

Assignment internship

Living Lab Biobased Brazil

The Living Lab Biobased Brazil is a transnational Living Lab in the field of Biobased Economy, created in 2014 by a consortium of Dutch Universities of Applied Sciences in collaboration with several Brazilian universities. The Living Lab helps students with internships and graduation projects in Brazil with the focus on Biobased Economy. We also help students finding accommodation, and offer buddy support, Portuguese classes, a bye-bye meeting and an introduction weekend in Brazil

In return the Living Lab expects you contribute to the Living Lab blog. You have to blog about your personal and internship experiences during your stay in Brazil. We also expect you to participate in the mini symposium at the end of each semester.

These events help you to increase your personal network and is focused on your personal development!

Company information

The Pontifícia Universidade Católica de Minas Gerais (PUC Minas) offers private education to around 60,000 students, divided over the different campuses in the Minas Gerais area. Most of the education is concentrated around the Belo Horizonte campus, divided in two university centers and three units. The education at PUC Minas is divided into separate research lines; Management, Religious Science, Social Sciences, Social Communication, Law, Education, Electrical Engineering, Mechanical Engineering, Teaching Science and Mathematics, Geography, Computer Sciences, Portuguese Language and Literature, Dentistry, Psychology, International Relations and Zoology. In total the university offers 56 undergraduate, 19 master and 7 PhD programs.

Research project

Performance of an anaerobic osmotic membrane bioreactor for domestic wastewater treatment aiming at removing toxicity and estrogenicity.

General background

Brazil, even though presents a privileged water supply condition, it has already experiencing the effects of water scarcity. Thus, the development of reuse of wastewater technologies for potable and non-potable purposes is one of the actions that could be taken in the medium and long term to deal with the water shortage in cities and metropolitan areas.

Endocrine disruptors (ED) and pharmaceuticals are classes of biologically active compounds of increasing environmental concern due to the adverse effects they may cause to aquatic community, such as the feminization of male fishes and turtles, and to humans, since they have been linked to cases of cancer in the female and male reproductive systems.

The concept of multiple barriers should be considered in the implementation of an advanced treatment system to be adopted in practice of potable reuse. This is based on a conjugation of different treatments in order to achieve high removal efficiencies of organic or inorganic micropollutants, ensuring the production of safe water. Accordingly, osmotic membrane bioreactor (OMBR) is a promising technology to treat domestic wastewater aiming at potable water reuse.

OMBRs consist of the combination of biological treatment, anaerobic or aerobic, with forward osmosis membranes. In these systems, an osmotic solution with osmotic pressure higher than the reaction liquid in bioreactor, promotes the creation of a pressure differential, which results in the permeation of water through membrane spontaneously, without any energy requirement for permeation. The OMBRs have figured as an efficient technology for removal of organic micropollutants, specifically pharmaceuticals, which enables their use in drinking water reuse system.

Nevertheless, only the evaluation of these compounds is not enough to determine the efficiency of the treatment processes, since they can be removed, but their byproducts or the interaction between them can have synergistic effect and increase the toxicity and estrogenic effects of the samples. Therefore, it is also important to quantify estrogenic activity and toxicity in anaerobic OMBRs, to assess biological activity removal mechanisms at all stages of treatment.

Goal of internship

This project aims to evaluate the removal of estrogenic activity and biologically active compounds, by the YES assay and chronic toxicity test with *Ceriodaphnia dubia*, in an anaerobic osmotic bioreactor combined with membrane distillation.

Activities

The project involves:

- Conducting physical-chemical analysis to characterize the effluent
- Operation of the bench-scale osmotic membrane bioreactor unit
- Analysis of the quality of the treated effluent
- Conducting toxicity test with *Ceriodaphnia Dubia*
- Conducting YES assay with raw and treated wastewater

Final product

The student will write a report that contains an overview of all activities and findings.

Starting date

September 2019. The length of the assignment is approximately 5 months (20 weeks).

The intern will be part of a research team lead by the adviser and supervised by Prof. Bárbara Caroline Ricci, professor of Chemical Engineering Department and MD in Environmental Engineering.

Desirable skills/qualities of the student

Good knowledge of the English (and preferably Portuguese) language is required.

Information of the company:

Contact person concerning this assignment	: Guilherme de Souza Reis
Phone	: +31 (06) 5192 4343
E-mail	: ga.desouzareis1@avans.nl
Visiting address	: Centre of Expertise Biobased Economy
Street / number, areal code and place	: Lovendijkstraat 63, Breda
Postal address	: 4800 RA
Website	: www.biobasedbrazil.org

Interested?

Please send your CV and motivation letter to Guilherme de Souza Reis (Coördinator Living Lab Biobased Brazil). For further questions you can contact: +31 (06) 51924343, or e-mail: ga.desouzareis1@avans.nl

**PLEASE BE AWARE THAT THE PROCES SUBSCRIBE AT
<https://www.biobasedbrazil.org/student/brazil/> APPLIES!**