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STABLE ISOTOPE RESULTS

Attention:
Company: Nelson Honey and Marketing (NZ) Ltd
276 State Highway 6
RD2 Motupiko
Nelson 7072
NEW ZEALAND

SIL Order No.:	J-1600281 ECON
Client Ref.:	
Date Received:	1/08/2016
Date Measured:	9/08/2016
Approved By:	Andy Phillips
Date Reported:	10/08/2016

Sample Type: Carbon isotope $\delta^{13}\text{C}$ in whole honey and honey protein by AOAC 998.12 method (First Revision 2013)

Lab Sample ID	Client Sample ID	Average $\delta^{13}\text{C}$ value (‰) Whole Honey	Average $\delta^{13}\text{C}$ value (‰) Protein Extract	Difference (Honey – Protein Extract) (‰)	%C4 Sugars
J-1600281	250716MH	-25.5	-26.0	0.5	3.1

Disclaimer: This test result is obtained from the sample(s) supplied for analysis. We cannot guarantee that either the AOAC 998:12 test or our test results will be accepted by the regulatory/testing authorities of other countries.

All results are reported with respect to VPDB normalized to our internal standards Leucine (-28.3‰ for $\delta^{13}\text{C}$), EDTA (-31.1‰ for $\delta^{13}\text{C}$), Cane Sugar (-10.3‰ for $\delta^{13}\text{C}$) and Beet Sugar (-24.6‰ for $\delta^{13}\text{C}$). GNS Honey standard was run in the same way as the samples as a check on the procedure. The $\delta^{13}\text{C}$ values obtained for this honey were within the analytical precision of 0.2‰ of the accepted values for $\delta^{13}\text{C}$.

Honey Test - (Stable Carbon Isotope Ratio Analysis) measures the carbon-13 content of the whole honey and protein, according to the International AOAC method 998.12 (First Revision 2013).

Interpretation of Results - Pure honey (free of corn or cane sugars) with an exception of a few unusual varieties yields a value of C-4 sugars less than or equal to 7%. Some unusual varieties may slightly exceed the range, but will have $\delta^{13}\text{C}$ for honey which are in the normal range (more negative than -24.0‰).

$$\%C4 \text{ sugars} = 100 \times [\delta^{13}\text{C} (\text{protein}) - \delta^{13}\text{C} (\text{whole honey})] / [\delta^{13}\text{C} (\text{protein}) - (-9.7)]$$

Please note, in our considerable experience, we note that bioactive Manuka honey can be classed as an unusual variety and has a tendency to have C-4 sugars which slightly exceed the AOAC test limit of 7%.

Samples will be kept for 3 months from the date of the report and then discarded unless otherwise notified.