </tr> <tr> <td>Total Fat (g)</td> <td>0</td> <td></td> </tr> <tr> <td>Sodium (mg)</td> <td>17</td> <td></td> </tr> <tr> <td>Total Carb. (g)</td> <td>16</td> <td></td> </tr> <tr> <td>- Sugars ** (g)</td> <td>0</td> <td></td> </tr> <tr> <td>Protein (g)</td> <td></td> <td></td> </tr> </tbody> </table> <p>* Percent Daily Values (DV) are based on a diet of 2000 calories. ** Sugars naturally occurring in honey. Store at room temperature.</p> <p>BATCH No: APR 2019</p>		Per Serve 21g	% Daily Value*	Calories (cal)	60		Total Fat (g)	0		Sodium (mg)	17		Total Carb. (g)	16		- Sugars ** (g)	0		Protein (g)					
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36			
37			
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<p>39</p>		<p>Harvested by our specialist beekeepers along the East Coast of Australia in pristine bushland to produce the finest quality Maruka Honey. Maruka Honey contains naturally occurring phenols and acts as the perfect natural sweetener.</p> <p>MGO 50+ For General Health and Wellbeing</p> <p>Directions for use: Consume 1-2 teaspoonsful (10g) before meals. Alternatively use in a delicious spread.</p> <p>Store below 18°C. Not suitable for children under one year.</p> <p>Honey Australia 2 Hill End Rd Mudgee NSW 2855 www.honeyaustralia.net.au</p> <p>#honeyaustralia</p> <p>Made in Australia from 100% Australian honey</p> <p>Ingredients: 100% Australian Honey.</p> <p>Best Before: 24/08/2024 Batch: MBZ1218-WA</p> <p>9 335217 009524</p>																																					
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<p>41</p>		<p>DROUGHT & BUSHFIRES Have damaged the environment and honey production. Your support means more now than ever.</p> <p>NUTRITION INFORMATION Serving size: Approx. 25g</p> <table border="1"> <thead> <tr> <th></th> <th>Avg. Quantity Per serving</th> <th>%Daily Intake*</th> <th>Avg. Quantity Per 100g</th> </tr> </thead> <tbody> <tr> <td>Energy</td> <td>350kJ (84Cal)</td> <td>4%</td> <td>1400kJ (335Cal)</td> </tr> <tr> <td>Protein</td> <td>LESS THAN 1g</td> <td>0%</td> <td>LESS THAN 1g</td> </tr> <tr> <td>Fat - total</td> <td>0.0g</td> <td>0%</td> <td>0.0g</td> </tr> <tr> <td>- saturated</td> <td>0.0g</td> <td>0%</td> <td>0.0g</td> </tr> <tr> <td>Carbohydrate</td> <td>20.5g</td> <td>7%</td> <td>82.1g</td> </tr> <tr> <td>- sugars</td> <td>20.5g</td> <td>23%</td> <td>82.1g</td> </tr> <tr> <td>Dietary Fibre, total</td> <td>0.0g</td> <td>0%</td> <td>0.0g</td> </tr> <tr> <td>Sodium</td> <td>LESS THAN 5mg</td> <td>0%</td> <td>14mg</td> </tr> </tbody> </table> <p>*Percentage Daily Intakes are based on an average adult diet of 8700kJ.</p> <p>INGREDIENTS Australian Honey.</p> <p>STORAGE Store in a cool, dry place.</p> <p>Product of Australia</p> <p>Coles is a trade mark used under licence from Coles Group Limited, 800 Toorak Road, Hawthorn East, VIC 3123. Call 1800 061 562 www.coles.com.au</p> <p>TRY IT. LOVE IT. OR YOUR MONEY BACK.</p> <p>A0078-0001</p> <p>9 310645 251952</p>		Avg. Quantity Per serving	%Daily Intake*	Avg. Quantity Per 100g	Energy	350kJ (84Cal)	4%	1400kJ (335Cal)	Protein	LESS THAN 1g	0%	LESS THAN 1g	Fat - total	0.0g	0%	0.0g	- saturated	0.0g	0%	0.0g	Carbohydrate	20.5g	7%	82.1g	- sugars	20.5g	23%	82.1g	Dietary Fibre, total	0.0g	0%	0.0g	Sodium	LESS THAN 5mg	0%	14mg	
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Appendix 2: Summary of labelling information found on a sample of WA honey containers

