

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Nanopesticides are pesticides that are linked to nanocarrier (size below 100 nm) for obtaining the novel properties, such as the slower release from a carrier and/or the solubility increase in water poorly soluble pesticides. As a result the efficiency of nanopesticide should increase and the concentration of effective dose – decrease. In theory they are considered to be safer compared to the conventional pesticides. Unfortunately, based on the current studies the reliable assessment of nanopesticides fate in the environment and impact of nanopesticides on organisms are impossible.

Therefore, the aim of this study is to assess the toxicity of nanopesticides on non-target microorganisms as well as to evaluate the potential environmental risk that may be caused by nanopesticides to the microbial communities in soil conditions. The hypothesis supposes that changes of the nanopesticide properties due to nanoformulation increase the risk of changes in the microbial community structure and function and thus extend the time for the recovery of the soil ecosystem.

The planned research is to be divided into three stages. To investigate the impact of nanopesticides on the microbial community in soils, new nanopesticides must be synthesized based on the utilization of various nanomaterials. During the second stage, the toxicity of the new nanopesticides will be assessed using various microbial tests. Based on the information obtained from these toxicological tests, nanopesticide will be selected for a laboratory-scale study. Finally, nanopesticide will be applied into the soil and its impact on microbial abundance and activity, structural and functional diversity will be evaluated with the use of modern techniques, such as quantitative PCR (qPCR) approach, next generation sequencing (NGS), GeoChip arrays or Biolog method.