TECHNOLOGY FOR P RECOVERY AS STRUVITE STARTING FROM PIG MANURE DIGESTATE WITH FLUIDIZED BED CRYSTALLIZATION SYSTEM

Keywords: *•struvite • phosphorous • crystallization • fluidized bed • nutrient recovery*

Key facts:

- → **Category of the technology**: Fludized bed crystallization
- → **Input:** Digestate from pig manure, magnesium salt and NaOH
  - → **Output product(s):** Struvite / Effluent for discharge
- → **Available capacity:** 50 L/h
- → **Focusing geographical areas**: EU28
- → **Technology status:** TRL 6
- → **EC/MS Authority permits:** N/A

Summary of the technology:

Residual biomass from the agri-food industry is a potential source of bioenergy and bioproducts. The research and application of biological processes, thermochemicals and chemicals to obtain energy, high value-added products and biofuels from organic and biomass waste was considered. With the aim of increasing the efficiency of the processes and obtaining more competitive, higher quality/purity products at a lower cost. Among these actions, the obtaining of struvite from digestate obtained in the anaerobic digestion of pig manure was studied.

The crystallization of nitrogen and phosphorus in the form of magnesium ammonium phosphate hexahydrate ($MgNH_4PO_4 \cdot 6H_2O$) also known as MAP or struvite, is one of the possible techniques used to eliminate and/or recover nutrients from the digestate, obtaining a product that can be applicable as a base in biofertilizers of high quality.

Fluidized bed crystallization is a process in which a solution circulates through a crystallizer in which the crystals are suspended by the rising fluid. The flow is such that the crystal does not deposit or flow out of the crystallization reactor, which allows the correct growth of the crystal due to the optimal contact between all the reagents that are part of the process.

The technology has been demonstrated at a sufficiently relevant scale (crystallisation reactor with a capacity of 50 L), so that the results can be used for subsequent implementation on an industrial scale.

Competitive position and advantages:

- → This method provides several advantages over the other methods of operation such as good solids mixing providing uniform temperature throughout the reactor, high mass and heat transfer and easy solids handling.
- → The reaction takes place at room temperature or similar (25-30 ºC), so it is not necessary to make a large energy consumption and does not need the addition of water.
- → Narrower product size distribution and easier solid-liquid separation.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818470