



SCALBUR

LEADING A REVOLUTION
IN BIOWASTE RECYCLING

Technologies for urban biowaste and wastewater valorisation

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➤ Feedstocks utilised

- ✓ To work towards circular economy, converting wastewater treatment plants into biofactories. Find optimization solution for sludge line in WWTPs



Main feedstock:

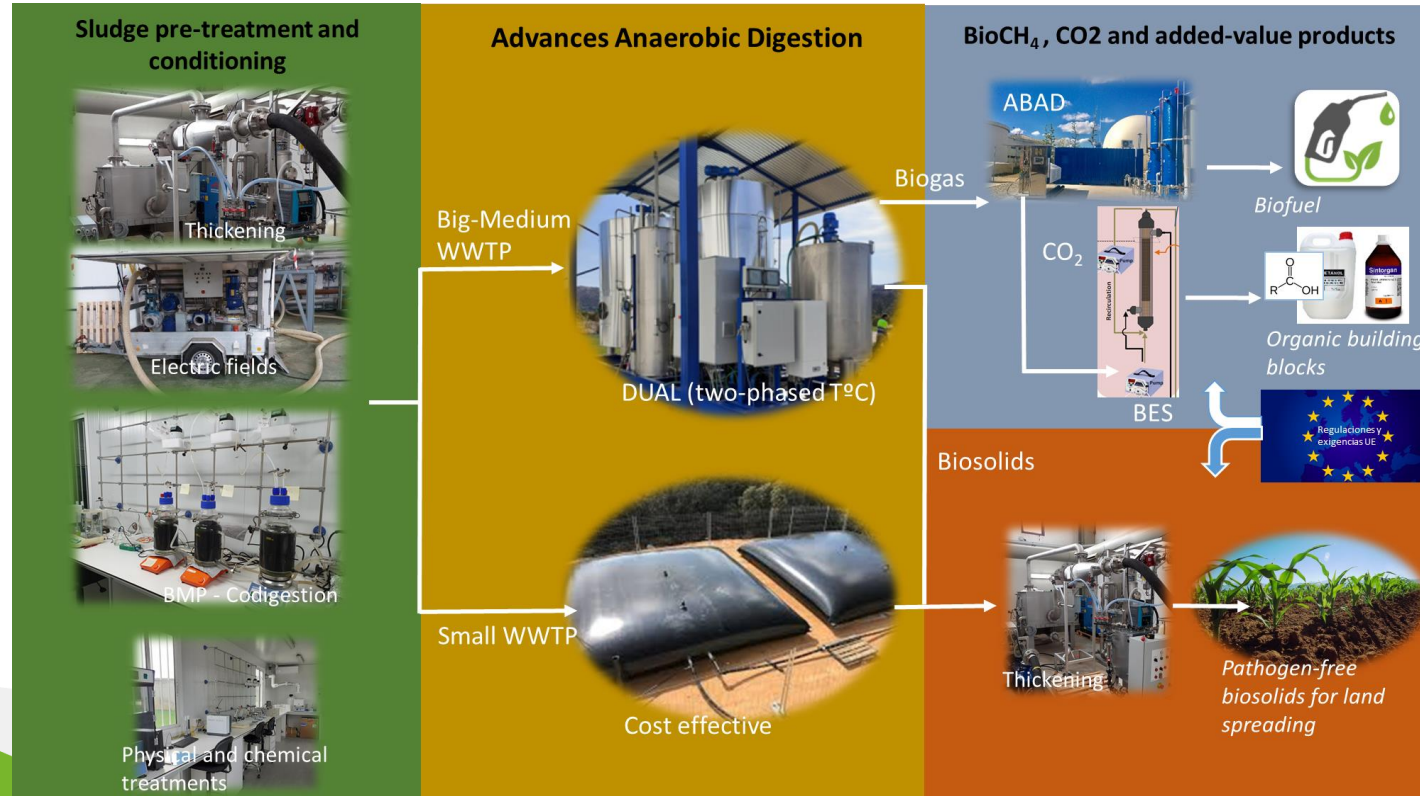
- Urban Sewage Sludge

Co - digestion

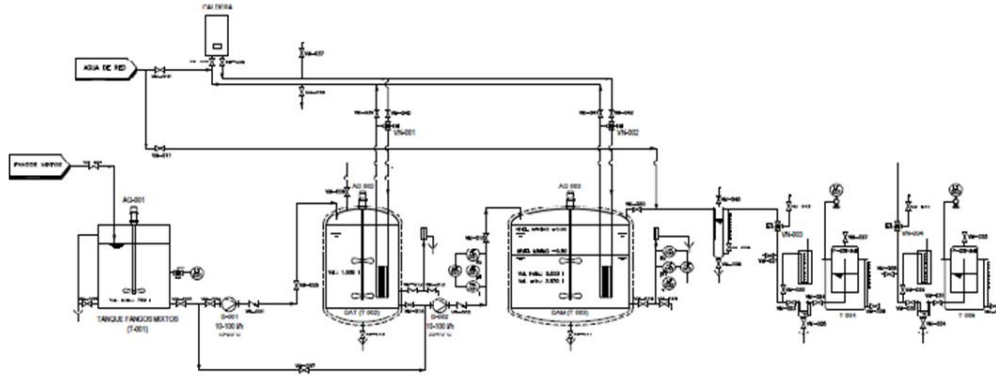
- Glycerine
- Slaughterhouse residues



