STUDENT THESIS PROJECT

Effect of single and mixed substrates on EPS production under nitrogen limited condition

Field: Environmental technology/engineering, water technology, biotechnology, or related fields

Duration: minimum 6 months (start date: November/December 2018)

Location: Wetsus, Leeuwarden, the Netherlands

Allowance: 350 € / month

Background

Microorganisms responsible for biological wastewater treatment excrete biopolymers, commonly referred to as extracellular polymeric substances (EPS). These EPS mainly comprise polysaccharides, proteins, lipids or their combinations such as glycoproteins and lipoproteins. The presence of high molecular weight biopolymer fraction in EPS, coupled with the negative surface charge make them promising flocculants. Our recent work demonstrated the possibility to simultaneously combine industrial wastewater treatment with the production of EPS as natural flocculants.[1]

With the aim of producing EPS with high molecular weight to enhance (waste) water particle flocculation, we at the *Natural Flocculant* theme of Wetsus want to investigate the effect of different carbon sources on EPS production under nitrogen limited condition.

Your tasks

- Literature review on the above topic. Formulate research questions.
- Operate in parallel three membrane bioreactors.
- Monitor the reactors' performances.
- Extract and purify EPS from sludge.
- Analyse and characterise the extracted EPS (molecular weight, charge density, carbohydrate and protein quantification, etc).
- DNA/RNA extraction
- Microscopic techniques: CLSM, FISH, etc.

Your profile

- Only open to EU citizens or foreigners studying in the Netherlands.
- Background (MSc in view) in environmental/biological engineering, water technology, biotechnology, or related fields. Relevant lab experience is an advantage.
- Knowledge and experience in molecular biology is an advantage.
- Highly motivated, enthusiastic, and can work independently.
- Can bring new ideas and initiatives into the project.
- Good experimental and analytical skills.
- Fluent in English language (speaking and writing) and able to work in an international environment.

Application

You feel excited about this project or still have questions? Just contact me! Interested students are invited to hand in a motivation letter (max. 1 page) and a CV (max. 2 pages) to Victor Ajao (victor.ajao@wetsus.nl).

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1. Ajao, V., Bruning, H., Rijnaarts, H. & Temmink, H. Natural flocculants from fresh and saline wastewater: Comparative properties and flocculation performances. *Chem. Eng. J.* **349,** 622–632 (2018).