**Determination of pyrogenic/petrogenic PAH, geosorbents and black carbon in urban soils as indicators for PAH bioavailability**

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Regions which are dominated by coal mining such as the Ruhr area (Germany) are often characterized by increased concentrations of polycyclic aromatic hydrocarbons (PAH) and total organic carbon (TOC) in top- and subsoils. PAH in low and medium rank coals are characterized by a petrogenic distribution pattern ("bell-shape" distribution), whereas products from thermal impact, like charcoal, ash, soot or coke, show a pyrogenic distribution pattern ("slope" distribution). Furthermore, coal, soot and charcoal can act as effective organic geosorbents in soils [Stout and Embso-Mattingly, 2008] and thus, may reduce bioavailability of PAH leading to reduced toxicity of these soils. Due to the high sorption capacity of non/low reactive organic carbon, black carbon (BC) is of particular interest. Identification and quantification of BC can be performed indirectly by chemical oxidation and analysis of benzene polycarboxylic acids (BPCA) [Brodowski et al., 2005] or directly by organic petrographic analysis. Recent studies have shown a link between PAH, BPCA which were initially bond at three positions of the aromatic ring to other rings and the aromatic condensation of pyrogenic organic matter [Wiedemeier et al, 2015].

The aim of this study is to find out, if a direct link between BC and PAH content as well as the type of geosorbents and PAH bioavailability exists. Therefore, a new combination of methods is applied to urban top- and subsoils from the Ruhr area. The methods include PAH analysis by gas chromatography – mass spectrometry, BC analysis via determination of BPCA by liquid chromatography – mass spectrometry, identification and quantification of geosorbents by organic petrographic analysis using microscopy, determination of bioavailability by soil-water batch experiments, physiologically based extraction tests for human oral exposure and various ecotoxicological test systems. First results are presented.

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