Conversion technologies

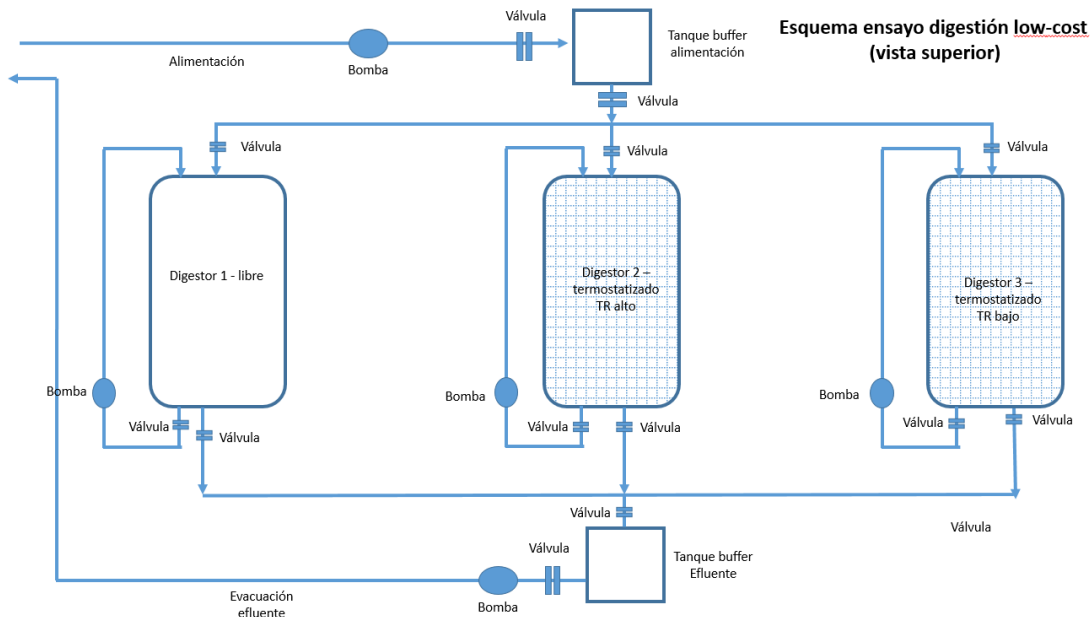


DUAL ANAEROBIC DIGESTION



Aims: 1. sludge reduction, 2. sanitation, 3. bioenergy production, 4. Chemical usage reduction

DECENTRALISED ANAEROBIC DIGESTION

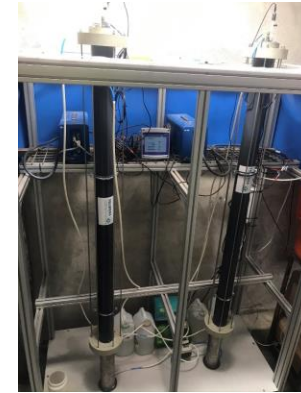
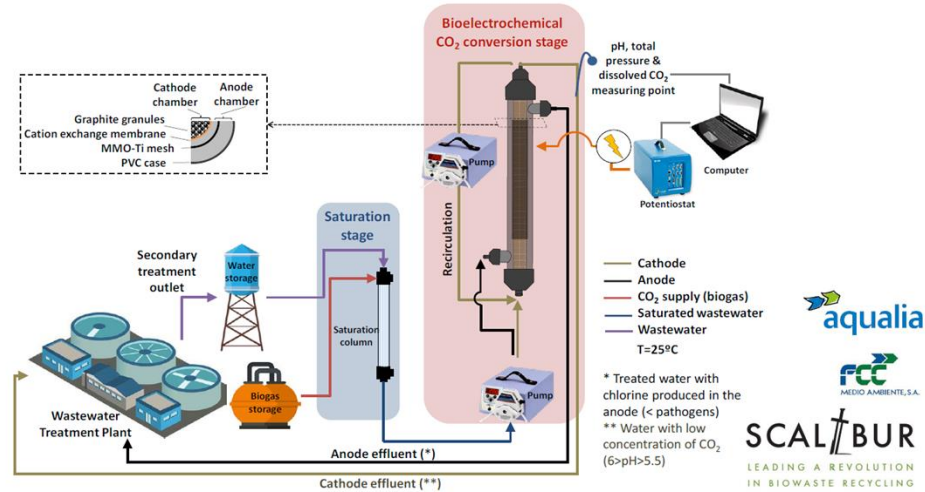


Aims: 1. In Spain, almost 30% of the total sludge is produced in small WWTPs : necessity to give treatment, reduce the amount of sludge produced, chemicals, CO2 emissions (transport) without losing low cost horizon