	Store	Local/ Imported/Mix	Brand	Name and/or description of the food	Batch number	Business name and street address	List of ingredients	Nutrition information panel	Country of origin kangaroo logo / Bar Graph	Weight	Quality Assurance Logo (Optional)
1	Napoli Mercato	Local	Karri Forrest Honey	Yes	No	Yes	Yes	Yes	Yes	Yes	No
2	Napoli Mercato	Local	WA Wild Flower Forrest Blend	Yes	No	No	No	No	Yes	Yes	No
3	Napoli Mercato	Local	Melisseus WA Jarrah Honey	Yes	Batch code printed on label	Yes	Yes	No	Yes	Yes	Realsource certified – No longer in operation
4	Napoli Mercato	Local	Elixir Jarrah Honey	Yes	Batch code printed on label	Yes	Yes	Yes	Yes	Yes	No
5	Napoli Mercato	Local	Hunnie	Not on front of label	No	No	Not clear	Yes	Yes	Yes	No
6	Napoli Mercato	Local	Postcode Honey	Yes	Packing date printed on label	Yes	Yes	Yes	Yes	Yes	No
7	Napoli Mercato	Local	Zeez Beez	Yes	Batch code on sticker	No	Yes	Yes	Yes	Yes	No
8	Napoli Mercato	Local	Raw Food Factory	Yes	Best before date on sticker	Yes	No	Yes	Yes	Yes	Australian Certified Organic
9	Napoli Mercato	Local	West Swan Natural Honey	Yes	Best before date on sticker	No	No	No	Yes	Yes	No
10	Napoli Mercato	Local	Fremantle Food Co.	Yes	Batch code written with marker on label	Yes	No	Yes	Yes	Yes	No
11	Napoli Mercato	No mention	Stonebarne Black truffle Honey	Yes	Best before date sticker at the bottom	No	No	Yes	No	Yes	No
12	Napoli Mercato	Local	Beekeepers Natural Honey	Yes	No	Yes	No	Yes	No	Yes	No
13	IGA	Local	Swan Valley Honey	Yes	Best Before date sticker	Yes	Yes	Yes	Yes	Yes	No
14	IGA	Local	Community Co.	Yes	Batch number printed on label	Yes	Yes	Yes	Yes	Yes	No
15	IGA	Mix	Chandler's Pure Honey	Yes	Packing date on lid	Yes	Yes	Yes	Not 100% Australian	Yes	No
16	Woolworths	Local	Wescobee	Yes	Packing date printed on lid	Yes	Yes	Yes	Yes	Yes	No

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17	Woolworths	Local	Fewster's Farm Honey	Yes	Best before date sticker	Yes	Yes	Yes	Yes	Yes	No
18	Woolworths	Local	Bee Cause	Yes	Batch code printed on label	Yes	Yes	Yes	Yes	Yes	No
19	Woolworths	Local	Beechworth Honey	Yes	Batch code printed on label	Yes	Yes	Yes	Yes	Yes	No
20	Woolworths	Local	Cloverdale Honey	Yes	Batch code printed on label	Yes	Yes	Yes	Yes	Yes	No
21	Woolworths	Local	B Honey	Yes	Batch code printed on label	Yes	Yes	Yes	Yes	Yes	No
22	Woolworths	Mix	Gardener Blossom Honey	Yes	Best before date printed on lid	Yes	Yes	Yes	Yes	Yes	No
23	Woolworths	Local	Golden Nectar	Yes	Batch code on side of lid	Yes	Yes	Yes	Yes	Yes	Certified Organic
24	Woolworths	Local	Capilano	Yes	Printed on container	Yes	Yes	Yes	Yes	Yes	No
25	Woolworths	Local	Nate's Honey	Yes	Best before date and Batch code printed on label	Yes	Yes	Yes	Yes	Yes	No
26	The House of Honey	Local	Honey Club	Yes	Batch code sticker	Yes	No	Yes	Yes	Yes	No
27	The House of Honey	Local	The House of Honey	Yes	Batch code printed on price sticker	Yes	Yes	Yes	Yes	Yes	No
28	West Coast Honey	Local	West Coast Honey	Yes	Filled date/Drum Num/Name of person who filled on label	Yes	Yes	Yes	Yes	Yes	B Qual
29	Goodlife Health Foods	Local	South West Honey	Yes	Packing date written on label	Yes	Yes	Yes	No	Yes	No
30	Goodlife Health Foods	Local	Roogenic Honey	Yes	Best before date on sticker at the bottom of jar	Yes	Yes	Yes	Yes	Yes	No
31	Goodlife Health Foods	Local	Marshall's WA Honey	Yes	Batch code written on label	Yes	No	Yes	Yes	Yes	No
32	Goodlife Health Foods	Local	Barne's Natural	Yes	No	Yes	Yes	Yes	Yes	Yes	Australian Manuka Honey Association (AMHA)
33	Aldi	Local	Branwell's WA Honey	Yes	Packing date printed on lid	Yes	Yes	Yes	Yes	Yes	No
34	Aldi	Local	Bramwell's Manuka Honey	Yes	No	Yes	Yes	Yes	Yes	Yes	No

35	Aldi	Mix	Bramwell's Mixed Blossom Honey	Yes	Batch code printed on container	Yes	Yes	Yes	Yes	Yes	No
36	Asian market Thornlie	Local	Old Forest WA Honey	Yes	No	Yes	Yes	Yes	Yes	Yes	No
37	Coles	Local	Fewster's Farm	Yes	Batch code printed on back of label	Yes	No	Yes	Yes	Yes	No
38	Coles	Local	Australian Red Gum Honey	Yes	No	Yes	Yes	Yes	Yes	Yes	No
39	Coles	Local	Honey Australia Manuka Honey	Yes	Batch code printed on label	Yes	Yes	Yes	Yes	Yes	No
40	Coles	Mix	The Honey Collective	Yes	Packing date printed on container	No	Yes	Yes	Yes	Yes	No
41	Coles	Local	Coles Pure Honey	Yes	No	Yes	Yes	Yes	Yes	Yes	No
42	Coles	Local	Coles Pure Honey	Yes	Packing date printed on lid	Yes	Yes	Yes	Yes	Yes	No
43	DFO	Local	Karribee	Yes	Manufactured, packing date & best before date printed on label	Yes	Yes	Yes	Yes	Yes	HACCP, Halal, Australian Manuka Honey Association



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