

HPLC-MS/MS Profiling of Urushiols in Leaves from *Toxicodendron quercifolium* (Michx.) Greene

Knödler, M*, Keller, E., Lorenz, P., Meyer, U., Stintzing, F.
WALA Heilmittel GmbH, Department of Research & Development, Dorfstr. 1,
D-73087 Bad Boll/ Eckwälden, *matthias.knoedler@wala.de

Toxicodendron quercifolium (Michx.) Greene (syn. *Rhus toxicodendron* L., Anacardiaceae), is a toxic plant used in traditional medicine and its aqueous fermented preparations are used in homeopathic and anthroposophic remedies [1, 2]

Urushiols, a mixture of 3-n-pentadec(en)yl- and 3-n-heptadec(en)ylcatechols [3] are the toxic principles in *T. quercifolium*, causing skin irritation, inflammation, and blistering in sensitive individuals.

A method for the selective detection of urushiols was developed on HPLC-ESI-MS/MS. CID experiments enabled the detection of a number of urushiols, including saturated as well as unsaturated mono-, di-, tri-, and tetraenoic pentadec(en)yl-, and heptadec(en)ylcatechols. Furthermore, the detection of paired but sufficiently well separated pentadecadienyls, heptadecatrienyls and -tetraenyls provides tentative evidence for the occurrence of isoforms, for which double bond positional isomers and/or *cis/trans*-isomers may be taken into consideration. The results obtained in the present study indicate that urushiols in *T. quercifolium* are a complex mixture of alk(en)ylcatechol congeners and can be characterized in detail using LC-MS/MS techniques.

References

[1] Commission C (Advisory Board on Anthroposophy of the German Drug Regulatory Authority). Monograph: *Rhus toxicodendron*. *Bundesanzeiger* No. 227b of 05.12.1989.

[2] Blaschek W, Hilgenfeldt U, Holzgrabe U, Reichling J, Ruth P, Schulz V (eds.) Hagers Enzyklopädie der Arzneistoffe und Drogen. Monographs: *Rhus*, *Rhus radicans* L., *Toxicodendron*, *Rhus radicans* hom. HAB 34, *Rhus toxicodendron* L., *Toxicodendri folium* (Giftsumachblätter), *Rhus toxicodendron* hom. HAB 34, HagerROM 2009. Heidelberg: Springer Medizin Verlag; 2009.

[3] Draper WM et al. 2002: Atmospheric Pressure Ionization LC-MS-MS Determination of Urushiol Congeners. *J. Agric. Food Chem.* **50**: 1852-1858.