

## **Cultivation of Cyanobacteria on Urine for Nutrients Recovery and Biopolymers Production**

### *Background*

Human urine has high nutrients content, containing up to 80% of the nitrogen (N) and 40% of the phosphorous (P) that end up in household wastewater, while accounting for only 1% of its volume (Kujawa-Roeleveld & Zeeman, 2006). Microalgae have been shown to grow in undiluted urine when employing high light supply rates and short light path photobioreactors (PBRs), making it possible to recover most of these nutrients in form of biomass (Tuantet et al., 2014). However, the N:P ratio of urine (30-47:1) limited microalgae growth along with the recovery of N due to P limitation.

P limitation could be overcome by cyanobacteria, which accumulate an N storage material called cyanophycin granule polypeptide (CGP) when facing P limitation. CGP has potential applications as dispersant and as raw material for the production of bioplastics (Joentgen et al., 2001). In this context, the production of cyanobacterial biomass on source separated urine could make it possible to fully recover these nutrients, and even transform a significant fraction of them into useful products for industry, contributing to a circular economy. For more information click [here](#).

### *Aim*

The goal of this project is to characterize the growth of cyanobacteria on human urine in automated flat panel PBRs in both batch and continuous mode. Nutrients recovery potential and CGP content in the biomass will also be determined along the cultivation.

### *Requirements*

- EU citizen or international student registered at a Dutch university enrolled in graduate (MSc) studies
- Strong background in chemical/environmental/bioprocess engineering, applied microbiology or related areas with previous laboratory experience
- Fluency in English both spoken and written
- Previous experience on operation of bioreactors is a plus

*Starting date:* May – June

*Duration:* 4-6 months (Either MSc Internship or Thesis are possible within this project)

### *Our Offer*

- Experience of working at a cutting edge water technology research institute
- The opportunity to work in an international environment
- Living allowance of €350/month

This project is carried out at Wetsus, Centre of Excellence for Sustainable Water Technology, located in Leeuwarden, the Netherlands [www.wetsus.nl](http://www.wetsus.nl) in cooperation with the Chair of Environmental Technology and the Division of Bioprocess Engineering of Wageningen University and Research [www.wur.nl](http://www.wur.nl)

*How to Apply:* Send CV and motivation letter to [sebastian.canizalesgomez@wur.nl](mailto:sebastian.canizalesgomez@wur.nl)