Thesis/Internship project:

Application of vortex aeration method on the control of algae bloom

Motivation:

A sustainable, additive free improvement of the quality of surface water is of major importance. It is known that the flow pattern of water in nature is always spiral, and vortexes are naturally occurring in every river as a natural aeration mechanism. This behaviour was first studied in detail by Austrian forester Victor Schauberger, according to whom sustainable technology should be developed according to the principle "first understand, then copy nature". Indeed, mechanical treatment based on such vortex processes has been available on the market. Moreover, field observation has shown that "vortexing" could treat surface water polluted with algae bloom, possibly due to the increased aeration efficiency and gas dissolution. The aim of the proposed master project is to start with basic physiological properties of cyanobacterial cells exposed to vortex treatment.

Research challenge

Two different types of vortex systems (hyperbolic funnel and a vortex created by a turning disc) are to be studied and compared to understand their influence on microbial cells.

Autoclaved surface water or other liquid media will be spiked with different concentrations of a cyanobacteria (known as blue algae) and the solution will be applied to the vortex systems. The influence of vortexing time, temperature, speed and volume on the growth behaviour of the cells and on their structural integrity will be studied. Therefor a number of different techniques (e.g. growth curve, flow cytometry, confocal laser scanning microscopy) have to be applied and developed.

Requirements

We are looking for a candidate with an MSc degree in the field of microbiology, molecular biology or biochemistry. The project has a duration of 6 month. Starting preferably in February.

If you are interested in the project, please contact the PhD researcher Xiaoxia Liu (xiaoxia.liu@wetsus.nl) for more information or directly apply by sending your CV to the same email address. The internship includes a monthly allowance of 175 euro per month. The project can only be offered to EU students or foreign students studying in Dutch Universities.