



Certificate of Analysis

Lab Reference: 20-23790
 Date Received: 1/07/2020
 Testing Initiated: 1/07/2020
 Date Completed: 1/07/2020

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
 Specific testing dates are available on request.

Results Summary

3in1

| Laboratory ID | Sample ID | Dihydroxyacetone (DHA) | Methylglyoxal (MG) | Non-Peroxide Activity* (NPA) | Hydroxymethylfurfural (HMF) |
|---------------|------------------------------|------------------------|--------------------|------------------------------|-----------------------------|
| | <i>Units Reporting Limit</i> | mg/kg 40 | mg/kg 8 | %w/v phenol eq. 1.3 | mg/kg 1 |
| 20-23790-1 | 202343 | 1,090 | 554 | 15.7 | 17 |

3in1 Approver:

Gurmeet Singh, Dip. Tech. (Sci)
 Technician

Leptosperin

| Laboratory ID | Sample ID | Leptosperin |
|---------------|------------------------------|-------------|
| | <i>Units Reporting Limit</i> | mg/kg 20 |
| 20-23790-1 | 202343 | 545 |

Leptosperin Approver:

Gurmeet Singh, Dip. Tech. (Sci)
 Technician

Method Summary

| | |
|--------------------|--|
| 3in1 | Determination of Dihydroxyacetone (DHA), Methylglyoxal (MG) and Hydroxymethylfurfural (HMF) by aqueous extraction, derivatisation, and UPLC analysis in accordance with in-house procedures. |
| NPA | <p>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 concentration 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</p> <p><i>(†) 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. 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.</i></p> |
| Leptosperin | Aqueous extraction, dilution, analysis by UPLC in accordance with in-house procedures. |



Certificate of Analysis

Lab Reference: 20-23426
 Date Received: 29/06/2020
 Testing Initiated: 29/06/2020
 Date Completed: 30/06/2020

Report Comments

Samples were received by Analytica Laboratories in acceptable condition unless otherwise noted on this report.

Results Summary

MPI Manuka Classification*

| Laboratory ID | Sample ID | MPI Manuka Classification* |
|---------------|-----------|----------------------------|
| 20-23426-2 | 202343 | MONOFLORAL MANUKA |

MPI Manuka Classification* Approver:

Johanna Marks
 Technician

MPI Manuka DNA

| Laboratory ID | Sample ID | Manuka DNA |
|---------------|-----------|---------------------------------|
| | | <i>Units</i> Reporting Limit |
| | | Cq |
| 20-23426-2 | 202343 | 27.19 |

MPI Manuka DNA Approver:

Johanna Marks
 Technician

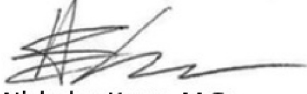
MPI Manuka Markers

| Laboratory ID | Sample ID | 4-Hydroxyphenyllactic acid (4-HPLA) | 2-Methoxybenzoic acid (2-MBA) | 2'-Methoxy acetophenone (2'-MAP) | 3-Phenyllactic acid (3-PLA) |
|---------------|-----------|-------------------------------------|-------------------------------|----------------------------------|-----------------------------|
| | | <i>Units</i> Reporting Limit | mg/kg | mg/kg | mg/kg |
| | | 0.80 | 0.80 | 0.80 | 20 |
| 20-23426-2 | 202343 | 7.2 | 9.7 | 23 | 740 |

MPI Manuka Markers

| Laboratory ID | Sample ID | 4-Hydroxyphenyllactic acid (4-HPLA) | 2-Methoxybenzoic acid (2-MBA) | 2'-Methoxyacetophenone (2'-MAP) | 3-Phenyllactic acid (3-PLA) |
|---------------|------------------------|-------------------------------------|-------------------------------|---------------------------------|-----------------------------|
| | <i>Units</i> | mg/kg | mg/kg | mg/kg | mg/kg |
| | <i>Reporting Limit</i> | 0.80 | 0.80 | 0.80 | 20 |

MPI Manuka Markers Approver:



Nicholas Kuan, M.Sc.

Technologist

Method Summary

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/ μ L.

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/ μ L.

MPI Manuka Markers

Solvent extraction, LC-MS/MS analysis.

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

Leptospermum scoparium DNA (PCR)

Samples were analysed as received by the Laboratory for Manuka Pollen DNA by pollen DNA extraction followed by qPCR in accordance with the MPI Technical Paper 2016/74 (modified) (96 well method 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.