

EGU21-15909

<https://doi.org/10.5194/egusphere-egu21-15909>

EGU General Assembly 2021

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## Techniques involving UV absorption spectroscopy for estimation of structural changes in soil organic matter

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UV spectroscopy is extensively used for the quantitative analysis of natural macromolecules because of simplicity. As a qualitative method it is not very selective. The absorption spectra of organic macromolecules are generally broad bands without distinct peaks decreasing with the increasing wavelength making thus impossible to draw conclusions about exact chemical composition. However certain optical properties enable to obtain information about the organic matter transformation and changes in soils.

In present study soil samples from different depths were investigated by UV spectroscopic methods to measure the absorbance ratios at several wavelengths that could be related to chemical properties of the organic matter, for example the aromaticity, average molecular mass, functional groups, etc. The aim was to study the changes in structural characteristics of humic acids in soil profiles by using their UV absorbance ratios (A<sub>254</sub>/A<sub>436</sub>, A<sub>280</sub>/A<sub>350</sub>, A<sub>470</sub>/A<sub>664</sub>, A<sub>254</sub>/A<sub>354</sub>, A<sub>254</sub>/A<sub>204</sub>). The top layer of the soil was also characterized by comparing the structure of humic and fulvic acids and unfractionated dissolved organic matter. The spectra and molecular masses were additionally obtained by high performance size exclusion chromatography (HPSEC) with diode array detection.

Our results showed that there is a systematic change in the absorbance ratios at different wavelengths of humic- and fulvic acids and dissolved organic matter spectra in the soil profile that indicates to structural changes in the soil in time. The comparison of all fractions indicated that fulvic acid and unfractionated organic matter are structurally more similar to each other than to humic acid. Although the values obtained by two studied methods (UV spectroscopy and HPSEC) did not give the same values for the absorbance ratios, the correlations are mostly comparable and therefore, both methods can be used to estimate the changes of structural properties in soil.