

Objectives

1. Recover energy from waste effluents
2. Obtain ready-to-use bio-based fertilising products for local agriculture
3. Increase the production of biogas
4. Generate biomethane from biogas to use as fuel in vehicles
5. Obtain the best performance of technologies to recover nutrients as bio-based fertilisers
6. Obtain reclaimed water suitable for fertigation and aquaculture
7. Study the fate of trace organic contaminants and metals
8. Reduce the environmental impact of both waste effluents and decrease the CO₂ footprint
9. Decrease the overall economic cost of both effluents treatment
10. Develop a versatile system to ensure replicability and transferability
11. Demonstrate social, economic, technical and environmental feasibility of the INFUSION solution

Acronym: INFUSION

Demosites: Asturias and Catalonia (Spain)

Budget: € 3,119,601

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infusion

Intensive treatment of waste effluents and conversion into useful sustainable outputs:
biogas, nutrients and water

Project coordinator:



Project partners:



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INFUSION in facts

What? To demonstrate a resource recovery-based innovative treatment scheme to obtain biogas, nutrients, and reclaimed water from both landfill leachate and liquid digestate from organic fraction of municipal solid waste (OFMSW).

How? Using a near zero-discharge process, according to circular economy principles.

Why? To close the loop between waste and resources in landfills and waste management plants, and reduce the social, economic and environmental impacts.

Where? At two Spanish waste management centers: mechanical-biological treatment plant (Ecoparc 2) in Barcelona (Catalonia), and landfill in Gijón (Asturias).

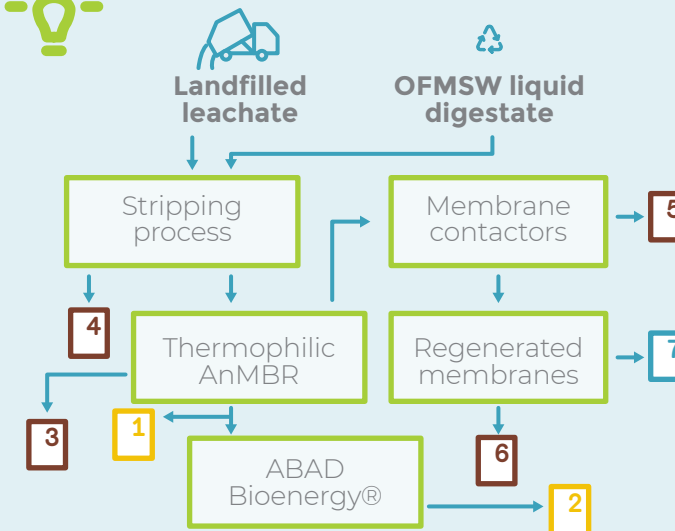


2.2 billion tonnes of MSW by 2025

25 % is landfilled

34 % is OFMSW

The high amounts of municipal solid waste (MSW) generated is a global concern - the annual generation is expected to reach 2.2 billion tonnes by 2025. Currently, the 25 % of the MSW is landfilled and the 34 % is OFMSW.



INFUSION proposes a environmentally friendly solution based on the combination of highly efficient biological and physical-chemical separation technologies to lower the environmental impact of MSW management while reclaiming high added-value products.

The stripping process removes ammonia from both effluents and recovers it as ammonium salts. A thermophilic anaerobic membrane bioreactor (tAnMBR) transforms the organic matter into biogas through the action of microorganisms. After this process, the biogas can be upgraded to biomethane by the ABAD Bioenergy® technology, which is based on absorption-adsorption process. The liquid fraction is treated through membrane contactors in order to keep removing ammonia and recover ammonium salts, which can be used as fertilizers. The regenerated membranes allow to produce reclaimed water.



1 Biogas

2 Biomethane

3 Sanitizer & stabilized solid

4 Fertilizer: NH₄NO₃

5 Fertilizer: (NH₄)₂SO₄

6 Struvite recovery (theoretical)

7 Regenerated water

Agricultural and aquacultural application

The INFUSION solution demonstrates the potential of both effluents from MSW management to be recoverable and to get energy, nutrients and reclaimed water.

The resources obtained can be used for agricultural and aquacultural application, thus contributing to the circular bioeconomy.

Energy will also be obtained in form of biogas (in Barcelona's demosite) and biomethane (in Asturias's demosite). These energy effluents could be used to produce electricity or heat in the same facility or to be injected into the natural gas network.