

TECO Mobility grant

Combined wetland and electrochemical treatment of septic tank effluent to improve sanitation at community toilets in India

Beneficiary of the grant – Dr. Ir. Inka Vanwongerghem

Host Institution (EU) - Ghent University, Prof. Korneel Rabaey

Host Institution (India) - BITS Pilani, K K Birla Goa Campus, Prof. Srikanth Mutnuri

Period of stay in India - 21/05/2018 – 18/06/2018



TECO Project

*Technological ECO-innovations for the quality control
and the decontamination of polluted waters and soils*

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Objective of the project

- Contribute to the sustainable development goals (SDG) by improving sanitation at the individual household and community scale in India.
- Treatment of septic tank effluent using empowered septic tanks, i.e. high-rate vertical flow constructed wetlands for removal of solids in combination with electrochemical cells for disinfection via in-situ chlorine production.
- Optimization of the treatment system to increase the robustness and decrease the energy consumption, e.g. via selection of alternative materials and/or adjustments in the design and flow rate.



Community toilet in Panjim



Community scale plant



Septic tank effluent → post wetland → post EC



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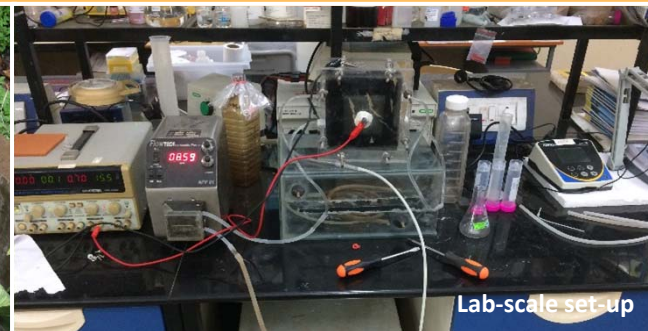
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Research activities carried out during the grant

- Visiting the household and community scale pilot plants and developing a thorough understanding of the design, performance, and operational issues.
- Checking the condition of the electrodes and membranes in the community scale treatment plant. Searching for alternative cathode electrode material to improve mixing and minimize fouling.
- Operation and monitoring of the household scale treatment plant on campus, and discussing problems related to the pumps.
- Testing different membranes in lab-scale experiments: cation exchange membrane (CEM), anion exchange membrane (AEM) and ceramic membrane.



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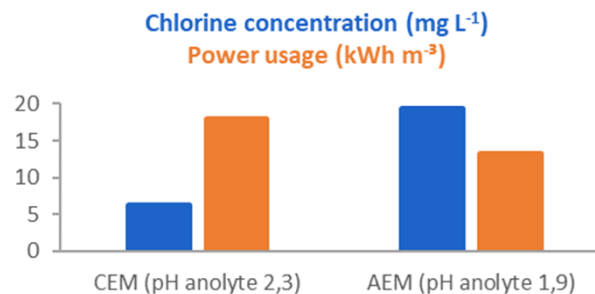
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Main research outcomes

- We contacted and visited a local steel vendor, and ordered stainless steel mesh for the cathode electrode.
- Problems with the pumps and flow regime of the household scale treatment plant persisted. This problem will be discussed with the team in Ghent in order to find a long-term solution.
- The AEM showed the highest chlorine production and lowest power consumption.
- The next phase will be to test the AEM together with the new electrode material in the community scale treatment plant, and monitor long-term performance (disinfection, power usage, fouling, etc.).



Alternative applications and funding opportunities

- Visit to the highly polluted St. Inez creek in Panjim to discuss the potential of using our technology to tackle the pollution at the source.
- Visit to the food market in Panjim and meeting with the commissioner of Panjim to discuss treatment systems for the fish/meat waste.
- Visit to a high school in the Panjim area where a wetland has been installed to treat the septic tank effluent.
- Visit to the fish market and polluted river Sal in Margao to view the construction site for a wetland to treat fish waste and river water.
- Meeting with the Head of Engineering Department at Aguas de Portugal who was visiting Goa to discuss potential collaborations.



Polluted St. Inez Creek



Wetlands at Panjim school



Polluted river Sal and wetland construction site



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