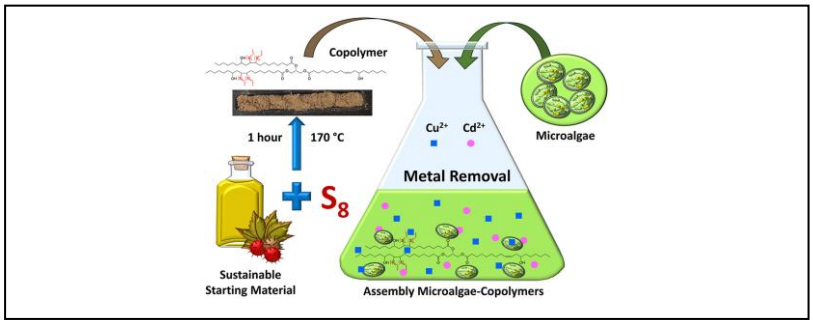
Green Bioremediation of Heavy Metals Using Immobilized Microalgae

Project description

Heavy metals are extremely hazardous to the environment and health due to their persistence, ubiquity and toxicity. Heavy metal contamination is mainly produced by anthropogenic activities, but also geochemical cycles play a significant role. Bioremediation with the help of microorganisms emerges as a promising solution to eliminate heavy metal contamination from aquatic ecosystems. Microalgae are a group of photosynthetic microorganisms, which produce about 50% of the atmospheric oxygen and convert the greenhouse gas CO_2 into biomass. Several microalga species can grow in wastewaters contaminated with heavy metals and therefore have the potential to be used in heavy metal bioremediation processes. Immobilization of microalgae, i.e. trapping or attaching them to a support matrix, has been shown to enhance their remediation efficiency.

We designed a sorbent, in which microalgae are immobilized on a copolymer produced entirely from recycled waste streams. This sustainable, biobased sorbent was highly efficient in removing heavy metal mixtures in lab scale. **The aim of this Master thesis is to characterize this novel biodegradable microalgae/polymer sorbent in real-world scenario using industrial wastewaters and evaluate its reusability and its potential for industrial upscaling.**



Research group/environment

Professor Christiane Funk´s research group is investigating the potential of Nordic microalgae in wastewater reclamation and biomass generation. Besides being a group of excellence affiliated to WISE, she is part of the strategic research environment Bio4Energy and Umeå University´s prioritized research area North Food. The group is in the Chemical Biological Centre of Umeå University, which offers excellent scientific infrastructure.

To be conducted at: Department of Chemistry, Umeå University, Christiane Funk@umu.se

Level: A (Master, 30/45/60 hp/ECTS depending on program)

Examiner: XXX

Supervisor: XXX

Contact person: XXX (XXX@liu.se)