

Title:

**Water2Return - Recovery and Recycling of nutrients
Turning wastewater into added-value products for a circular economy in agriculture**

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Abstract:

Project Water2REturn (<https://water2return.eu>) will built a full-scale demonstration process for integrated nutrients recovery from the slaughterhouse industry wastewater using biological, chemical and physical technologies and a positive energy balance. The demonstration installation will be built at the demo site in Seville (Spain). One part of the process will utilize microalgal ponds for the treatment of biogas digestate after anaerobic digestion and the production of algal biomass for the fertilizer- and biostimulant-products in agriculture.

Algal module will be built on the basis of AlgaeBioGas technology developed by ALGEN (<https://algaebiogas.eu>; <http://saltgae.eu>) at Koto premises in Slovenia. The module will consist of a main pond for treatment and biomass production as well as a smaller inoculation pond. Main pond will be equipped with the CO₂ diffuser and sensor system (pH, DO, ORP, conductivity, flow), connected to the integrated control system for all modules.

In the first phase, algal populations' growth in the biogas digestate was researched to select optimal culture and conditions for the algal treatment and biomass production. The produced biomass was tested for its biostimulant action on the cress and barley growth at University of Ljubljana. Additional tests will be done at the demo plant at University of Ljubljana, where various algal ponds (different mixing, materials, architecture) in the greenhouse are connected with hydroponics system or fields for crop and vegetable cultivation.