



Country deep dive:  
**Germany**

# State of the European alternative protein research and innovation ecosystem

Dr David Hunt and Dr Stella Child



## Alternative protein research in Germany

Germany is leading Europe in government funding for plant-based research, and is beginning to embrace fermentation and cultivated meat and seafood research.

While Germany is a European powerhouse for alternative protein research and innovation, it is starting to fall behind other countries that have increased their commitment to the field, for example in terms of funding per capita or high-performing research institutions.



## 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

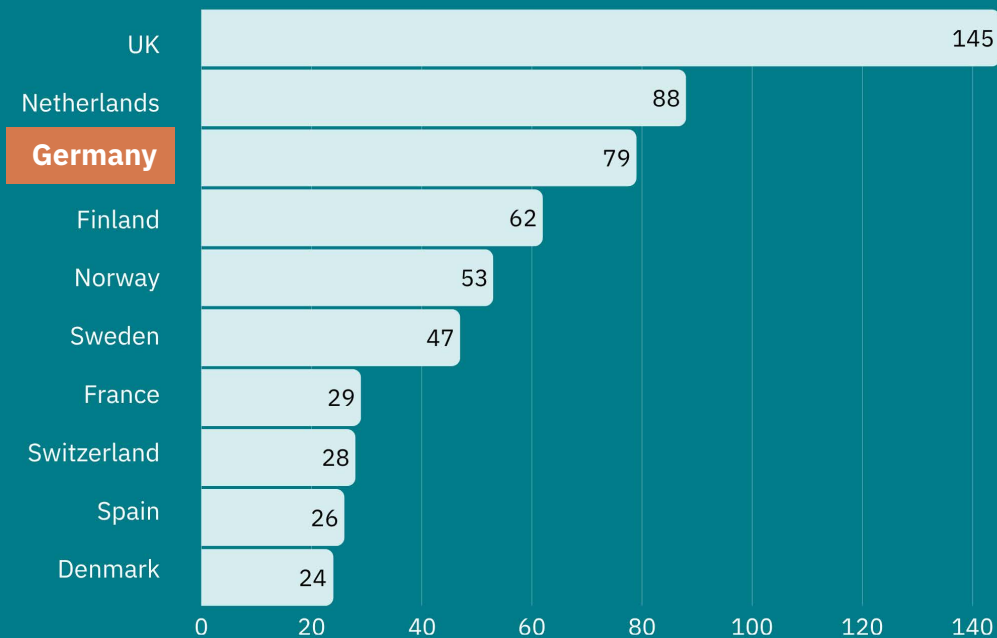
In some instances, research projects combine techniques from across these disciplines. For example, research projects on cellular agriculture, the combined approaches of precision fermentation and cultivated meat development, or research on an aspect of the entirety of the alternative protein field,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

# German 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.\*\* Germany ranks third in total funding, but only 10th on a per capita basis.

