Recommendations for FP10 – ensuring a robust R&I foundation for alternative proteins

Europe must invest in research and innovation to become a leader in food biotechnology and further build out its plant-based food sector.

Governments across the world are starting to recognise the role of plant-based foods, cultivated meat and fermentation in both addressing societal challenges such as climate change and in building a competitive, resilient food supply. While the EU has increased its funding for this sector, other regions are starting to lead the way in food biotechnology. European policymakers must capitalise on the opportunity of the next research framework programme to set clear, strategic priorities on diversifying protein, as part of the wider priority of securing a leading role for Europe in the food biotechnology field. This should be seen within the societal context of ensuring food security for Europe. Given its strong and growing research ecosystem in alternative proteins, Europe is well-placed to step into this leadership role.

Many of the technical challenges facing the sector are of a fundamental, pre-competitive nature. Rather than each company addressing these challenges in silos, it is much more efficient for scientists to publish their research for the benefit of the wider ecosystem, ultimately de-risking and providing a solid foundation on which to build private sector innovation. This kind of research also reduces duplication of effort, promotes interdisciplinary collaboration, and can tackle the kinds of questions that industry isn't necessarily incentivised or well-placed to address.

A coherent and targeted approach should build on publicly-funded, open-access research, with measures to ensure a path to market for food biotechnology. Recent publications, namely the Draghi and Heitor reports, emphasise the role of governments in creating a bridge between research and scaling up, and ensuring research leads to technology deployment.

Governments have a role to play in providing the necessary support to de-risk investments, making it more feasible for companies to access the capital needed to scale. The public sector is uniquely positioned to create markets for new technologies, much like it has done for renewable energy, electric vehicles, and more recently clean hydrogen through tax credits, loan guarantees, and industrial policies. Similar forms of government support can drive progress in the food biotechnology and plant-based food sector.

Transparent governance that favours forward-looking industry players, targeted focus on technical R&I, and measures to develop collaboration, would put the EU in good stead to take a global lead on food biotechnology and diversified protein.

This paper summarises the Europe-wide findings of two recent GFI Europe reports: State of the European alternative protein research ecosystem: publications and State of the European alternative protein research ecosystem: funding. These analyses take stock of the alternative protein research ecosystem in Europe, looking at both what has been funded so far, and how many researchers are working in the field. In the summer of 2024, GFI Europe also consulted 25+ researchers working on alternative proteins to gather their input on what has worked well under Horizon Europe and what could be improved in FP10. Building on these analyses and survey results, the report proposes a set of policy recommendations for the forthcoming FP10.

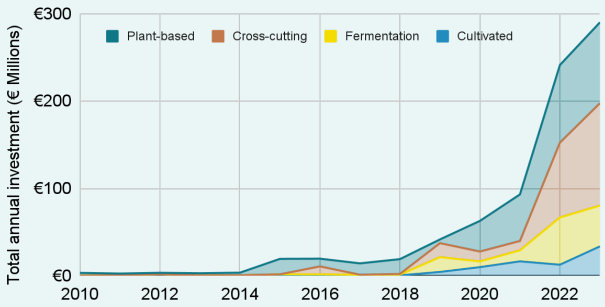
European alternative protein research ecosystem and funding

Two GFI Europe publications from October 2024 evaluate the growth and development of the open-access research ecosystem in alternative proteins across Europe, and provide analysis into which countries, and at what scale, public and non-profit funding[1] has been directed to the space in recent years (scope for both reports is 2019 onwards).

These reports show that, as a global research and innovation powerhouse accounting for over 20% of global R&I investment, Europe can be home to a thriving alternative protein research ecosystem. Across all disciplines, the EU is second only to China in terms of scientific output and is responsible for 18% of global scientific publications, while 49 of the world's top 200 universities are in Europe – more than any other region. Increased application of this expertise to the fundamental research behind alternative proteins would position the EU to be a global leader.

Increasing levels of funding

Public and non-profit funding for alternative proteins across Europe has grown at an average rate of 70% – increasing from €63 million in 2020 to €290 million in 2023, reaching almost half the annual investment amount required by the 2021 Global Innovation Needs Assessment to ensure protein diversification technologies mature. However, the rate of growth is not consistent across member states and at the EU level the amount of funding has not been commensurate with its potential to boost European competitiveness and address issues such as climate change. A more consistent whole-government approach is needed to channel higher amounts of funding towards the sector given its strategic importance.



