



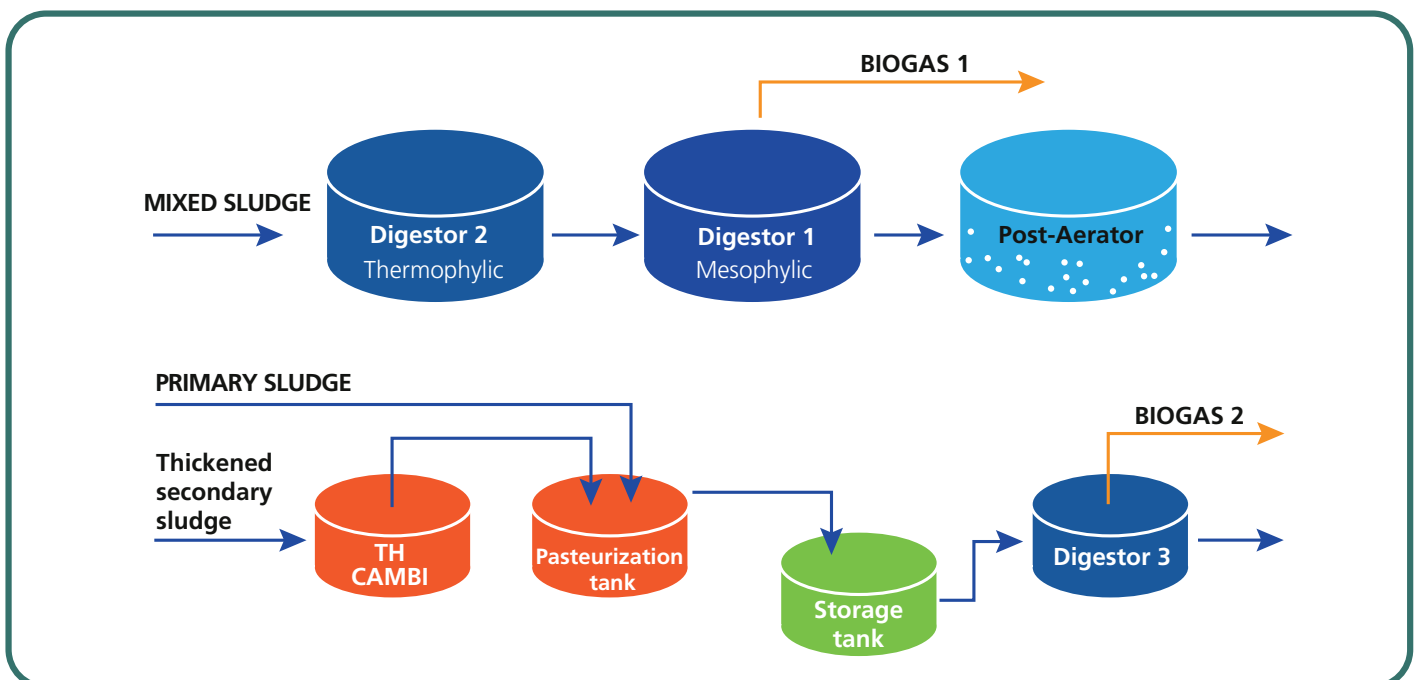
## Sanitisation and energy optimisation of anaerobic sludge digestion with thermal hydrolysis.

# SALAMANCA SLUDGE Project

### PROJECT

Discussion on the safety of sewage sludge from wastewater treatment used on agriculture land has made it necessary to increase waste quality and disinfection. The motivation behind intensifying the digestion and co-digestion of sludge with other substates is to drive a reduction in greenhouse gas emissions, to favour biofuel production and to contribute to the energy self-sufficiency of treatment plants by increasing biogas production. The objective of this study, which has been funded by the Ministry of Science and Innovation through the CDTI and has received EU technology funds, was to establish the optimum conditions for anaerobic sludge digestion in order to clean and maximise the stabilisation of the organic matter, while simultaneously improving the energy sustainability of the process with two pre-treatments: thermal hydrolysis and thermophilic digestion.

Experimental work at the test plant constructed in Salamanca's wastewater treatment plant was carried out over a year, using the thermal hydrolysis equipment of CAMBI and three digesters with gasometers to measure the produced biogas.



**Location:** EDAR Salamanca.

**Duration:** 3 years.

**1<sup>st</sup> Landmark:** 4/05/2009-17/02/2011.

**2<sup>nd</sup> Landmark:** 18/02/2011-30/06/2012.

**Current state:** Finished.

**Total budget/Aqualia:** 608,211 €.

## PROJECT PARTICIPANTS:

### Partners:

aqualia gestión integral del agua

### Main Collaborators:

CIDTA (CIDTA-USAL)  
CEIT

CAMBI  
FCC Medio Ambiente



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## RESULTS OBTAINED:

The thermal hydrolysis process increased the solubility of the organic matter by 30% and cut the digestion process down to 13-14 days, achieving a high degree of stabilisation and improvement in sludge quality. The methane concentration in the produced biogas increased by 65-70%, thereby increasing its heating ability and energy production potential.

Digestion tests were conducted in two phases: the first was used as a 55°C pre-treatment to obtain hydraulic retention in 3 days, reducing the subsequent hydrolysis and anaerobic digestion process to 12 days at 35°C. The optimal combination of the process in two phases was established to obtain the maximum stabilisation of the sludge, to reduce the total solids and to produce the greatest amount of biogas. The yields obtained were high and the production of biogas practically doubled that of current conventional digestion.

In both lines of the process, the elimination of almost all pathogens was achieved, meeting the EPA's quality standards for class A biosolids.

With the two process improvements tested on the Salamanca project, the normal hydraulic residence time in current digesters was slashed by half and, similarly, the investment needed to build new facilities was drastically reduced. Furthermore, the consumption of energy for heating and insulation was reduced, compared with current processes, and the capacity of biomass production was doubled, which represents a big step towards sustainability.

## GRANT:

**Support name and granting body:** CDTI's R&D project, R&D Operative Programme and for the benefit of companies- Technology Fund, 2017-2013

**Project:** IDI-20090794

**Grant:** A loan of 75% of the approved budget. Of that amount, 75% was granted by through the CDTI and 15% was funded through the Technology Fund, which is the non-refundable part of the grant.

**Total subsidy / Aqualia:** 456,158.25 € (387,734.51 € CDTI's loan and 68,423.74 € Technology Fund non-refundable)