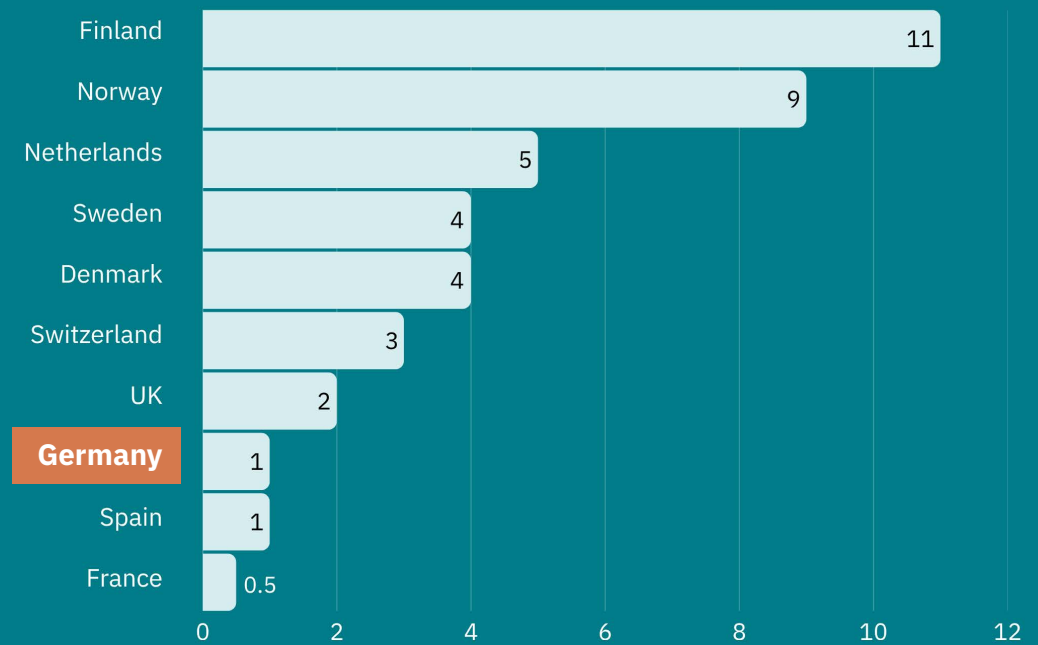
## Total public funding

Million € · 2020-2025



## Funding per capita

€ per person · 2020-2025

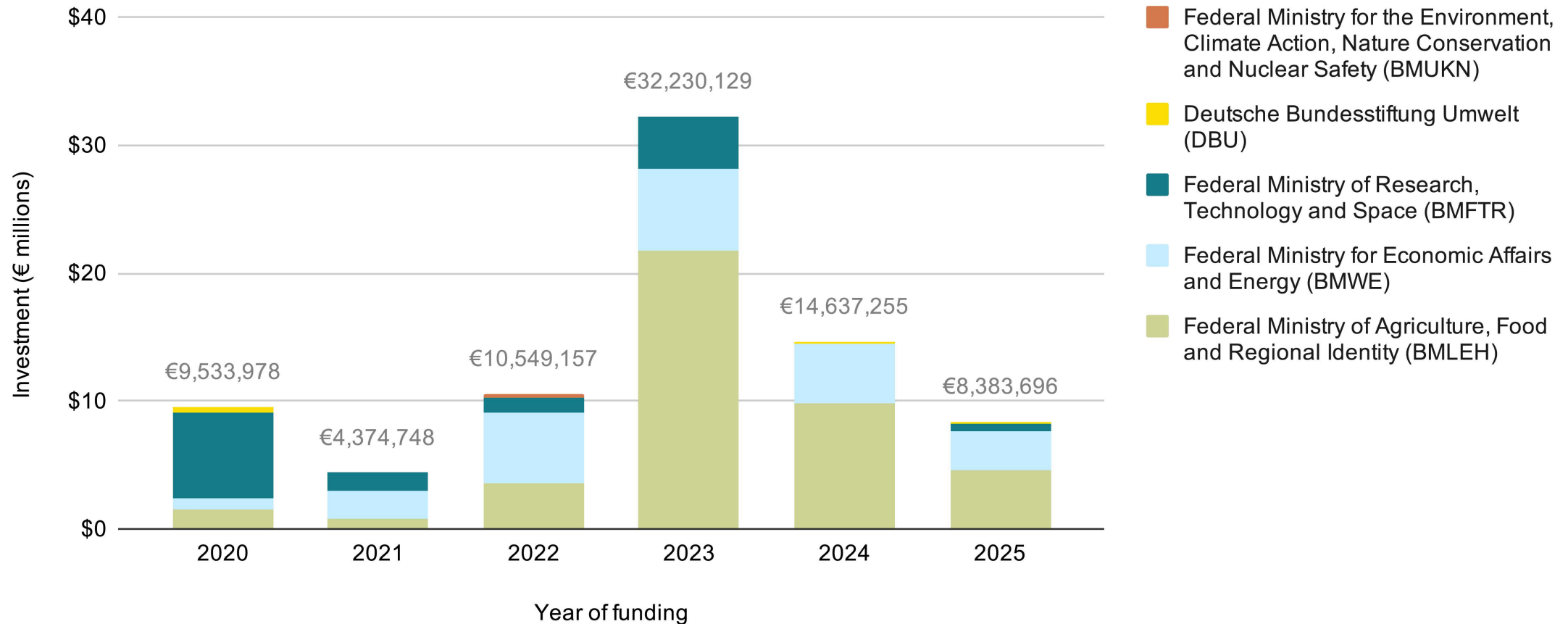


\*Funding for some countries, such as the Netherlands, France, and Belgium, is likely an underestimate.\*\*Per capita spending is only shown for the top 10 countries by total public research funding. Note that this is not a ranking of the top 10 by per capita spending, and that some countries in the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

# Funding in Germany

## Investment in Germany, by research funder, 2020-2025.\*

Funding in Germany has been led by the Federal Ministry of Agriculture, Food and Regional Identity (BMLEH), alongside other ministries. While 2023 was a bumper year, there has been consistent funding available throughout the period.

