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Certificate of Analysis

Client:	Midlands Apiaries Limited	**Lab No:**	3378208 HGPv1
Contact:	Lily Zhao	**Date Received:**	04-Oct-2023
	C/- Midlands Apiaries Limited	**Date Reported:**	09-Oct-2023
	PO Box 65	**Quote No:**	70096
	Ashburton 7740	**Order No:**	
		Client Reference:	Organic/Tokyo Europe/Nubu
		Submitted By:	Lily Zhao

Sample Type: Honey

Sample Name:		290923B1
Lab Number:		3378208.1
MPI Manuka Classification		
MPI Manuka Honey Classification		Monofloral Manuka Honey
3-Phenyllactic acid (3-PA)	mg/kg	500
2'-Methoxyacetophenone (2'-MAP)	mg/kg	6.4
2-Methoxybenzoic acid (2-MBA)	mg/kg	4.1
4-Hydroxyphenyllactic acid (4-HPA)	mg/kg	4.1
Manuka DNA	Cq	26.57
Manuka Honey Analysis		
Dihydroxyacetone (DHA)	mg/kg	289
5-Hydroxymethylfurfural (HMF)	mg/kg	27.0
Methylglyoxal (MGO)	mg/kg	161
Non Peroxide Activity (NPA)*	% Phenol Equivalent	7.4
Leptosperin	mg/kg	172
Tutin Analysis		
Tutin Result Evaluation	Pass/Fail	PASS
Tutin	mg/kg	0.024
MRL as per Tutin in Honey Food Standard 2016	mg/kg	0.70
C-4 Sugar Analysis - AOAC method		
δ ^{13}C Honey (Whole)	‰	-25.89
δ ^{13}C Honey (Protein)	‰	-26.81
Difference (Whole - Protein)	‰	0.9
C-4 Sugar Content	%	5.4
Microbiological Analysis		
Aerobic Count 35°C	cfu / g	45
Yeasts & Moulds	cfu / g	10
American Foulbrood Analysis		
American Foulbrood (AFB)		Not Detected

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Honey		
Sample Name:		290923B1
Lab Number:		3378208.1
American Foulbrood (AFB)	Spores and/or cells per g	< 36
Diatase Analysis		
Diastase Activity	DN	11.4
Glyphosate Analysis		
AMPA	mg/kg	< 0.010
Glufosinate	mg/kg	< 0.010
Glyphosate	mg/kg	< 0.010

Analyst's Comments

Sample 1 Comment:
Please note: This result of "Not Detected" could include situations where late amplification of one or both AFB markers was seen, past the limit of detection (LOD) of the assay (i.e. 1-35 cells and/or spores per g).

Sample 1 Comment:
C-4 Sugar Content:
As reported in AOAC method 998.12, pure honey (free of corn or cane sugars) with an exception of a few unusual varieties, yields a C-4 Sugar Content value of less than or equal to 7%. Some unusual varieties may slightly exceed this value, but will have a d ^{13}C for honey which is in the normal range (more negative than -24.0‰).

Sample 1 Comment:
The results presented on the Certificate of Analysis have been rounded to an appropriate number of significant figures, based on the Uncertainty of Measurement of the methods performed. The 'MPI Manuka Honey Classification' has been determined using unrounded values. In cases where one or more values were close to the critical levels (as defined by MPI), there may be a seeming inconsistency between the classification and the rounded values reported.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Honey			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Diastase Activity	Aqueous extraction, analysed using the Phadebas amylase method. Diastase activity is expressed as the diastase number, equivalent to Schade units.	2.0 DN	1
3-in-1 Honey method	Aqueous extraction, derivatisation. Analysis by uHPLC / UV-Vis (dihydroxyacetone, 5-hydroxymethylfurfural, methylglyoxal). In-house.	1.0 - 10 mg/kg	1
C-4 Sugars Analysis - AOAC method	Methodology was performed in accordance with AOAC Official Method 998.12 (Revised First Edition 2013), C-4 Plant Sugars in Honey, using Internal Standard Stable Carbon Isotope Ratio Analysis (ISCIRA). All isotope ratios are reported as 'per mil' i.e. parts per thousand (‰), and are reported relative to the international standard for Carbon, V-PDB.	-	1
Leptosperin	Aqueous extraction, dilution, analysis by LC-MS/MS.	15 mg/kg	1
Non Peroxide Activity (NPA)*	NPA is calculated from methylglyoxal using an industry accepted correlation curve based on published data[1,2] for NPA and the primary active ingredient, methylglyoxal. [1] Isolation by HPLC and characterisation of the bioactive fraction of New Zealand manuka (Leptospermum scoparium) honey. C. J. Adams, et al. Carbohydrate Research 343 (2008) 651-659. [2] Corrigendum to "Isolation by HPLC and characterization of the bioactive fraction of New Zealand manuka (Leptospermum scoparium) honey" [Carbohydr. Res. 343 (2008) 651]. C. J. Adams, et al. Carbohydrate Research 344 (2009) 2609.	1.0 % Phenol Equivalent	1

