# Next-level Bio-engineering: A Biological Solution for Degradation of PFAS

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UNIVERSITY & RESEARCH

*Wageningen Food and Biobased Research aims to develop a novel methodology for maximizing biological degradation of one of the most challenging compounds to date, namely perfluoroalkyl substances (PFAS). Our Expertise Groups have experience with the use and industrial application of adaptive laboratory evolution and sensitive monitoring of very specific molecules*

## Towards efficient biological degradation of PFAS

PFAS is used for a very diverse set of applications thanks to its many beneficial properties. A major drawback of this class of substances is that their inherent high stability makes them very resistant to any type of degradation. Recent findings have shown that unique bacteria show significant rates of degradation of several PFAS species[1,2,3,4]. So far the mechanism and concentration dependence of degradation had remained unclear.

WFBR takes the lead in unraveling the mechanism and further optimizing the rate of the PFAS degradation and concentration dependence by employing Adaptive Laboratory Evolution (ALE). In this Public-Private-Partnership initiative, WFBR aims to further optimize currently known PFAS degrading micro-organisms that are selected for their suitability in an industrial process. In the proposed system, micro-organisms that are able to degrade PFAS, at an industrially relevant concentration, most efficiently will have a selective advantage. This system will therefore allow natural selection of mutants that show improved ability to degrade PFAS.

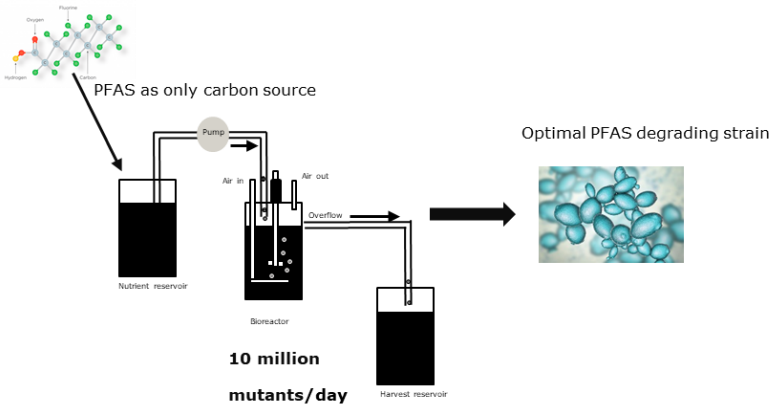
## Implementing the technology

The adapted micro-organisms may be employed at specific sites with high PFAS concentrations, over time improved strains are expected to degrade lower PFAS concentrations. This will be done in a fit-for-purpose membrane bioreactor that retains the adapted micro-organisms. The bioreactor ensures a maximum loading and containment of adapted bacteria, so they will not be diluted out of the system.

## What Do We Offer?

Our expertise group has experience with developing, testing and assisting with implementation of this process. This will be done in a 3-year Public-Private-Partnership initiative with a targeted total research budget of 3.0 M€. Within this program we aim to develop:

- Micro-organisms that degrade PFAS faster than current available technologies
- Test the system using effluent from the manufacturing sites of each of the partners
- Development of a continuous monitoring system for the targeted PFAS molecules




Evolve micro-organism → Test in a membrane bioreactor system → Industrial Production Test → Tech transfer to your production facility

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1. Chemosphere 2014 Aug;109:221-5.
2. Applied Biochemistry and Microbiology, 2017, Vol. 53, No. 5, pp. 533–538
3. Environ Technol. 2019 Oct;40(24):3153-3161
4. Biochemical Journal (2020) 477 2875–2891