gfi Europe

Country deep dive:

Sweden

State of the European alternative protein research and innovation ecosystem

Dr David Hunt and Dr Stella Child

Alternative protein research in Sweden

Sweden, while somewhat overshadowed by its neighbours Denmark and Finland, has steadily invested in the field of alternative proteins since 2020.

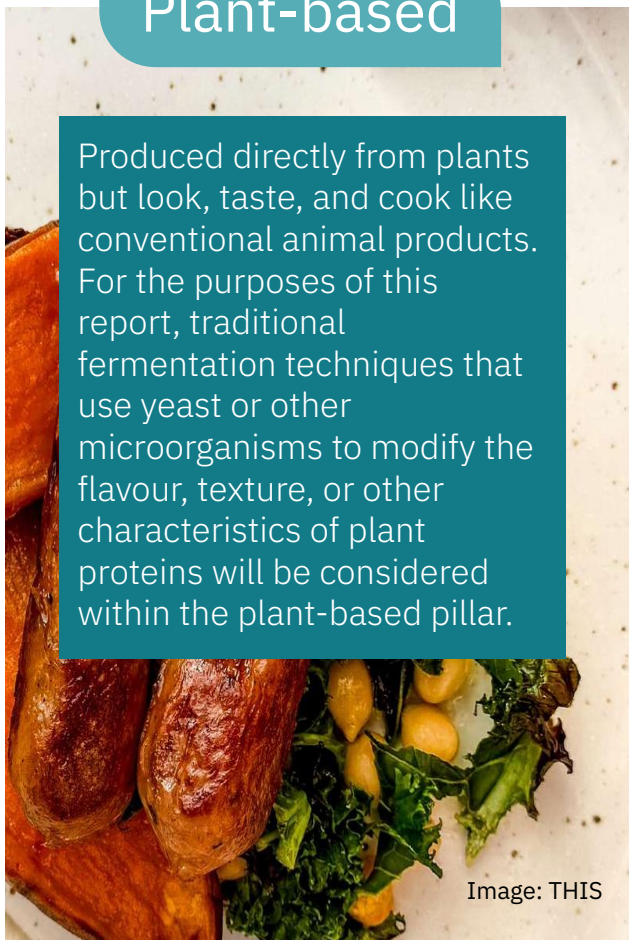
The Swedish alternative protein R&I ecosystem punches above its weight in Europe but would benefit from a more clearly defined vision to capitalise on the country's strengths.

Credit: Damir K via Pexels

What do we mean by alternative protein pillars?

The fields of research that are the focus of this report are split into three main 'pillars', described below. In some instances, research projects combine techniques from across these disciplines. These are referred to as 'cross-cutting' throughout the report.

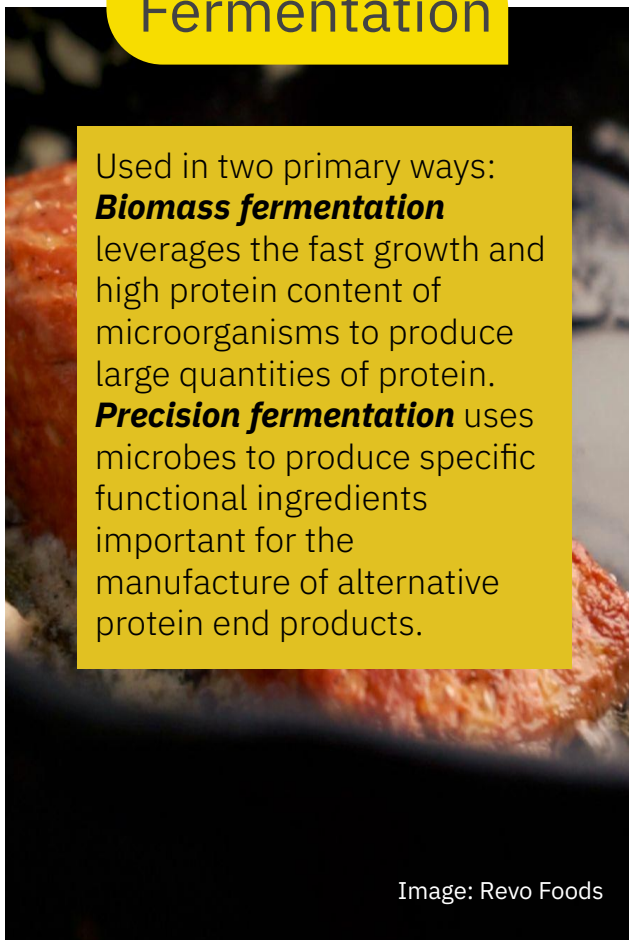
Plant-based



Produced directly from plants but look, taste, and cook like conventional animal products. For the purposes of this report, traditional fermentation techniques that use yeast or other microorganisms to modify the flavour, texture, or other characteristics of plant proteins will be considered within the plant-based pillar.

Image: THIS

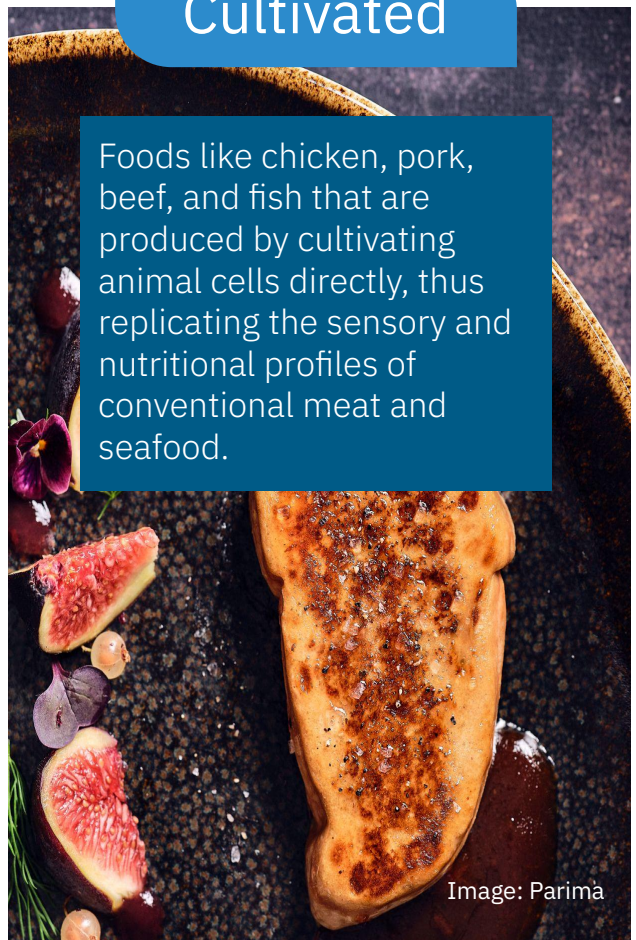
Fermentation



Used in two primary ways: ***Biomass fermentation*** leverages the fast growth and high protein content of microorganisms to produce large quantities of protein. ***Precision fermentation*** uses microbes to produce specific functional ingredients important for the manufacture of alternative protein end products.

Image: Revo Foods

Cultivated



Foods like chicken, pork, beef, and fish that are produced by cultivating animal cells directly, thus replicating the sensory and nutritional profiles of conventional meat and seafood.

