

P-028: Phenolic profiles of *Acer pseudoplatanus* as affected by plant developmental stage in the light of equine atypical myopathy

Franziska Scharmann¹, Diana Bunzel, Sabine E. Kulling, Sabine Aboling²

¹Max Rubner-Institut – Federal Research Institute of Nutrition and Food, Karlsruhe, Germany, E-mail: franziska.scharmann@mri.bund.de

²University of Veterinary Medicine Hannover, Foundation, Institute for Animal Nutrition, Hannover, Germany, E-mail: sabine.aboling@tiho-hannover.de

Acer pseudoplatanus is a European maple species associated with the incidence of equine atypical myopathy, which is caused by the non-proteinogenic amino acid hypoglycin A (HGA) and commonly fatal [1]. In *A. pseudoplatanus*, HGA was found in fruits, cotyledons of young seedlings as well as in the seedlings' primary leaves [2]. Own field studies revealed a near-total negative selection of seedlings with mature primary leaves by grazing horses, while the fruits were readily eaten (unpublished data). This indicates that there might be a significantly reduced risk of HGA intoxication on horse pastures once *A. pseudoplatanus* seedlings show fully developed primary leaves.

We hypothesized that changing horse–maple interaction is driven by differences in phenolic compounds at proceeding developmental stages. Therefore, the aim of the study was to comprehensively characterise phenolic profiles in *A. pseudoplatanus* fruits, young and mature seedlings as well as adult leaves by LC-ToF-MSⁿ. In addition, selected quantitative parameters were determined, i. e. total phenolics by photometric Folin–Ciocalteu assay and total gallotannins by LC-DAD.

Limited data was available on phenolic compounds in *A. pseudoplatanus*. Therefore, an extensive literature search was conducted including other *Acer* species. The data collected was used to design and interpret LC-ToF-MSⁿ analyses and to develop a comprehensive profiling method. A total of 133 phenolic compounds, including polyphenols and phenolic acids, were identified in *A. pseudoplatanus* fruits, seedlings and adult leaves, the majority of which were gallotannins as well as quercetin and kaempferol derivatives. Both, total phenolics as well as the diversity of phenolic compounds substantially increased during the development from fruit to mature seedling. The most profound changes occurred once the seedling had developed mature primary leaves. Gallotannins and most quercetin/kaempferol monoglycosides increased from fruit to mature seedling or adult leaves, while quercetin/kaempferol di- and triglycosides generally peaked at the stage of young seedlings and subsequently decreased.

LC-ToF-MSⁿ data correlate with – and therefore substantiate – observations made in field studies on equine grazing preferences towards *A. pseudoplatanus* plant organs, which is crucial for risk communication to horse owners.

References

- [1] BOCHNIA, M., 2016: PLoS ONE, **10**.
- [2] ABOLING, S., 2016: Horse-Maple Interaction on Pastures with Reported Occurrence of Atypical Myopathy. 2nd International Congress of the German Equine Veterinary Association (GEVA) and the subgroup "Equine Diseases" of the German Veterinary Medical Society (GVMS), Berlin.