Pyrrolizidine alkaloids in honey: Quantification with and without standards

Quantification of a large number of compounds in the absence of authentic standards is always a challenge. More than 600 pyrrolizidine alkaloids (PAs) have been found in plants however only limited number of PAs standards are commercially available. As PAs are the most widely distributed natural plant toxins with threat to human health, risk assessment calls for quantitative analytical methods with a wide scope including PAs without available standards. In this study, a method was developed that allows simultaneous quantification of 12 PAs in the honey samples by using HPLC-HRMS with authentic standards. This method was further extended to screen for other potential PAs in the honey using multi-target screening combined with a quantitative prediction model in the cases that authentic PAs were not available. The prediction model was subsequently validated by cross-validation and additional PAs standards which were not included in the model. The maximum concentration prediction error was 50.8%.