**Highly sensitive analysis of 67 polycylic aromatic compounds in environmental samples by gas chromatography – atmospheric pressure laser ionization – mass spectrometry (GC-APLI-MS)**

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The hyphenation of gas chromatography (GC) with atmospheric pressure laser ionization and time-of-flight-mass spectrometry (APLI-MS) shows high potential for the analysis of polycyclic aromatic compounds (PAC). As only aromatic systems are ionized during the APLI process, analysis is very selective and sensitive, and - due to the fact that only one radical cation per analyte is generated - the results are easy to interpret. Former results revealed very low limits of detection (LODs), which are by about a factor of 1,000 lower compared to conventional GC-MS with electron impact ionization (EI), e.g. the LOD for phenanthrene is 5 fg/µL [1].

In this study, method performance and further applications to environmental matrices are evaluated. For this, different certified reference materials were analyzed to estimate accuracy of the results. Further, beyond the regulated limited suite of compounds, 67 PAC including most known highly toxic compounds were analyzed in samples of soil, sediment, soot, plant material, dust, crude oil or particulate matter. The analytes comprise polycyclic aromatic hydrocarbons in the range from 128 Da to 302 Da, a selection of its alkylated derivatives, and heterocyclic aromatic compounds. To overcome the high influence of matrix on the accuracy of the results, perdeuterated internal standards were added. Finally, for comparison, all samples were additionally measured with established GC-EI-MS. Here, detailed results concerning method accuracy and applicability to different matrices and occurrence of less known PAC with high toxic potential in the samples are presented.

[1] Stader et al. **(2013)** Anal Bioanal Chem 405, 7041.