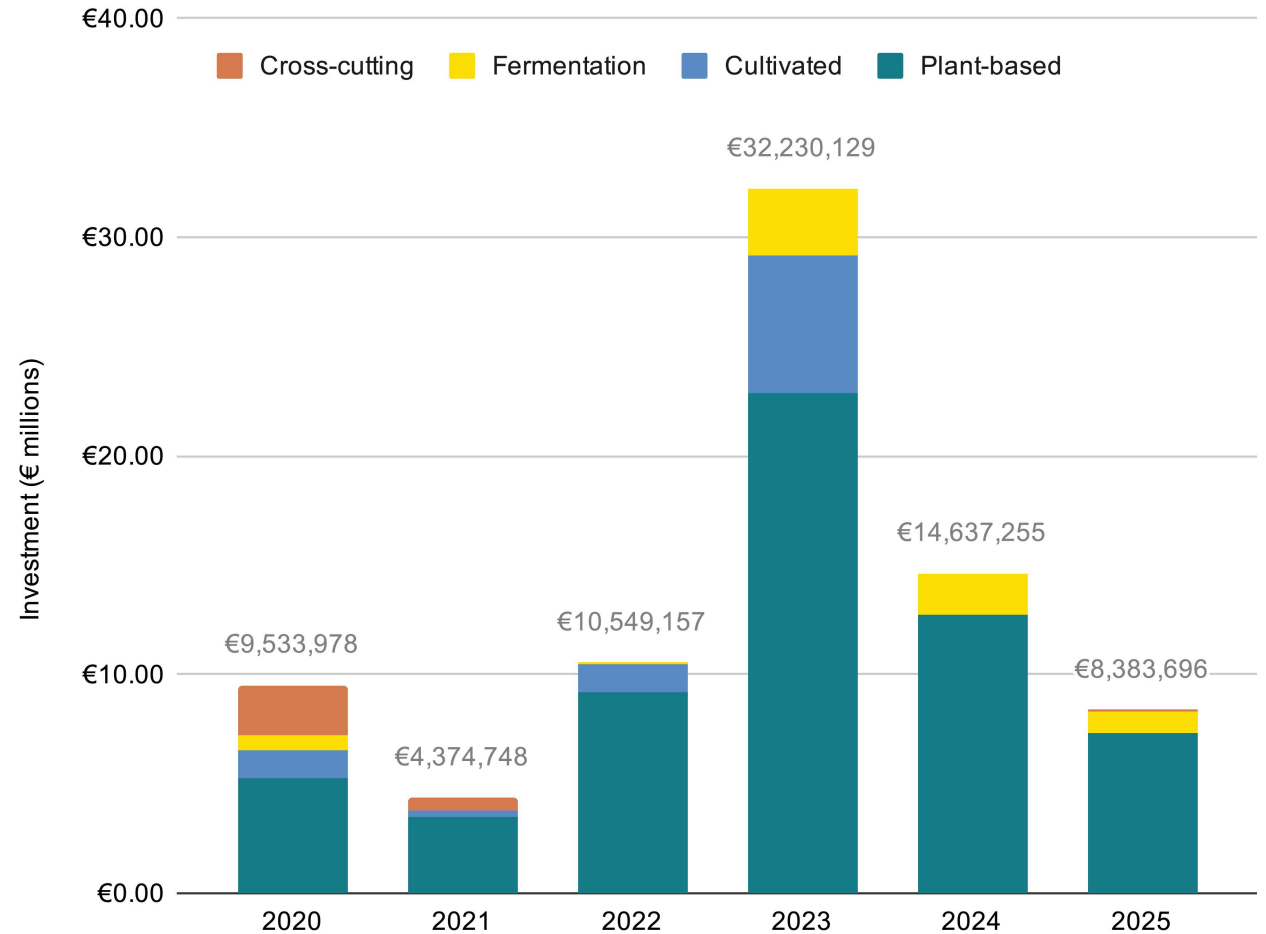


\*The Federal Ministries are reported using the current names as of April 2026. Funding from previous years may have been made under a different ministry name.

