

Population dynamics and their structure may be influenced by environmental pollution. Recently, a growing interest in nanoparticles (NPs) has been observed. They are widely used in sciences, medicine, as well as innovative technologies, industry and agriculture. However, together with advantages, the use of NPs entails risks. Nanoparticles entering the surrounding environment may have impact on wildlife and human health. Till now, ecotoxicological studies were mainly focused on manufactured chemical compounds with the sizes of their crystallites larger than 100 nm. However, the effects of nanoparticles may be completely different than their larger counterparts. These differences result from higher surface area to volume ratio, and higher surface reactivity of NPs. Despite that, the knowledge about NPs influence on living organisms, as well as trophic transfer of the NPs is still insufficient.

Therefore, the aim of the study is to evaluate the influence of lanthanide-doped nanoparticles on biology, ecology and behaviour of invertebrates. Project's research hypothesis assumes that NPs are taken up by animals, accumulated in their body and have impact on them. Therefore, the occurrence of bioaccumulation of the nanocrystals in freshwater and terrestrial biota will be determined. Moreover, the sublethal effects of the studied NPs to freshwater and terrestrial invertebrates will be identified. One of the project goals is verification of the hypothesis that lanthanide-doped nanocrystals are transferred in trophic chains (freshwater and terrestrial). During the research, two group of organisms will be used: aquatic and terrestrial. In both studied groups, species from three trophic levels will be analysed (producers: plants, primary consumers: herbivorous invertebrates and secondary consumers: carnivorous invertebrates).

Obtained results may have a significant influence on current knowledge of ecotoxicology. The results may bring an essential progress both in wildlife conservation, human health, as well as development of safe nanoparticles in the future.