

Progressive technologies of the environment protection and effective water management in small watersheds - Infiltration of pretreated wastewater

David Rozman, E. Novotná, Z. Hrkal and P. Eckhardt

T. G. Masaryk Water Research Institute, Czech Republic

One of the main issues in today's water management in Czech Republic is mitigating the hydrological extremes, such as drought and floods. Infiltration of precipitations and wastewater is an example of possible measure, which enables more efficient accumulation and retention of water in the region. Current legislation is not favorable to such systems, due to concerns about possible effects on quality of groundwater. Our study is focused on testing a progressive technology of the wastewater infiltration, preparation of methodology for assessing wastewater infiltration systems and proposing alternatives to current legislation if required.

The treatment of infiltrated wastewater depends on many complex reactions in hydrogeological environment. The assessment of the natural attenuation processes and threats to the environment therefore requires efficient monitoring system, which provides representative samples for analysis of wide spectrum of water quality indicators.

The present results from testing locations indicate that main pollutants from wastewater are efficiently removed within a 100 meters reaction zone. The microorganisms are not detected in samples from monitoring boreholes, situated in the infiltration plume. The rock environment intercepts bacteria and viruses, which eventually die. COD and BOD values confirm that the organic compounds are quickly decomposed and mineralized in the soil. Phosphorus is immobilized by adsorption and precipitation to insoluble forms. Ammonium and nitrite from wastewater oxidize to nitrate, which remains in groundwater. The concentrations of nitrate are decreasing mostly because of dilution, which is apparent from comparison with concentrations of conservative anions like Cl⁻. First measurements of carbamazepine concentrations are showing that pharmaceuticals can present a significant component of wastewater. Therefore we are expanding our research to new scale of pollutants, to make a complete assessment of the wastewater infiltration systems.

David_Rozman@vuv.cz