

## Certificate of Analysis

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<b>Client:</b>	Happy Beekeeping Limited	<b>Lab No:</b>	3563774	HGPV1
<b>Contact:</b>	Dr Isaac Flitta C/- Happy Beekeeping Limited 414 Kerikeri Road Kerikeri 0230	<b>Date Received:</b>	30-Apr-2024	
		<b>Date Reported:</b>	01-May-2024	
		<b>Quote No:</b>	97667	
		<b>Order No:</b>		
		<b>Client Reference:</b>	Totika Nature Swiss	
		<b>Submitted By:</b>	Sara Samavati	

Sample Type: Honey			
<b>Sample Name:</b>			0065213
<b>Lab Number:</b>			3563774.1
<b>MPI Manuka Classification</b>			
MPI Manuka Honey Classification			Monofloral Manuka Honey
3-Phenyllactic acid (3-PA)	mg/kg		1,080
2'-Methoxyacetophenone (2'-MAP)	mg/kg		34
2-Methoxybenzoic acid (2-MBA)	mg/kg		10.8
4-Hydroxyphenyllactic acid (4-HPA)	mg/kg		9.6
Manuka DNA	Cq		28.16
<b>Manuka Honey Analysis</b>			
Dihydroxyacetone (DHA)	mg/kg		1,021
5-Hydroxymethylfurfural (HMF)	mg/kg		35.5
Methylglyoxal (MGO)	mg/kg		1,150
Non Peroxide Activity (NPA)*	% Phenol Equivalent		24.4

Analyst's Comments
<p><b>Sample 1 Comment:</b> 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.</p>

## 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			
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

Sample Type: Honey			
Test	Method Description	Default Detection Limit	Sample No
Non Peroxide Activity (NPA)*	NPA is calculated from methylglyoxal using an industry accepted correlation curve based on published data <sup>1,2</sup> for NPA and the primary active ingredient, methylglyoxal. <sup>1</sup> Isolation by HPLC and characterisation of the bioactive fraction of New Zealand manuka ( <i>Leptospermum scoparium</i> ) honey. C. J. Adams, et al. Carbohydrate Research 343 (2008) 651-659. <sup>2</sup> Corrigendum to "Isolation by HPLC and characterization of the bioactive fraction of New Zealand manuka ( <i>Leptospermum scoparium</i> ) honey" [Carbohydr. Res. 343 (2008) 651]. C. J. Adams, et al. Carbohydrate Research 344 (2009) 2609.	1.0 % Phenol Equivalent	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) <b>RLP Official Test 10.05.</b>	5 mg/kg	1
2'-Methoxyacetophenone (2'-MAP)	Aqueous solvent extraction, dilution. LC-MSMS analysis. MPI Technical Paper 2017/30 (modified) <b>RLP Official Test 10.05.</b>	0.5 mg/kg	1
2-Methoxybenzoic acid (2-MBA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. MPI Technical Paper 2017/30 (modified) <b>RLP Official Test 10.05.</b>	0.5 mg/kg	1
4-Hydroxyphenyllactic acid (4-HPA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. MPI Technical Paper 2017/30 (modified) <b>RLP Official Test 10.05.</b>	0.5 mg/kg	1
Manuka Honey PCR Profile			
Manuka DNA	Quantification of Manuka ( <i>Leptospermum scoparium</i> ) DNA by real time PCR. MPI Technical - Paper No: 2017/31 (modified). <b>RLP Official Test 10.04.</b>	> 36 Cq	1

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

Testing was completed between 30-Apr-2024 and 01-May-2024. 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.

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

Bruce Morris PhD  
Senior Technologist - Food & Bioanalytical