

A hands-on International Summer School

Abstract

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The study focus consists in the development of soil-filter installations named Constructed Wetlands as tertiary treatment for micropollutant removal in medium-sized WWTPs on the Sure river. For this, 27 compounds have been selected taking into account those known to be excreted in the highest amount (in the case of pharmaceuticals: antibiotics, beta blocker, cytostatics etc), those known with the highest eco-toxicity (i.e. cytostatics), those known to be under observation (i.e. Glyphosate, Erythromycin) or with legal obligations (i.e. Diclofenac, Isoproturon, Diuron).

In the pilot scale, six planted (i.e. Phragmites australis and Iris pseudacorus) lysimeters have been fed with synthetic wastewater three times a day with a relaxation time of 7.5 hrs, resulting an hydraulic load of 100 L/m²d (lately increased to HL of 150 L/m²d). Removal rates of the individual compounds have been evaluated with respect to substrate and its physical parameters, together with operational conditions (i.e. hydraulic load, time of operation and treated wastewater). Several removal mechanisms were detected (phytodegradation, biodegradation, sorption and photodegradation). Among all of these mechanisms, sorption seems to be the one with the biggest impact.

Three of the most promising adsorbing materials will be performed in an intermediate test in the treatment plant of Reisdorf, Luxembourg (i.e. 4000 PE) in order to see the effect of real matrix.

The gained knowledge will be then used to design and dimension a full scale wetland to be installed in the WWTP of Echternach, Luxembourg (i.e. 20000 PE) and subsequently for decision policy support in the Greater Region.