Algae& Organic Matter Laboratory

Water treatment
Separation processes
Characterisation
Monitoring

www.aom.unsw.edu.au

Recyclable green coagulants for the solid-liquid separation of algae

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The processes to separate microalgae and cyanobacteria from raw waters receive a lot of scientific interest today in the framework of various applications such as water treatment and biotechnology. The occurrence of microalgae and cyanobacterial blooms are increasingly challenging the operational capability of drinking water and advanced wastewater treatment to meet Australian drinking and recycled water guidelines due to the release of metabolites including cyanotoxins and taste and odour compounds that adversely impact water quality. In the framework of biotechnology, cheap and effective separation of microalgae and cyanobacterial biomass is a crucial process in the overall design of economical biomass production to be applied in novel food, feed or biofuel applications. Both for water treatment and biotechnology contexts, novel coagulation-based separation methods (sedimentation or flotation) are desired to optimise existing and designing future separation strategies. Metal coagulants, such as (poly)aluminium and ferric salts, or synthetic polymers, such as polyacrylamides, have been applied for decades in water treatment and mining industry. However, in most cases, the use of those type of coagulants is costly, leading to the production of large and unsustainable sludge volumes. Secondly, it could lead to toxic contamination of the separated biomass when applied in microalgae and cyanobacterial biomass production processes, thereby, leaving a large environmental footprint. Hence, research in the development and application of novel green and recyclable coagulants is essential to improve the sustainability of separation process. This inter-disciplinary project will therefore investigate the potential for the application of novel green and recyclable polymers in flotation processes for the separation and harvesting of microalgae and cyanobacteria. Elements from the fields of polymer science, water treatment, colloidal chemistry, and algal biochemistry would be assessed to delineate the underlying mechanisms that govern separation while ensuring that the process is robust, sustainable and leaves little environmental footprint.

The successful candidate will join the AOM Lab under the algae separation and harvesting stream. The candidate should have a background in either chemical, civil or environmental engineering (or similar), a demonstrated aptitude for undertaking laboratory work and have excellent communication skills. The student needs to be successful in securing their own primary scholarship via a Research Training Program (RTP) or equivalent (https://research.unsw.edu.au/graduate-research-scholarships). Further information on the project and scholarship may be obtained from A/ Prof. Rita Henderson (email: r.henderson@unsw.edu.au). Applications should submit (including a cover letter, academic transcript and CV) to A/ Prof. Rita Henderson at UNSW Sydney.