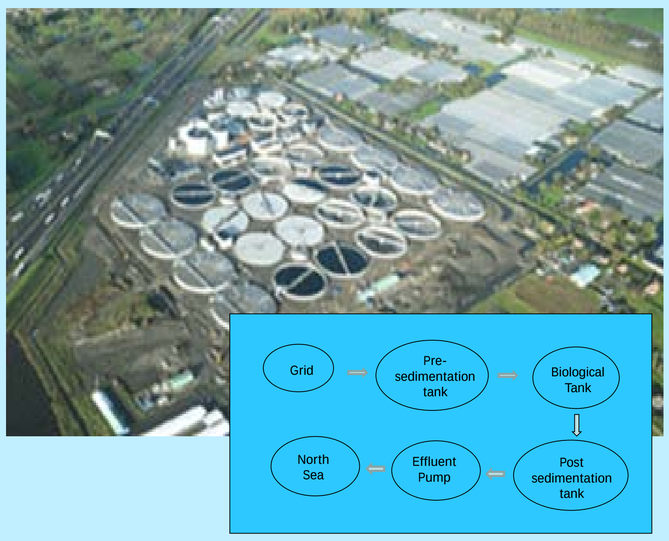
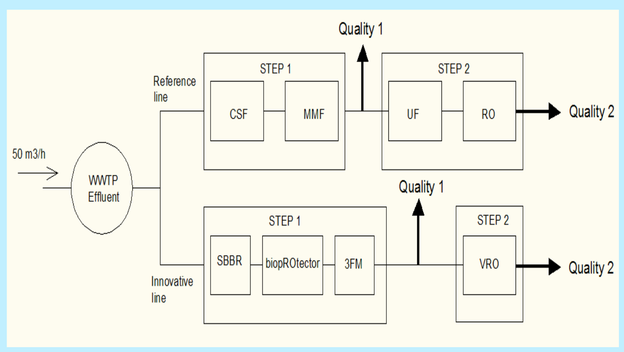
Delft Blue Water: Heavy metals removal in reclamation of used urban water

D. Norton Brandão, J. de Koning, J.B. van Lier



Harnaschpolder WWTP

Harnaschpolder WWTP



Reclamation pilot at Harnaschpolder – treatment lines

Reclamation pilot at Harnaschpolder WWTP

Background

A research pilot plan was installed in Harnaschpolder in the scope of the Delft Blue Water project, managed by Evides, Rossmark, Veolia, Delfluent Services and Delfland, in order to produce surface water and green houses water supply. Among the quality standards that must be met for production of both purposes, heavy metals represent a group of components that is often reported in literature to occur in wastewater in higher concentrations than the desired ones.

Objective

The objective of this study is to explain the biosorption mechanisms that are involved in the removal of heavy metals (HM), particularly Cd, Cu, Hg, Ni and Zn, using metal sorbing bacteria in media filtration of treated urban effluent.

Methodology

Filter experiments will be performed in order to evaluate heavy metals removal in the treated effluent of Harnaschpolder with selected bacteria and understand the biosorption involved mechanisms. Biosorption results from the interaction between microbial cells and soluble target species leading to the reduction of mobility and toxicity of such species. A lab scale filter will be setup next to the HNP pilot, consisting of three sand columns to test different inoculations of metal sorbing bacteria. Batch experiments will be performed to compare the removals performed by mixture of specific bacteria and bacteria contained in metal bearing sludge. A inoculation procedure supported by bioagumentation of bacteria will be created in order to test metal removal in the filters. Further characterization on produced filtrate and sludge produced from the filter, together with biofilm analyses will allow to describe mechanisms involved in metal removal by metal resistant bacteria.

CONTACT: d.brandao@tudelft.nl /+31 15 27 85457 /www.watermanagement.tudelft.nl

HIGHLIGHTS

Lab scale experiments using two approaches:

-Innoculation of selected metal sorbing bacteria in a sand filter;

- Innoculation of industrial sludge containing heavy metal bacteria in a sand filter

Characterization of:

- feed water
- sludge produced from the filter
- heavy metals removal
- Biofilm
- Mechanisms involved in metal removal by metal resistant bacteria

Section Sanitary Engineering
Department Water Management
Faculty of Civil Engineering and Geosciences

Dit project wordt mede mogelijk gemaakt door het Innovatieprogramma Kaderrichtlijn Water van het Ministerie van Verkeer en Waterstaat
Agentschap NL Ministerie van Economische Zaken

Hier wordt geïnvesteerd in uw toekomst. Dit project wordt mede mogelijk gemaakt door het Europees Fonds voor Regionale Ontwikkeling
Kansen voor West

Delft University of Technology