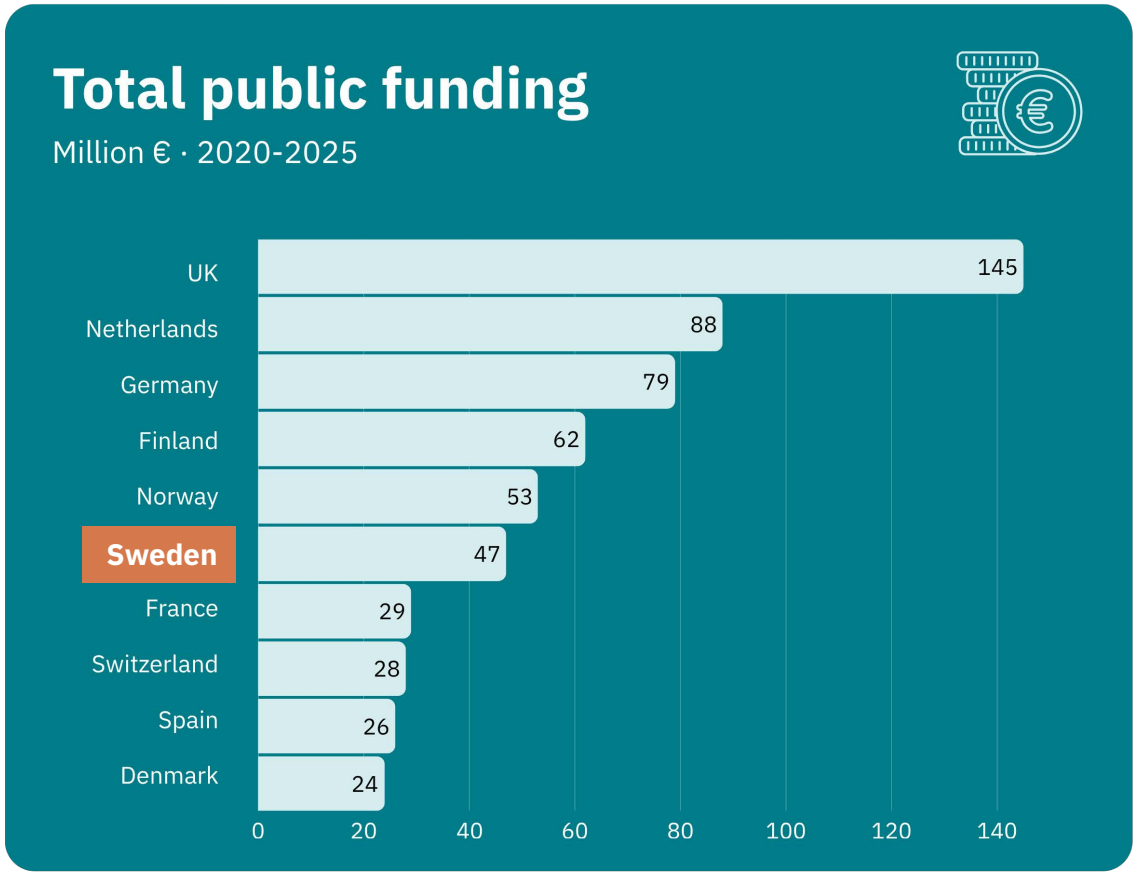
Image: Parima

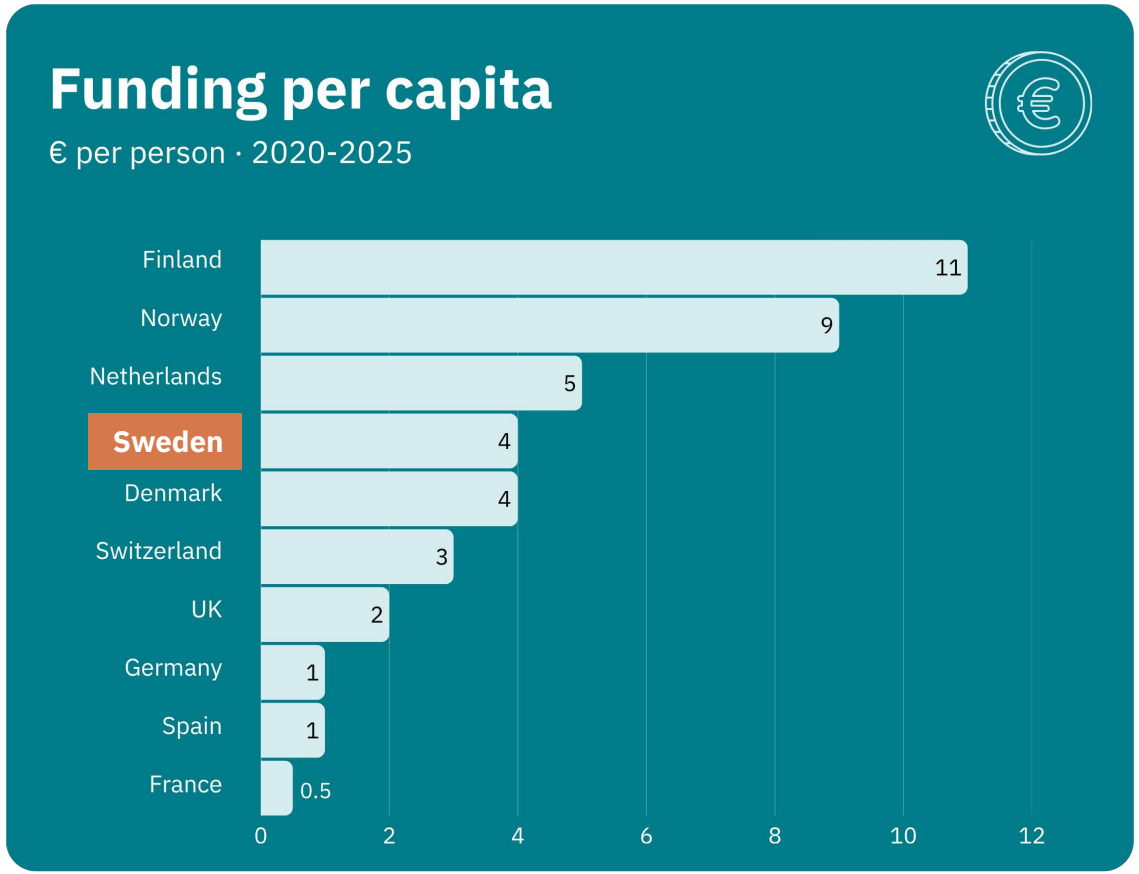
Cross-cutting

In some instances, research projects combine techniques from across these disciplines. For example, research projects on cellular agriculture, the combined approaches of precision fermentation and cultivated meat development, or research on an aspect of the entirety of the alternative protein field, such as a social science question.

Swedish funding compared to governments across Europe

Investment from the top 10 governments funding alternative proteins in Europe, 2020-2025, showing total public funding* (excluding non profit contributions) and funding per capita.**
Sweden ranks sixth in total public funding but 4th, just ahead of Denmark on a per capita basis.



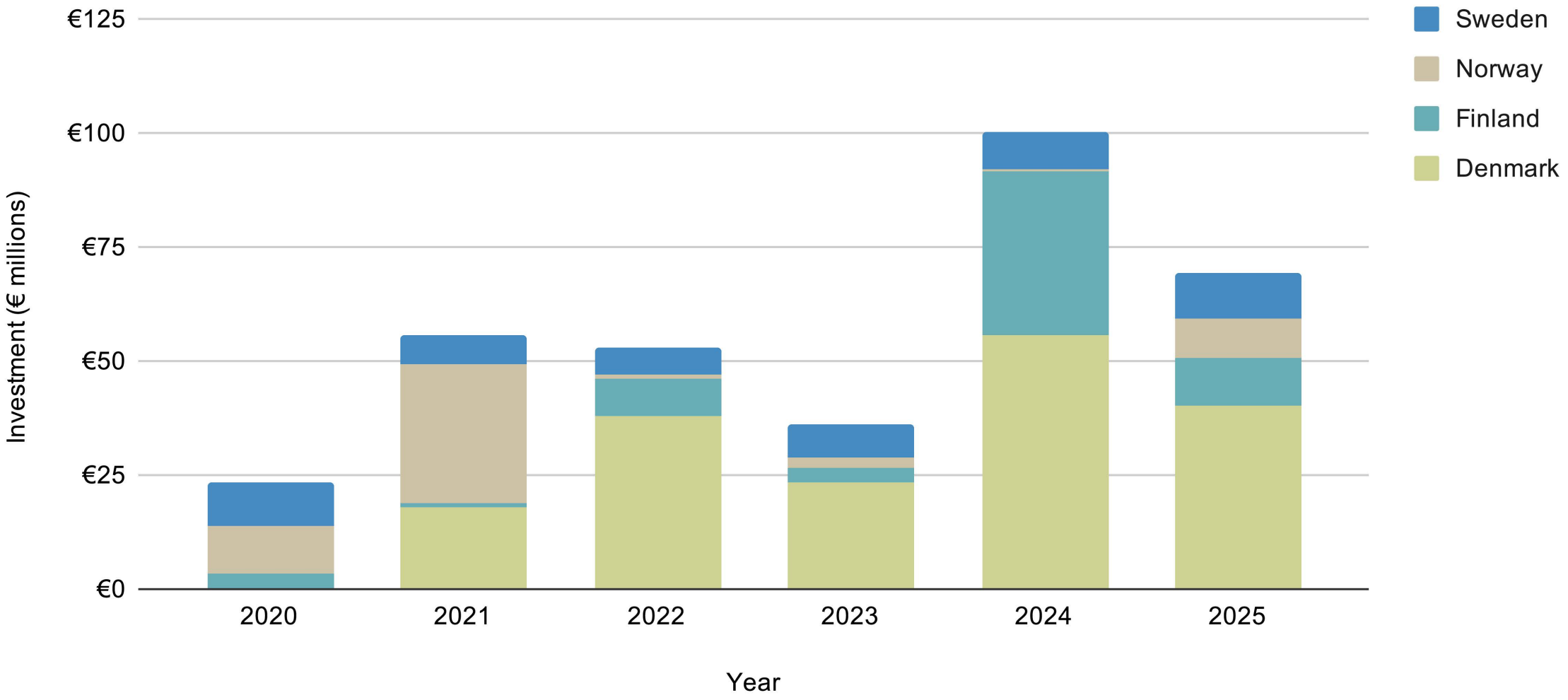


*Funding for some countries, such as the Netherlands, France, and Belgium, is likely an underestimate. **Per capita spending is only shown for the top 10 countries by total public research funding. Note that this is not a ranking of the top 10 by per capita spending, and that some countries in the top 10 by per capita spending are not displayed.

A regional funding overview

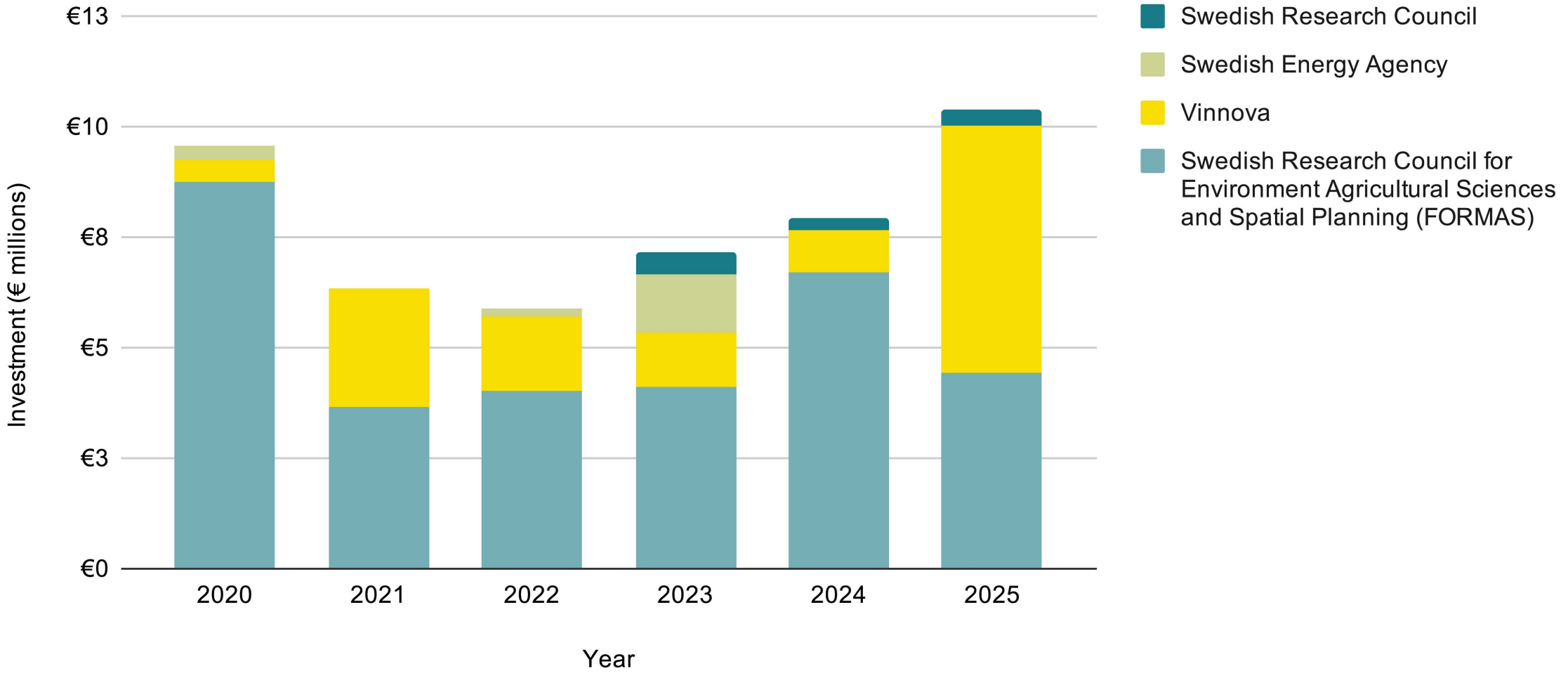
Investment from the Nordic region, broken down by jurisdiction of funder (including nonprofit funders), 2020-2025.

Some variation in funding was seen across the period, but there was continued interest from all four countries. Finland showed the most variability.



Swedish funding landscape

Investment from Sweden, broken down by research funder, 2020-2025.
FORMAS and Vinnova together account for the majority of funding flowing into the field in Sweden, making for a balance of applied and innovation funding.

