

Organic Waste Treatment: Controlled Anaerobic Digestion with Dynamic Recirculation of Digestate

Optimized organic waste treatment process through anaerobic digestion with separate phases and dynamic recirculation of the digestate



IP Status

Patent application submitted

Seeking

Licensing, Development partner

Background

The proposed invention is a method to optimize the biological production of biohydrogen and volatile fatty acids (VFA) using an anaerobic digestion process in separate phases. This optimization is achieved by controlling the pH in the fermentation reactor, through the recirculation of the digestate. The amount to be recirculated is controlled by a mathematical model based on pH readings and ammonia estimation.

Tech Overview

The proposed process of anaerobic digestion with separate phases includes a dynamic recirculation of the digestate. The recirculation ratio is managed by an algorithm that, through pH and electrical conductivity measurements from probes in the two reactors, estimates the ammonia concentration. The algorithm also automatically establishes the recirculation flow rate to maintain the pH in the fermentation reactor at a value close to optimal conditions while at the same time preventing an excessive accumulation of ammonia in the system. The system has a high resilience and a rapid and automatic ability to restore optimal settings, following stress conditions. The process can be fed by Organic Fraction of Municipal Solid Waste (OFMSW) or by sludge from wastewater treatment, as well as zootechnical and agro-industrial waste (**Figure 1**, **Figure 2**).

Benefits

- Automatic process management
- Continuous pH and electrical conductivity measurements on line
- Ammonia concentration estimation with mathematical model
- Automatic control of the recycled portion
- Resilience and automatic system recovery in case of stress
- Minimal investment & operating costs

Applications

- Treatment of OFMSW or other fermentable organic waste
- Automation of anaerobic digestion processes
- VFA and biogas production

Opportunity

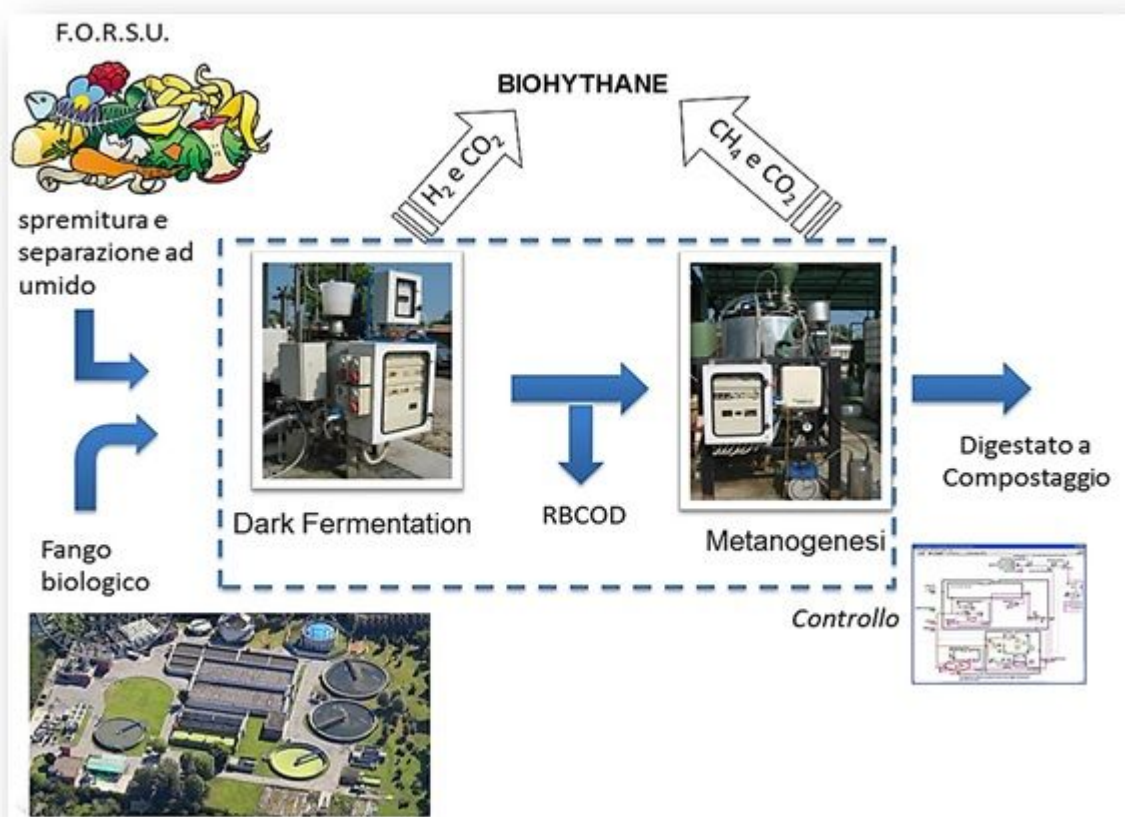
Open to collaborative projects to further develop the technology and/or licensing.

Patents

- IT: 102018000008006
- PCT: IB2019/056702

Appendix 1

Figure 1



Appendix 2

Figure 2

