Hill Laboratories
TRIED, TESTED AND TRUSTED

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Midlands Apiaries Limited	**Lab No:**	2354417	HGPv1
Contact:	Claudine McCormick	**Date Received:**	18-Apr-2020	
	C/- Midlands Apiaries Limited	**Date Reported:**	23-Apr-2020	
	PO Box 65	**Quote No:**	70096	
	Ashburton 7740	**Order No:**		
		Client Reference:	Larnac	
		Submitted By:	Lily Zhao	

Sample Type: Honey

Sample Name:		180420B1-1				
Lab Number:		2354417.1				
MPI Manuka 5 Attributes Analysis						
MPI Manuka Honey Classification		Monofloral Manuka Honey	-	-	-	-
3-Phenyllactic acid (3-PA)	mg/kg	970	-	-	-	-
2'-Methoxyacetophenone (2'-MAP)	mg/kg	24	-	-	-	-
2-Methoxybenzoic acid (2-MBA)	mg/kg	8.8	-	-	-	-
4-Hydroxyphenyllactic acid (4-HPA)	mg/kg	8.1	-	-	-	-
Manuka DNA	Cq	29.63 #1	-	-	-	-
Manuka Honey Analysis						
Dihydroxyacetone (DHA)	mg/kg	1,120	-	-	-	-
5-Hydroxymethylfurfural (HMF)	mg/kg	21	-	-	-	-
Methylglyoxal (MGO)	mg/kg	714	-	-	-	-
Non Peroxide Activity (NPA)*	% Phenol Equivalent	18.3	-	-	-	-
Tutin Analysis						
Tutin Result Evaluation	Pass/Fail	PASS	-	-	-	-
Tutin	mg/kg	0.012	-	-	-	-
MRL as per Tutin in Honey Food Standard 2016	mg/kg	0.70	-	-	-	-
Microbiological Analysis						
Aerobic Count 35°C	cfu / g	44	-	-	-	-
Yeasts & Moulds	cfu / g	< 10	-	-	-	-

Analyst's Comments

#1 The Key Technical Personnel for this analysis is Eilidh Mowat.

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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Honey

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			

ilac-MRA IANZ ACCREDITED LABORATORY

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 *, which are not accredited.

Sample Type: Honey			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
3-in-1 Honey Method	Aqueous extraction, derivatisation. Analysis by UPLC-UV (dihydroxyacetone, 5-hydroxymethylfurfural, methylglyoxal).	-	1
Non Peroxide Activity (NPA)*	NPA is calculated from methylglyoxal using a correlation curve based on published data for NPA and the primary active ingredient, methylglyoxal. (1,2). (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
Tutin Analysis in Honey	Solvent extraction, SPE cleanup. Analysis by LCMSMS. Results are representative of the liquid honey, not the sample as a whole. **RLP Official Test 8.42** *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.* <u>Tutin Result Evaluation (PASS/FAIL)</u> 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. <u>Individual Sample Testing Recommended?</u> 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.	-	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
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, as per 'General Export Requirements for Bee Products - 29 January 2018.	-	1
Manuka Honey Chemistry Profile			
3-Phenyllactic acid (3-PA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. **RLP Official Test 10.05**.	10 mg/kg	1
2'-Methoxyacetophenone (2'-MAP)	Aqueous solvent extraction, dilution. LC-MSMS analysis. **RLP Official Test 10.05**.	1.0 mg/kg	1
2-Methoxybenzoic acid (2-MBA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. **RLP Official Test 10.05**.	1.0 mg/kg	1
4-Hydroxyphenyllactic acid (4-HPA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. **RLP Official Test 10.05**.	1.0 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 **RLP Official Test 10.04**.	1.00 Cq	1

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

Dates of testing are available on request. Please contact the laboratory for more information.

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.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Shaun Clay BSc
Senior Technologist - Food and Bioanalytical