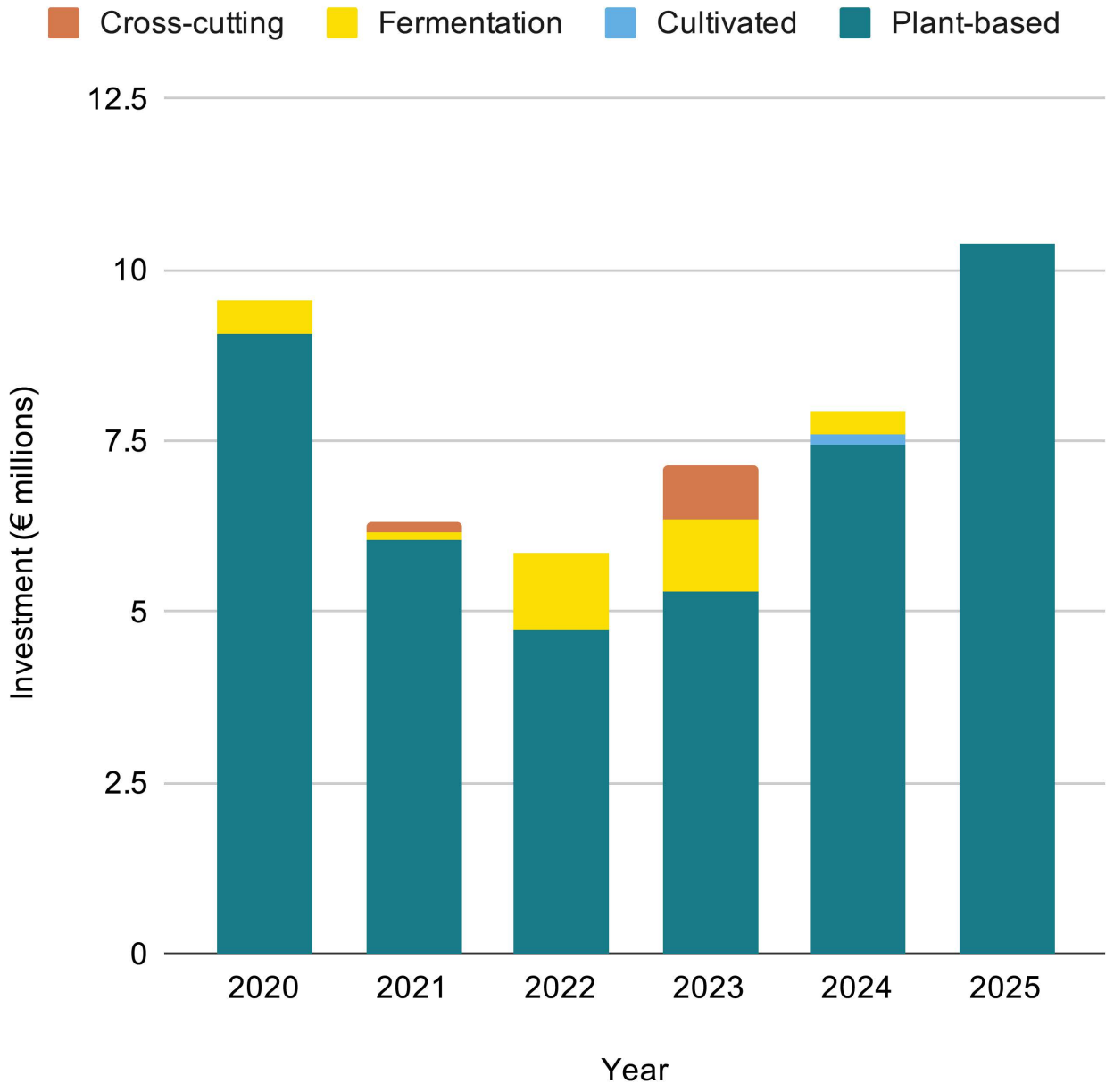


Swedish funding by pillar

This chart shows investment from Sweden, broken down by alternative protein type, over the period 2020-2025.

Sweden has largely focused on plant proteins, and has invested relatively little in fermentation and cultivated meat.

As a result, Sweden is behind only the UK and Germany for government investment in plant-based proteins but is ranked seventh in fermentation and 12th for cultivated.



Publications: overall trends

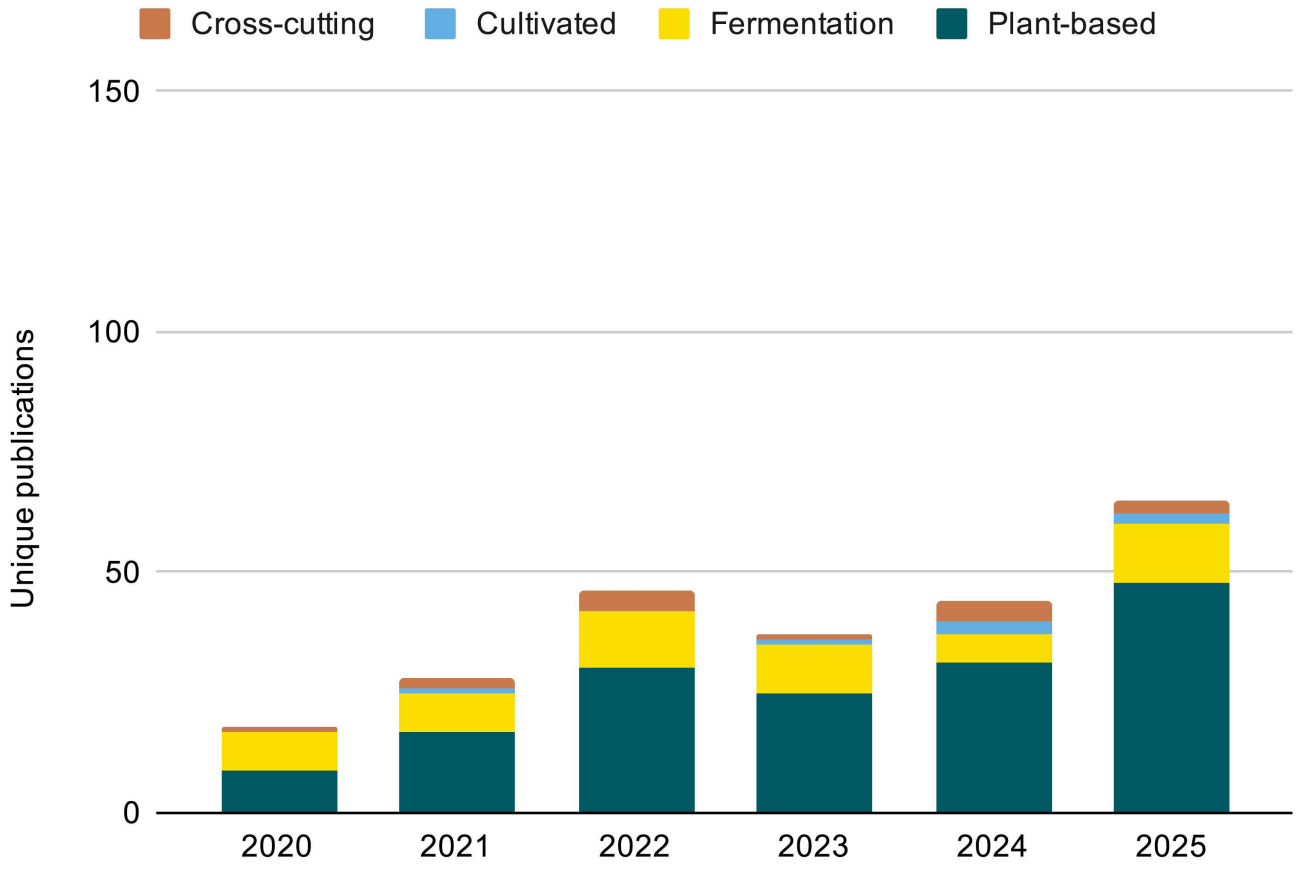
This chart shows the overall trends in Swedish academic publications in peer-reviewed journals on topics related to alternative proteins in the period 2020-2025.

Sweden contributed to 238 publications in this period and ranks eighth overall in Europe.

Publication outputs grew by 33% per year on average but fluctuated over time. There were 65 research publications in 2025 compared with 18 in 2020 – a 261% increase.

Breakdown of publications by alternative protein pillar:

- 67% plant-based proteins
- 24% fermentation-made proteins and ingredients
- 3% cultivated meat and seafood
- 6% cross-cutting topics

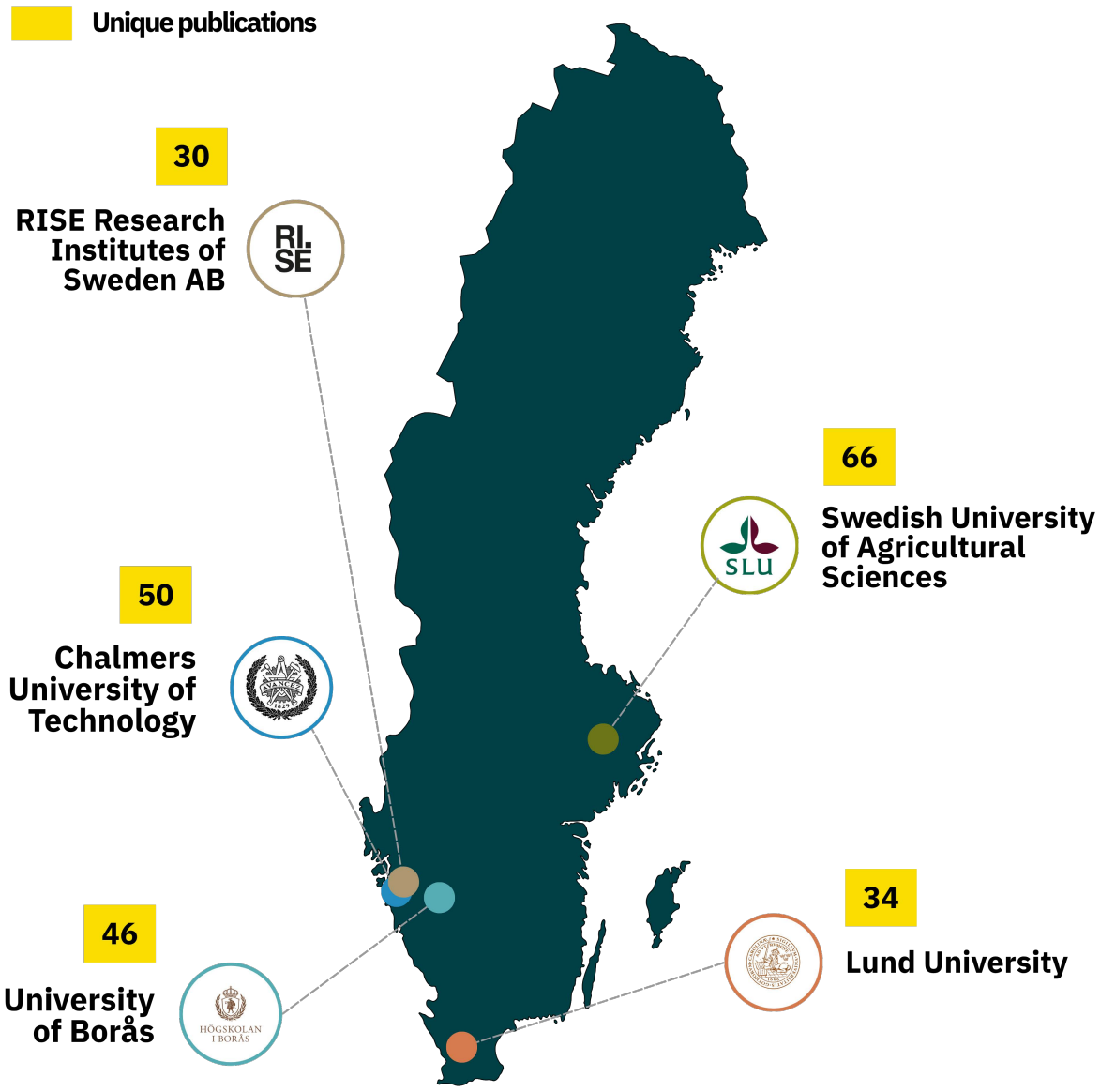


Leading research performing organisations

This map shows the leading institutions for alternative protein research in Sweden on the basis of unique publications in the period 2020-2025.

