



## Certificate of Analysis

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Client: Contact:		Lab No: Date Received: Date Reported: Quote No: Order No: Client Reference: Submitted By:	2977485 05- May-2022 11- May-2022 108874 	hpm p- 1v1
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Sample Type:Honey			
Sample Name:		B22 194-199OMP 229-232OMP	
Lab Number:		2977485.1	
Manuka Honey Analysis			
Methylglyoxal (MGO)	mg/kg	299	
Dihydroxyacetone (DHA)	mg/kg	2,130	
5-Hydroxymethylfurfural (HMF)	mg/kg	2.9	
Non-Peroxide Activity (NPA)*	% Phenol Equivalent	10.8	

The maximum and forecast values in the following tables and subsequent graphs are based on in-house derived kinetic models. This forecast model is designed for New Zealand Manuka honeys only, so use of the model for other types of honey may lead to inaccurate results. The data outputs are intended as a guide only and so should not be used as a substitute for an actual analytical result, particularly for the purposes of product labelling. R J Hill laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to these predicted values and graphs.

### Maximum MGO

Storage Temperature	20 °C	27 °C	34 °C
Storage time to max MGO* weeks	> 104	> 104	35
Maximum MGO* mg/kg	840	810	640
Maximum NPA* % Phenol Equivalent DHA	20.1	19.7	17.1
after this time* mg/kg	800	400	660
HMF after this time* mg/kg	21	58	70

### Forecast Over Time

Storage at 20 °C						
Compound	Initial Value	4 Months	8 Months	12 Months	18 Months	24 Months
MGO* mg/kg NPA* % Phenol Equivalent	299	390	480	550	650	730
DHA* mg/kg	10.8	12.8	14.4	15.7	17.3	18.5
HMF* mg/kg	2,130	1,910	1,720	1,530	1,300	1,100
	2.9	4.9	6.9	9.0	12.1	15.2

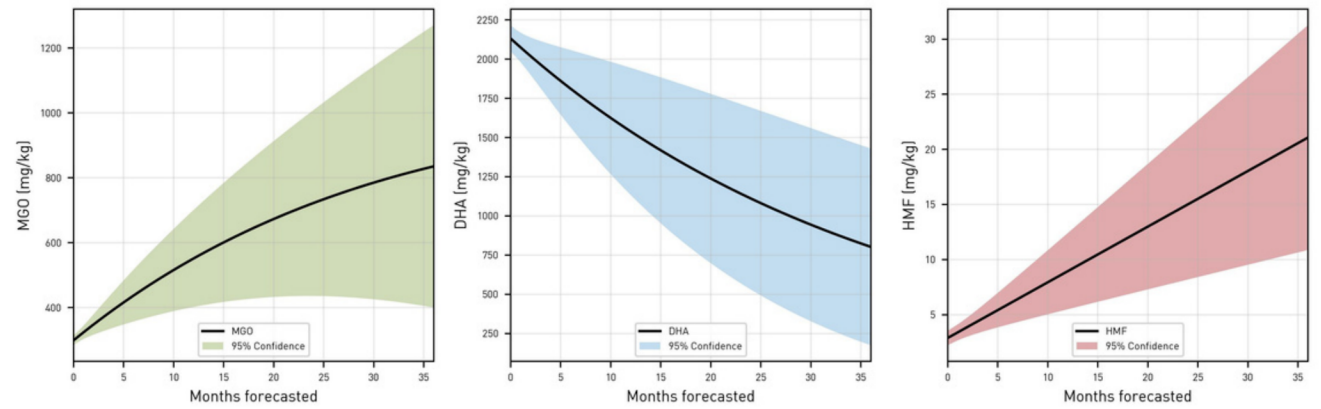
Storage at 27 °C						
Compound	Initial Value	4 Months	8 Months	12 Months	18 Months	24 Months
MGO* mg/kg NPA* % Phenol Equivalent	299	480	610	710	780	810
DHA* mg/kg	10.8	14.5	16.7	18.2	19.3	19.7
HMF* mg/kg	2,130	1,660	1,290	990	670	460
	2.9	11.3	19.7	28	41	54

Storage at 34 °C						
Compound	Initial Value	4 Months	8 Months	12 Months	18 Months	24 Months
MGO* mg/kg NPA* % Phenol Equivalent	299	570	640	600	490	370
DHA* mg/kg	10.8	16.0	17.1	16.5	14.6	12.3
HMF* mg/kg	2,130	1,210	690	380	160	68
	2.9	36	68	102	152	200

