

ADVANCING ALTERNATIVE PROTEINS FOR A MORE RESILIENT EUROPE

Molly Benjamin from the European Food Information Council shares updates for the InnoProtein project, which aims to tackle the EU's protein gap and facilitate sustainable protein sources in the European market

Since its launch in 2023, InnoProtein has brought together researchers, industry partners, and collaborators across Europe to advance more sustainable and circular protein production systems. Over the past year, the consortium has focused its efforts on exploring innovative novel protein sources, optimizing waste streams, and preparing the pathway to bring these proteins from the lab into the real world.

InnoProtein's work is driven by a pressing global challenge. By 2050, the world's population is expected to reach nearly ten billion, increasing demand for high-quality protein while placing greater pressure on natural resources.⁽¹⁾ Meeting this demand will require a fundamental shift in how protein is produced, processed, and consumed.

InnoProtein is working to help make this transition possible. Guided by the objectives of technological development, sustainability, digital innovation, and eventual market validation, InnoProtein is helping strengthen Europe's protein self-sufficiency while maintaining a zero-waste approach.

Four innovative protein sources

InnoProtein's research has focused on four novel protein sources, namely fungi, bacteria, microalgae, and insects. Though these sources differ in origin and cultivation methods, they share a common advantage: they all require minimal arable land, can deliver high-quality nutritional profiles, and are generally scalable to more commercial settings.

Solid-state fermentation allows fungi to grow on damp materials like low-grade cereals and agricultural byproducts. Depending on the substrate used, the biomass produced can offer generous nutritional value, as the fermentation process enhances digestibility and the availability of essential amino acids. Additionally, this method is more sustainable, requiring considerably less water and energy than conventional fermentation.

To create protein biomass from bacteria, InnoProtein partners identified methylotrophic bacteria as capable of converting methanol, a renewable carbon source, into protein-rich biomass. Researchers optimized cultivation conditions, including methanol supply, nutrient availability,



and oxygen levels, to support stable growth and consistent protein cultivation.

In contrast, the insect work focused on optimizing rearing conditions. Research on black soldier fly and mealworm species determined that feed composition had a greater influence on protein quality than other production variables. Both species demonstrated strong amino acid profiles, with the next phase focusing on translating these laboratory findings into ingredients consumers are intrigued to try.

Finally, microalgae research focused on identifying suitable microalgae species for sustainable protein production. Following laboratory-scale research, the project selected a microalgae species

whose biomass can be used directly for food and bio-based applications, simplifying downstream processing.

From waste into resources

Alongside the development and refinement of these four novel proteins, partners also focused their efforts on valorizing residual biomass and side streams to maximize the value of every system.

Recovering valuable compounds for applications such as bio stimulants and bioplastics further supports InnoProtein's zero-waste approach. This reflects the broader ambition of InnoProtein: not only to develop alternative proteins, but to advance more circular production models, where every input is used as efficiently and sustainably as possible.

Bringing proteins to market

Now, in the final phase, InnoProtein partners are applying the results from the exploration phase, extracting proteins from different sources to test them in food and feed products as well as non-food applications. Some highlights from this work include in vitro and in vivo testing, toxicological analyses, regulatory reviews, and the creation of biostimulants, biofertilizers, and plastic-free cutlery from excess materials.

While this research remains confidential, early results are positive.

Toward Europe's protein self-sufficiency

As InnoProtein moves into its final stages, with the final conference set for May 2027, the project has successfully advanced from exploring promising protein sources to optimizing cultivation processes and demonstrating their

broader potential. Partners have shown how even waste streams can be transformed into valuable products, reinforcing the project's commitment to circularity throughout the manufacturing chain.

While research and validation continue, the progress achieved so far demonstrates the value of bringing together expertise from across Europe to tackle one of the food system's most pressing challenges. By integrating technological innovation with circular production principles, InnoProtein is helping build the knowledge, processes, and partnerships needed to support Europe's future protein resilience.

References

1. Albaladejo Román A. EU protein strategy. European Parliamentary Research Service. 2023; PE 751.426: 1-8



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