The most highly ranked Swedish organisation is the Swedish University of Agricultural Sciences which ranked 14th for total publications in 2025 and 12th overall for the period 2020-2025.

Sweden ranks sixth in Europe for total fermentation publications since 2020 and ninth for plant-based research. It is less competitive in cultivated meat and seafood, coming in at 15th.



Map created with Datawrapper. For a breakdown of the methodology used in this analysis, see the appendix

Patents: overall trends

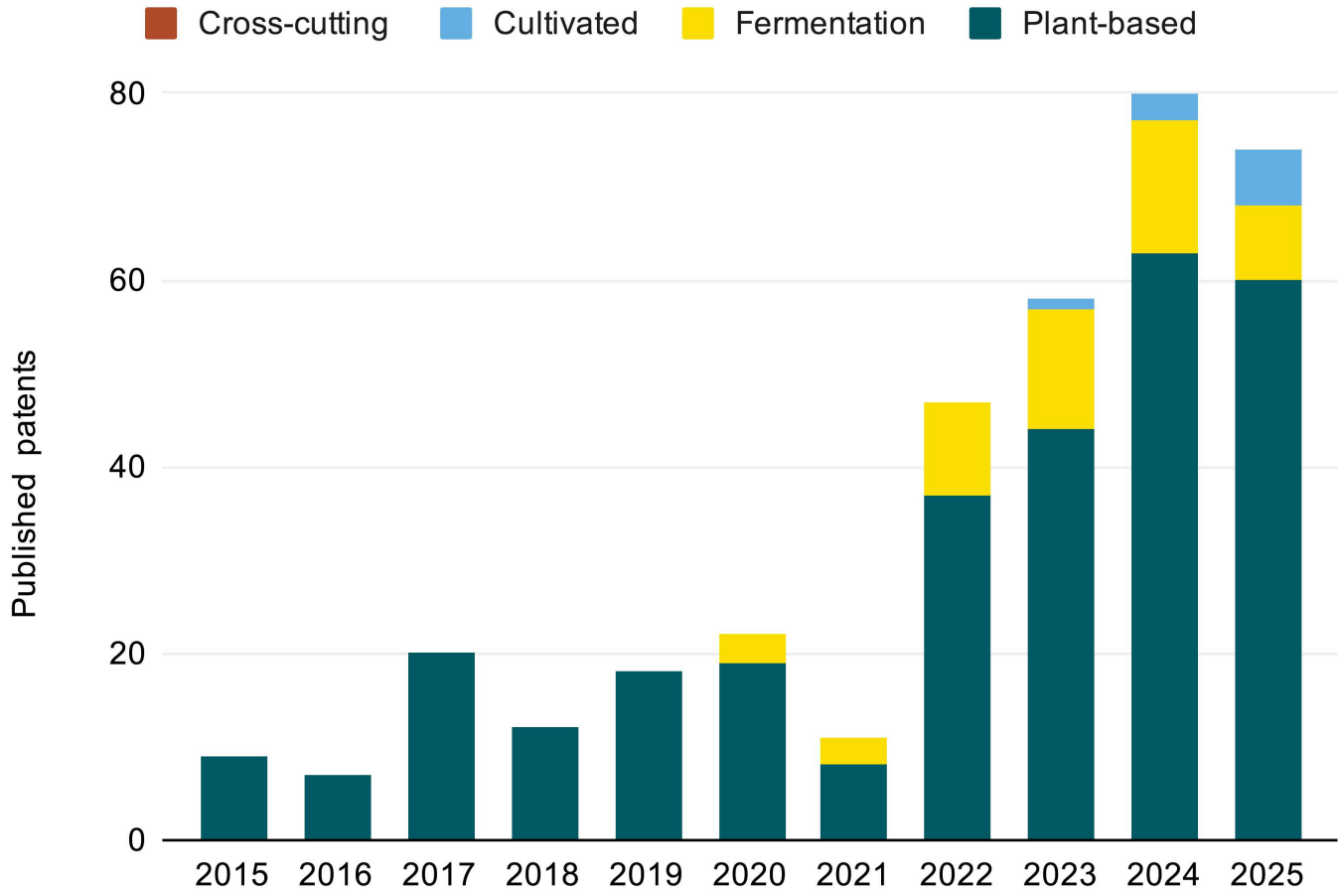
This chart shows the overall number of alternative protein patents published by Swedish innovators in the years 2015-2025 inclusive, stratified by alternative protein pillar.

The number of patents published rose consistently from 2021 to 2024, peaking at 80 in 2024 before declining slightly in 2025.

There were 358 total patents published by Swedish innovators in the period 2015-2025 – the eighth highest total in Europe.

Breakdown of patents by alternative protein pillar:

- 83% plant-based proteins
- 14% fermentation-made proteins and ingredients
- 3% cultivated meat and seafood
- 0% cross-cutting topics



Given there can often be a significant delay between patenting filing, publication, and granting, this section focuses on patenting trends in the European alternative protein sector since 2015. **For glossary of patent terms, see appendix.**

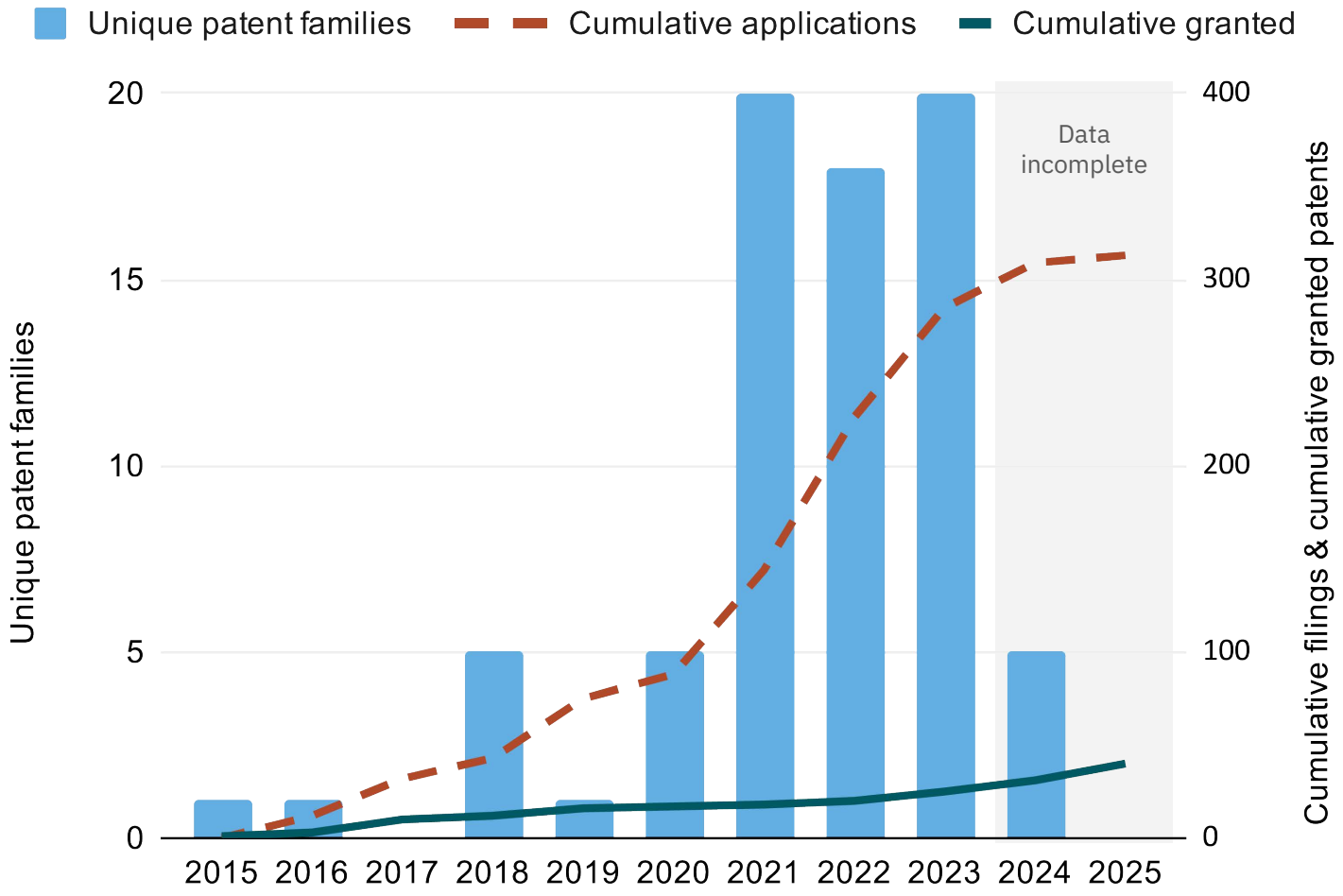
Patents: overall trends

This chart shows trends in unique patent families and cumulative patent filings by Swedish innovators in the years 2015-2025 inclusive, along with the cumulative number of patents that have been granted.

Priority filings – the very first filing on a new invention – peaked at 20 in both 2021 and 2023.

Overall, a total of 313 patents have been filed since 2015, with 2022 seeing the highest number of filings at 82.

The number of patents granted has also risen, reaching nine in 2025, with 40 patents granted in total.



Due to the ~18-month lag between patent filing and publishing, 2024 and 2025 data are incomplete and should be treated with caution. **For glossary of patent terms, see appendix.**

Deep-dive: Plant-based

This section breaks down funding, publications, and patent trends, using research categories to explore strengths and weaknesses in the field of plant-based meat, seafood, eggs and dairy in Sweden.

Research categories:

Plant-based

Crop development

Breeding of crops and increased use of underutilised protein crops for higher protein yields and functionality.