Sample Type: Honey			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Tutin Analysis in Honey	Solvent extraction, dilution. Analysis by LC-MS/MS. Results are representative of the liquid honey, not the sample as a whole. *Please note the Pass/Fail criteria is for extracted honey only. For comb honey tutin criteria please refer to the MPI Food Standard: Tutin in Honey.* Tutin Result Evaluation (PASS/FAIL) The PASS/FAIL result is based on comparison of the tutin result with the "Food Standard: Tutin in Honey (2016)". A result that falls at or BELOW the maximum permitted tutin level will give a PASS result. A result that falls ABOVE the maximum permitted tutin level will give a FAIL result. Individual Sample Testing Recommended? Where a tutin result for a composited sample is above the maximum permitted level, it is recommended that the individual samples are retested. Please contact the laboratory to arrange for individual sample retesting. **RLP Official Test 8.42**.	0.010 mg/kg	1
Aerobic Count 35°C	Automated MPN count on TEMPO AC, Incubated at 35°C for 22-28 hours. bioMérieux, TEMPO.	10 cfu / g	1
Yeasts & Moulds	Automated MPN count on TEMPO YM, Incubated at 25°C for 72-76 hours. bioMérieux, TEMPO.	10 cfu / g	1
Glyphosate LCMSMS Analysis	Aqueous extraction, Analysis by LC-MS/MS. In-house. **RLP Official Test 8.47.1**.	0.010 mg/kg	1
MPI 5 Attributes Tests			
MPI Manuka Honey Classification	Evaluation of results against Ministry of Primary Industries (MPI) criteria for classification of monofloral and multifloral Manuka honey. General Export Requirements for Bee Products - 27 October 2021.	-	1
Manuka Honey Chemistry Profile			
3-Phenyllactic acid (3-PA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. MPI Technical Paper 2017/30 (modified) **RLP Official Test 10.05**.	5 mg/kg	1
2'-Methoxyacetophenone (2'-MAP)	Aqueous solvent extraction, dilution. LC-MSMS analysis. MPI Technical Paper 2017/30 (modified) **RLP Official Test 10.05**.	0.5 mg/kg	1
2-Methoxybenzoic acid (2-MBA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. MPI Technical Paper 2017/30 (modified) **RLP Official Test 10.05**.	0.5 mg/kg	1
4-Hydroxyphenyllactic acid (4-HPA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. MPI Technical Paper 2017/30 (modified) **RLP Official Test 10.05**.	0.5 mg/kg	1
Manuka Honey PCR Profile			
Manuka DNA	Quantification of Manuka (*Leptospermum scoparium*) DNA by real time PCR. MPI Technical - Paper No: 2017/31 (modified). **RLP Official Test 10.04**.	> 36 Cq	1
American Foulbrood Profile			
American Foulbrood (AFB)	Quantification of Paenibacillus larvae, causative agent of American foulbrood (AFB), using real time PCR analysis. **RLP Official Test 2.14**.	36 Spores and/or cells per g	1

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 04-Oct-2023 and 07-Oct-2023. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

Shaun Clay BSc
Senior Technologist - Food and Bioanalytical