Quality restoration of Impaired water through artificial recharge

CRISTINA VALHONDO[12], LURDES MARTINEZ-LANDA[23], JESUS CARRERA[12], SILVIA DIAZ-CRUZ[1], STEFANO AMALFITANO[4], CATERINA LEVANTESI[4]

[1]Institute of Environmental Assessment and Water Research (IDAEA)- Spanish National Research Council (CSIC).
[2]Groundwater Hydrology Group (GHS), Barcelona, Spain.
[3]Department of Civil and Environmental Engineering (DECA) of the Universidad Politécnica de Cataluña (UPC) .
[4]Water Research Institute National Research Council, Roma, Italy.

The reuse of impaired waters has become a required component of water resources management due to the increasing demand of quality water. Therefore, the development of sustainable, high-efficiency, low cost technologies for water treatment is urgent. Artificial recharge of aquifers with impaired water is a water renaturalizing technology which allows to improve the recharge water quality and to increase groundwater resources. One of the major concerns is the potential contamination of the underlying aquifer with pathogens, and inorganic and organic chemicals present in the infiltrating water. The aim of this study is to test and improve reactive barriers based on organic substrates to prevent leaching of pathogens, antibiotic resistant bacteria, antibiotic resistant genes, inorganic nutrients, and emerging organic compounds to underlying aquifers during artificial recharge of aquifers through infiltration basin. We tested diverse barriers in six meso scale artificial recharge systems recharged with secondary treatment effluent of an urban wastewater treatment plant. Preliminary results show the potential of reactive barriers to reduce emerging compounds and pathogens in short residence times.