Strain development

Screening and optimisation of novel strains to identify the most efficient pathways for producing targets or modifying substrates.

Texturisation methods

Process innovations, including (but not limited to) novel texturisation methods such as extrusion, electrospinning, 3D printing, and enzymatic processing to match the texture of animal protein.

Ingredient optimisation

Improved protein fractionation and functionalisation for higher-quality ingredients with less processing, and development of novel ingredients to augment nutritional profiles and enhance sensory experience.

End product formulation

Formulation and product design, including fat integration, shelf life, stability, sensory quality, and nutritional assessment and fortification.

Food safety and quality

Toxicological and safety assessments, regulatory improvements, such as assay development or validation.

Health and nutrition

Dietary impacts of alternative proteins including population-wide studies, systematic reviews, and in vitro studies on health impacts such as bioavailability.

Consumer and market research

Consumer behaviour research including nomenclature studies, purchasing intent across retail and food environments, and market scoping and brand development.

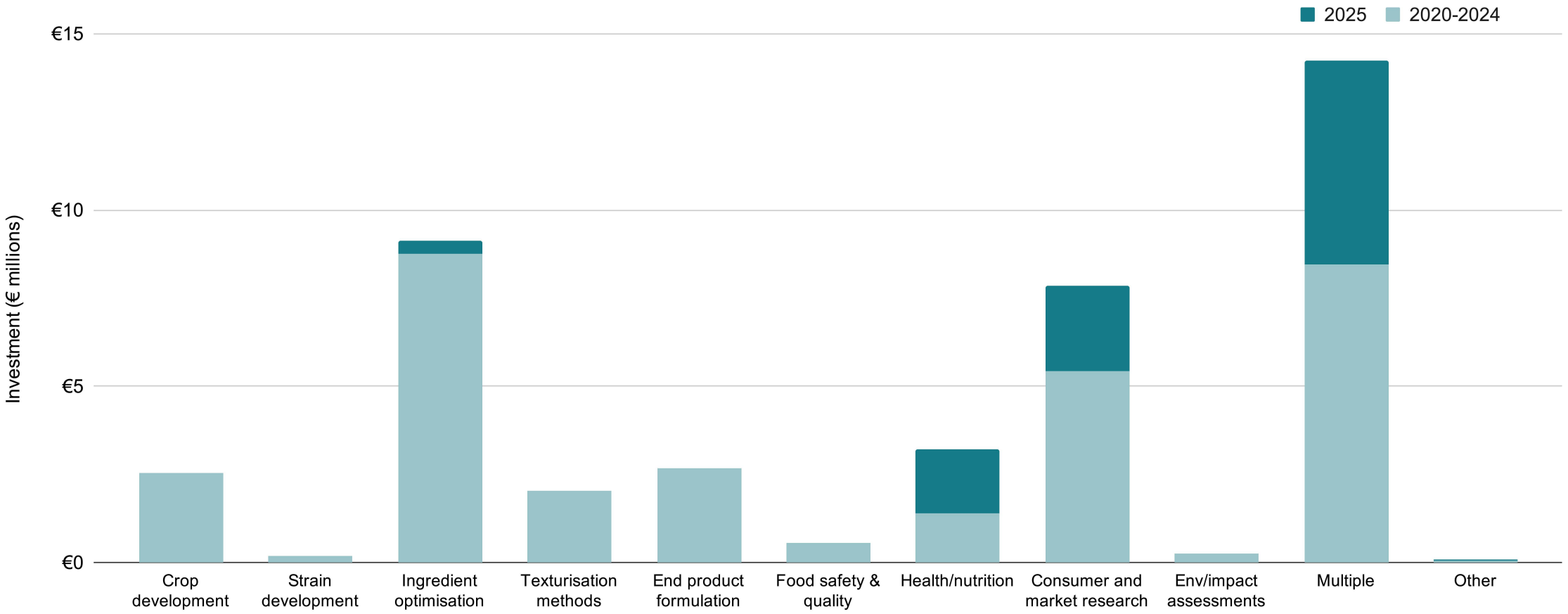
Impact assessments

Includes life cycle, techno-economic, environmental, social, and geopolitical impact analyses.

Swedish plant-based deep dive: research categories

Plant-based investment from Sweden, broken down by research category, 2020-2025.

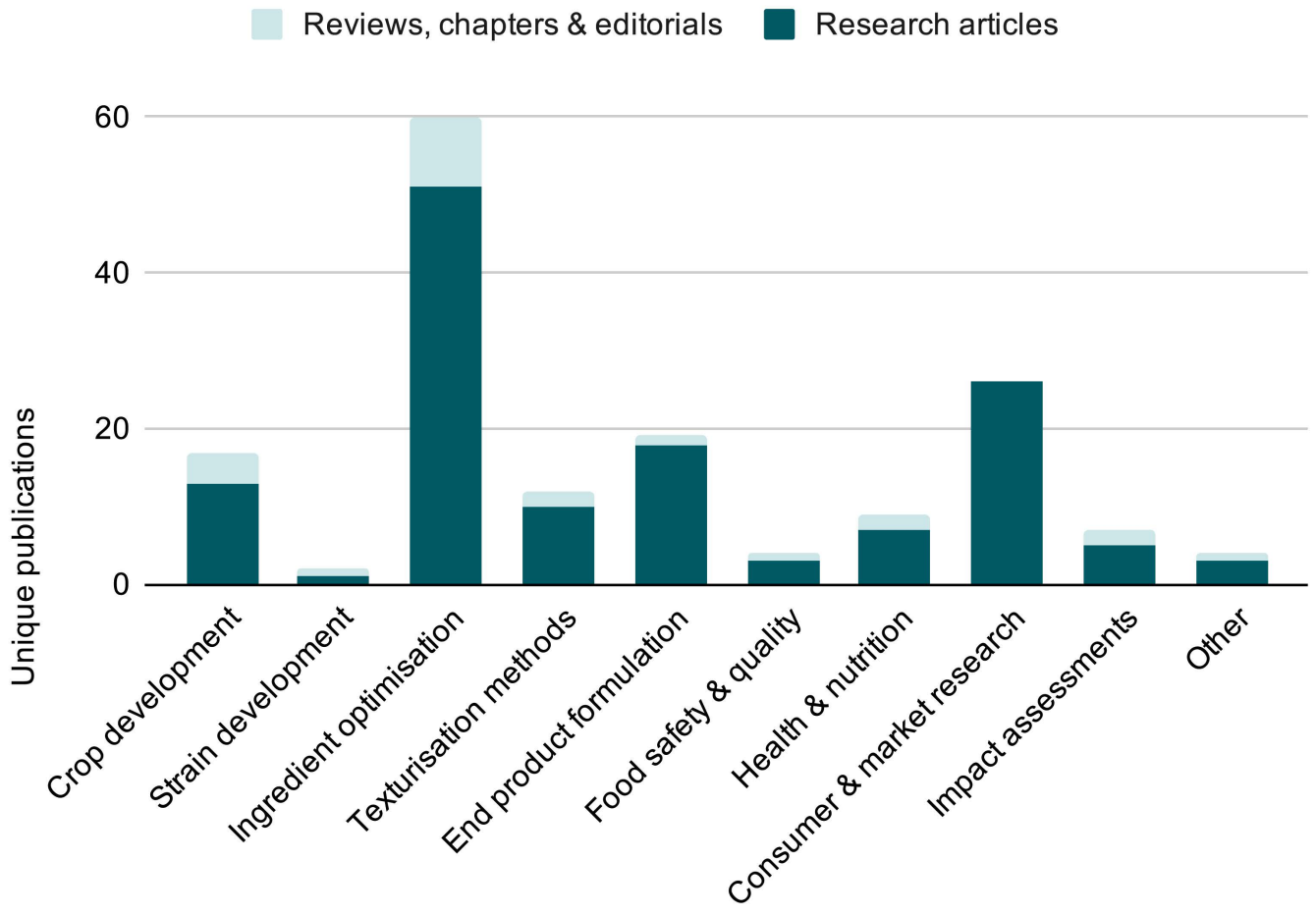
Sweden's investment in plant-based research broadly follows the overall trend in Europe, but with more focus on downstream aspects such as health and nutrition and consumer research. The major new investment in Multiple in 2025 was the FORCE research centre.



Plant-based publications: research categories

This chart shows a breakdown by research category of Swedish academic publications on plant-based proteins in the years 2020-2025 inclusive.

Swedish researchers mostly focused on ingredient optimisation (38% of all publications), followed by consumer & market research (16%), and crop optimisation (11%).

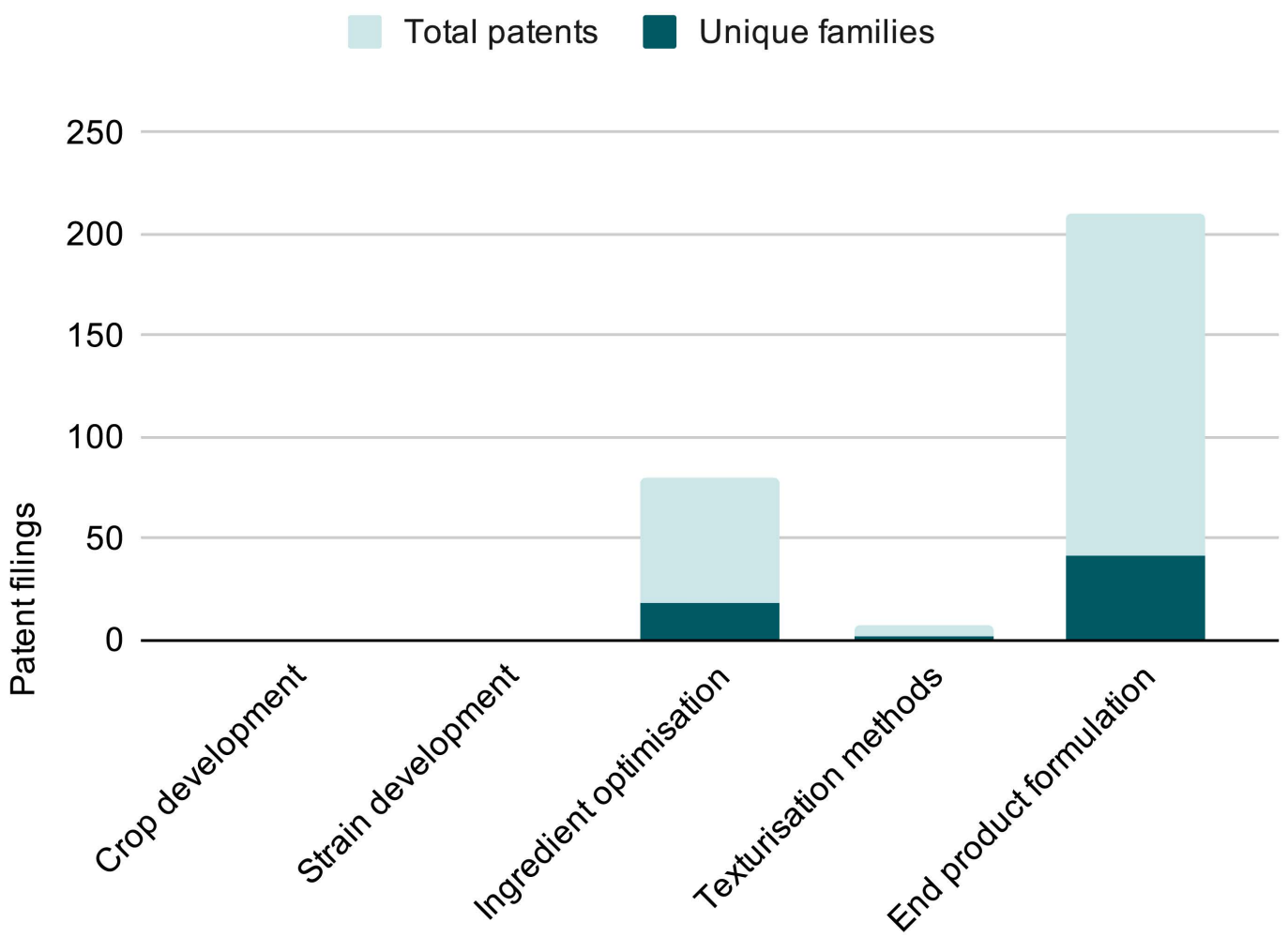


Plant-based patents: research categories

This chart provides a breakdown of patent filings by Swedish innovators on technology areas related to plant-based proteins in the years 2015-2025 inclusive.

