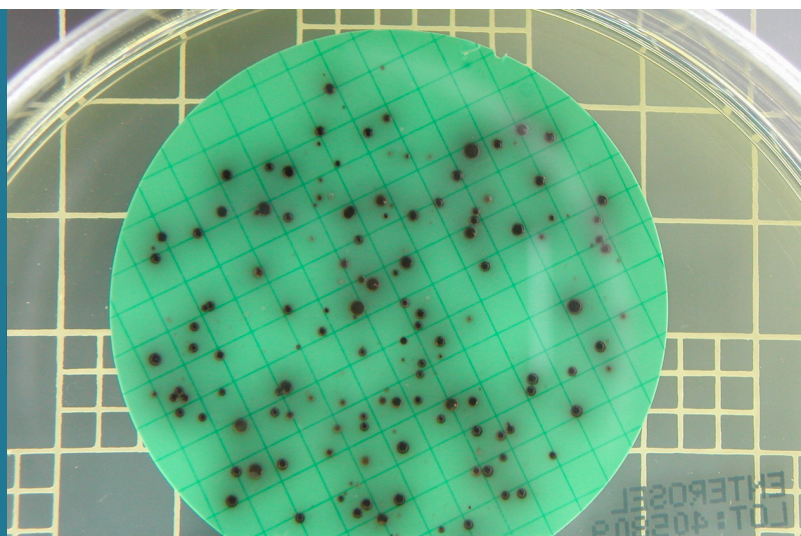


Environmental microbiology and biotechnology



As part of their activities in the Environmental microbiology and biotechnology group, researchers develop knowledge, know-how and innovative solutions in relation to the contamination of water, food and the environment by pathogenic microorganisms.

research challenges

1. Microbial Risk Assessment

Food and water is regularly contaminated by microorganisms along the production chains. Recent outbreaks of food-borne and waterborne microbial infections highlight the increasing risk of microbial propagation in a globalized world. The research group is engaged in understanding the way these microorganisms interact with the matrices they encountered (water, air, food, soil, sediment,...) in order to precisely characterize the risk associated with food or water production and consumption, water-based recreational activities, water reuse in agriculture or cities.

The research group offer to private and public partners, among others:

- Development of monitoring tools for surface water and groundwater. These tools are based on molecular biology, analytical chemistry as well as culture-based methods for assessing viruses, parasites, bacteria or algae;
- Development of biosensors for the real-time assessment of microbes in water. These biosensors are key to implement innovative Smart Water management;
- Integrative studies of environmental contamination of water resources and public health epidemiology, e.g. for pathogens such as *Campylobacter*; *Noroviruses*, *Adenoviruses* or *Cryptosporidium*;
- Assessment of the fate and transport of pathogens in surface water or groundwater in a drinking water protection perspective;
- Background or emergency studies of contamination for bottled water industry;
- Drone-assisted monitoring of surface water resources contaminated with cyanobacteria in complement to assessment of the dynamics of algae and toxins.

2. Clean-tech related to microorganisms

Fighting microorganisms has become of paramount important in order to propose responses to the increasing microbial risk generated by the globalization. Researchers develop innovative decontamination processes for food-related or water-based businesses.

The research group offers to private or public partners:

- Development of technologies based on cold atmospheric plasma for the decontamination of inert surfaces or food items
- Validation and marketing of new decontamination devices including ultrapure water production systems
- Management of beneficial microbial strains in the [Luxembourg Microbial Culture Collection managed by LIST](#)

On the other hand, researchers develop greener alternatives to classical treatments for water infrastructures, bottled water industry, food industry, hospitals,... using beneficial microorganisms (such as probiotics or microbial enzymes) to eliminate pathogenic microorganisms or chemical pollutants such as pharmaceuticals (antibiotics in particular), in wastewater or on building materials (polymers stainless steel, etc.).

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