

Why using the level of the active component in manuka honey to replace the UMF rating is misleading

Dr Peter Molan
Honey Research Unit, University of Waikato

There have been some news releases claiming that Professor Henle in Germany has found the chemical identity of UMF, and that in future chemical analysis will be used instead of assays of antibacterial activity to indicate the level of UMF in manuka honey. Both of these claims are misleading.

The work done in the institute of Food Chemistry at the Technical University of Dresden in Germany as a PhD thesis project was a survey of a range of foods, including various types of honey, for their content of carbonyls, substances that form when carbohydrate foods spoil on prolonged storage when heated. It was a serendipitous finding that some samples of manuka honey that were included in the survey had a very high level of a substance known to kill bacteria. Using a very crude method for measuring antibacterial activity it was found that the antibacterial activity of this substance at the level it was found in the manuka honey was sufficient to account for the antibacterial activity of the manuka honey. But this does not constitute scientific proof that the substance is responsible for the UMF activity. Statistical analysis has been conducted at the Waikato Centre for Applied Statistics at the University of Waikato of the data reported in the thesis for the antibacterial activity of the four samples of manuka honey tested, converted

into a form that can be compared quantitatively. This has revealed that there was not a significant correlation between the level of the substance present and the antibacterial activity of the manuka honey samples.

The thesis was completed in 2005. Nothing has been reported from that laboratory since on testing the antibacterial activity. The paper published on 23 January 2008 on the work in the thesis that led to the discovery of the chemical identity of UMF reports only the crude data on antibacterial activity that was in the thesis. Thus it appears that the claim that the antibacterial activity of manuka honey can be determined by chemical analysis of the active substance is based on a simplistic assumption rather than on research which been carried out to verify the claim.

Dr Chris Adams in the Chemistry Department at the University of Waikato has analysed a large number of samples of manuka honey for the active substance using the same method of analysis as used in Professor Henle's laboratory, and has assayed the antibacterial activity of these samples by the much more accurate technique that is used to rate the UMF activity of manuka honey. His published results, as illustrated in Figure 1 for the samples of manuka honey with an activity of UMF 8 or more, show that the level of this substance is not a good indication of the antibacterial activity of the honey samples. The graph shows a lot of scatter of the data, meaning that for a single stated level of the active substance

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the actual antibacterial activity can vary by several UMF units. But what is worse is that the antibacterial activity is not proportional to the level of the active substance present in the honey. For example, a level of 100 for the active substance corresponds to an antibacterial activity of UMF 8, but a seven times higher level of the active substance, 700, corresponds to only a three-and-a-half times higher antibacterial activity (i.e. UMF 27.5, not UMF 56 as may be expected as the level of active substance is seven times higher).

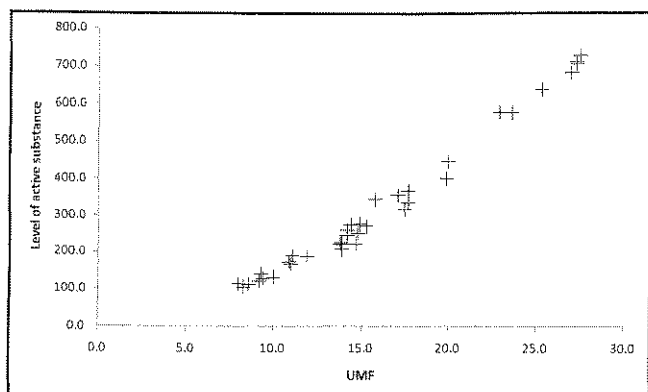


Figure 1: The level of active substance in manuka honey plotted against the UMF activity for 36 commercial samples of manuka honey

The composition of honey is complex, and there are various interactions between components which will influence the antibacterial activity. This is why the antibacterial activity is not proportional to the level of active substance in the honey. The currently used rating system, UMF[®], measures the actual antibacterial activity of each batch of honey, tested against *Staphylococcus aureus*, the species of bacteria that is the most common cause of wound infections. It is a very good way of showing the antibacterial activity, has been in world-wide use for many years, and has been relied on for many research papers that have been published on the antibacterial activity of honey, and relied on for a very large amount of clinical treatment with manuka honey.

Because the level of the active substance in manuka honey is an unreliable indication of the level of antibacterial activity and can be very misleading, it is hard to see any commercial advantage for it to be used to indicate antibacterial activity other than if someone wanted to fool the consumer into thinking that the higher numbers are giving them a level of antibacterial activity that is far higher than they are really getting.



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Why?

Recently we read that an amateur beekeeper, I think in the Hutt Valley was getting passers-by stung when he was removing honey. Then more recently *The New Zealand BeeKeeper* reported that a dog was stung to death.

Why do these things occur? Do we take a perverse pleasure in tolerating really nasty bees? Perhaps we are starting to follow in the footsteps of some of our British friends.

A year or so ago, I was talking to a British couple on holiday here in New Zealand. They apparently had real man-eating bees and needed the real flash bee suits we are starting to see here, as well as good leather gloves.

What surprised me was that they seemed to think it quite normal and reasonable to tell the adjoining tennis club to stop playing games on the days they wanted to look at their bees. Perhaps the tennis club had experienced the kamikaze bees in the past as it seemed to agree quite readily.

I get the impression that a number of New Zealand beekeepers have similar attitudes. And I don't mean just amateurs. I know a number of commercials believe that their nasty hybrid bees gather more honey than the quiet Italians. Perhaps they do, but I haven't seen any evidence that nasty mongrels do as well.

Anyway, assuming there is more honey, what a problem trying to remove it without getting everyone nearby as well as stock stung.

Perhaps we are spoilt as we seem to have lost our bee gloves and can usually take off honey in most conditions with the minimum of smoke, shaking the bees off the combs and usually don't need overalls. Makes life much more enjoyable in hot weather.

The only time there can be a problem is if robbing starts as then even quiet bees get nasty. However robbing can often be solved by removing honey late in the day when the bees are coming home, or when it is fairly cool.

The trouble with having nasty bees, is that everyone assumes that all bees are the same, and we end up with restrictive council bylaws etc that make it difficult for everyone. If you take care with your stock, replace supersedures regularly etc, you should be able to safely put hives up driveways, alongside houses, schools etc with no problem to anyone at all.

Anyway, perhaps a little thought about re-queening and management will present our industry in a better light as well as giving the individual enjoyment from his beekeeping.

- Gary Jeffery

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