Swedish innovators filed patent applications mostly in relation to end product development (71% of all filings) and ingredient optimisation (27%).

Innovations in novel protein crops and microbial strain for modifying plant protein characteristics remain neglected by Swedish innovators.



Deep-dive: Fermentation

This section breaks down funding, publications, and patent trends, using research categories to explore strengths and weaknesses in the field of fermentation-enabled alternative proteins in Sweden.

Research categories:

Fermentation

Target molecule selection

Target identification and validation to broaden the scope of food ingredients produced by precision fermentation.

Strain development

Screening and optimisation of novel strains to identify the most efficient pathways for producing targets or modifying substrates.

Ingredient optimisation

Improved protein fractionation and functionalisation for higher-quality ingredients with less processing, and development of novel ingredients to augment nutritional profiles and enhance sensory experience.

End product formulation

Formulation and product design, including fat integration, shelf life, stability, sensory quality, and nutritional assessment and fortification.

Health and nutrition

Dietary impacts of alternative proteins including population-wide studies, systematic reviews, and in vitro studies on health impacts such as bioavailability.

Impact assessments

Includes life cycle, techno-economic, environmental, social, and geopolitical impact analyses.

Feedstocks

Media composition and feedstock utilisation strategies (including alternative feedstocks) to improve efficiency, scale and cost.

Bioprocess design

Innovations in bioreactor design and upstream/downstream processes to improve efficiency, monitoring, and control.

Texturisation methods

Developing techniques such as extrusion technology to replicate the fibrous, chewy textures of conventional meat and dairy.

Food and safety quality

Toxicological and safety assessments, regulatory improvements, such as assay development or validation.

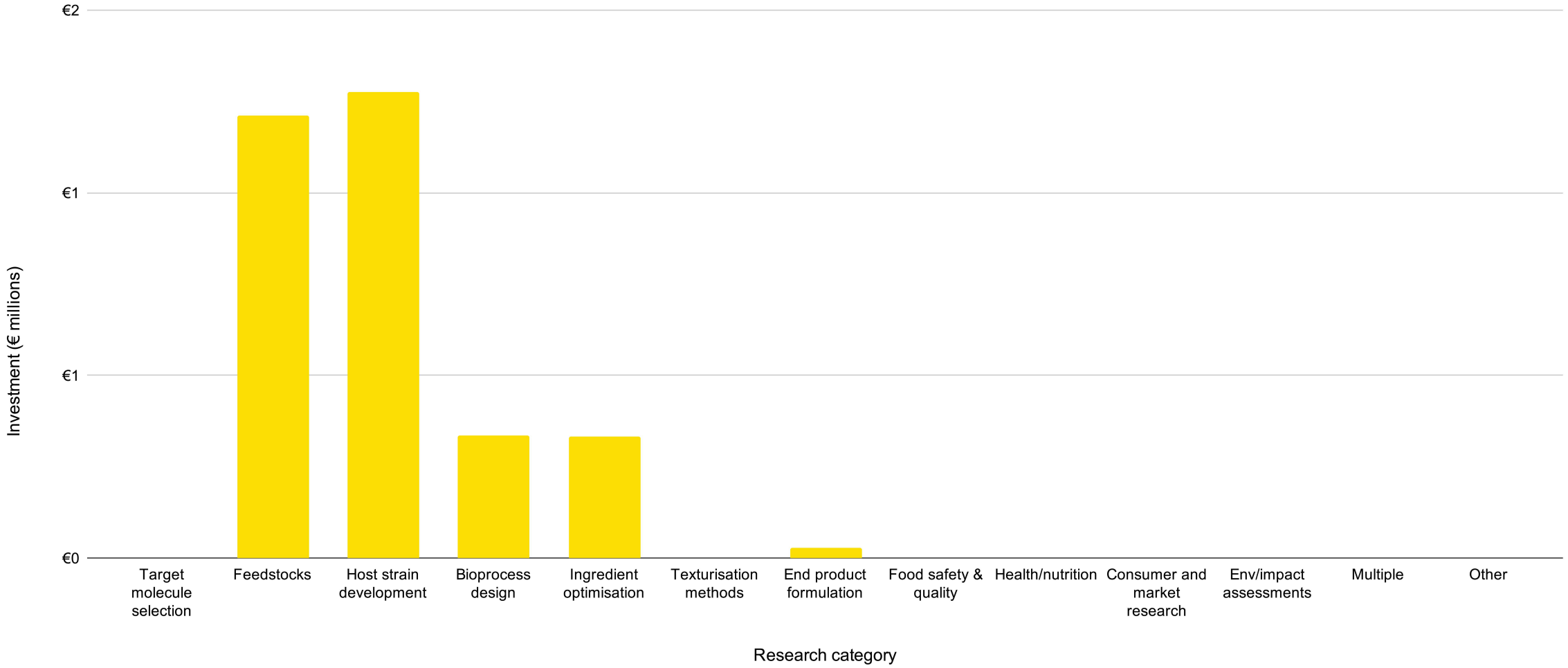
Consumer market and research

Consumer behaviour research including nomenclature studies, purchasing intent across retail and food environments, and market scoping and brand development.

Swedish fermentation deep dive: research categories

Fermentation investment from Sweden, broken down by research category, 2020-2025.

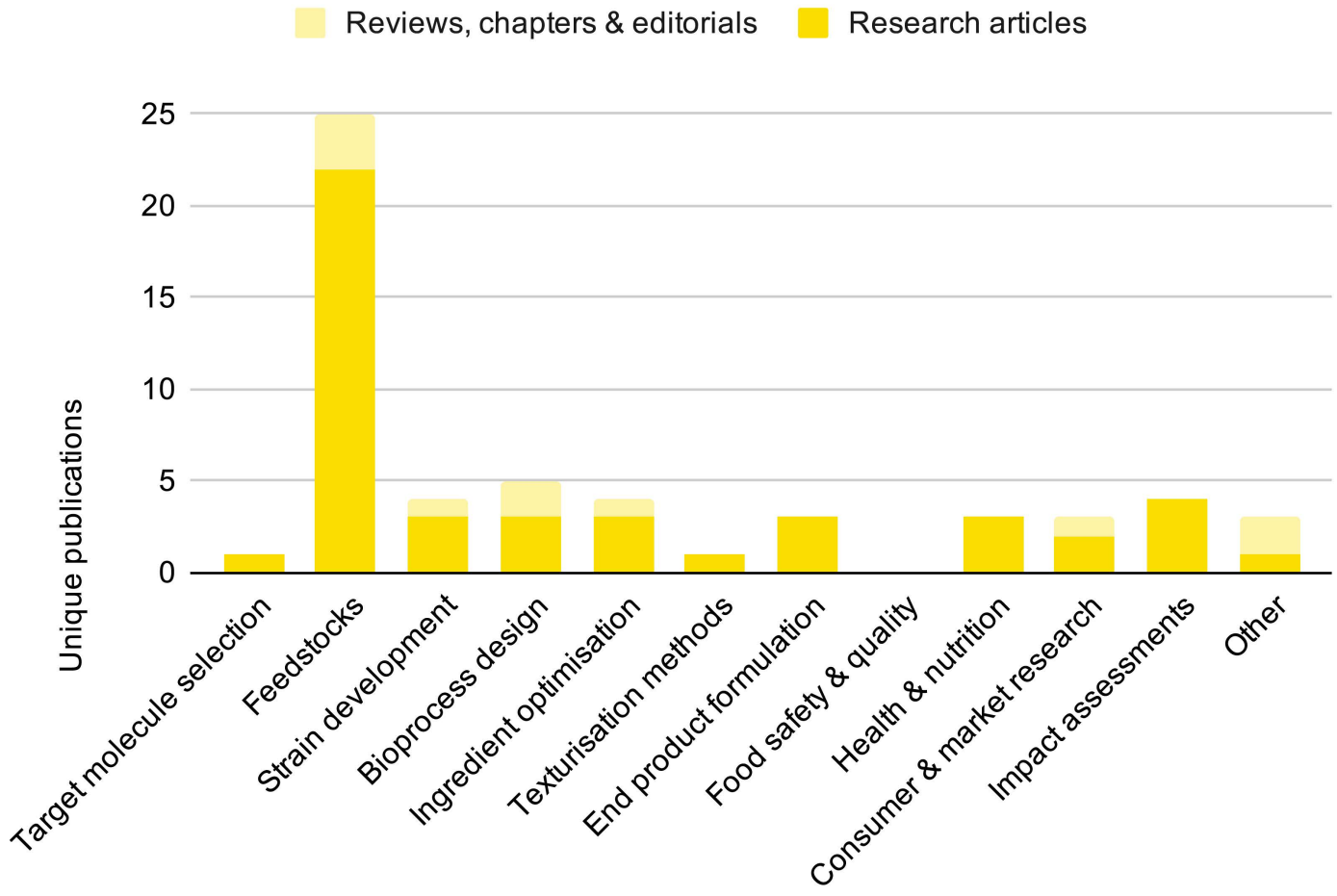
Swedish fermentation research remains in its infancy, and thus far has focused largely on upstream aspects such as feedstocks and host strain design.



Fermentation publications: research categories

This chart shows a breakdown by research category of Swedish academic publications on fermentation-made proteins and ingredients in the years 2020-2025 inclusive.

