SIMPOSIO 2025
EVALUACIÓN DE APLICACIÓN DE PROCESOS DE TRATAMIENTO DE AGUAS

Biodigestores anaerobios de bajo coste para la valorización de la fracción acuosa de purines de cerdo

Ángeles de la Rubia Romero
Universidad Autónoma de Madrid
angeles.delarubia@uam.es

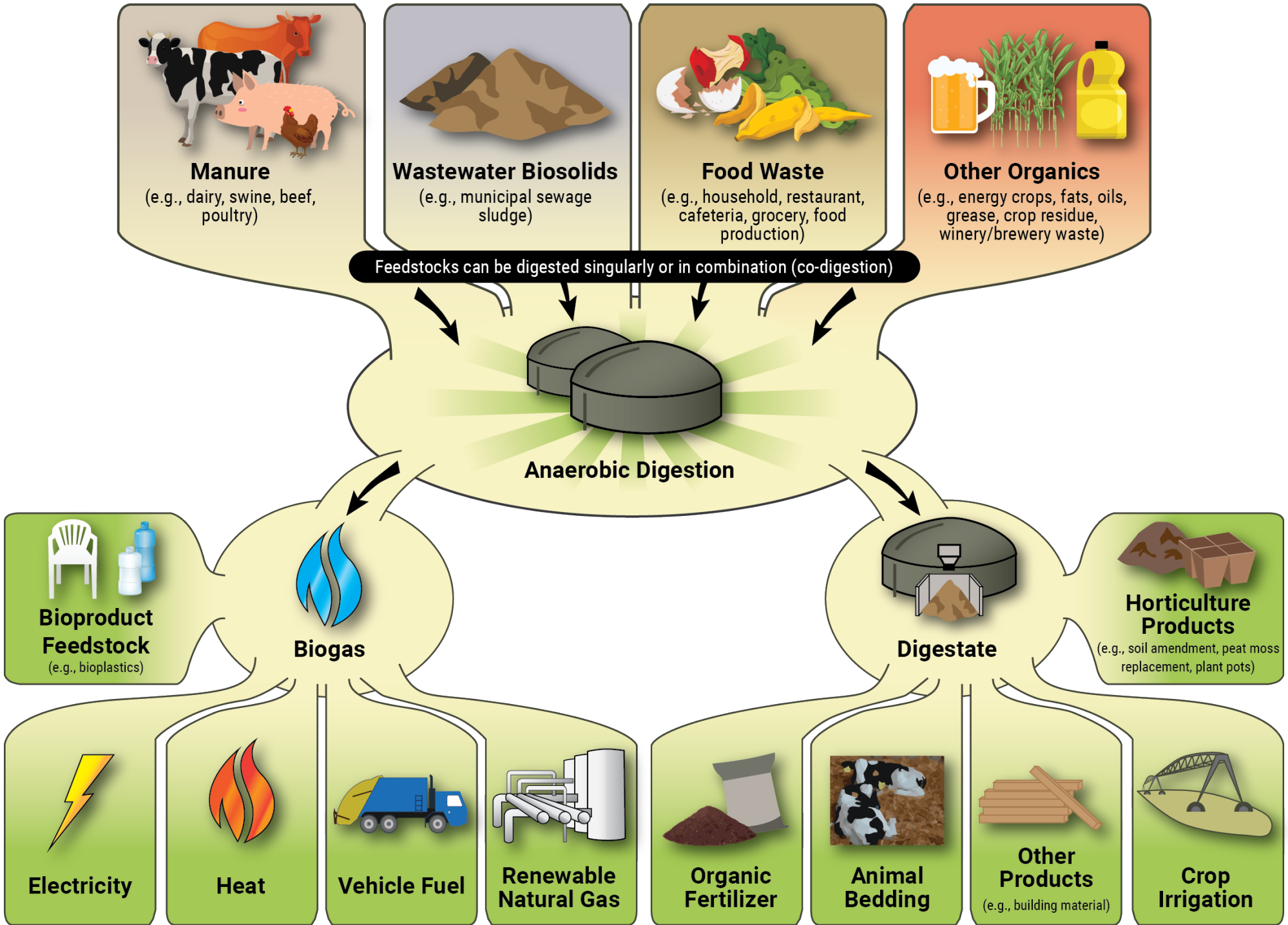
UAM | FACULTAD DE CIENCIAS | Departamento de Ingeniería Química

