TECHNICAL SUMMARY

THE RATIO OF DHA TO MG IS A HANDY TOOL FOR ASSESSING MĀNUKA HONEY

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Following on from last month's article on how forecasting models can be used to work out how honey composition may change over time, this article outlines how the ratio of DHA to MG in honey can be used to give a quick indication of its potential to change in future.

Photo: Paul Sutherland, New Zealand Story.

Forecasting models can be used to estimate the way that concentrations of DHA, MG, and HMF in mānuka honey will change in the future.

However, sometimes a forecast is not available when looking at a set of test results for honey. The ratio of DHA to MG in honey can be used to give a quick indication of its potential to 'grow' (the increase in MG concentration) over time. While not as good as a forecast for working out how a honey may change in future, it can be very helpful.

How to calculate a DHA to MG ratio

The ratio of DHA to MG (DHA:MG) is calculated as follows:

DHA concentration (mg/kg) ÷ MG concentration (mg/kg) = DHA:MG

For example:

- a honey with 1,200 mg/kg of DHA and 120 mg/kg of MG has a DHA:MG ratio of 10:1 (or 10 times as much DHA as MG in the honey)
- a honey with 425 mg/kg of DHA and 150 mg/kg of MG has a DHA:MG ratio of 25:1 (or 25 times as much DHA as MG in the honey).

Why DHA:MG is useful

As described in the article on forecasting models in the July 2020 issue (Howse, 2020), DHA in honey (which comes from the nectar bees collect from mānuka plants) converts to MG over time. However, at the same time, the MG in the honey is also changing to other things.

When there is a lot of DHA in the honey relative to MG (a high DHA:MG ratio), the rate at which DHA is converting to MG will be faster than the rate at which MG is changing to other things. So the MG concentration goes up. As the amounts of DHA relative to MG reduce, more of the DHA is required simply to make up for the MG changes and so the rate of increase in MG concentration slows down. Eventually there is only enough DHA to maintain the MG level, and after that you tend to see a decline in MG concentration.

Some guidelines about interpreting DHA:MG

Figure 1 shows how honey with 1000 mg/kg of DHA and 100 mg/kg of MG at harvest is forecasted to change over time when stored at a consistent 23 degrees Celsius, based on Analytica Laboratories' forecasting model. The graph has been overlaid with four boxes, numbered 1–4, which represent zones within which you can use the DHA to MG ratio to indicate where the honey is at in its growth process.

Zone 1 – Rapid Growth. Over the first stage of the life of the honey (eight months in this example) its MG increases rapidly. Honey in this zone has a DHA:MG ratio of 3:1 and higher.

Zone 2 – Slow Growth. Over the next period (six months in this example), the MG concentration in the honey increases, but only slowly. Honey in this zone has a DHA:MG ratio of between 2:1 and 3:1.

Zone 3 – Very Slow Growth. The honey then enters a period where changes in MG concentration are very slow, as it moves to a peak. In this example this takes nine months. Honey in this zone has a DHA:MG ratio of between 1.3:1 and 2:1.

Zone 4 – Decline. After this, the MG concentration in the honey will start to reduce, very slowly at first, but eventually more quickly. Honey in this zone has a DHA:MG ratio of less than 1.3:1.

Application

Being able to calculate the ratio of DHA:MG gives you a useful way of quickly assessing honey you own, honey that you are considering purchasing, or your specification for honey that you are processing for sale to an end user. It is a good idea to develop your own 'rules of thumb' which can be used to decide when to sell, buy, or pack honey for final consumer use.

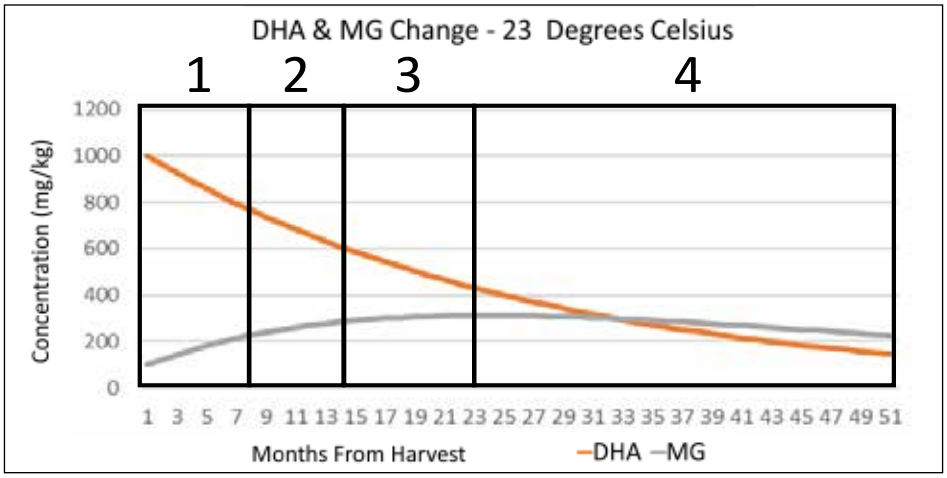

Figure 1: Zones of 'growth' (linked to the DHA:MG ratio) in a mānuka honey stored at 23 degrees Celsius over five years.

If beekeepers regularly sell honey to the same processors, it may be helpful to understand whether those processors have specific requirements for the ratio of DHA:MG in honey that they are choosing to pack and sell to end consumers. This way, beekeepers can maximise the value they offer by making sure the honey they are selling is well matched to what the processor requires for their products.

Reference

Howse, S. (2020, July). Forecasting the change in 3-in-1 results for mānuka honey. *The New Zealand BeeKeeper, 28*(6), 10–11.