

The Water2REturn consortium reveals interesting findings for turning slaughterhouse wastewater into value-added biofertiliser and biostimulant products to be used in agriculture

OBJECTIVES

The goal of Water2REturn (an Innovation Action that is co-funded by the European Commission under its Horizon 2020 programme) is **to provide, in compliance with the Circular Economy package, an innovative, sustainable, and convenient solution to process slaughterhouse wastewater (SH WW) and turn it into value-added products for the agricultural sector (nitrate and phosphate concentrate), energy, and clean H₂O**. The project was launched in July 2017, and the team met in Naples in January 2018 to discuss the initial findings.

AN INNOVATIVE TECHNOLOGY

The Water2REturn technology consists of a zero waste and low emission combined system, and the **pilot plant** for testing this technology is the **"Matadero del Sur"** slaughterhouse in Spain. At this stage, wastewater from Matadero del Sur has been analysed and characterised, which was a crucial step to have a baseline to start designing Water2REturn technologies in the most appropriate way, and one of the first outcomes of the project. This characterisation was also the basis for performing the first of a long list of Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) studies; of crucial importance to assess the eco-efficiency and sustainability of each of the processes to be implemented in the demonstration site and to optimise them according to the Circular Economy concept. In parallel, much work has been done and will continue at lab-scale in all treatment lines (water, sludge, and algal lines). This work has covered the following areas:

- Choosing the best option for NO₃ recovery;
- Identifying the most suitable conditions for maximising sludge valorisation through a novel fermentation process;
- Determining the biomethane production of hydrolysed sludge obtained at the fermentation unit and of raw wastewater and to optimise the operating conditions;
- Carrying out catalytic oxidation tests to produce hydrogen from biogas and to select optimal algal culture and conditions for biogas digestate treatment and biomass production.

It was foreseen that all these studies would be concluded by the end of February 2018, allowing the consortium to start designing the technologies to be implemented at Matadero del Sur.

BENEFITS

It will be possible **to reduce disposal costs associated with SH WW** by at least 30%, and **to recover and recycle nutrients from SH WW**, turning them into value-added products, such as: nitrate and phosphate concentrate, hydrolysed sludge, algal biomass, and thermal and electric energy. The market potential for this technology is huge as every year around 750,000 m³ of SH WW is produced in the EU¹, and the need for fertilisers reached around 13.6 million tonnes in 2012². At the end of the project, **three natural agronomic products will be ready to be commercialised: 1 organic fertiliser and 2 biostimulant products**. Farmers and the fertiliser industry can expect high-quality and competitive products. Slaughterhouses in turn will benefit from lower disposal costs, and the wastewater treatment industry will get more efficient treatment plants. Last but not least, the project will have benefits for civil society on the whole in terms of offering environmentally innovative solutions for the private sector and public administrations.

WHY AND HOW TO GET INVOLVED IN THE W2R ACTIVITIES – STAKEHOLDER QUESTIONNAIRES

The goal of the project is to create a replicable model that can be repeated all over Europe in order to capitalise on the benefits of the technology at a larger scale. For this reason, the project team wants to engage a broad range of people in the project right from the beginning. Consumers, farmers, and NGOs, as well as representatives from

¹ According to mass balance calculations made by the consortium

² Total mineral fertilisers (N+P₂O₅+K₂O) consumption in Europe according to EC 2011/2012 data

the fertiliser, slaughtering, and wastewater treatment industries, are invited to provide their input through the online questionnaires which are available in English, French, German, Spanish, Italian, Dutch, and Slovenian. People are also invited to interact with the Water2REturn project using social media ([LinkedIn](#), [Twitter](#), and [YouTube](#)).

The Water2REturn project team is coordinated by [BIOAZUL](#) (Malaga, Spain) and involves 15 partners that come from the private and the public sectors (industry, universities, and research centres).

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