WASTE2VALUE

UAM
Universidad Autónoma de Madrid

FACULTAD DE CIENCIAS

WASTE2VALUE



excelencia Campus Internacional UAM CSIC+

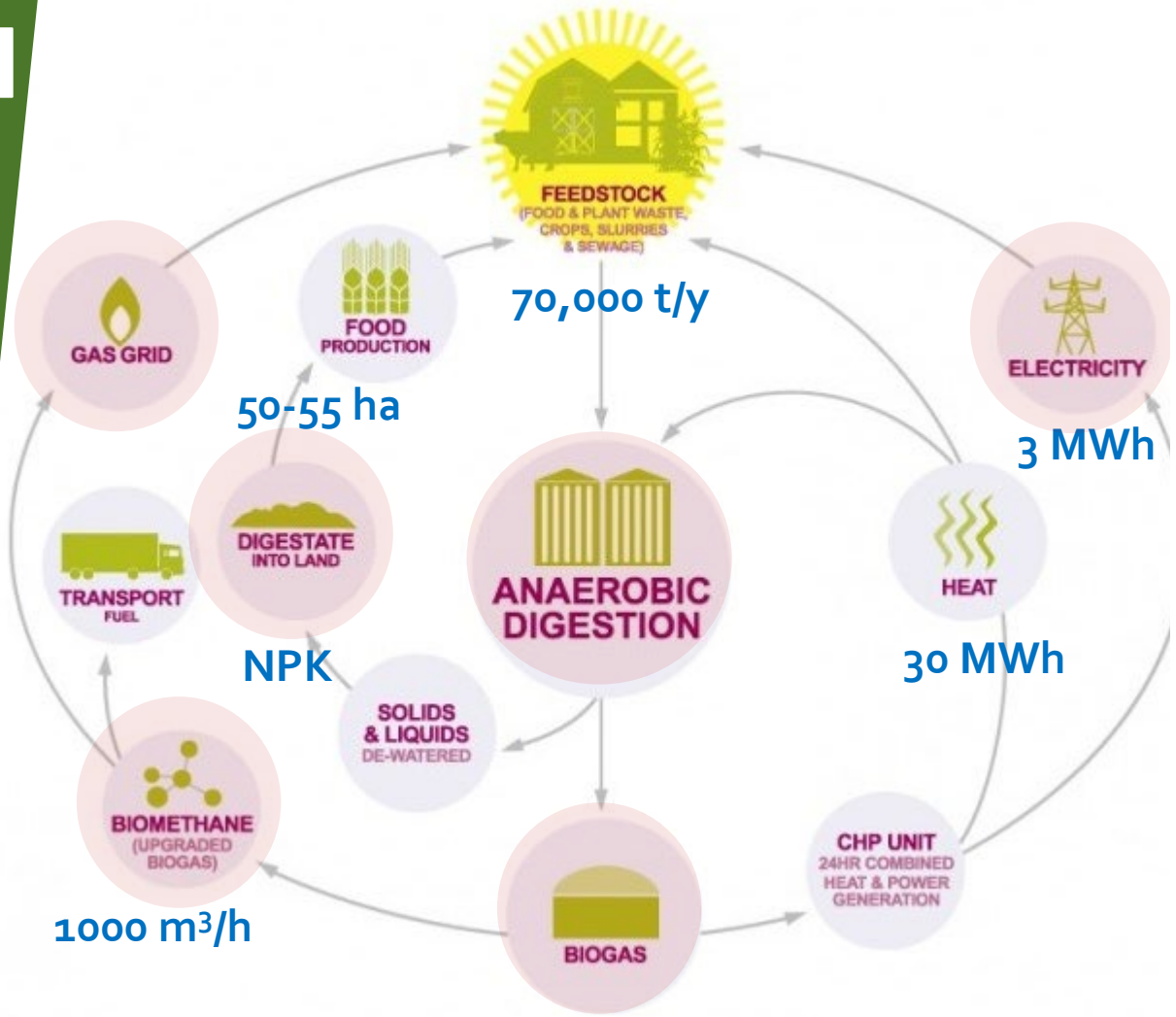
Universidad Autónoma de Madrid

FACULTAD DE CIENCIAS

WASTE2VALUE

Carbon neutral economies needs anaerobic digestion

Above 20,000 biogas plants have been constructed in Europe



excelencia Campus Internacional UAM CSIC+

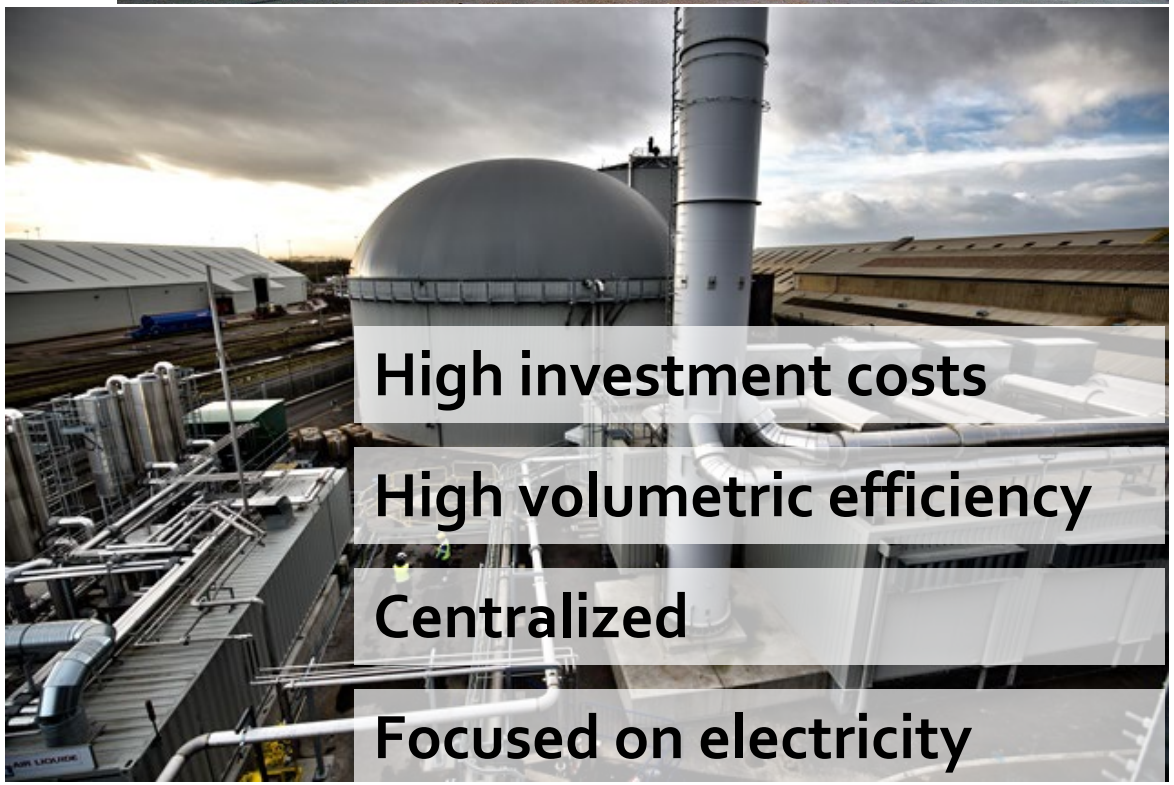
Two technological approaches

Complex biodigesters

Simple biodigesters

Sophisticated BDGs - high technological requirements