Annual public and non-profit investment in Europe (EU & national funding) between 2010 and 2023 Source.

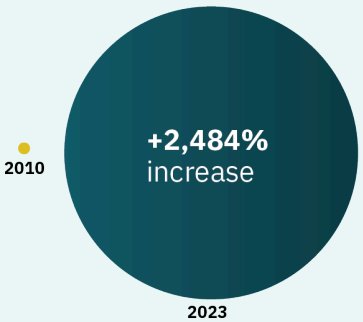
A growing number of researchers

Increased levels of funding are beginning to attract more researchers to the field, with strong and consistent increases in research outputs in recent years. However, as this growth is relatively recent, work remains to be done to reduce the fragmentation of the research community and achieve high degrees of integration and cohesion. Horizon Europe Cluster 6 funding for alternative proteins has been successful in attracting researchers to the field, but should ultimately be supported by funding from other instruments and domestic funding in order to provide more funding security to researchers.

Alternative protein research is undergoing tremendous growth in Europe, with an **average year-on-year growth in publications of 32%.**

Since 2010, when 19 research outputs were published on alternative proteins, the field has seen rapid expansion, with 472 papers published in 2023.

The **bulk of this output has come in the past five years.** 77% were published between 2019 and 2023, and 26% were published in 2023 alone. Source.



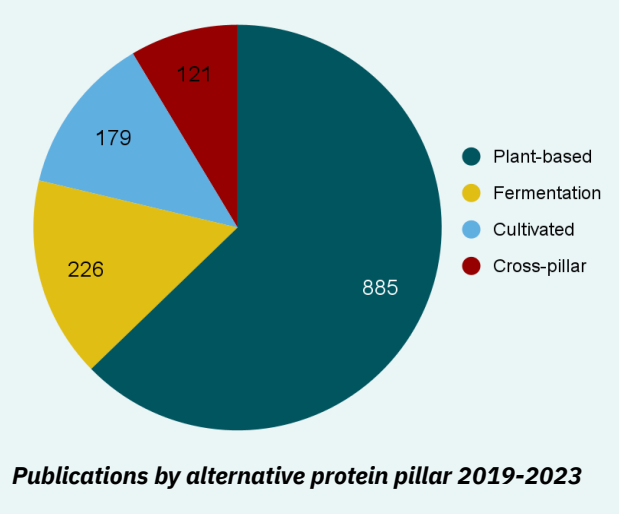
[1] Public funding accounts for 90 % of the total. Non-profit funding refers to the remaining 10 % which comes from foundations and research institutes. Private funding was not included.

Funding focus differs

The main focus of research up until the end of 2023 was on plant-based food, with the majority of published papers being in this category, and the majority of European alternative protein research funding going into it. With total investment hitting a cumulative total of €390 million between 2020 and 2024, plant-based is the best-funded of the three pillars. The top five funding regions of plant-based meat, eggs and dairy in Europe between January 2020 and April 2024 were Denmark, the European Commission (EC), France, Germany and Norway. This plant-based research is well-connected and cohesive, with 80% of funding going towards technological development.

The funding figures for 2024 show that fermentation funding is likely to take the lead from plant-based funding this year. While an equivalent proportion of fermentation research is focused on technology development (80%), precision fermentation research towards animal protein analogues and functional ingredients in particular is still in its infancy, with key underlying research areas such as strain development largely underdeveloped in the scientific literature. There is also a low degree of interconnectivity between these topics, which points to a relatively immature scientific ecosystem that is still working in silos and has not yet developed a high degree of knowledge-sharing and collaboration on key research challenges.

On cultivated meat, the majority of published research has focused on addressing socio-economic questions and consumer research, with only 34% of research publications aimed at solving technical challenges. Furthermore, there is a lack of ecosystem collaboration. There is a low diversity of technological areas being explored and weak links between these research areas. While to some degree this reflects the nascency of this research field, it also shows the need to urgently prioritise these technology areas for increased funding and develop mechanisms through which research groups can collaborate more effectively on solving the major research challenges in these areas.