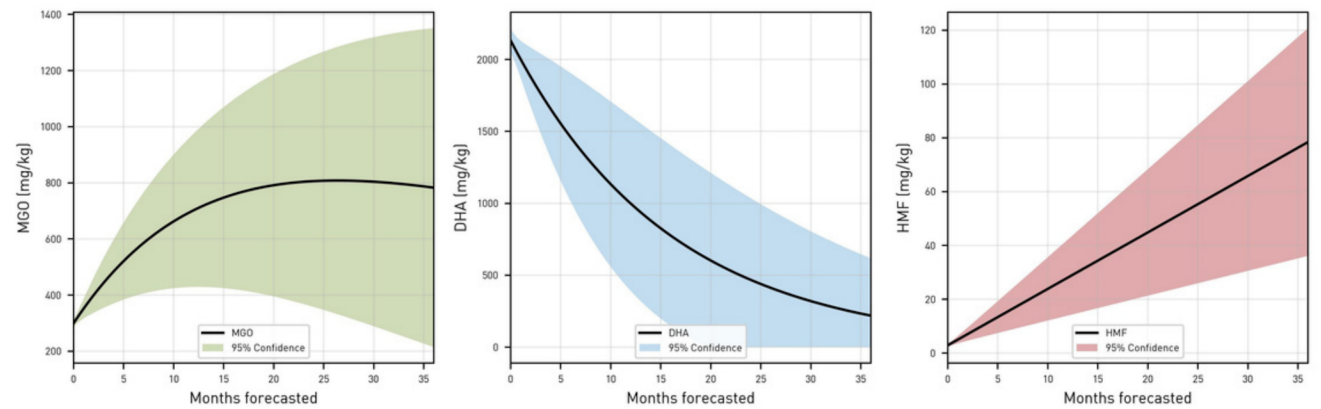


This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported 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.

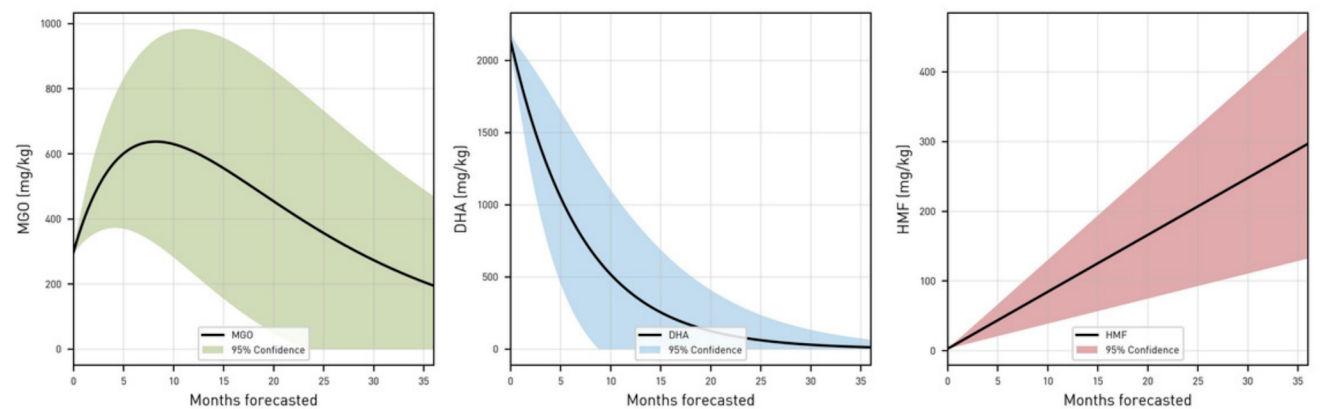
2977485.1  
B22 194-199OMP 229-232OMP  
Honey Forecast at 20°C



2977485.1  
B22 194-199OMP 229-232OMP  
Honey Forecast at 27°C



2977485.1  
B22 194-199OMP 229-232OMP  
Honey Forecast at 34°C



## 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			
Forecasted Weeks to Maximum Methylglyoxal at 20°C*	Forecasted weeks to achieve maximum MGO at 20 degrees based on in-house derived kinetic model.	1 weeks	1
Forecasted Weeks to Maximum Methylglyoxal at 27°C*	Forecasted weeks to achieve maximum MGO at 27 degrees based on in-house derived kinetic model.	1 weeks	1
Forecasted Weeks to Maximum Methylglyoxal at 34°C*	Forecasted weeks to achieve maximum MGO at 34 degrees based on in-house derived kinetic model.	1 weeks	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
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 ( <i>Leptospermum scoparium</i> ) 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 ( <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
Honey Forecast*	Forecasted results for dihydroxyacetone (DHA), 5-hydroxymethylfurfural (HMF), methylglyoxal (MGO) and Non Peroxide Activity (NPA) based on in-house derived kinetic model.	-	1

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

Testing was completed on 09-May-2022. 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.

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Shaun Clay BSc  
Senior Technologist - Food and Bioanalytical