



Analysis of cutin and suberin biomarker patterns in alluvial sedi-ments

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Cutin and suberin are the primary source of hydrolysable aliphatic lipid polyesters in soil organic matter (SOM). They are known as geochemical biomarkers to estimate the contribution of different plant species and tissues to SOM. Despite their potential as biomarkers, cutin and suberin have received less attention as flood plain sediment biomarkers. The objectives of this study were to investigate the efficiency of cutin and suberin as biomarkers in floodplains. Therefore similarities between the lipid pattern in alluvial sediments and in the actual vegetation were considered. Lipids of plant tissues (roots, twigs, leaves) from different species (reed (e.g. *Phalaris arundinacea*), *Salix alba*, *Ulmus laevis* and grassland (e.g. *Carex spec.*)) and of the un-derlying soils and sediments were obtained and investigated at four sites in the nature reserve Knoblauchsau (Hessen, Germany). The four sampling sites differ not only with respect to their vegetation, but also within their distance to the river Rhine. Cutin and suberin monomers of plants and soils were analysed by alkaline hydrolysis, methylation and acetylation and subsequent gas chromatography-mass spectrometry. Resulting lipid patterns were specific for the appropriate plant species and tissues. However, the traceability of single selected lipids was decreasing alongside the soil profile, with the exception of monomers in softwood floodplain soils. Selected tissue specific lipid ratios showed a higher traceability due to strong attributions of lipid ratios in soils and roots of *U. laevis* and *Carex spec.* and in leaves of *U. laevis* and *S. alba*. In contrast, there was no accordance between the suberin specific lipid ratios in soils and roots of *S. alba* and *P. arundinacea*. The most robust interpretations were afforded when a set of multiple biomarkers (i.e. a combination of free lipid ratios and ratios of hydrolysable lipids) was used to collectively reconstruct the source vegetation of different sediment layers.