



### Challenges

- Alternative protein sources for food & feed
- Upscaling insect rearing farms

Project duration: 9 months

Industrial sectors: Agri-food

Consortium coverage: Spain, Slovenia



INSECTOPIA2050 S.L. was founded by two Aragonese women who together, have more than 20 years of experience in design, implementation and development of R&D&I projects linked to the agri-food sector. Knowing which challenges the sector must face, as well as the areas with high market potential, INSECTOPIA 2050 has the mission to further develop the potential offered by large scale insect rearing farms, such as the development of an alternative and sustainable source of protein for food and feed, obtaining bio-compounds derived from insects and bio-digesting agri-food waste and transforming this into new products.

## The Challenge

The increasing global population as well as the environmental impact of the agricultural sector, especially that of livestock, highlights the importance to develop and produce alternative and sustainable sources of protein for food and feed. Insect rearing, the practice of raising and breeding insects as livestock, is a promising and growing market to address the need for a sustainable protein source to be utilised. As this is an emerging sector, there are no commercial tools and equipment that allow for the breeding of insects on farms in a large scale set-up. The production of these tools using traditional technologies does not offer a feasible solution from both the technical and economic perspective. By capitalising on the possibilities offered by Additive Manufacturing, INSECTAM will enable an economically viable solution towards the production and integration of these tools in large scale insect rearing farms.

## The Project

The INSECTAM project aims to enhance the production capacity of INSECTOPIA to establish itself within an emerging market and thus, to contribute to global objectives related to the development of new sustainable food sources with a reduced environmental impact. Through the implementation of the project, new tools and pieces of equipment are designed, manufactured, tested, and validated for future uptake in the scaling-up of insect rearing farms. Additive Manufacturing will be utilised to manufacture highly customised small batch series of the developed tools. Furthermore, Additive Manufacturing enables the production of the tools using biobased materials, a necessity to ensure compatibility with the insects.





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## Role of the Facility Centres

In the context of the INSECTAM project, INSECTOPIA partnered up with two European Facility Centres, Fundación AITIIP, based in Spain, and TECOS, based in Slovenia. AITIIP was involved in the early design stages of the project, looking not only at the functional design of the different tools, but also conducting analysis on candidate biobased materials to be used in the production process. Sample specimens were manufacturing by AITIIP using FDM technology in order to characterise both the mechanical and rheological characteristics of the tools. These specimens were also tested on resistance to different chemical agents used for disinfection and the elimination of fungi in the farming process. Based on these tests, an appropriate biobased material was selected for the manufacturing of the tools. TECOS subsequently performed a second design iteration, this time focussing on the refinement and optimisation of parts for the Additive Manufacturing production process. TECOS printed a first pre-series of the tools which were used to validate the functionalities and requirements during a five week field test conducted by INSECTOPA. Following the success of this field test, a functional report was made in conjunction with TECOS, who supported in the economic analysis of the solution. Currently, INSECTOPIA and AITIIP remain in regular contact to update each other on the ageing characteristics of the tools following the material selection in the early phases of the project.

## Results achieved

The personalisation and customisation possibilities offered by Additive Manufacturing made it possible to make the business more viable, which, a priori, was investing heavily in customising tools from other sectors. The collaboration with the Facility Centres enables INSECTOPIA to reach the set goals of the INSECTAM project. Furthermore, the collaboration yielded further dissemination and training of INSECTOPIA staff on the possibilities related to the integration of Additive Manufacturing in the company's' production processes. INSECTOPIA is preparing to scale up the insect farm and forecasts the large scale production of the new tools in the short to medium term. Recent changes in the European legislation regarding the use of proteins derived from insect rearing to food applications is beginning to open within the framework of the European Union, so INSECTOPIA is conducting market studies to develop a business model and plan adapted to the new market that includes the synthesis of food for humans.

