

 **Case study factsheet**

# LaTrappe, Netherlands

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LaTrappe Koningshoeven Abbey Brewery , **Netherlands**



## Description

The Koningshoeven BioMakery is a biological wastewater treatment system based on modular and functional reactor based ecological engineering. The BioMakery is powered by Metabolic Network Reactor (MNR) technology, which uses 2-3,000 different species of organisms ranging from bacteria to higher level organisms such as plants. The BioMakery serves as a test facility for advanced circular space technology developed within the micro-ecological life support system alternative (MELiSSA) program of ESA. SEMiLLA formerly known as IPStar has a mandate to implement this technology in civil society. Coupling MNR with MELiSSA advanced separation and photobioreaction based technologies, reusable process and/or irrigation water will be produced, while also growing biomass that can be used as slow-release fertilizer for the plant nursery, as fish fodder, or as human food.

## Technology performance and best practices

### Metabolic Network Reactor (MNR) coupled to a Micro-Ecological Life Support System Alternative (MELiSSA) advanced separation systems (MF/RO)

Before the installation of the MNR and MELiSSA systems the effluent from the brewery was released into the public sewerage network of Tilburg. The treatment took place in the Tilburg municipal wastewater treatment plant, located approximately 9km from the brewery, at the opposite end of the city. The transport of high strength wastewater over long distances can cause issues in the sewer lines, such as deposition of solids and anaerobic decomposition resulting in emission of odors and corrosive gases.

The performance expected of the MNR unit was with a 99% of water yield, a 97.6%, 99.7% and 99% of BOD, COD and turbidity were removed. Assuming stable operation of the MNR, high quality effluent could be produced. However, due to lower than expected MNR effluent water quality it was not possible to determine KPIs in terms of flux, energy consumption for the membrane systems. Quality parameters were at or above expectations after membrane filtration. For example, the conductivity reduction rate was 95%. The turbidity reduction rate was 25%. The COD reduction is equal to 90%. More details are provided in [D1.3](#).

### Protein production from wastewater

In La Trappe (NL), a photobioreactor was demonstrated to treat brewery wastewater and urine in a mainstream to produce proteins that can be used as a slow release fertiliser. In general, this technology is also capable to produce proteins that can be used as fodder or even food additive. The TRL of the technology is still low between 5 and 6 and further investigations are needed. The recovery rates were 38% for COD, 20% for N and 25% for P. The photobioreactor produced roughly 0.48 g TSS biomass per litre wastewater. This corresponds to a production of around 276 to 575 kg of dried biomass per year to be used as a slow release fertiliser. In NextGen, the proteins were successfully tested as a slow release fertiliser to grow microgreens. Furthermore, this technology is also very well suited to treat concentrates from membrane treatments. More details are provided in [D1.5](#).



## Publications and references

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## Scale

Operational scale of this case study related to the application of tools and technologies

- Local scale

## Challenge

Challenge that is addressed through the application of tools and/or technologies to the case study

- Increasing water demand by growing industrial sectors

## Related tags

Resource recovery

Water reuse

European Space Agency

## Contact data

### Contact person

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### Involved organisations

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**BIOPOLUS**  
The Living Technology Alliance

Biopolus
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**SEMILLA**  
IPSTAR Circular Systems™

SEMILLA IPStar
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**Waterschap  
De Dommel**

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### URL

<https://nextgenwater.eu/demonstration-cases/la-trappe/>