P-009: Application of infrared spectroscopic approaches for describing and reducing pyrrolizidine alkaloid contamination in plant material

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Pyrrolizidine alkaloids (PA, necine bases) are plant derived alkaloids based on pyrrolizidine structure used for plant defense against insects. More than 6,000 plant species are found to produce these alkaloids for which about 700 different structures (Pas and their N-oxides) are known today. For over the half hepatotoxic, cancerinogenic, or veno-occlusive effects are described. PA producing plants can be found in nearly all families (Fabaceae, Boraginaceae, Asteraceae and Orchidaceae…) and it is proposed that more than 3 % of flowering plants may produce Pas [1]. Besides direct application of PA plants (e.g. common borage, coughwort, comfrey) also intoxication pathways by honey, milk and/or innards are described.

Due to the partly very high PA content in plants only few individuals are sufficient to contaminate the yield of several hectares especially for medicinal and aromatic plants. Besides an emerging resistance against pesticides of PA plants, in particular organic farming is strongly affected of the increasing appearance of these plants making effort of manual weed control.

Therefore, technical solutions for reduction of a) PA plants in field and b) contamination plants and parts of them in crop material are highly demanded in agriculture.

Thus, the aim of the present work is to develop (hyperspectral) near-infrared spectroscopy and VIS detection (RGB) approaches to identify PA plants directly in field as well as in the following manufacturing process.

First results of infield detection and NIRS based quantification of contamination level in drugs are presented.

References

[1] Smith, L. W., and C. C. J. Culvenor, 1981: Journal of Natural Products, **44**, 129-152. DOI: 10.1021/np50014a001.