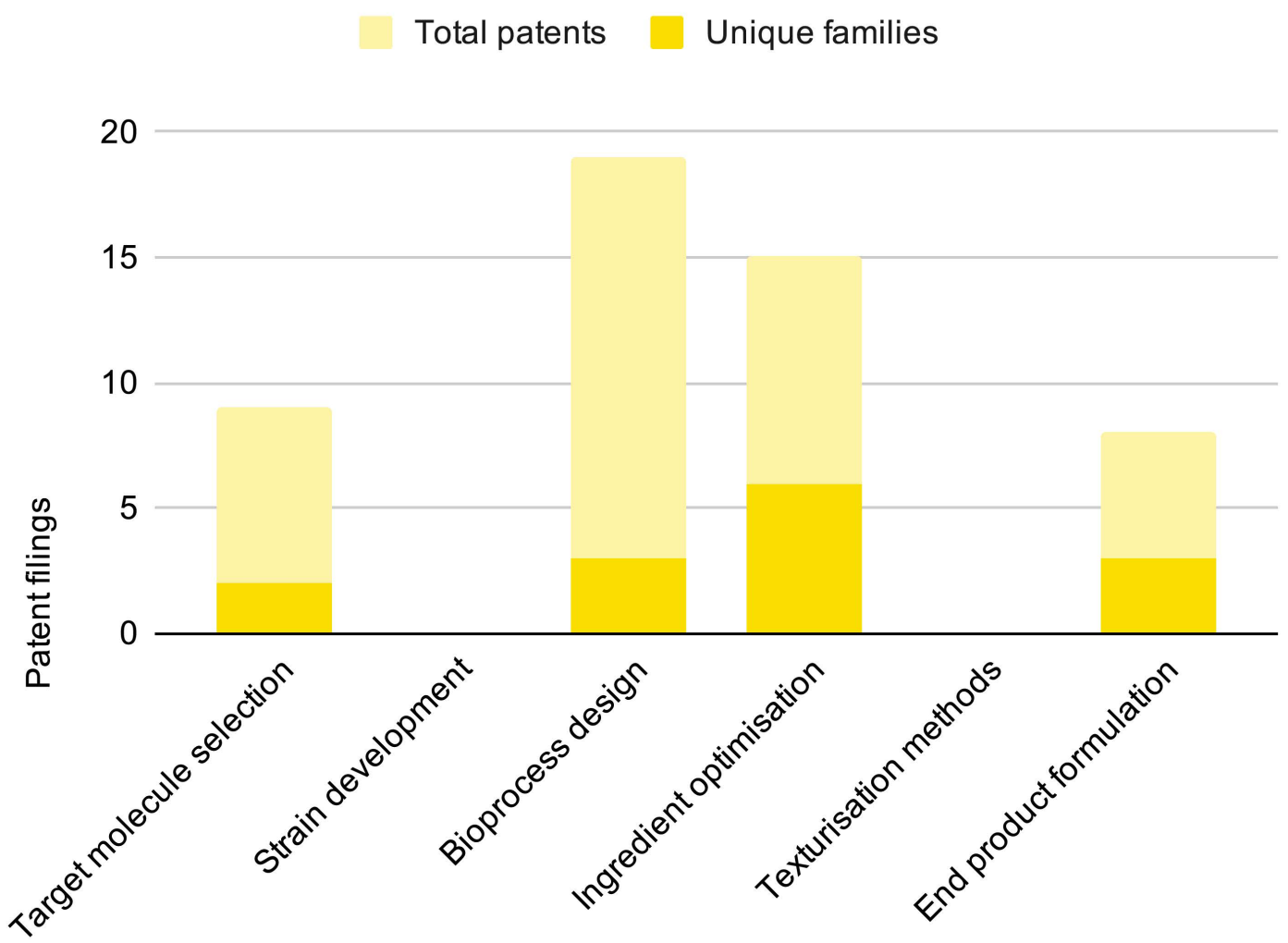
Swedish researchers focused primarily on the development of novel feedstocks (45% of all publications).



Fermentation patents: research categories

This chart provides a breakdown patent filings by Swedish innovators on technology areas related to fermentation-made proteins and ingredients in the years 2015-2025 inclusive.

Swedish innovators filed patent applications on a range of research categories in fermentation, with bioprocess design (37% of all filings) and ingredient optimisation (29%) the most common.



Deep-dive: cultivated

This section breaks down funding, publications, and patent trends, using research categories to explore strengths and weaknesses in the field of cultivated meat and seafood in Sweden.

Research categories:

Cultivated

Cell line development

Sourcing, optimising, and banking new and existing cell lines to achieve faster growth, greater stability and stress tolerance, improved performance (including adherence and differentiation), and higher density across terrestrial and aquatic cell lines.

Cell culture media

Reducing cell culture media costs and increasing their availability by characterising and validating novel sources of growth factors, amino acids, and other media components.

Scaffolding

Improved scaffolding biomaterials that support cell adherence and differentiation to allow the replication of complex animal meat structures.

Bioprocess design

Innovations in bioreactor design and upstream/downstream processes to improve efficiency, monitoring, and control.

Texturisation methods

Developing techniques such as extrusion technology to replicate the fibrous, chewy textures of conventional meat and dairy.

End product formulation

Formulation and product design, including fat integration, shelf life, stability, sensory quality, and nutritional assessment and fortification.

Health and nutrition

Dietary impacts of alternative proteins including population-wide studies, systematic reviews, and in vitro studies on health impacts such as bioavailability.

Food safety and quality

Toxicological and safety assessments, regulatory improvements, such as assay development or validation.

Consumer market and research

Consumer behaviour research including nomenclature studies, purchasing intent across retail and food environments, and market scoping and brand development.

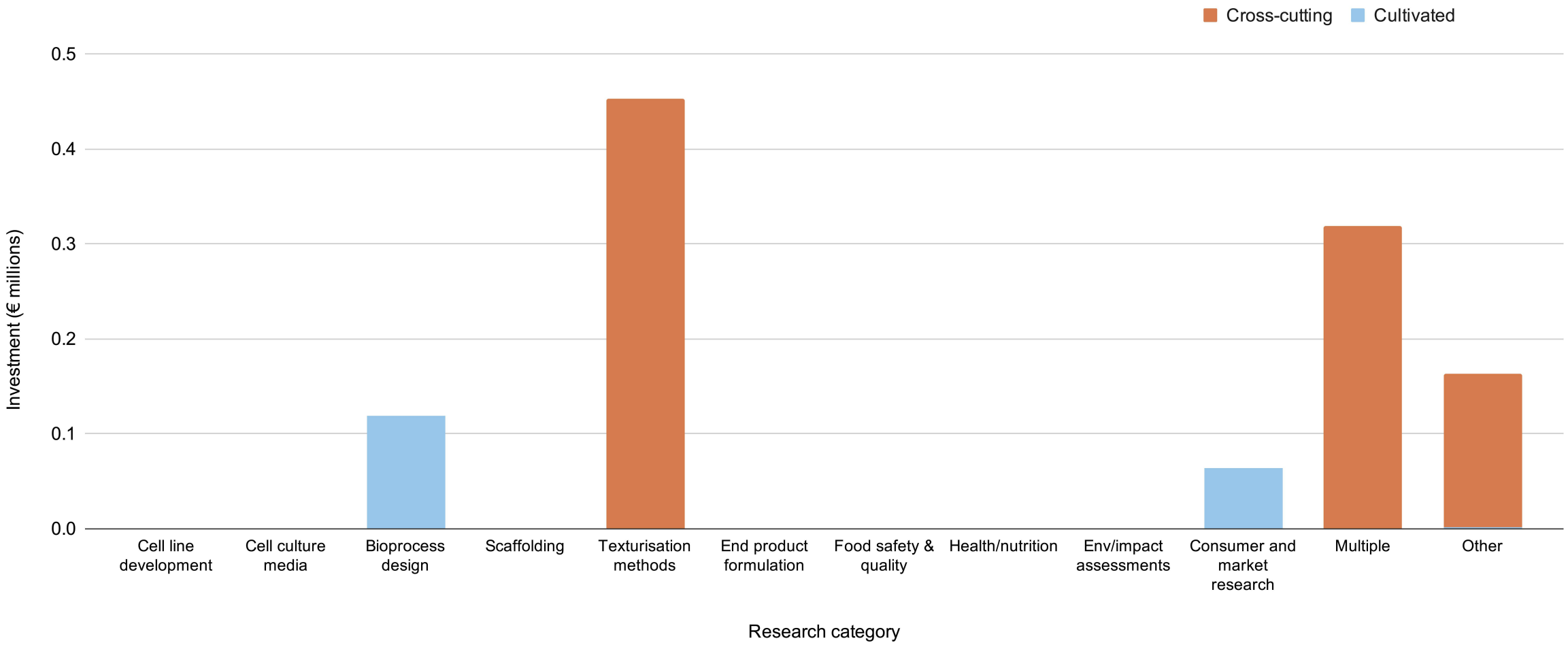
Impact assessments

Includes life cycle, techno-economic, environmental, social, and geopolitical impact analyses.

Swedish cultivated and cross-cutting deep dive: research categories

Cultivated investment in Sweden, broken down by research category, 2020-2025.

