EGU25-19511, updated on 08 Aug 2025
https://doi.org/10.5194/egusphere-egu25-19511
EGU General Assembly 2025
© Author(s) 2025. This work is distributed under
the Creative Commons Attribution 4.0 License.

Physicochemical Characterization of Dissolved Organic Matter in Soil Solution from Lysimetric Sampling

Kristýna Müllerová, Vojtěch Enev, and Roman Glončák
Brno University of Technology, Faculty of Chemistry, Institute of Physical Chemistry, Czechia (kristyna.mullerova@vut.cz)

Dissolved organic matter (DOM) in soil plays a crucial role in biogeochemical cycles, nutrient transport, and soil solution chemistry. This study focuses on the physicochemical characterisation of DOM extracted from soil solution samples collected using lysimeters at different depths (20 cm, 40 cm, and 60 cm). The primary analyses included pH and electrical conductivity measurements, dynamic light scattering (DLS) for particle size, ζ-potential measurements, Fourier-transform infrared spectroscopy (FTIR) for functional group identification, and three-dimensional excitation-emission matrix fluorescence spectroscopy (3D EEMs) for further characterisation of organic matter fractions. The concentration of humic substances in the soil solution was also determined according to the ČSN 75 7536 standard. The results indicate slightly alkaline soil conditions (pH 7.5-8.0) and increasing conductivity with depths, suggesting nutrient and organic matter accumulation at 60 cm. DLS and ζ-potential measurements provided insights into colloidal stability, while FTIR confirmed the presence of key functional groups such as O–H, C=O, and C–N, indicating polysaccharides, carboxylates, and others in the structure of DOM. These findings enhance understanding of DOM composition and mobility in soil, emphasising the significance of lysimetric sampling in studying DOM under natural conditions.