DESCRIPTION FOR THE GENERAL PUBLIC

Soil organic matter (SOM) is the main soil component that affects the accumulation of organic contaminants (OCs). SOM consists of various fractions depending on habitat factors like climate, bedrock composition, water conditions and agronomical practices. SOM is a mixture of polymorphic organic compounds, which chemical structure and mutual proportions are subjected to changes in time. Humic substances (HS) including fulvic acids (FA), humic acids (HA) and humins (HN) represent a substantial part of SOM, with more than 85% of the total organic matter content in majority of mineral soils. Despite many studies on chemistry of humic substances, there is still insufficient knowledge on their structure and reactivity with organic pollutants. So far it is known, that HS structure is based on the isocyclic and heterocyclic rings, with many aliphatic side chains completed by function groups, that forms reactive microregions. This means that the heterogeneous structure of organic matter with strong variations of humic substances molecular structures and properties influences the type, strength and direction of the interactions with organic contaminants. OCs include various groups of compounds, differing with properties, molecular structure and affinity to SOM.. Therefore Hs-OCs mutual reactions influence contaminants accumulation and mobility in soil but may also change the structures of HS.

The objectives of this project are 1) to assess the impact of HS individual fractions on sorption affinity for OCs represented by polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCP) and non-chlorine pesticides (NCP) and 2) recognize structural changes of HS influenced by these pollutants. The sorption experiments (bath studies) considering individual fractions of humic substances and selected deuterated OCs (added individually and as a mixture), will be applied. The results will extend the current state of knowledge on sorption potential of HS and interaction between HS and OCs . The results will also fill the gaps in knowledge on the specific role of humic acids, fulvic acids and humins in binding of OCs with regard to chemical structure in molecular scale.