



## Certificate of Analysis

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<b>Client:</b>	Barton Holdings Limited	<b>Lab No:</b>	2557255	HGPV1
<b>Contact:</b>	Brett Mascull C/- Barton Holdings Limited PO Box 7021 Fitzroy New Plymouth 4312	<b>Date Received:</b>	16-Mar-2021	
		<b>Date Reported:</b>	17-Mar-2021	
		<b>Quote No:</b>	108459	
		<b>Order No:</b>		
		<b>Client Reference:</b>	Ben Collier	
		<b>Submitted By:</b>	Brett Mascull	

### Sample Type: Honey

Sample Name:	BC-00700-1	BC-00700-2	BC-00700-3	BC-00700-4	BC-00700-5	
Lab Number:	2557255.1	2557255.2	2557255.3	2557255.4	2557255.5	
<b>Manuka Honey Analysis</b>						
Dihydroxyacetone (DHA)	mg/kg	2,990	2,940	2,990	2,940	3,020
5-Hydroxymethylfurfural (HMF)	mg/kg	3.1	2.2	3.2	2.0	3.2
Methylglyoxal (MGO)	mg/kg	335	328	333	328	334
Non Peroxide Activity (NPA)*	% Phenol Equivalent	11.6	11.4	11.6	11.5	11.6

Sample Name:	BC-00700-6	BC-00701-1	BC-00701-2	BC-00701-3	BC-00701-BATC H	
Lab Number:	2557255.6	2557255.7	2557255.8	2557255.9	2557255.10	
<b>MPI Manuka 5 Attributes Analysis</b>						
MPI Manuka Honey Classification	-	-	-	-	Monofloral Manuka Honey	
3-Phenylactic acid (3-PA)	mg/kg	-	-	-	1,150	
2'-Methoxyacetophenone (2'-MAP)	mg/kg	-	-	-	33	
2-Methoxybenzoic acid (2-MBA)	mg/kg	-	-	-	9.0	
4-Hydroxyphenylactic acid (4-HPA)	mg/kg	-	-	-	6.2	
Manuka DNA	Cq	-	-	-	21.61	
<b>Manuka Honey Analysis</b>						
Dihydroxyacetone (DHA)	mg/kg	2,910	2,970	3,010	2,960	-
5-Hydroxymethylfurfural (HMF)	mg/kg	3.0	4.0	3.4	5.1	-
Methylglyoxal (MGO)	mg/kg	327	323	319	332	-
Non Peroxide Activity (NPA)*	% Phenol Equivalent	11.4	11.3	11.3	11.5	-
<b>Tutin Analysis</b>						
Tutin Result Evaluation	Pass/Fail	-	-	-	-	PASS
Tutin	mg/kg	-	-	-	-	0.012
MRL as per Tutin in Honey Food Standard 2016	mg/kg	-	-	-	-	0.70



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**

<b>Sample Name:</b>	BC-00700-BATC H				
<b>Lab Number:</b>	2557255.11				
<b>MPI Manuka 5 Attributes Analysis</b>					
MPI Manuka Honey Classification	Monofloral Manuka Honey	-	-	-	-
3-Phenyllactic acid (3-PA)	mg/kg	1,220	-	-	-
2'-Methoxyacetophenone (2'-MAP)	mg/kg	32	-	-	-
2-Methoxybenzoic acid (2-MBA)	mg/kg	8.3	-	-	-
4-Hydroxyphenyllactic acid (4-HPA)	mg/kg	7.1	-	-	-
Manuka DNA	Cq	20.26	-	-	-
<b>Tutin Analysis</b>					
Tutin Result Evaluation	Pass/Fail	PASS	-	-	-
Tutin	mg/kg	< 0.010	-	-	-
MRL as per Tutin in Honey Food Standard 2016	mg/kg	0.70	-	-	-

**Analyst's Comments**

**Samples 10-11 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 Laboratories, 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.	-	1-9
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	1-9
Tutin Analysis in Honey	Solvent extraction, SPE cleanup. Analysis by LCMSMS. Results are representative of the liquid honey, not the sample as a whole.  <i>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.</i>  <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. <b>RLP Official Test 8.42.</b>	-	10-11

MPI 5 Attributes Tests

Sample Type: Honey			
Test	Method Description	Default Detection Limit	Sample No
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 - 29 January 2018.	-	10-11
Manuka Honey Chemistry Profile			
3-Phenyllactic acid (3-PA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. <b>RLP Official Test 10.05.</b>	5 mg/kg	10-11
2'-Methoxyacetophenone (2'-MAP)	Aqueous solvent extraction, dilution. LC-MSMS analysis. <b>RLP Official Test 10.05.</b>	0.5 mg/kg	10-11
2-Methoxybenzoic acid (2-MBA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. <b>RLP Official Test 10.05.</b>	0.5 mg/kg	10-11
4-Hydroxyphenyllactic acid (4-HPA)	Aqueous solvent extraction, dilution. LC-MSMS analysis. <b>RLP Official Test 10.05.</b>	0.5 mg/kg	10-11
Manuka Honey PCR Profile			
Manuka DNA	Quantification of Manuka ( <i>Leptospermum scoparium</i> ) DNA by real time PCR. MPI Technical - Paper No: 2017/31 <b>RLP Official Test 10.04.</b>	1.00 Cq	10-11

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

Testing was completed between 16-Mar-2021 and 17-Mar-2021. 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.



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Operations Support - Food & Bioanalytical