## German funding landscape

**This chart shows investment in Germany, broken down by research pillar, between 2020 and 2025.**

German funding has largely been directed towards plant-based research. In 2023, when more funding was available, a larger proportion was dedicated to the less mature platforms of fermentation and cultivated meat and seafood.



# Publications: overall trends

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

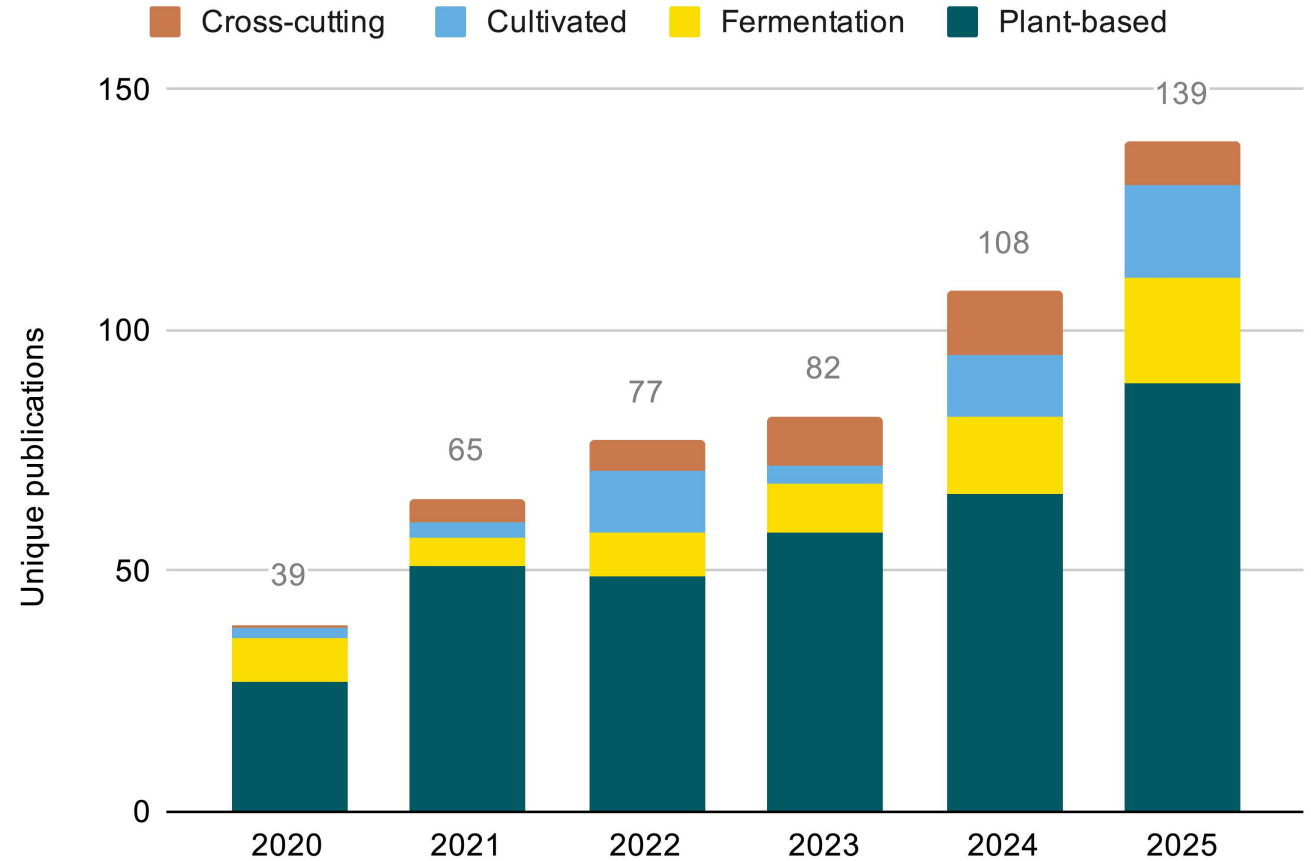
Germany contributed to 510 publications on topics related to alternative proteins in the period 2020-2025 and ranked first overall in Europe.

Publication output grew by 30% per year on average.

There were 139 research publications in 2025 compared with 39 in 2020 – a 256% increase.

