

Aquifer microbial community and micropollutant biodegradation kinetics changes following DOM amendment



Type of project: MSc thesis or internship

Research field: Environmental technology, Bioremediation

Duration: Minimum 6 months

Start date: April 2021

Location: Wetsus, Leeuwarden, the Netherlands

Project background: Groundwater, the largest body of freshwater in the European Union (EU), supplies drinking water to about 75 % of its residents. Nevertheless, micropollutants, such as pesticides, pharmaceuticals and industrial substances, are detected in European groundwater above the concentration limits set by the EU. Moreover, the current technologies for micropollutants removal are costly and can generate toxic by-products. Biodegradation could be a cost-effective and sustainable solution. However, groundwater has low nutrients and is anaerobic, which limits groundwater microbial activity and thus micropollutant biodegradation. Recent studies have shown that amendment with dissolved organic matter (DOM) can enhance biodegradation[1,2]. Moreover, biodegradation of micropollutants has been reported to be redox-dependent.

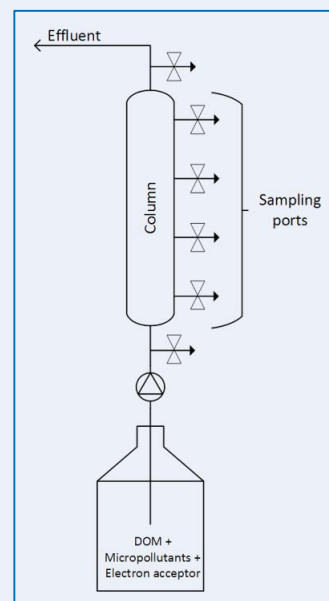
Project description: The aim of this research is to describe the kinetics of biodegradation of micropollutants under different redox conditions when DOM is added. Additionally, microbial community changes in time and space will also be studied. To reach these goals, groundwater systems will be simulated using columns packed with aquifer material, continuously fed with media containing micropollutants, electron acceptors and DOM. The results will help to understand the fate of subsurface contaminants when DOM is added, a step towards developing an *in situ* micropollutant bioremediation technology.

Your profile:

- Either EU citizenship or international student registered at a Dutch university
- Enrolled in graduate (MSc) studies
- Specialization in biotechnology/biochemistry/environmental engineering/microbiology or equivalent
- Experience in laboratory (e.g. analytical work, media preparation)
- Fluency in English both spoken and written
- Good organization skills

Our offer:

- Allowance of 175 €/month (except for students with other scholarships)
- Working in an international and multidisciplinary environment
- Developing laboratory skills and critical thinking
- Being part of the leading European research center in sustainable water technology



How to apply: For questions about the project please contact Rita Branco (rita.branco@wetsus.nl). Interested students are invited to send a CV (max. 2 pages) and a motivation letter (max. 1 page) to the same address.

[1] Luo, Y., et al., *Sci. Total Environ.* **2019**, 677, 692–699. <https://doi.org/10.1016/j.scitotenv.2019.04.128>.

[2] He, Y., et al., *Sci. Total Environ.* **2018**, 630, 1335–1342. <https://doi.org/10.1016/j.scitotenv.2018.02.180>.