Multivariate analysis of High-Performance Thin Layer Chromatography derived data of Banksia honeys

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Funding*: CRC for Honey Bee Products*

Speaker Bio

Md Khairul Islam completed Bachelor of Pharmacy (B. Pharm) and Master of Pharmacy (M. Pharm) from the University of Rajshahi, Bangladesh. He has been working as a Lecturer at the Department of Pharmacy at Varendra University, Bangladesh for three and half years before moving to Perth for PhD studies at the UWA in October 2018. Previously, he was involved in research on food microbiology and now he is working in the field of medicinal chemistry (Authentication and Quality Control of Honey) at the Division of Pharmacy. His research is funded by the Cooperative Research Centre for Honeybee Products (CRC HBP).

Presentation

Background

HPTLC fingerprinting is a novel method for the identification of a honey's floral source. The fingerprints, which are derived from the organic extract of the honeys, allow a visual comparison of the different banding patterns (aka HPTLC fingerprints) in order to identify similarities and differences and to guide the authentication of their floral origin.

Hypothesis

Multivariate analysis of HPTLC derived fingerprints provides a better understanding of the honeys' floral source compared to a purely visual analysis.

Methodology

The study is based on the analysis of 31 Banksia honey samples, 14 were identified by the beekeeper as *Banksia sessilis* honey, 10 as *B. menziesii* honey, one each as *B. grandis, B. prionotes* and *B. victoriae* honey and 4 were not assigned to a particular species (i.e. *Banksia spp.* honey). The obtained dataset consists of the individual HPTLC tracks of the organic extracts of these honeys at 254 nm and 366 nm as well as at 366 nm and white light after derivatization with vanillin reagent. Conversion of the images into their corresponding chromatograms allowed to record Rf values and the corresponding intensity of each band. To account for differences in colour, band intensities were then multiplied by the respective colour value (RBG value) and the obtained values plotted against the Rf to construct the data matrix. Multivariate analysis was performed with the resulting scatter plot illustrating the clustering of the various Banksia honeys based on the similarity of their HPTLC fingerprints.

Findings

Using a 60% confidence assessment, two major clusters could be clearly identified, those of *B. sessillis* and *B. menziesii organic honey extracts*, which were in the main concurrent with the beekeepers' assessment of the honeys' floral origin. The clustering also allowed assigning some of the *Banksia spp*. honeys to either of these two clusters.

Conclusion

Multivariate analysis of HPTLC derived data supports the distinguishing between *B. sessilis* and *B. menziesii* honeys and also allows to potentially assign *Banksia spp*. honeys to either of the two clusters. It might also be a suitable authentication tool for the floral source of other honeys.