# GO ATENEAA: Application of an insect protein (*Tenebrio molitor*) for animal feed and frass for organic agriculture

## Summary

Monogastric animal diets require a large amount of high-protein ingredients to meet the growth requirements of chickens and pigs. Soybean meal is currently the most widely used protein source, alongside cereal protein and crystalline amino acids. In 2021, more than 38 million tonnes of monogastric feed were produced in Spain, of which soy products accounted for around 5 million tonnes. Most of this comes from Brazil, Argentina and the United States. A recently published study shows that from 2000 to 2019, the area used for soybean crops in Brazil more than doubled from 26.4 M ha to 55.1 M ha.

This deforestation has serious environmental and social consequences in these countries. Therefore, the dependence of animal production on soya can be considered negative by both producers and importers, as the importing of large quantities of nitrogen also poses a major environmental risk.

**Insect farming has been proposed as a possible solution for more efficient and sustainable production of proteins for the agri-food industry**, offering promising opportunities for implementing the principles of the circular bioeconomy. Insects have high growth rates and short reproduction cycles, and adapt easily to different conditions, resulting in rapid biomass accumulation and high feed conversion efficiency. In addition, certain insect species can be reared from by-products generated by the agri-food sector itself.

Moreover, fertilisation **requirements for organic crops are expected to increase considerably in the coming years, given that one of the challenges in the EU, within the framework of the European Green Deal, is for 25% of the crop land to be used solely for organic farming by 2030**. Thus, obtaining a fertiliser suitable for organic farming, in this case focussing on the wine industry and its specific requirements, from *T. molitor* larvae frass is an innovative and sustainable alternative to consider in fertilisation plans.

The project is based on the circular economy as it aims to make use of products and by-products from the livestock, wine and insect production industries.

## Objectives

MILESTONE 1. Developing and optimising methods for the processing of *Tenebrio molitor (*T. molitor) larvae
MILESTONE 2. Increasing knowledge of its nutritional potential in pigs and other benefits, depending on the field of application.
MILESTONE 3. Recovering frass from insect farming.

## Description of the actions planned in the project

**MILESTONE 1. Developing and optimising methods for the processing of *Tenebrio molitor* (T. molitor)** larvae

- Assessing existing processing technologies in the agri-food world in order to use this technology in the production of insect-derived products.

- Assessing separation, processing and packaging technologies to ensure they are completely harmless to frass, so that their physical, chemical and biological characteristics are maintained.

**MILESTONE 2. Increasing knowledge of its nutritional potential in pigs and other benefits, depending on the field of application.**

- Carrying out tests on the nutritional value of the insect-based product for monogastric animals and studying the limits of their inclusion in animal feed.

**MILESTONE 3. Recovering frass from insect farming.**

- Testing the effect of frass from insect farming on vines and studying its viability.

## Expected results and practical recommendations

The expected results of the project are:

- Determining the ideal conditions for producing different ranges of products derived from *T. molitor* and part of the experimentation of this operational group to find commercial solutions.
- The aim is to replace up to one part of the conventional protein source, soya, in the diet with a more sustainable source, *T. molitor* larval meal, without harming the growth or immune status of the animals.
- Obtaining a selection of measures to ascertain the technical, economic and environmental feasibility of fertilising organically produced vineyards with frass.

## Leader of the Operational Group

**ORGANISATION:** IBERINSECT, SL

## Coordinator of the Operational Group

**ORGANISATION:** INNOVACC CATALAN MEAT AND ALTERNATIVE PROTEIN CLUSTER

## Other members of the Operational Group (grant recipients)

**ORGANISATION:** VALL COMPANYS, SAU

**ORGANISATION:** MIGUEL TORRES, SA

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

**ORGANISATION:** IRTA - Institute of Agrifood Research and Technology

## 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) |
|---|---|
| TARRAGONA<br>BARCELONA<br>LLEIDA | BAIX CAMP<br>ALT PENEDÈS<br>SEGRIÀ |

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

- Publication of the news from 30 August 2021, on the 2021 Operational Group projects requested by the cluster on the INNOVACC website:
  **https://www.innovacc.cat/2021/08/30/__trashed/**

- Publication of the news from 27 July 2022, on the 2021 Operational Group projects approved by the cluster on the INNOVACC website:
  **https://www.innovacc.cat/2022/07/27/7-projectes-aprovats-de-la-linia-grups-operatius-2021-projectes-amb-ajut-dacc/**

## Project website

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

## More information on the project

| PROJECT DATES | TOTAL BUDGET |
|---|---|
| **Starting date:** July 2021 | **Total budget:** €199,112.52 |

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|---|---|
| | **DACC funding:** €92,080.15 |
| **Current status:** Under way | **EU funding:** €69,463.97 |
| | **Own funding:** €37,568.40 |

## With funding from:

Project funded through Operation 16.01.01 (Cooperation for Innovation) through the Catalan Rural Development Programme 2014-2022.

*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**

**Fons Europeu Agrícola de Desenvolupament Rural:**
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