CSTR
35 ºC
Mixed
Pretreatment



High investment costs

High volumetric efficiency

Centralized

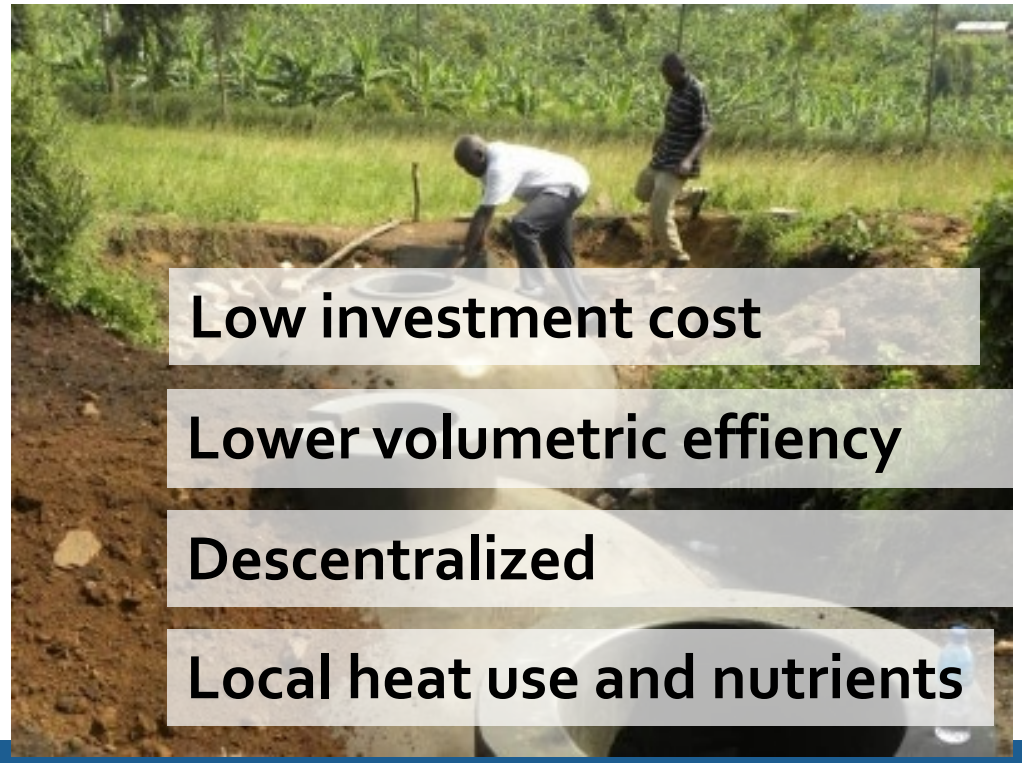
Focused on electricity

Simple BDGs - low technological requirements

Ambient T
No mix
<3-4% TS

Santa Cruz de la Sierra. Bolivia 2012

Ambient T
pneumatic mix
<7-8%TS



Low investment cost

Lower volumetric effiency

Descentralized

Local heat use and nutrients

UAM
Universidad Autónoma de Madrid

FACULTAD DE CIENCIAS

WASTE2VALUE

Cáchira. Colombia 2022

