

Project ID number: **7F14045**

Project title: **Utilization of long term (passive) sampling methods combined with in situ microcosms for assessment of (bio)degradation potential**

Project acronym: **PASSES**

The PASSES project deals with research and innovation of progressive methods and tools for detailed description of processes occurring in saturated zone of contaminated sites before, during and after implementation of remedial actions (e.g. injection of organic substrate, biological preparation containing allochthonous microorganisms or nano zero valent iron). Detailed knowledge of these processes is crucial for impact assessment as well as for achieving maximal remediation effectiveness. The main aim of the project is to assess the possibility of stimulating biodegradation of organic pollutants (especially chlorinated hydrocarbons) by autochthonous or allochthonous microbial communities. This includes to design and to test selected combinations of innovative analytical and genomic approaches that will enable to exactly predict whether biodegradation is feasible on specific localities.

The main research objective is completed by long term assessment of ecotoxicity of performed treatment actions. This is especially needed because combinations of several different remediation methods are usually applied in practice. Biodegradation generally represents the final step, which provides further long term treatment of remediated sites and thus, it may be affected (positively or negatively) by the previously carried out treatment steps.

The first (main) part that will be adapted and utilized within the project is passive sampling of chemicals from the groundwater. It allows analysing both actual concentration of chemical compounds (using equilibrium samplers) and their average concentrations over time (using integrative samplers) without necessity to pump contaminated water out of the well and disturb the natural conditions.

The second element of the project involves the use of in situ microcosms. In situ microcosms will allow long term monitoring of microbial populations using advanced molecular methods (such as PLFA or pyrosequencing). Additionally, special hydrogeological assessment methods will be applied (e.g. assessment of groundwater flow or continuous monitoring of physical-chemical parameters).

The combination of the above mentioned methods will provide a strong solid background for establishment of an innovative theory about mutual interaction of measured parameters in situ providing a complex view on processes ongoing on remediated sites.

The project involves intensive a transnational collaboration of a Czech research institute, a Czech R&D performing SME (both highly experienced in designing innovative remedial actions and having the access to case study areas) with a Norwegian world-leading laboratory.

Key words in English

biodegradation potential, in situ microcosms, passive sampling, ecotoxicity, contamination, chlorinated hydrocarbons, phospholipid-derived fatty acids (PLFA)