

Q: What first prompted you and your research team to consider Methylglyoxal as the compound responsible for Manuka honey's antibacterial properties?

A: I must admit that until about 3 or 4 years ago, I had not heard anything about Manuka honey and its spectacular antibacterial properties. Our main research interest was in reactions occurring during food processing, the identification of amino acid and carbohydrate degradation compounds and so on. In this context, we investigated several food items for their content of carbohydrate degradation products, so-called dicarbonyl compounds, which are important precursors for protein modifications which can be used as indicators to control heat treatment. We came into honey research more or less by chance, when we quantified these compounds for the first time in a number of honey samples commercially available in Germany. Among them was one sample of Manuka honey we found in a local drugstore in which we quantified surprisingly high amounts of Methylglyoxal – more than a hundred-fold higher than local honeys. Based on this, we started systematic investigations and became aware of the non-peroxide anti-bacterial activity of Manuka honey and the fact, that - despite several attempts - the molecular background of this phenomenon was still unknown.

Q: To what extent is Methylglyoxal responsible for the non-peroxide anti-bacterial activity in Manuka honey?

A: Our studies show Methylglyoxal is exclusively responsible for the non-peroxide antibacterial activity of Manuka honey. There may be some synergistic effects, for instance resulting from polyphenols or not yet identified compounds, which may make Methylglyoxal even more effective in honey compared to solutions of Methylglyoxal in water. But without Methylglyoxal, there probably would be no antibacterial activity at all.

Q: Is MGO™ the best measure for consumers to rate the unique antibacterial activity of Manuka honey?

A: Based on our studies, the amount of Methylglyoxal directly correlates with the antibacterial properties of Manuka honey samples. From a scientific point of view, the amount of Methylglyoxal therefore can be used to rate the antibacterial activity.

Q: Is it possible in future that widespread MGO™ tests will provide a basis for substantiating (or not) the health claims made for honey products?

A: For substantiating a real health claim, intervention studies with human volunteers or patients are necessary. As soon as a direct structure-function relationship is shown, meaning for instance that a certain amount of Methylglyoxal in honey can be made responsible for a biological effect in vivo, it should be possible to take Methylglyoxal as the hallmark for the certain claim.

Q: What is the minimum Methylglyoxal content (mg/kg) required for Manuka honey to be effective against a wide range of harmful pathogens?

A: We are currently working on that issue. The minimum concentration may vary for various microorganisms and, as mentioned above, may also be effected by other compounds present in the honey. In our studies, we found for pure solutions a concentration of around 70 to 100 mg Methylglyoxal per kilogram is the minimum concentration needed to inhibit *E. coli* and *S. aureus*.

Q: Would you rate Manuka honey with Methylglyoxal content 100mg/kg and higher as a true functional food?

A: Yes, definitely. Manuka honey should be one of the few food items for which a health-promoting property beyond the basic nutritional function can be clearly documented. Health claims require significant scientific consensus, and I think from a scientific point of view, the data concerning the methylglyoxal-induced antimicrobial properties of Manuka honey are very promising to fulfill the requirements.