Publications by alternative protein pillar 2019-2023

Greater collaboration and technical research needed

These analyses point to the need for much greater collaboration within the research ecosystem in Europe and the need for more funding – specifically for technical research.

There are many repeated collaborations between the same authors, resulting in limited cross-pollination and information exchange. As a result, there are numerous potential connections between researchers that remain unexplored, leaving room for further collaboration and interdisciplinary research. The research community requires greater support to stimulate and sustain cross-border, interdisciplinary research collaborations.

Funding mechanisms that allow this type of large-scale interdisciplinary, cross-border collaboration are limited and can be exceptionally competitive. Mechanisms such as COST Actions can play an important role here in helping to grow the research ecosystem and fill knowledge gaps, but alternative protein research remains under-represented in the COST ecosystem at present.

While the Horizon Europe mechanism has funded a number of projects that bring together diverse stakeholder groups to tackle important research questions in alternative proteins (including projects such as Giant Leaps, Smart Protein Project, NextGen Proteins, VALPRO Path, FEASTS, and HealthFerm), not all of this research is of a technical nature. It will be important to find ways to fill this funding gap to facilitate more international collaborations on the technical bottlenecks in alternative protein research.

Policy recommendations

Ensure a strategic focus on food biotechnology, including diversifying protein

- EU R&I funding should be aligned with EU strategic industrial goals, one of which should be **to develop a competitive and world-leading food biotechnology sector in Europe.** As a subset, securing a resilient and diversified protein value chain in Europe should be a priority.
- A 'whole-government approach' is needed in order to ensure policy/ funding coherence. Policy measures should ensure there is a **path to market for deployment of food biotechnology with the greatest potential to contribute to the EU's climate and competitiveness goals.**
- The follow-up to the Biotechnology and Biomanufacturing Initiative offers an opportunity to secure food as an integral part of the bioeconomy, and to build Europe's economic and food resilience (following in the footsteps of the United States, the UK and Brazil, who are leading the way). For example, the **EU could establish an industrial and environmental ('white') biotechnology fund** to be co-administered by DG GROW and DG RTD. This would ensure that Europe isn't falling behind on innovation on the lab-to-market path.

Transparent governance favouring innovative industry

- Closer integration of research and competitiveness goals would ensure greater commercial and societal impact of funding, but **goals must be clearly defined, developed and governed in a transparent manner**. In addition, aligning funding with commercial outcomes should not unduly increase the burden on applicants.
- If the governance structure of FP10 moves towards greater industry involvement, it should ensure there is a **defined role for new cleantech industries, including SMEs, and favouring innovative, forward-looking food biotechnology players.**

Increase technical funding

- Funding should be more **focused towards achieving technical outcomes** in alternative protein research. There has generally been a lack of technical funding for areas such as cultivated meat. This low TRL (technology readiness level) research must be increased, such as research to improve the taste and texture of alternative proteins. This will create a pipeline of new research that can be picked up by industry and startups, therefore avoiding duplicative R&I within the private sector.
- Horizon Europe funding has largely overlooked the **middle part of the food value-chain**, leading to incomplete results. FP10 should take a more comprehensive approach.
- **All projects of excellence with a focus on technical research should be funded**. Under Horizon Europe calls for alternative proteins, typically only 2-3 projects have been funded per call, which combined with high rates of oversubscription, limits the opportunities for many high-potential

projects. This low funding rate can be discouraging for researchers and innovators, as knowing that only a couple of projects will be funded often demotivates potential applicants and discourages submission.

