

Thesis/Internship Project

Influence of magnetic water treatment on the biofilm growth in drinking water distribution systems

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. The aim of this proposed master project is to characterize the basic physiology of bacteria under the influence of magnetic treatment.

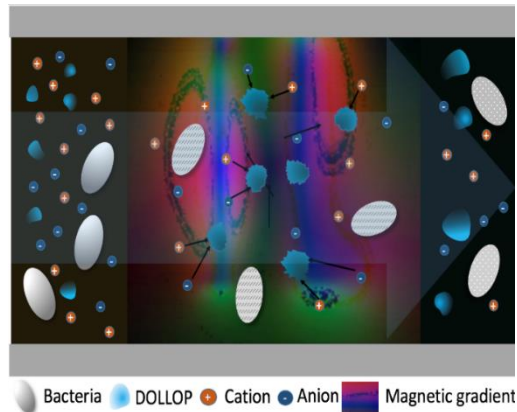


Fig.1 Illustration of the effect of a strong magnetic gradient on the formation of calcium colloid (DOLLOP) and microorganisms. As a result, dynamics of ions and microbes can be changed by the magnetic field.

Research Challenge:

Pure culture of bacteria isolated from drinking water will be used to assess the effect of magnetic fields on the physiology of microorganisms. For the culturing of bacteria, cell enumeration as well as IC water pipes are also available for investigation. The development of drinking water biofilm treated with magnetic field will be characterized with different methods (OCT, Scanning electron microscopy, fluorescent microscopy) and compared with non-treated biofilm.

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 should be June.

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 350 euro per month.

Research Institute

Wetsus is located in Leeuwarden, the Netherlands. As an innovation research center, Wetsus dedicates in connecting the industry sector with academic researches to promote sustainability water technology. It provides an international and multidisciplinary environment that allow interactions among researchers with various backgrounds.