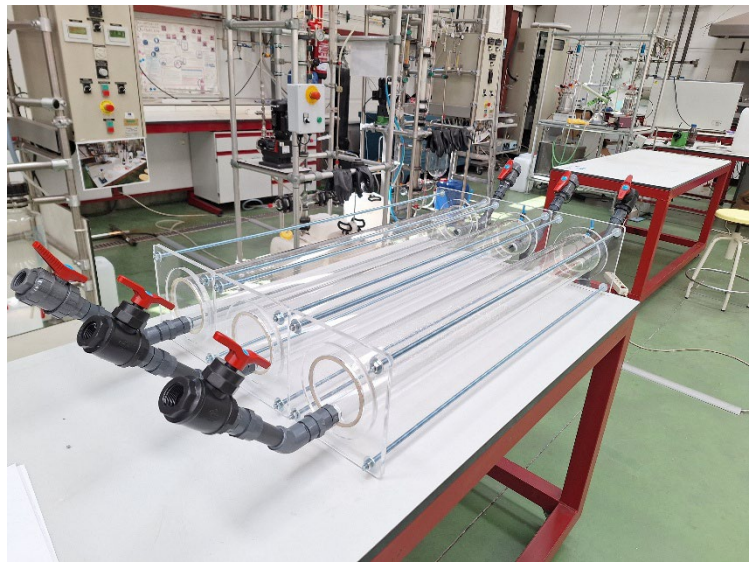
Universidad Autónoma de Madrid

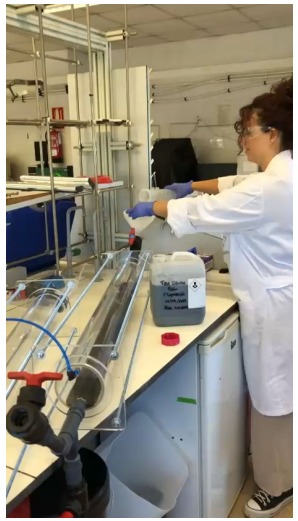
FACULTAD DE CIENCIAS

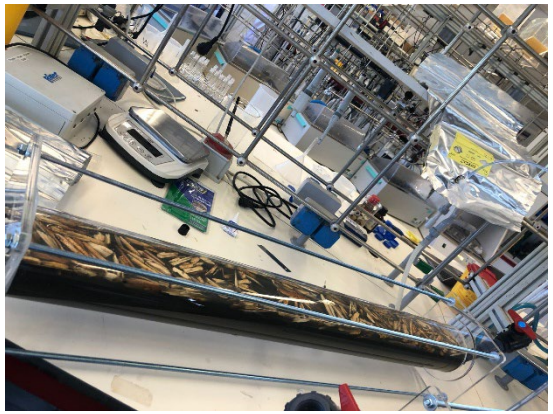
WASTE2VALUE

ENHANCING METHANE PRODUCTION IN LOW-COST TUBULAR ANAEROBIC DIGESTERS USING STRUCTURAL SUPPORT MEDIA

The objective of this research is to study the effect of hydraulic retention time as well as the use of different kinds of support (organic and plastic) on the performance of psychrophilic tubular digesters for treating the aqueous fraction of swine manure.







