Removal of microbial pathogens in a sandy gravel aquifer under forced-gradient subsurface flow conditions

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Subsurface media are being used around the world as a means to mitigate microbial contamination, but vary widely in their ability to remove pathogens. To help to provide accurate risk assessments of microbial contamination of groundwaters, and establish safe setback distances between receiving waters and disposal fields, this study aims to use aquifer tracer tests to evaluate the ability of subsurface media to attenuate these pathogens.

The novelty of this work is the use of a variety of different tracer substances (e.g. phages, spores, microspheres, conservative tracers) together in field experiments. This will be done by means of injecting these substances under a forced gradient in a sandy gravel aquifer in Lobau, Austria. The extraction of the tracers will be monitored in a pumping well at a distrance of 50m downgradient. This will be able to provide us with insight to the characteristics of microbial transport and how the microorganisms react to the subsurface in the study site. Subsequent numerical modelling of the experiments can tell us more about quantification of subsurface processes such as attachment/detachment, inactivation and die-off of these substances.

The first field experiment with conservative tracers (NaCl) has been carried out in December 2016, and subsequent tests are being planned for the next months.