Toulouse Biotechnology Institute
Bio & Chemical Engineering

Sylvain Faixo : PhD

Development of a process to treat refractory carbon and nitrogen from advanced treatments of wastewater sludge.

Years: 2019-2022

Background

Biological treatment of wastewater leads to the production of large amount of sludge that must be treated. This treatment is expensive and can represent up to a third of total water treatment costs (Vilardi et al., 2020). To improve and optimize sludge disposal, the thermal pretreatment of sludge can be implemented to optimize energy balance by improving methane production through anaerobic digestion and reducing the overall sludge disposal costs.

Such thermal processes lead to the production of refractory organic matter that may impact the overall performances of a wastewater treatment plant. Therefore, these compounds should be removed from treated waters and this requires detailed characterization of such compounds and an evaluation of various treatment processes.

Objectives

This PhD project aims at finding the best process to deal with refractory organic compounds formed during the thermal pretreatment of sewage sludges from technical and economical point of view. A first step aims at investigating the formation of these compounds and to chemically characterize them more accurately. Then, the second phase consists in an in-depth study of various possibilities to remove them with different processes or combination of processes.

Methodology

- → Characterization of matrices related to sludge thermal processes
- → Screening of various refractory molecule removal techniques
- → Optimization of selected technique

Keywords

Sewage sludge, thermal treatment, biorefractory organic matter