RESEARCH/TECHNICAL SUMMARY

# TEST RESULTS FOR NEW SEASON MĀNUKA: PART 1

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In the first of a two-part series on mānuka honey testing, Analytica Laboratories compares findings from honey samples collected over the past two seasons.

| NPA Grade (% Phenol Equivalent) | MGO Concentration (mg/kg) |
|---|---|
| 5 | 83 |
| 10 | 263 |
| 15 | 514 |
| 20 | 829 |

*Table 1. Correlation between NPA grade and MGO levels.*

Test results for freshly extracted honey samples from the past two seasons were analysed to identify trends relating to the level of non-peroxide activity (NPA), commonly associated with mānuka honey. Overall, NPA was slightly higher in honeys tested this season, and honeys in the NPA 5+ and 10+ categories had the greatest potential for growth with 8–10 times more dihydroxyacetone (DHA) than methylglyoxal oxidase (MGO). This article is the first in a two-part series sharing information about the honey that has been tested for the common mānuka tests at Analytica Laboratories so far this season.

## Introduction

As we near the end of the 2019/20 honey extraction season, many of the freshly extracted honeys around the country have been subsampled and tested. One of the main tests of interest for mānuka honey is the 3-in-1 test. Beekeepers eagerly await these test results to see what the grade of their mānuka crop is for the season.

The 3-in-1 test measures the levels of DHA, MGO and hydroxymethylfurfural (HMF) in honey, as well as a calculation for the NPA. These measurements are all critical to grading and valuing honey. By knowing the levels of DHA and MGO at extraction and the DHA to MGO ratio, mānuka forecast models can predict the potential grade (maximum NPA) of a honey. Beekeepers and buyers can then make informed decisions on storing and aging a honey to optimise the quality of the product that is ultimately packed.

We've taken the opportunity to review the results of honeys we have tested this season between December 2019 and March 2020, and compare these to the test results observed for honeys tested during the same period last season in 2018/19. The dataset consists of a large number of freshly extracted honey samples from a wide variety of regions, beekeepers, and honey producers. All samples have been analysed for both the mānuka 3-in-1 test and the MPI 5 Attributes (MPI mānuka chemical markers and MPI mānuka DNA marker). The data set is based on freshly extracted honey samples tested by Analytica Laboratories, with the client and sample identification kept confidential.

## The NPA grades for freshly extracted honeys from this season are slightly higher than last season

The unique antibacterial property of mānuka is commonly expressed as NPA or non-peroxide activity, which is calculated from the concentration of MGO in the honey. The higher the level of MGO, the higher the NPA.

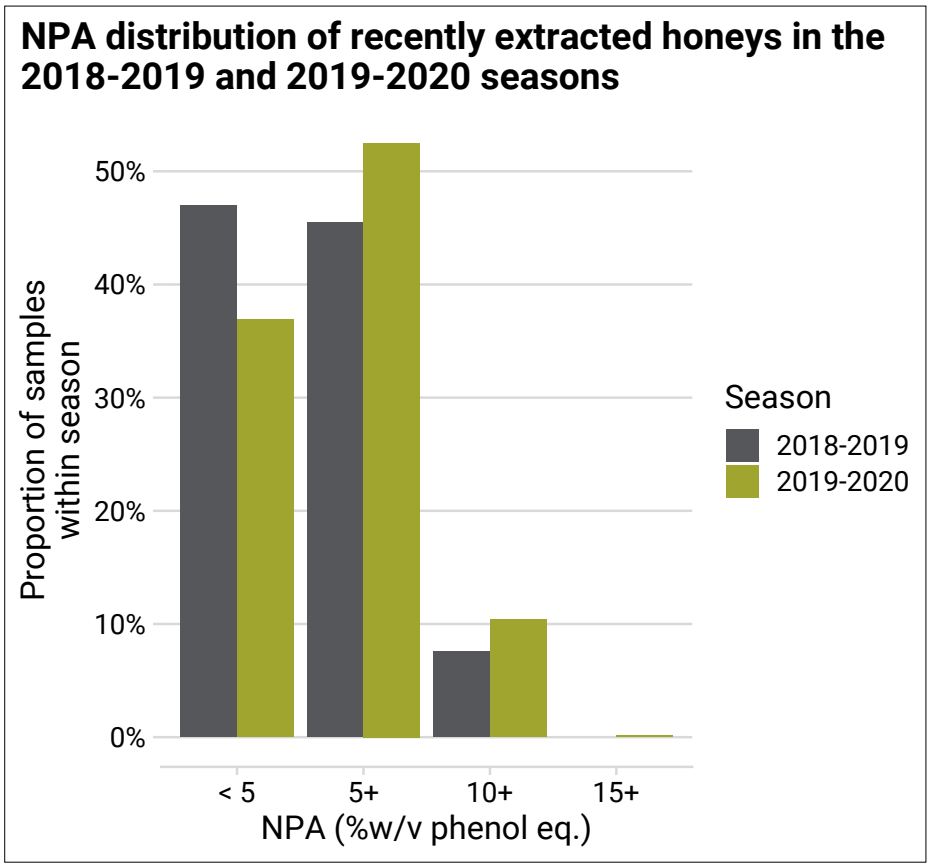


*Figure 1. Distribution of recently extracted honeys in each NPA grade from the 2018/19 honey season and the 2019/20 honey season.*

For further reference in this article, Table 1 shows the minimum MGO levels required to meet selected grade requirements.

The median (middle) NPA grade of honeys tested this season (2019/20) was 6.1, which is 15% higher than the median NPA grade last season (2018/19) of 5.3.