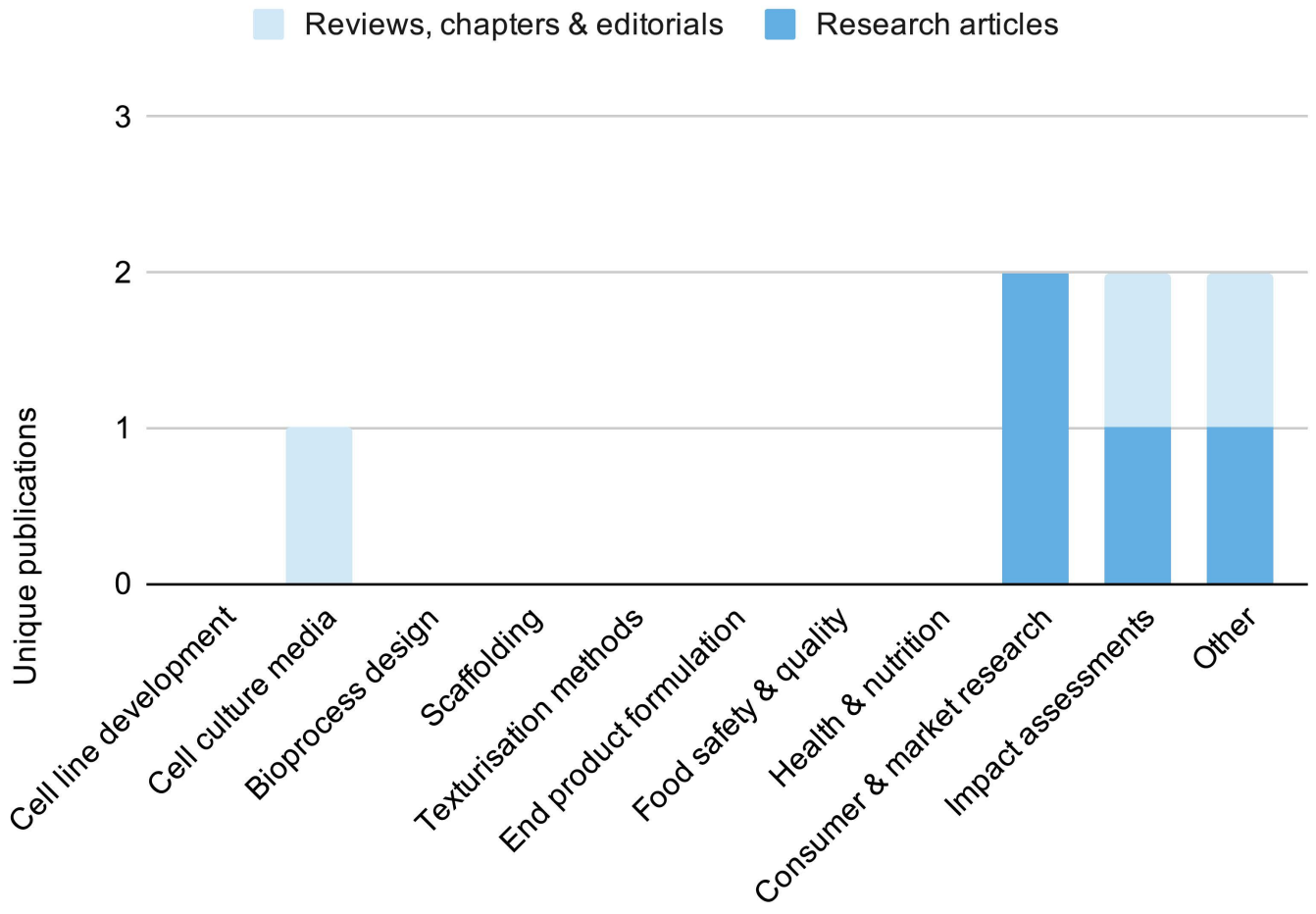
Very few cultivated meat projects have been funded in Sweden, with bioprocess design receiving the most funds, but in a limited funding environment.



Cultivated publications: research categories

This chart shows a breakdown by research category of Swedish academic publications on cultivated meat and seafood in the years 2020-2025 inclusive.

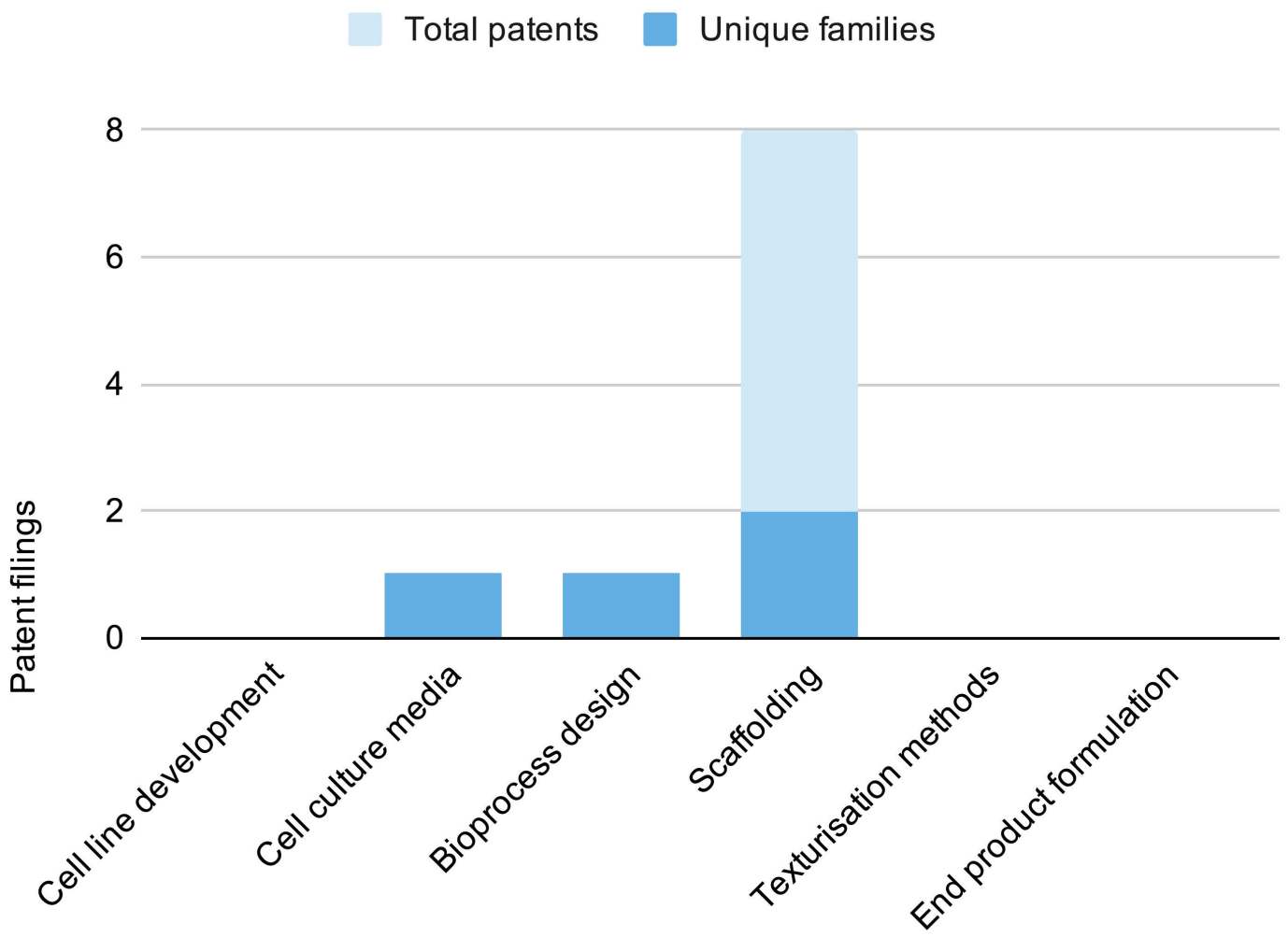
Swedish research on cultivated meat has been very limited to date and mostly focused on non-technical topics such as consumer & market research and impact assessments.



Cultivated patents: research categories

This chart provides a breakdown patent filings by Swedish innovators on technology areas related to cultivated meat and seafood in the years 2015-2025 inclusive.

Swedish patent filings on cultivated meat and seafood have been limited to date and mostly focused on innovations in scaffolding.



Appendix and methods

Methodology

For full methods including search terms, inclusion and exclusion criteria and other technical details, please see the full technical appendix **here.**

Funding

Data
Data sourced from GFI's publicly available global research funding database, the GFI Research Grants Tracker, which houses information published by funders and research conductors globally, retrieved from Dimensions.ai. Kernel Science contributed to data retrieval.

Time period
2010-2025. Data retrieved in February 2026.

Country focus
EU27 + Norway + Switzerland + UK.

Search strategy
A list of search terms was developed and Dimensions.ai results screened against predefined inclusion/exclusion criteria to identify those in scope for the study.

Grants focusing plant-based, fermentation-made, or cultivated proteins and ingredients meeting these criteria were analysed by title, recipient, funder country, pillar categorisation, end product and research sub-category.

Publications

Data
Data sourced from Dimensions, an interlinked research information system provided by Digital Science (https://www.dimensions.ai).

Time period
2020-2025. Data retrieved January 2026.

Country focus
EU27 + Norway + Switzerland + UK.

Search strategy
Complex search terms were devised that allowed us to trigger numerous publications that may be relevant to our analysis.

Search returns were screened against predefined inclusion/exclusion criteria to identify those in scope for the study.

Publications relevant to plant-based, fermentation-made, or cultivated proteins and ingredients meeting these criteria were analysed in the Dimensions Landscape & Discovery application and in spreadsheet format.

Patents

Data
Data sourced from Dimensions, an interlinked research information system provided by Digital Science (https://www.dimensions.ai).

Time period
2015-2025. Data retrieved February 2026.

Country focus
EU27 + Norway + Switzerland + UK.

Search strategy
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Search returns were screened against predefined inclusion/exclusion criteria to identify those in scope for the study.

Patents relevant to plant-based, fermentation-made, or cultivated proteins and ingredients meeting these criteria were analysed in the Dimensions Landscape & Discovery application and in spreadsheet format.

Key terminology: patents

Patent	An exclusive right granted for an invention that excludes others from making, using, offering for sale, or selling the invention. Patents benefit inventors by providing them with legal protection for their inventions. To receive this protection, they must publicly disclose details of the invention.
Patent family	A collection of patents covering the same or similar technical content disclosed by a common inventor(s) and patented in more than one country.
Priority date	Sometimes called the “effective filing date”, this is the first filing date in a family of patent applications and is used to establish the novelty and/or obviousness of a particular invention relative to other art. Each patent family will only have one priority date.
Filing date	The date when a patent application is first filed in the respective patent office. As there are no global patents, there may be numerous patent filings in different jurisdictions from the same patent family, each with its own filing date.
Publication date	The date on which the patent application is published (ie, the information is available to the public). This normally occurs approximately 18 months after the filing date.
Assignee	Organisation(s) and individual(s) that have an ownership interest in the legal rights a patent offers. An assignee is often the organisation employing the inventor of the technology. An assignee can also change at a later date.
Jurisdiction	The legal territory in which a patent is sought, for example, France, Spain, etc. Each patent must be filed with a national patent office in the country where protection is sought and there are no global patents.
Patent legal status	The current legal status of the patents, eg. ‘Granted’, ‘Active’, ‘Abandoned’, etc.

The patenting process

There are differences between patent offices in how a patent application is processed once it has been filed, but a general overview of the process is described in the table below.

For a more detailed explanation, please refer to this resource from the World Intellectual Property Organization. A detailed description of the European patent application process can be found here.

1.	**Formal examination**	The application is examined to ensure it complies with the administrative requirements set by the patent office.
2.	**Prior art search**	A search is conducted to identify prior art that will be relevant in determining the patentability of the claimed invention.
3.	**Substantive examination**	A more detailed examination is carried out to ensure the claimed invention satisfies the main criteria for patentability (patentable subject matter, novelty, inventive step, industrial applicability and sufficiency of disclosure).
4.	**Notification**	Results of the examination are sent to the applicant or their legal representative and they are given an opportunity to respond to any objections raised.
5.	**Publication of patent application**	The patent application is usually published approximately 18 months after the filing date.
6.	**Granting of patent**	If the outcome of the examination is positive, the patent office grants the patent.
7.	**Publication of granted patent**	The granted patent is published and the invention is disclosed to the public.
8.	**Pre-grant and/or post-grant opposition**	Patent offices offer others the opportunity to oppose the grant of a patent, for example, if they believe the claimed invention is not new. Opposition proceedings can be held before or after the patent is granted.

About this report

Authors
Dr David Hunt, Dr Stella Child

Acknowledgements
Kernel Science contributed to the funding data collection.

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