TECHNICAL SUMMARY

What happens to your honey in the laboratory?

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In this article, I am going to give you a brief rundown on how we perform some common honey tests, to give you a better understanding of what your honey goes through once it arrives at our doors. Another good way to understand what we do in the laboratory is to come for a laboratory tour!

SAMPLE RECEPTION PROCESS

Once your honey is delivered, it will head into our Sample Reception team to be receipted. Using the analysis request form that you send in with your samples, the team will register your honey into our laboratory information management system (LIMS) and label the samples with unique identifying barcodes before sending it to the laboratory. If there are any problems interpreting your request form or with the samples we have received, the team will contact you to confirm. If all is fine, you will receive your sample receipt notifying you that your samples have arrived and are in the laboratory being tested..

LABORATORY ANALYSIS PROCESS

After your honey has been through sample reception, it will make its way to the laboratory. An important thing to note is that honey samples in the laboratory are anonymous, so laboratory staff do not know who the client is. This is an IANZ requirement which keeps any potential bias from interfering with the laboratory process.

The first step in the honey process is to thoroughly mix the honey, then weigh the honey into smaller subsamples for each test that the sample needs. This ensures the proportion taken for testing is representative of the sample submitted. After the honey has been weighed out, the subsample will be sent off for testing and any leftover sample will be stored for any retesting that may be required.

Performing the 3-in-1 and Leptosperin tests

To analyse a sample for DHA, MG, HMF and Leptosperin, we use a technique called **H**igh **P**erformance **L**iquid **C**hromatography (**HPLC**). This machine works by sending a carefully prepared solution of the honey at high pressure through a stainless-steel tube containing special absorbents, called a 'column'. The idea is that the compounds in the sample all have different chemical properties so they will travel through this column at different speeds. By placing an optical detector at the end of the column we can measure when each compound comes out, and by determining the size of the signal we can determine the concentration. The end result is called a 'chromatogram', which is like a graph of the signal against time. An example is shown in Figure 1.

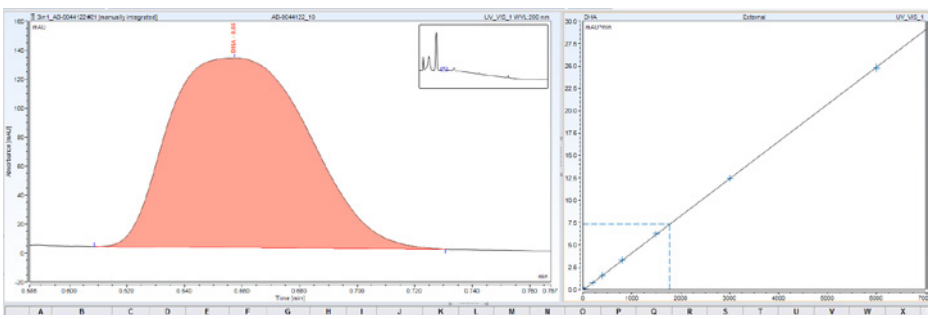

Figure 1. An example chromatogram for the 3-in-1 test, showing the signal (a 'peak') for DHA in a mānuka honey sample.

Performing the Ministry for Primary Industries' (MPI) Chemical Markers test

Analytica uses **L**iquid **C**hromatography-**M**ass **S**pectrometry (**LC-MS**) to analyse honey for the MPI Chemical Markers. This instrument follows the same principle as the HPLC instrument but rather than using an optical detector to create a chromatogram, we will run it through a mass spectrometer. This allows us to quantify analytes that are at much lower levels than those we could detect using HPLC alone. The LC-MS works by spraying the eluent (sample solution) from a column into a fine mist, applying an electrical charge, then measuring the signals originating from particular masses corresponding to the compounds of interest. This gives very high sensitivity, and very high selectivity.

INTERPRETING THE DATA

To interpret the data, we first look at the chromatograms of the standards. Standards are verified solutions that contain known levels of each analyte. Using the results of the standards we tested, we can establish a mathematical relationship between the size of a signal and the corresponding concentration. By applying that relationship to the honey samples, we can determine their concentrations. We verify that the results are correct by checking quality control samples which are run with every single sample and every single analysis batch.

SUMMARY

Next time you receive your results, have a look at the method summary section to see what process your sample went through to get the result. Hopefully now you will have a better understanding of the chemistry-based processes your honey has gone through!