FERTIECO: Implementation of hyperthermophilic composting for the production of organic fertiliser from pig slurry solid fraction

Summary

The use of manure and slurry and its recovery as a substrate in biofertiliser production is environmentally and economically profitable, due to its rich composition of organic matter and nitrogen, phosphorus and potassium, among other nutrients. Moreover, the reuse of these recovered by-products is an ideal practice for managing surplus manure, increasing the quality of agricultural soils and enhancing the circular bioeconomy. Moreover, fertilisation requirements for organic crops are expected to rise considerably in the coming years, as one of the challenges of the European Green Deal is to turn 25% of Europe's agricultural land into organic farming by 2030. In this case, the problem arises when certain intensive livestock manures, generated excessively in Catalonia, are not accepted as raw materials for producing fertilisers suitable for organic farming, most often due to the likelihood of them containing drugs (mainly antibiotics) and antibiotic resistance genes.

Objectives

The main objective of this study is to optimise composting technology to sanitise and stabilise the pig slurry solid fraction under hyperthermophilic conditions, obtaining a biofertiliser low in drug and resistance gene content. This study will help demonstrate not only the percentage reduction associated with the application of this technology, but also compare the effect of applying manure usable for fertilising organic crops to that of the biofertiliser obtained in this study.

A number of specific objectives are also considered in order to achieve the general objective of the proposal:

- Assessing the hyperthermophilic process in terms of reducing veterinary drug content and the resistance genes in pig slurry solid fractions from sows, fattening pigs and the digestate of the latter.
- Demonstrating that biofertilisers obtained from pig slurry have an equivalent drug and resistance gene content to cattle manure and organic pig manure currently suitable for fertilising organically farmed soils.
- Demonstrating that the agronomic qualities of the biofertilisers obtained are equivalent to those obtained with cow dung and organic pig manure.
- Assessing pig manure from intensive livestock farming on organic crops in environmental and economic sustainability terms (which would involve the use of hyperthermophilic compound).

Description of the actions planned in the project

This study is divided into different tasks:

1. Optimising the hyperthermophilic composting process for manure unsuitable for organic farming
2. Comparative study of organic and non-organic manure and composts
3. Agronomic assessment of hyperthermophilic compost and manure suitable for organic farming
4. Technical, economic, social and environmental feasibility study of the developed system

Expected results and practical recommendations

This project will help demonstrate not only the percentage reduction of antibiotics and antibiotic resistance genes associated with implementing hyperthermophilic composting with the pig slurry solid fraction, but also compare the agronomic effect of applying manure that is usable for fertilising organic crops (cattle manure and organic pig manure) to that of the biofertiliser obtained in this study. In addition to the aforementioned environmental aspects, a technical, economic and social feasibility study will also be carried out to ensure this technology can be applied in the future. If the expected results are obtained, they will also provide scientific evidence that, with this treatment, the pig slurry solid fraction can be made into an optimal fertiliser for organic fertilisation in organic production.

Leader of the Operational Group

ORGANISATION: AGROPECUARIA CATALANA, SCCL

Coordinator of the Operational Group

ORGANISATION: INNOVACC CATALAN MEAT AND ALTERNATIVE PROTEIN CLUSTER

Other members of the Operational Group (grant recipients)

ORGANISATION: SELECCIÓN BATALLÉ, SA

ORGANISATION: GRUP GEPORK, SA

ORGANISATION: AGRÀRIA PLANA DE VIC I SECCIÓ DE CREDIT, SCCL

ORGANISATION: EMBOTITS SALGOT, SA

Other members of the Operational Group (not recipients of the grant)

ORGANISATION: BALMES UNIVERSITY FOUNDATION (UNIVERSITY OF VIC - CENTRAL UNIVERSITY OF CATALONIA)

ORGANISATION: CATALAN INSTITUTE FOR WATER RESEARCH

Subject area(s) of application

☐	Agricultural production system
☐	Agricultural practice
☐	Agricultural equipment and machinery
☐	Livestock farming and animal welfare
☐	Vegetable production and horticulture
☐	Landscape / Territorial management
☐	Pest and disease control
☒	Fertilisation and nutrient management
☒	Soil management
☐	Genetic resources
☐	Forestry
☐	Water management
☐	Climate and Climate Change
☐	Energy management
☐	Waste and by-product management
☐	Biodiversity and environmental management
☐	Food quality/processing and nutrition
☐	Supply chain, marketing and consumption
☐	Competitiveness and agricultural and forestry diversification
☐	General

Geographical area(s) of application

PROVINCE(S)	REGION(S)
BARCELONA GIRONA	BAGES SELVA OSONA VALLÈS ORIENTAL GARROTXA GIRONÈS

Dissemination of the project (publications, conferences, multimedia, etc.)

https://www.innovacc.cat/2021/08/30/__trashed/

https://www.innovacc.cat/2022/07/27/7-projectes-aprovats-de-la-linia-grups-operatius-2021-projectes-amb-ajut-dacc/

Project website

More information on the project

PROJECT DATES	TOTAL BUDGET
Starting date: July 2021	**Total budget:** €246,506.90
	DACC funding: €113,997.81
Current status: Under way	**EU funding:** €85,998.34
	Own funding: €46,510.75

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Order ARP/113/2021 of 20 May, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ACC/1660/2021, of 27 May, announcing the call for the grant.

Generalitat de Catalunya
Departament d'Acció Climàtica, Alimentació i Agenda Rural

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