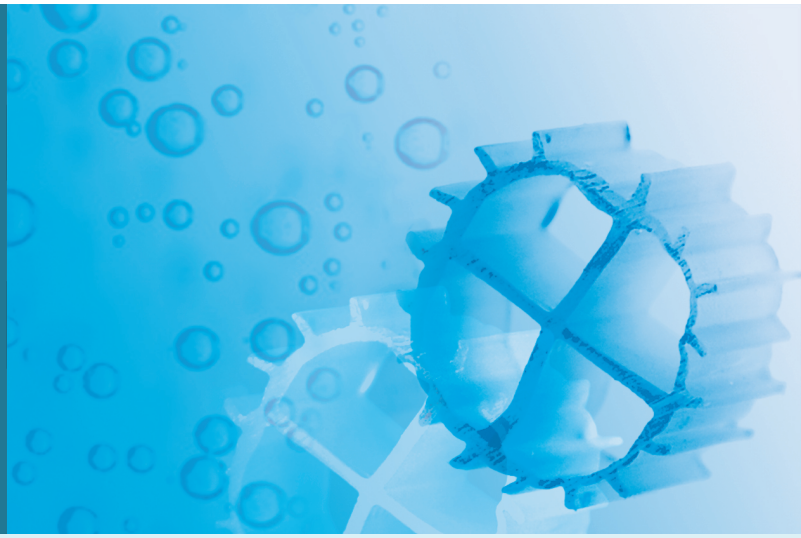
# PROJECT FACTSHEET

www.list.lu/en/research/project/biopharm/?no_cache=1&cHash=8854479faaba237058bed9f129157863

# Biopharm

An investigation into the removal of pharmaceuticals from domestic wastewater using biofilm degradation processes



## INSPIRATION

Have you ever thought about what eventually becomes of the pills you take when you are sick? The wastewater from households, care homes, and hospitals contains the residue of many such pharmaceuticals. After passing through a treatment plant, this water later flows back into rivers and lakes, potentially affecting plants and wildlife.
Conventional wastewater treatment plants are not designed to remove pharmaceuticals, and the newer post-treatment options that have been developed are often costly and energy-intensive. There are currently no regulations on national or EU-level concerning pharmaceutical emissions from wastewater treatment plants, but it is expected that they will be introduced in the near future. This will concern all EU member states including Luxembourg, where smaller rivers can result in relatively high concentrations of certain pollutants, and necessitate upgrades to certain treatment plants. Biopharm will focus on a treatment stage known as biodegradation which could be optimised to remove pharmaceuticals, potentially leading to an efficient and low-energy solution.

## INNOVATION

During the biological degradation stage of treatment, bacteria circulate in the wastewater and digest pollutants. Biopharm aims to investigate how bacteria remove pharmaceutical micro-pollutants from wastewater using Moving Bed Biofilm Reactor (MBBR) technology and how to improve this process. The results will be expressed in a mathematical model to simulate the biological degradation processes. The model can be later used to predict the biological optimisation potential of existing plants.

## IMPACT

The knowledge gained from this project could help reduce pharmaceutical residues in the urban water cycle through the upgrading of existing treatment plants, while reducing the need for other energy-intensive and costly post-treatment technologies. Cleaner water leaving treatment plants would mean less harm to our plants and animals, and less contamination of our drinking water reserves.

## Partners

University of Luxembourg (LU) , Administration de la Gestion de l'Eau (LU) , modelEAU research group (CA) , Université Laval (CA)

**Contact**
5, avenue des Hauts-Fourneaux
L-4362 Esch-sur-Alzette
phone: +352 275 888 - 1 | LIST.lu

© Copyright April 2025 LIST

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST