PROJECT FACTSHEET

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Microbiome Designer

Towards a ready-to-use microbial community for improved anaerobic digestion of biomass

Inspiration

Anaerobic digestion of biomass, also known as biomethanization, is a multi-purpose technology that has emerged as a promising model of biowaste utilization that leads to renewable energy production. As sustainable environment is one of the main priority of the European Union, this process might be of great interest as it not only provides green energy, but also offers an efficient organic waste recycling in a form of a natural fertilizer, thus it greatly contributes to the development of circular economy, especially in the agricultural sector.
However, the current anaerobic digestion process may face high constraints in terms of robustness and efficiency. At the dawn of metagenomics studies, “bacterial dark matter” characterization shed the light on the phylum *Cloacimonetes*, which has been identified as ubiquitous and abundant in different aerobic digestion reactors.
LIST efforts deployed to unravel the diversity of the anaerobic digestion microbiota (GASPOP) provided evidence that some microbes can offer a significant resilience in laboratory conditions towards volatile fatty acid intoxication (acidosis), which is the most common failure of the process.

Innovation

As a follow-up of the previous research projects GASPOP and CLOMICS conducted by LIST, the Microbiome Designer project aims to identify potential manufacturers and hand-users of the *Cloacimonetes*-enriched bacterial solution within the Greater Region and beyond.
Together with a specialized consulting agency, LIST researchers will perform an accurate market study, and develop potential collaborations in order to optimize the product and scale experiments up from laboratory conditions to full-scale anaerobic digestion reactors.

Impact

The Microbiome Designer project will identify potential manufacturers for the mass production of the Cloacimonetes-enriched bacterial solution, as well as potential hand-users in the Greater Region and bordering countries.
The optimization and scaling-up of this innovative product might be of great interest for Luxembourgish and European decision-makers, as well as stakeholders of the biomethanization sector. Indeed, the bacterial solution developed by LIST will improve the process through a bioaugmentation of anaerobic digestion reactors, prevent the most common failure called acidosis, and increase significantly the biogas production yield.

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