Conversion technologies

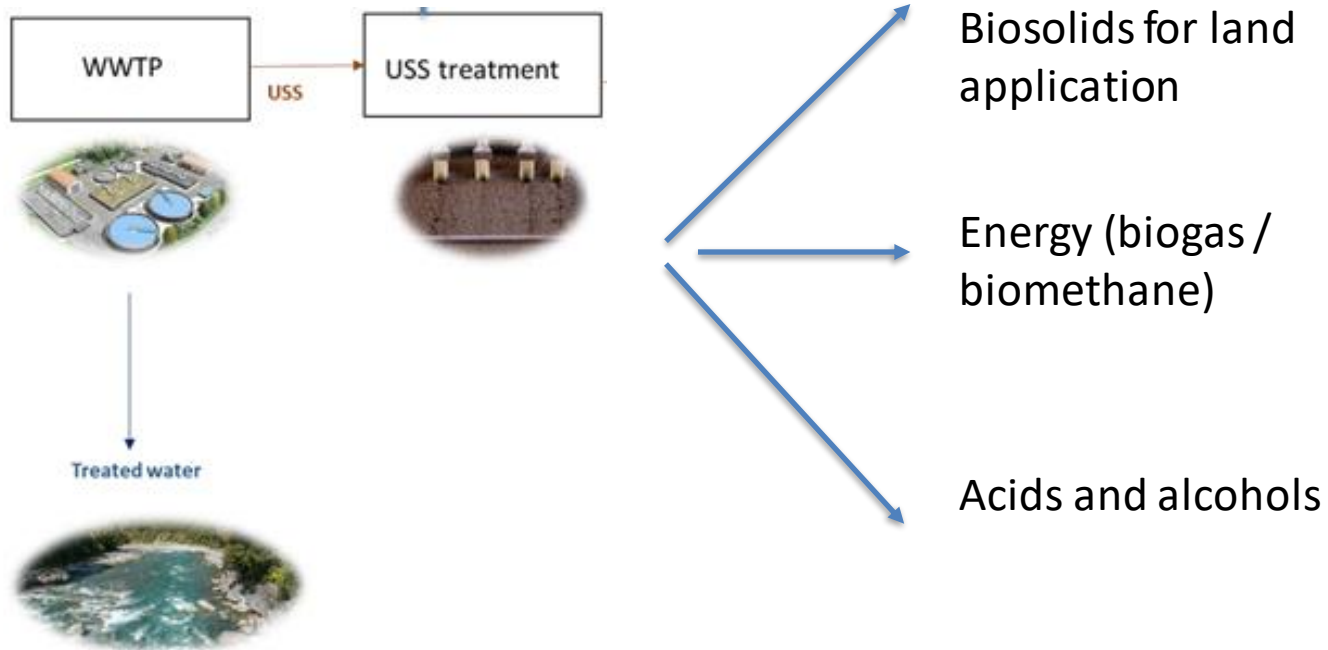


CO₂ conversion to added-value products using bio-electrochemical process.



Aims: CO₂ sink, production of added value products

➤ End products



➤ Opportunities and barriers



Opportunities

- ✓ Maximise methane production. Methane can be used as fuel itself or as a platform for other chemicals (H₂, ectonine).
- ✓ Produce biosolids with direct application in land
- ✓ CO₂ sink and production of added value products

Challenges

- ✓ To obtain biosolids with a quality in line with 4th Draft of European Legislation for Sludge Management (2003) , especially **Clostridium**
- ✓ Find right conditions to maximise biogas production and a positive techno-economical analysis. To control methanogenesis in thermophilic reactor.
- ✓ Consider alternative treatments for biosolids (pyrolysis, gasification, hydrogen production)
- ✓ Obtain a steady-state production of acetate in the BES reactor
- ✓ Commission biogas pre-treatment plant in Czech Republic to test BES. Technology transfer

➤ Current stage of development and next steps



- Working towards fulfilment of [4th Draft of European Legislation for Sludge Management \(2003\)](#). Dual Stage achieves better performance than single stage.
- Acetate production achieved in BES reactor: Semicontinuous operation: 1,02 g/day, continuous operation 0,5 g /day
- SmVak is working towards the preparation of gas pre-treatment plant in Czech Republic for the BES using biogas from a WWTP

➤ Current stage of development and next steps



NEXT STEPS

Dual AD and decentralised AD

- During following stages (different HRT and temperatures) parameters to monitor include biogas production and quality (H₂ and CH₄ in particular), pathogen removal, dewatering capability, VFAs profile among others. Most interesting stage at 65°C.
- Define techno-economic analysis and best performing stage.
- Decentralised: techno-economic analysis to assess the scenario in Population Equivalent until which this solution fits

BES

- Continuing Monitoring and Optimisation.
- Increase temperature of the system.
- Correct assessment of the energy balance
- SmVak is working towards the preparation of gas pre-treatment plant in Czech Republic for the BES using biogas from a WWTP.



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 SCALIBUR project

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