



Bulk Naturals Wholesale LLC

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RAW MANUKA HONEY UMF 15+ CERTIFICATE OF ANALYSIS LOT: BN250801/H

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Specification	Unit	Reporting Limit	Result
MPI Classification for Honey			
MPI Manuka Classification*			Monofloral Manuka
MPI Manuka DNA in Honey			
Manuka DNA	Cq		24.17
MPI Manuka Markers in Honey			
4-Hydroxyphenyllactic acid (4-HPLA)	mg/kg	0.80	11
2-Methoxybenzoic acid (2-MBA)	mg/kg	0.80	8.6
2'-Methoxy acetophenone (2'-MAP)	mg/kg	0.80	40
3-Phenyllactic acid (3-PLA)	mg/kg	20	1,200
3in1 in Honey			
Dihydroxyacetone (DHA)	mg/kg	40	1,740
Methylglyoxal (MG/MGO)	mg/kg	8	581
Non-Peroxide Activity* (NPA)	%w/v phenol eq.	1.3	16.1
Hydroxymethylfurfural (HMF)	mg/kg	1	11.9

Method Summary

3in1 Determination of Dihydroxyacetone (DHA), Methylglyoxal (MG/MGO), and Hydroxymethylfurfural (HMF) by aqueous extraction, derivatization, and UPLC (diode array) analysis in accordance with in-house procedures.

Shelf life is guaranteed for two years from the date of production if the product is stored in the unopened original container between 15°C - 30°C, protected from light. Containers that have been opened should be tested at least yearly to ensure potency. Although Bulk Naturals Wholesale LLC believes the above information to be accurate based on the information available to Bulk Naturals, it is the responsibility of the customer and user of the material to perform its own investigation and due diligence prior to using to verify that the product purchased from Bulk Naturals meets their quality requirements and is appropriate for the use to which the product is to be put. The information provided above shall be considered effective only for the lot with which the information is being provided. Use and purchase of this material are subject to Bulk Naturals Wholesale LLC standard terms and conditions, which supersede any conflicting terms contained on the Buyer's purchase order or any document or instrument supplied by the Buyer.

Method Summary

NPA

Non-Peroxide Activity (NPA) values are not directly measured by the laboratory but are calculated from the measured methylglyoxal concentration in the honey according to the requirements of the client. The calculation is based on published data(†) comparing the NPA and methylglyoxal concentrations measured in a range of honey samples. These calculated values are not accredited by IANZ and do not imply that the honey is or is not manuka honey. NPA values less than 5 are an estimate based on extrapolation of the relationship between methylglyoxal and NPA.

(†) Isolation by HPLC and characterization of the bioactive fraction of New Zealand manuka (*Leptospermum scoparium*) honey. C. J. Adams, et al. Carbohydrate Research 343 (2008) 651-659. And, Corrigendum to "Isolation by HPLC and characterization of the bioactive fraction of New Zealand manuka (*Leptospermum scoparium*) honey" [Carbohydr. Res. 343 (2008) 651]. Carbohydrate Research 344 (2009) 2609. C. J. Adams, et al.

MPI Manuka Markers

Solvent extraction, LC-MS/MS analysis in accordance with in-house procedures.

Analytica Laboratories Ltd., is approved by the New Zealand Ministry of Primary Industries to conduct this analysis under the Recognised Laboratory Programme (MPI Technical Paper 2017/30 Modified, RLP Method 10.05)

Leptospermum scoparium DNA (PCR)

Samples were analyzed as received by the Laboratory for Manuka Pollen DNA by pollen DNA extraction followed by qPCR in accordance with the MPI Technical Paper 2017/31 (modified) (96 well methods with magnetic bead extraction). Analytica Laboratories Ltd., is approved by the New Zealand Ministry of Primary Industries to conduct this analysis under the Recognised Laboratory Programme (RLP Method 10.04).

The DNA component of the MPI Manuka Honey Definition requires a Cq value of less than 36 to qualify for either a monofloral or multifloral manuka honey.

MPI Manuka Classification

For classification as monofloral manuka, the following chemicals all need to be present and at these levels (Animal Products Notice - General Export Requirements for Bee Products, 2018):

- 4-hydroxyphenyllactic acid at a level greater than or equal to 1mg/kg
- 2-methoxybenzoic acid at a level greater than or equal to 1mg/kg
- 2'-methoxyacetophenone at a level greater than or equal to 5mg/kg
- 3-phenyllactic acid at a level greater than or equal to 400mg/kg

And the DNA level from manuka pollen is less than Cq 36, which is approximately 3fg/µL.

For classification as multifloral manuka, the following chemicals all need to be present and at these levels:

- 4-hydroxyphenyllactic acid at a level greater than or equal to 1mg/kg
- 2-methoxybenzoic acid at a level greater than or equal to 1mg/kg
- 2'-methoxyacetophenone at a level greater than or equal to 1mg/kg
- 3-phenyllactic acid at a level greater than or equal to 20 mg/kg but less than 400mg/kg

And the DNA level from manuka pollen is less than Cq 36, which is approximately 3fg/µL