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Origin identification of Hungarian chestnut and linden honey using NIR and melissopalynology

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Honey is a food product rich in nutritionally active components Their amount mainly depends on the origin of the honey, where botanical origin has the higher role. However, according to the geographical origin, we can find significant differences in the composition even within honeys from the same botanical origin. Therefore, determination of the origin is very important as it has a high impact not only on the composition, but also on the price of honey. Therefore, our aim was to identify the botanical and geographical origin of honey samples based on their near infrared and pollen spectra.In this study samples labelled as linden (Tilia spp.) and chestnut (Castanea sativa) were collected directly from beekeepers. Ten samples were analysed per each honey type. Pollen analysis of the samples was performed using acetolysis. Pollens were counted up to 300 for every sample. Near infrared transflectance spectra (NIR) of the samples were recorded using a benchtop MetriNIR instrument. Each sample was measured three times using three consecutive scans, resulting in nine spectra per samples. The statistical analysis was performed using principal component analysis and linear discriminant analysis for the classification of the botanical and geographical groups. Mellissopalynological analysis showed a good discrimination of the botanical origin, where the pollen of Castanea sativa in chestnut honeys ranged between 61-93 %, while in the case of linden honeys Tilia pollen ranged between 8-71 %. Principal component analysis of the mellisopalynology data showed complete separation of the two unifloral honeys, however, differentiation regarding the regions was not clear. NIR showed high accuracy in the separation of regions >90 %. Merging the two dataset also provided promising results for geographical classification. The combination of the two techniques can be useful for the origin identification of honey. The project was supported by the DAAD research program for PhD students.