The proportion of honeys in each NPA grade differed this season compared to the last, as shown in Figure 1. Compared to last season, there were 10% fewer honeys with a NPA < 5 and 7% more honeys with a NPA of 5+.

It is interesting to note that none of the recently extracted honeys in the dataset from last season had an NPA of 15 or greater. There were some extremely rare samples (< 1%) this season that had an NPA grade of 15+ when tested soon after extraction, as well as a greater proportion of honeys in the 10+ NPA grade compared to last season.

### Potential for growth: DHA in freshly extracted honeys was between 8–10 times greater than MGO

As mānuka honey ages, DHA converts into MGO, resulting in an increase in the NPA of the honey. The higher the concentration of DHA relative to the concentration of MGO (DHA to MGO ratio), the greater potential for growth. For example, a honey with a 10:1 DHA to MGO ratio has more DHA available, relative to MGO, to convert to MGO over time than a honey with a 7:1 DHA to MGO ratio. This can be thought of as more 'gas in the tank' to keep fuelling the growth of the NPA over time.

Honeys in the NPA 5+ and 10+ categories, both this season and last season, had the greatest potential for growth with 8–10 times more DHA than MGO. Honeys with NPA < 5 had the lowest DHA to MGO ratio with 6–8 times more DHA than MGO in the samples.

### The forecasted NPA growth of newly extracted honeys was between 70-90%

Using initial DHA and MGO results, the growth of the honey can be forecasted using a mānuka forecast modelling tool. Forecasting information can help honey producers predict the potential grade of the honey if it is carefully stored and matured. More information regarding the applications of the mānuka forecasting tool can be found in the articles referenced at the end of this article (Howse & Cherynshev, 2015; Howse, 2016).

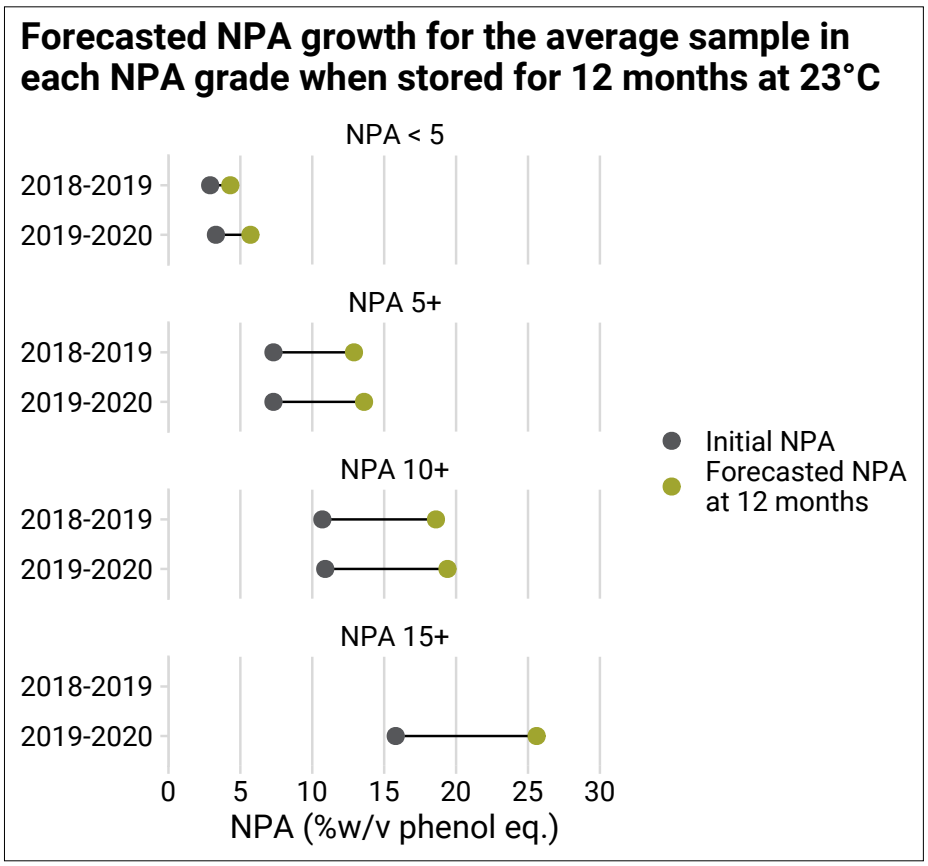


*Figure 2. Forecasted NPA growth for the average sample in each NPA grade when stored at 23°C over a 12-month period.*

Using the initial NPA and the DHA to MGO ratio of the average sample in each NPA grade, we forecasted the change of NPA in these honeys when stored at 23°C over a 12-month period (shown in Figure 2). It was predicted that honeys in the NPA 5+ category may grow by an average of 6 NPA points over a 12-month period, and NPA 10+ honeys would grow by an average of 8.2 NPA points.

We observed that 60% of the honeys that had a NPA < 5 could grow to a NPA 5+ or greater.

This demonstrates the value of evaluating the DHA to MGO ratio of a honey and utilising mānuka forecasting tools after extraction to help ascertain the potential growth of a honey.

It is important to note that in recent years meeting the requirements of the MPI mānuka honey definition has become a crucial part of mānuka classification. Honeys must meet the MPI monofloral or multifloral mānuka classification to be labelled as mānuka, regardless of the current or forecasted NPA grade of the honey. The second part of this series will cover in more detail how the recently extracted honeys from this season and last season compared to the MPI mānuka definition.

## References

Howse, S., & Chernyshev, A. (2015, October). Forecasting the change in mānuka honey is now a reality. *The New Zealand BeeKeeper, 23*(9), 47–48.

Howse, S. (2016, April). Using mānuka honey forecasts for trading honey. *The New Zealand BeeKeeper, 24*(3), 21–25.