LIFE Smart Fertirrigation

Integrated pig manure digestate processing for direct injection of organic liquid fertilizer into irrigation systems

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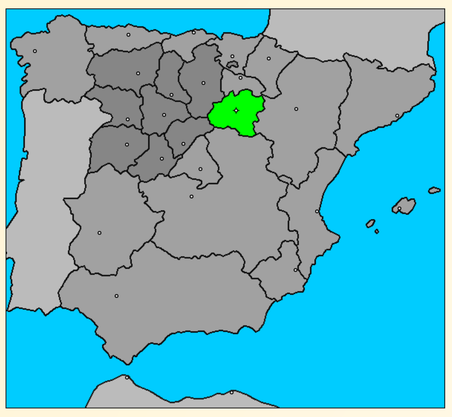
Final Conference

¿What is it?

LIFE **Smart Fertirrigation** aims to demonstrate the environmental and economic feasibility of **innovative pig manure digestate treatment** at **biogas plants** in order to produce precise volumes of **natural liquid fertilisers** for **direct injection into irrigation systems**.



Demonstration area:
Biogas plant and Agricultural fields at province of Soria, Castilla y Leon (Spain)

Objectives









Increase the recycling of natural resources in digestate: an innovative treatment is applied to recover the natural nutrients in the liquid fraction of pig digestate for direct injection in irrigation systems.

Reduce the amount of phosphorous in the digestate: Trials with new phytase enzymes are carried out to significantly lower the levels of phosphorous in pig slurry, avoiding eutrophication

Substitute the use of mineral fertilizers with natural liquid and solid fertilizers from digestate:
GHG emissions from digestate are reduced and soil acidification in prevented.

Maximize agricultural production in a sustainable way:
Costs savings for farmers is increased and a new source of income for biogas plants is created.

Action Plan: Based on a circular economy model



1 Intensive livestock farms.
Use of phytase to improve intake in feed and reduce phosphorous concentration in pig manure and its subsequent impact on the environment.

2 Anaerobic Digestion.
Energy is obtained from biogas and a final product is obtained and can be used as a more efficient fertilizer, with less smell and pathogens.

3 Separation into two fractions.
Separation treatment divides the digestate into two different fractions in order to obtain fertilizers.

4 Solid fraction – Drying.
Savings in energy and chemical use through biological treatment of ammonia in the gas stream when drying solid fraction with recirculated liquid fraction of digestate to obtain organic fertilizers.

5 Liquid fraction - Filtration for irrigation purposes.
Treatment for the liquid phase through different processes in order to obtain a product with lowered concentration of solids to be used as liquid fertilizer.

6 Top dressing fertilization.
Solid fraction used as fertilizer before sowing.

7 Storage and application of liquid fertilizer
Use of the liquid fraction as liquid fertilizer:
- Fertirrigation
- Efficient application of fertilizer with irrigation water (precision agriculture)

8 Large scale demonstrations.
Comparison with mineral fertilization
- Environmental impact
- Yield
- Economic viability

9 Nutrient recycling.
Harvest cereal for pig feed.

10 Communication and dissemination of results.
Results are dissemination across a large audience and relevant stakeholders.

¿Why?

Spain is Europe's second largest producer of pork with 99.561 pig farms. The excess of manure available in intensive pig breeding areas, however, along with a lack of land to spread it on, needs addressing. Many anaerobic digestion plants have nevertheless been established to convert the enormous amount of pig slurries into biogas and digestate. Biogas can be transformed into renewable energy, while the digestate has untapped potential.

Expected results

Economic viability of the project:
- ❖50% cost saving of liquid fertilisers vs inorganic fertiliser
- ❖70% substitution of inorganic fertilisers in the project area

Positive environmental impact:
- ❖Prevention of CO_2 emissions vs inorganically fertilised fields (estimation of 3.600t CO_2 saved).
- ❖20% increase in nutrient absorption capacity of the plant vs inorganic fertilised fields, leading to reduction of nitrogen and phosphorous in the ecosystem.
- ❖30% reduction of phosphorus present in tested pig manure vs manure of conventionally bred pigs. The project intends to reduce approx. 3.400 kg of P in tested pig manure.

Project partners are from Germany, Spain & The Netherlands:

Copiso · DORSET DE AGRAR- UND UMWELTTECHNIK · COMUNIDAD DE REGANTES DEL CANAL DE ALMAZÁN · bosman WATERMANAGEMENT · TeqBio · pural · TRANSFER CONSULTANCY

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