

Thesis/Internship Project

Effect of magnetic field on drinking water biostability

Motivation:

Biofilm formation in drinking water distribution (DWD) pipes is responsible for a wide range of water quality and operational problems. In the water industry, it has been frequently observed that magnetic fields, as a sustainable and additive-free technology, can greatly preserve drinking water quality and reduce the fouling tendency. However, despite the numerous field and laboratory observations, there is lack of solid explanation of the mechanism on how magnetic field can affect biofilm growth in DWD.

Recently, a hypothesis on how magnetic gradients can affect calcium precipitation has been experimentally verified. As biofilms interact intensively with inorganic calcium ions in drinking water, this interaction may affect the microbial community as well. Recently, our group also found the effect of magnetic field on enzymatic activities and protein regulation. The aim of this proposed master project is to characterize the basic physiology of bacteria and the stability of drinking water microbial communities under the influence of magnetic treatment.

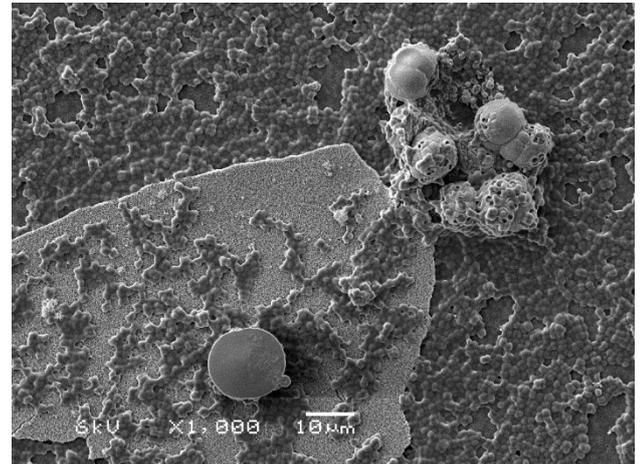


Figure 1, Calcium precipitation mediated by drinking water bacteria biofilm

Research Challenge:

Pure culture bacteria and synthetic microbial community that simulate drinking water conditions will be used to assess the effect of magnetic fields on the biofilm development and drinking water biostability. The development of drinking water biofilm treated with magnetic field will be characterized with different methods (NGS, OCT, Scanning electron microscopy, fluorescent microscopy) and compared with non-treated biofilm. The interaction between the microbial communities and calcium in drinking water will also be investigated.

Requirements:

We are looking for a candidate studying a BSc or MSc program in the field of microbiology, molecular biology or biochemistry. The project has a minimum duration of 6 month. Starting date is preferably in March 2021.

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 for the students without Erasmus scholarship.

P.S. Due to the visa related issues, only 1) EU citizens enrolled in any university or 2) non-EU citizens already living in the Netherlands and enrolled in a Dutch university will be allowed to work as internship/thesis student.