Project: Development of Sustainable Treatment and Recovery Strategies for Intensive Pig Slurry in Eastern Andalusia **(AGROPURITECH),** PEI.IDF2023030.001

Universidad Autónoma de Madrid

FACULTAD DE CIENCIAS

WASTE2VALUE

Mechanical solid-liquid separation

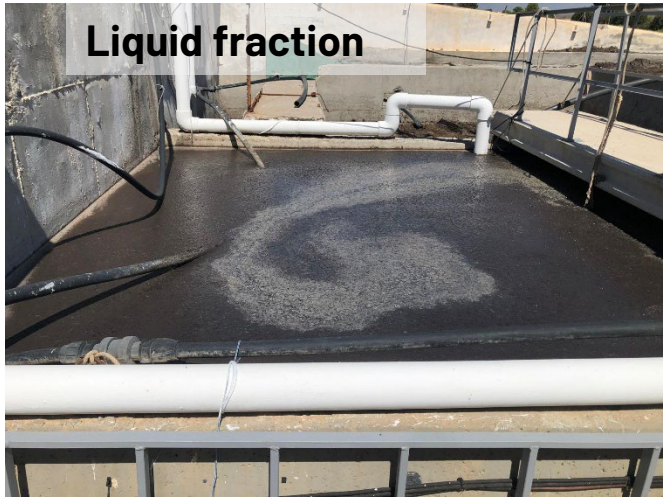
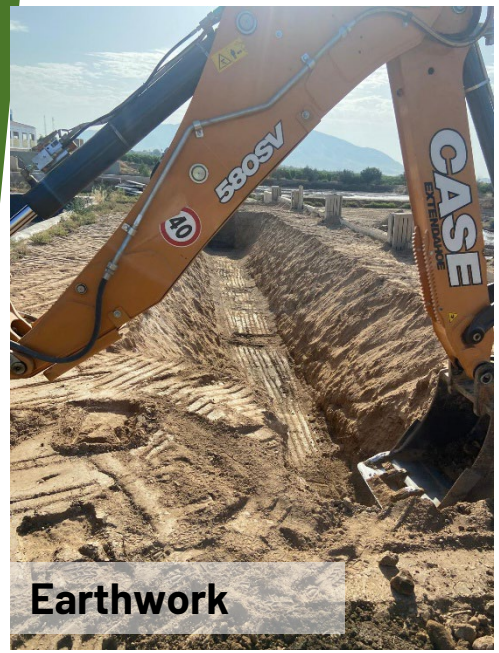


Table. Characterization of swine manure

Parameter	Inoculum	Feed
pH	7.3 (0.01)	7.7 (0.01)
Alkalinity (g $CaCO_3 \cdot L^{-1}$)	4.7 (0.5)	6.7 (0.6)
Total solids (g·kg^{-1})	7.2 (0.1)	12.8 (0.7)
Volatile solids (g·kg^{-1})	3.4 (0.1)	6.8 (0.4)
Total COD (g $O_2 \cdot L^{-1}$)	17.5 (0.4)	14.3 (0.4)
Soluble COD (g $O_2 \cdot L^{-1}$)	4.2 (0.1)	6.9 (0.1)
Total Kjeldahl Nitrogen (mg·L^{-1})	1550 (152)	1800 (10)
Ammoniacal Nitrogen (mg·L^{-1})	733 (70)	1567 (10)
Volatile fatty acids (mg COD ·L^{-1})	4031 (217)	4279 (169)

Integrated Process for Installation of a Geomembrane-Based biodigester



Earthwork


Deep, straight trenches

Our pilot low cost biodigester


Concrete blocks to anchor structure

In-Factory Fabrication of the Geomembrane Units

On-Site Installation and Deployment

On-Site Installation and Deployment

Treatment of the Aqueous Fraction of Slurry Using a Low-Cost Anaerobic Biodigester

Benefits:

- Reduction of environmental impact from livestock waste.
- Improved nutrient management for potential reuse in agriculture.
- Efficient system operation with low maintenance and automation.

Next Steps:

- System monitoring and optimization.
- Integration with renewable energy or composting systems (if applicable).
- Evaluation of long-term performance and environmental indicators.

UAM
Universidad Autónoma de Madrid

FACULTAD DE CIENCIAS

excelencia Campus Internacional UAM CSIC+

WASTE2VALUE