

Ag- ions and nanoparticles - interactions with different soil organic fractions as important aspect of heavy metals mobility in environment

Humus substances play key role in environment determining soil fertility as well as plant growth and development. The above compounds exhibit high reactivity, which has a great impact on the binding processes of nutrients but also impurities, including heavy metals. These processes are extremely complex, mainly due to the large chemical diversity of humic substances. The size of organic molecules as well as degree of their aggregation (resulting from different pH conditions) appear to be one of the most important determinants of metal binding mechanisms and bioavailability to plants. Nanoparticles and ions of silver are now increasingly used in various industries, which is reflected in their presence in the environment, including soil. The aim of the studies will be focused on the analysis of the influence of different fractions of humic substances on the mechanism of binding of silver nanoparticles and ions. The processes will be analyzed in a wide range of pH and metal concentrations using modern measuring techniques including: FTIR, UV-VIS, fluorescence and atomic absorption spectrometry, potentiometric titration, thermogravimetry coupled with FTIR spectroscopy and mass spectrometry as well as analysis of particle sizes.

Scientific supervisor: prof. dr hab. Z. Sokołowska, assistant supervisor: dr P. Boguta

Profile of the candidate:

- master's degree in Chemistry, Physics, Biology, Biotechnology, Agricultural Sciences or related
- having graduated university with at least good final result
- providing recommendation letter issued by the research supervisor
- very good command in English, including specialist terminology
- knowledge on chemistry and physicochemistry of solid and liquid phase as well as on sorption processes in above phases
- knowledge on statistical elaboration of research data