

Optimising the use of resources and reducing the environmental impact in different pig genetics (OPTIPORC)

Summary

The sustainability of pig production requires making more efficient use of resources and reducing its environmental impact, and doing so in parallel with improving production performance and the resilience of pig populations. In response to these challenges, this project was born from the shared interests of the five pig breeding companies that make up the Catalan Association of Select Pig Breeders (ACCBPS) to improve the environmental and economic sustainability of pig production with the different crosses derived from their purebred lines. The ultimate goal is to develop knowledge, tools and strategies to optimise the use of resources and reduce the environmental impact in different pig genetics. The project will characterise in a certified way and in a controlled environment the potential of the different crossings in relation to resource efficiency and pollutant emissions and will assess the carbon footprint and water footprint. In addition, the mitigating effect of genetic selection for feed efficiency will be analysed, innovative nutritional strategies will be tested and predictive models of the environmental footprint in different scenarios will be developed. In this way the project will contribute to mitigation and also adaptation to climate change, reducing the carbon footprint and water footprint, and to a better economic balance of pig production.

Objectives

The overall objective of the project is to contribute to improving the environmental sustainability and economic results of pig production through the development of knowledge and strategies to improve efficiency in the use of resources, as well as to reduce polluting emissions and the carbon footprint of farms, taking into account different genetics used in Catalan pig breeding companies.

Description of the actions planned in the project

The project is structured in four phases:

1. Phase 1: Generation of the animal material to be controlled in the experimental trials, setting up the facilities of the IRTA's Pig Control Centre (CAP), compilation of the data for calculating the carbon footprint and water footprint and formulation and analysis of the feed to be used in the trials.
2. Phase 2: On-farm trials, controls and experiments will be carried out during the fattening phase. Production parameters and consumption of food, water and electricity will be monitored; measurement of greenhouse gases and NH₃; slurry volume measurement and slurry sampling; blood and faeces sampling for biomarker analysis and digestibility studies.
3. Phase 3: Analysis of all samples obtained during phase 2 (slurry, manure and blood analysis in IRTA laboratories) and calculation of the environmental footprint in each of the scenarios.
4. Phase 4: Data analysis and results. The IRTA will be responsible for analysing all the data generated in the project, obtaining results and evaluating the predictive capacity of the different indicators tested in the proof of concept.

Expected results and practical recommendations

1. Diagnosis of the current situation: characterisation of the different pig genetics of Catalan companies in relation to their environmental impact and their efficiency in the use of resources:
 - 1.1. Quantification of emissions of nitrogen, phosphorus and greenhouse gases (CH₄, N₂O, CO₂) and NH₃ for each genetic type.

- 1.2. Efficiency in the use of resources and the productive performance of each genetic type: feed consumption, feed efficiency, water consumption, growth and body composition.
- 1.3. Association between food efficiency, water consumption, pollutant emissions and different production parameters.
- 1.4. Carbon footprint and water footprint of the different systems represented by the different genetic types and diets adapted to their productive performance.
2. Impact of direct selection for feed efficiency on reducing slurry and GHG emissions; the effect of selection on digestibility, productive performance and other physiological and health parameters will also be evaluated.
3. Mitigating effect on the environmental impact of alternative feeding strategies by limiting the amount of protein and/or including soluble fibre, as well as possible effect on feed digestibility and productive performance.
4. Mitigating effect on NH₃ levels derived from the addition of organic acids in the diet. Parallel assessment of the possible effect on nutrient digestibility and other intake and efficiency parameters.
5. Biomarkers/indicators with predictive capacity for emissions from an individual or group of animals.
6. Predictive modelling of emission levels and environmental footprint.

Leader of the Operational Group

ORGANISATION: SELECCIÓN BATALLÉ, SA

Coordinator of the Operational Group

ORGANISATION: IRTA - Institute of Agrifood Research and Technology

Other members of the Operational Group (grant recipients)

ORGANISATION: BARÓ GERMANS, SA

ORGANISATION: GRUP GEPORK, SA

ORGANISATION: PINSOS SANT ANTONI, SA

ORGANISATION: UPB GENETIC WORLD, SL

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

ORGANISATION: CATALAN ASSOCIATION OF SELECTED PIG BREEDERS

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

<input type="checkbox"/>	Waste and by-product management
<input type="checkbox"/>	Biodiversity and environmental management
<input type="checkbox"/>	Food quality/processing and nutrition
<input type="checkbox"/>	Supply chain, marketing and consumption
<input type="checkbox"/>	Competitiveness and agricultural and forestry diversification
<input type="checkbox"/>	General

Geographical area(s) of application

PROVINCE(S)	REGION(S)
Girona, Barcelona, Lleida	Selva, Osona, Bages, Noguera

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

The IRTA will develop the Dissemination and Communication Plan for the project and the results of the innovation, and will be jointly responsible for the dissemination and transfer of the results of the innovation. All OG members will collaborate in publicising the project and the results, through sectoral conferences, the Association's website and the companies' websites and sales networks. The dissemination plan will be as follows:

- At least 2 press releases will be sent to specialised and general media, one at the beginning and one at the end of the project.
- Information on the project will be published on the ACCBPS website (www.acbps.org). The link from the IRTA portal (www.irta.cat) and the website of some of the companies will also be attached.
- Project updates and results will also be disseminated through the IRTA newsletters (more than 2,000 subscribers) and accounts on social media (Twitter, Facebook, LinkedIn or YouTube).
- Organisation of a specific conference on the project, aimed at pig breeders, producers and professionals (consultants, veterinarians or engineers) from the pig sector, where all the results of the innovation obtained in the project and its impact will be presented and discussed.
- Publications and articles in technical journals and other specialised media targeting the pig production and breeding sectors (e.g. Anaporc, Porcinews, Avances Porcinos, 3tres3).
- Seminars and talks on the results of the project at some of the numerous leading conferences of the pig sector, particularly those organised by associations and administrations.
- Drafting of electronic bulletins with the main applications of our results to be published on the ACCBPS website, the IRTA transfer portal (transferencia.irta.cat) and other platforms.
- Communication of the results to the scientific community is envisaged. The IRTA will be in charge of the dissemination of these results in scientific conferences (e.g. Animal Production Conference (AIDA or National Conference on Animal Breeding), and the possible drafting of scientific articles for SCI journals.

Project website

www.acbps.org

More information on the project

PROJECT DATES	TOTAL BUDGET
Starting date: July 2021	Total budget: €246,452.54
	DACC funding: €113,972.67
Current status: Under way	EU funding: €85,979.39

Own funding: €46,500.48

With funding from:

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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.



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