

Project NuRedrain: Highlights and Achievements

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Plants need nutrients, such as nitrogen (N) and phosphorus (P), to grow. Therefore, nutrients are used in agriculture. The excess of nutrients end up in the water and deteriorate the water quality. The NUREDRAIN project wants to tackle this problem by testing filter technologies which can trap N and P.

Filters need to be filled with a material which can adsorb P or remove N. These materials have been provided by Nuredrain partners from Belgium and Denmark or have been purchased. A series of lab tests revealed which materials are suitable for an efficient P removal. Noteworthy is the fact that filter materials used to remove low concentrations of P can later on be reused to remove high concentrations of P.

One of the filter materials has already been tested in the field in Belgium and Germany. The filter material is 'iron coated sand', a waste product from drinking water production. This material was tested to adsorb P. In drainage water, the material was able to remove 59 to 92% of P. In water discharged from greenhouses, the material was able to remove 99% of P. Despite these promising results, improvements are required to prevent clogging of the filter.

Another filter material has been produced from sludge derived from drinking water production. It was a great work to dry, break, sieve and heat sludge in order to obtain 100 kg of material. This material will pretty soon be used in a filter set up to remove P from surface water for drinking water production.

With respect to N removal, 2 different mechanisms have been tested in lab conditions: a 'moving bed bioreactor' and a 'zero-valent-iron filter'. Both showed great potential. The moving bed bioreactor can be scaled up for field testing whereas the zero-valent-iron filter needs further modifications before the step from lab to field demonstrations can be made.

Saturated filter materials are intended to be reused as fertilizers. A first preliminary pot experiment was unsuccessful. The P adsorbed on the filter material could not be released by the plant. Hence, no P was provided to the plant and plants showed a low quality. Therefore, it was decided that saturated filter materials will undergo a pre-treatment before being used as fertilizers in pot experiments.