MICRO4 BIOGAS

Best-in-class microorganisms to optimise biogas production

The European project Micro4Biogas aims to **make biogas energy competitive** using applied microbiology. Biogas is a sustainable fuel made by microorganisms which decompose organic waste, but the process is inefficient. Understanding and **improving these microbial communities** is the key to boost biogas production.

Biogas fuel

A key support for the energy transition

Biogas is made up **mostly of methane** (CH_4; 55-70%), with some carbon dioxide (CO_2; 30-40%) and traces of other gases. It can be burned for:

Heating · Transport · Elecricity

It is made by the microbial decomposition of biomass and has **three main advantages** over other power sources:

Storable
Biogas can be reserved until the energy is needed.

Scalable
Digester plants are cost-efficient at any size.

Renewable
The fuel comes from organic waste, an unlimited resource.

Improved production

For a truly efficient energy source

Micro4Biogas will use the **bioaugmentation strategy** to boost industrial biogas production. The project will test this technology at a pilot power plant in Spain (925 m³).

Four features of biogas production **will be improved**:

Speed
A quicker process of waste degradation.

Yield
Obtaining more biogas out of the organic waste.

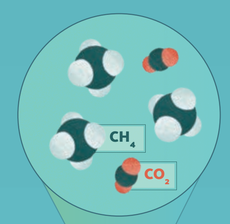
Quality
More refined biogas with higher methane content.

Reproducibility
Solid protocols that can be implemented in other plants.

From organic waste, energy and fertilizer

The process of anaerobic digestion

Discarded **organic matter** is placed in tanks called anaerobic digesters. Here, it is **transformed into biogas** by the sequential activity of two **groups of microorganisms:** bacteria and archaea.



Biomass sources

Farming waste · Sewage sludge · Food waste

Traditional anaerobic digester

First, **bacteria** decompose the waste into organic acids.

Then, **archaea** turn these acids into methane gas.

The fertilizer can be used on **local crops**, which in turn generate new biomass.

As a by-product, **clean fertilizer** is recovered from the digester.

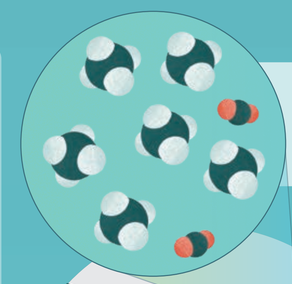
Bioaugmentation

Enhancing the microbial communities

The **natural microorganisms** which grow inside anaerobic digesters and process waste are **not efficient or reliable** industrially.

Micro4Biogas will create optimised microbial consortia:

1. **Selecting the most efficient bacteria and archaea** already present in biogas plants.
2. **Using directed evolution techniques in the laboratory**, similar to selective breeding of livestock.



Better biogas with top yields and high methane concentration.

Efficient anaeorbic digester

The **optimised microbial communities** will be **inoculated** into anaerobic digesters to boost waste degradation and biogas formation.

The project in numbers

4 Years · **14** Partners · **6** Countries · **5,7 M€** Funding

Find out more!

www.micro4biogas.eu · @Micro4Biogas · info@micro4biogas.eu

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