

The Institute of Soil Science and Plant Cultivation - State Research Institute in Puławy announces a competition for the position of a doctoral student at the Doctoral School of Quantitative and Natural Sciences

Proposed topic of dissertation: The role of dissolved organic matter in nitrogen and phosphorus transformations in soils under various management systems.

Dissolved organic matter (DOM) is one of the least stable but also the most mobile components of soil organic matter (SOM). Its diverse composition and strong sorption properties significantly affect its role in the nutrient movement in the soil-plant system and in the soil profile. Despite the fact that dissolved organic matter constitutes a small share (up to several percent) of the total SOM, its biological and chemical activity is generally considered as a relevant factor regulating the dynamics of numerous processes taking place in the soil environment. Due to the challenges related to fulfilling Sustainable Development Goals addressed by the European Green Deal, more and more attention is paid to DOM as a significant factor affecting carbon sequestration in the lower layers of the soil profile, the source of available forms of N & P and the fraction of SOM that enables their movement in soil and migration to ground waters. Research will be carried out under the European Joint Programme - EJP SOIL (Grant agreement ID: 862695) topic: "Towards climate-smart sustainable management of agricultural soils". The overall objective of EJP SOIL is to build a sustainable European integrated research community on agricultural soils, and develop and deploy a roadmap on climate-smart sustainable agricultural soil management.



The goal and scope of the study:

The goal of the study will be to assess the composition and structure of dissolved organic matter and the relationship between the carbon, nitrogen and phosphorus content in relation to the soil properties and management systems.

The scope of the study will include field and laboratory work consisting in determining verification points on arable land and grassland and collecting soil samples from specific layers of the soil profile for chemical and physical analyses. To analyze dissolved organic matter and

C, N and P, elementary and spectroscopic methods will be used, including UV-Vis-NIR, EEM and NMR.

Rules and conditions:

- The period of research realization, including preparation of doctoral dissertation, will take 38 months (from 30/10/2021 to 30/12/2024). The research will be conducted at the Department of Soil Science, Erosion and Land Conservation of the Institute of Soil Science and Plant Cultivation – State Research Institute in Puławy, under the supervision of dr hab. Bożena Smreczak; and dr Aleksandra Ukalska-Jaruga;
- Research works will be financed from the EJP SOIL program *“Towards climate-smart sustainable management of agricultural soils”*;



- The language of instruction at the Doctoral School and preparation of doctoral dissertation will depend on the candidate’s aptitude and the currently applicable regulations (English or Polish);
- Recruitment of candidates in the Online Registration System and deadline for submission of documents at the Doctoral School – **31 August 2021**

Details of the recruitment process:

<https://www.umcs.pl/pl/limit-przyjec-i-terminarz-rekrutacji,21436.htm>

<https://www.umcs.pl/pl/zasady-oceny-kandydata,21434.htm>.

Competence required of the candidate:

- A diploma of completion of Master’s degree studies in the field of quantitative and natural sciences, i.e. chemistry, biology, environmental protection, agriculture, environmental engineering, bioengineering and other related;
- Knowledge of the basic principles of the organisation of work in the laboratory environment, basic knowledge of spectroscopic methods would be an asset;
- Fluency in English with good oral and written communication skills;
- Creative and analytical thinking skills;
- Willingness to expand knowledge and improve qualifications;
- Teamwork skills and lack of contradictions to conducting fieldwork;
- Additional formal requirements available at: <https://www.umcs.pl/pl/wymogi-formalne,21433.htm>

Contact:

For further information candidates are asked to contact dr hab. Bożena Smreczak; bozenas@iung.pulawy.pl or dr Aleksandra Ukalska- Jaruga; aukalska@iung.pulawy.pl.