

LABORATORY TECHNIQUES FOR CONTAMINANT TRANSPORT ASSESSMENT

DESCRIPTION

Laboratory techniques

Experimental analysis of processes affecting transport of contaminants through the vadose zone and the aquifer are necessary to interpret field data, especially when the recognition at field level is hampered by the complexity of the environmental system.

Batch and column experiments, specifically designed to simulate field conditions as reliably as possible, provide valuable information on interaction between contaminants and vadose zone and/or aquifer materials.

These laboratory techniques are also useful to assess the response in terms of contaminant removal during water reuse and water treatment activities.



Parts of an experimental equipment for unsaturated column study

Experimental study should always be coupled with numerical modelling to quantify contaminant transport parameters, with the aim of finding the nexus between field and laboratory research.

IMDEA-WATER SOLUTIONS

Batch and column experiments are carried out at the IMDEA Water laboratories to simulate field conditions and obtain transport parameters describing the movement of contaminants through different kinds of porous materials.

scientific & technical offer

By means of these laboratory techniques combined with numerical modelling, IMDEA Water can act as a consultant to assist in the design of water reuse activities (wastewater irrigation in land application systems, reactive barrier operations), water treatments (e.g. sand filtration) and decontamination strategies (e.g. in situ air sparging) by predicting the response in terms of contaminant removal.

In the case of already ongoing activities, IMDEA Water can provide consulting services to test possible improvements in the reduction of contaminant leachate (e.g. vegetable carbon and nitrogen sources) by specifically designed laboratory experiments.

Contaminants routinely investigated by the working group of IMDEA Water include **inorganic contaminants** and organic substances such as **emerging compounds** (e.g. pharmaceuticals, personal care products, life-style compounds).

IMPLEMENTATION SECTOR

- Water Companies
- Any company or public body interested in the development of water reuse activities
- Environmental consulting firms

ADDITIONAL INFORMATION

- Martínez Hernández, M.V., Meffe, R., Herrera, S., Arranz, E., De Bustamante, I., 2014. *Sorption/desorption of non-hydrophobic and ionisable pharmaceutical and personal care products from reclaimed water onto/from a natural sediment*. Science of the Total Environment. 472, pp. 273 - 281.
- Meffe, R., Gudrun, M., Kohfahl, C., Taute, T., Richter, D., Dünnbier, U., Pekdeger, A., 2012. *Investigating the redox sensitivity of para-toluene sulphonamide (p-TSA) with a column study*. Environmental Earth Sciences. 65 - 3, pp. 861 - 870.
- Meffe, R., Massmann, G., Kohfahl, C., Taute, T., Holzbecher, E., Richter, D., Dünnbier, U., 2011. *Investigation and modelling of the degradation during rapid sand filtration and redox sensitivity of the industrial contaminant p-TSA*. Book Series: IAHS Publication. 342, pp. 42 - 45. ISSN 0144-7815.
- Meffe, R., Kohfahl, C., Holzbecher, E., Massmann, G., Richter, D., Dünnbier, U., Pekdeger, A., 2010. *Modelling the removal of the sulphonamide para-toluene sulphonamide (p-TSA) during rapid sand filtration used for drinking water treatment*. Water Research. 44, pp. 205 - 213.

TECHNOLOGY KEYWORDS

Laboratory experiments, contaminant, remediation assessment

CONTACT PERSON

Raffaella Meffe

raffaella.meffe@imdea.org