Stronger collaboration across the value chain

- FP10 should invest in more **pre-competitive, collaborative projects,** such as consortia-based projects or twinning programmes. This format creates stronger knowledge exchange between researchers and companies, benefiting companies by giving access to leading knowledge, benefiting researchers via connection to the business world's needs, and benefiting the overall sector by **ensuring uptake of new technologies**. For many researchers, inviting colleagues from other countries or industry partners to collaborate on an EU proposal is a crucial step in building networks and establishing a presence within the European research community. This lays the foundation for long-term partnerships that can lead to more significant research outcomes.
- **FP10 should ensure stronger participation from SMEs**, as administrative barriers currently prevent many from taking part in consortia. The concept of cascade funding, which has been used under Horizon Europe and permits more flexible SME engagement after funding, is a best practice example from other Clusters that could be expanded into Cluster 6.
- Funding should strategically **link up parts of the value-chain** that need greater collaboration. More funding is needed to bring together specific actors given that the alternative protein value chain is particularly complex. Particular focus should be paid to creating opportunities to connect farmers and primary processors.
- FP10 could also establish a **grant programme or prize incentives to develop value-chain solutions to address projected future bottlenecks** (for which there is otherwise no current economic incentive to begin the necessary R&I). Some examples of this are the prize-based challenge on cultivated meat media that EIT Food and GFI Europe ran in 2023, EU project ValPro Path's supply chain modelling, and XPrize, which is funded by philanthropy.
- Funding should also be directed to projects involving **universities and research institutes with high potential to establish cross-departmental alternative protein research tracks** (for example, creating strong links between food science and engineering biology or tissue engineering, or chemical or mechanical engineering, which will mean there is a better chance of research leading to market change).

Paving the way to market

- More international **public-private funding partnerships are needed to drive forward investment in the sector**. Given its success, the CBE-JU public-private partnership model could be replicated for food biotechnology, bringing in funding from large, innovative companies in Europe leading in this space, member states who are already investing, and the EC. Whichever platform or partnership model is pursued, the focus should be, *inter alia*, on boosting infrastructure, connecting the value-chain, and ensuring that research is translated into commercial success. Public-private partnerships are crucial, given their role in sending a signal to investors, and thereby increasing confidence and private-sector investment.
- To ensure connections between R&I and commercialisation, the EU should fund **innovation centres of excellence focused on bringing together researchers, universities and companies and acting as an accelerator.** There are several examples

of these, such as the CellFood Hub in Denmark, CiPA in Catalonia, Biotech Heights in Sweden, and NAPIC in the UK, but there is much more latent potential in other regions in Europe.

- More public funding should be dedicated to **bridging the valley of death – offering support to scale-up and reduce the infrastructure gap** and thereby bringing down costs to consumers. Governments should help during the critical scaling phase with non-dilutive financing options, such as loans, guarantees, and other public subsidies, for example, to improve access to financing for infrastructure build-out. Additionally, governments can invest in measures such as supporting the conversion of disused plants in other sectors for the protein transition and fund open-access platforms that provide pilot facilities for scale-ups, such as the publicly-funded Bio-Base Europe Pilot Plant in Belgium.
- To help alternative protein companies come to market, the EU should consider measures such as allowing **tax relief for companies investing in R&I with societal benefits.**
- Strategic priorities that receive research funding should also receive support from FP10 during the following stages of scaling up, **ensuring funding continuity throughout their development**. Existing programmes like the EIC Accelerator, which recently provided a €50 million investment to scale precision fermentation and algae technologies, have been successful in providing this support, but are highly oversubscribed. **Increasing funding for the EIC** and exploring innovative models like blended finance could expand available support. Achieving this may go beyond the scope of FP10 and will require close alignment with other scaling-up programmes. The Competitiveness Fund should help ensure that such technologies can access funding at every critical stage, allowing innovations created in Europe to scale and thrive within Europe.

Key Takeaways:

- Europe has an increasingly strong alternative protein research ecosystem which could pave the way for it to be a leader in protein diversification.
- Limited collaboration and insufficient technical research are barriers under Horizon Europe.
- Alternative proteins, embedded in food biotechnology, should be a strategic focus of FP10, as should further growth of the plant-based sector.
- Stronger policy/ funding coherence is crucial, as is R&I driven by technical and commercial impact.
- Innovative, forward-looking industry should be at the heart of FP10 governance.
- An approach which strategically connects parts of the value-chain is crucial – from farmers to low TRL R&I, to processing R&I.
- Strategic priorities should receive funding continuity throughout their development, and these scale-up measures must receive adequate financing.

About the Good Food Institute Europe

The Good Food Institute Europe is a nonprofit and think tank helping to build a more sustainable, secure and just food system by diversifying protein production.

We work with scientists, businesses and policymakers to advance options like plant-based and cultivated meat – ensuring they are delicious, affordable and accessible across Europe.

By making meat from plants and cultivating it from cells, we can reduce the environmental impact of our food system and feed more people with fewer resources. GFI Europe is powered by philanthropy.

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