Breakdown of publications by alternative protein pillar:

- 67% plant-based proteins
- 14% fermentation-made proteins and ingredients
- 11% cultivated meat and seafood
- 9% cross-cutting topics



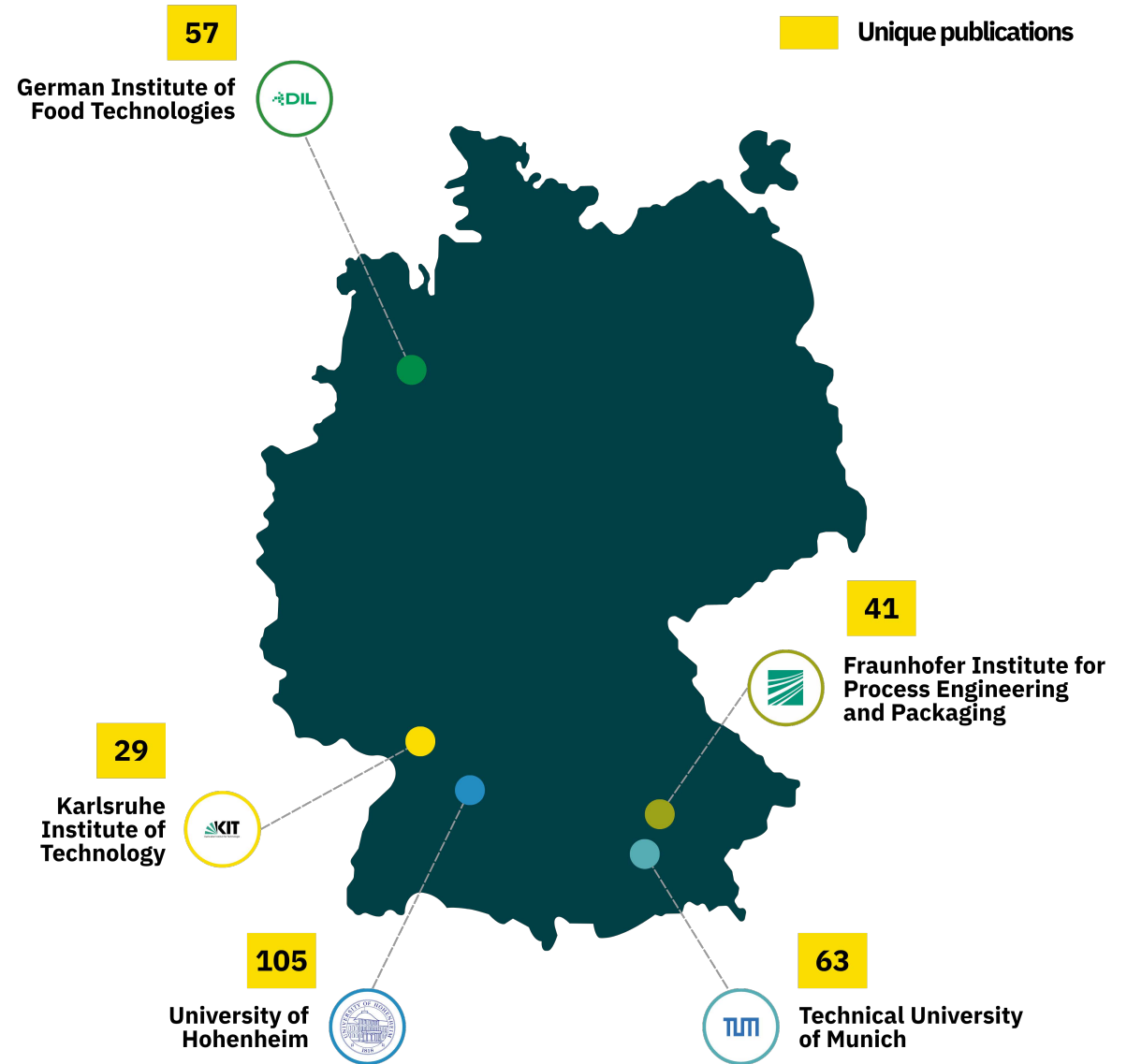
# Leading research-performing organisations

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

Germany has been highly competitive across the alternative protein pillars since 2020, ranking second for total publication output in all three.

10 of the top 100 most productive European institutions in alternative protein research are in Germany – putting it joint second with Spain and behind only the UK. The most highly ranked German organisation is the University of Hohenheim, which is 5th in Europe for the period 2020-2025.

However, many German institutions have begun to fall down the European rankings in recent years as other countries have increased their commitment to the field. In 2025, the Technical University of Munich ranked 16th in Europe for total publications, followed by Hohenheim ranking 17th.



## Patents: overall trends

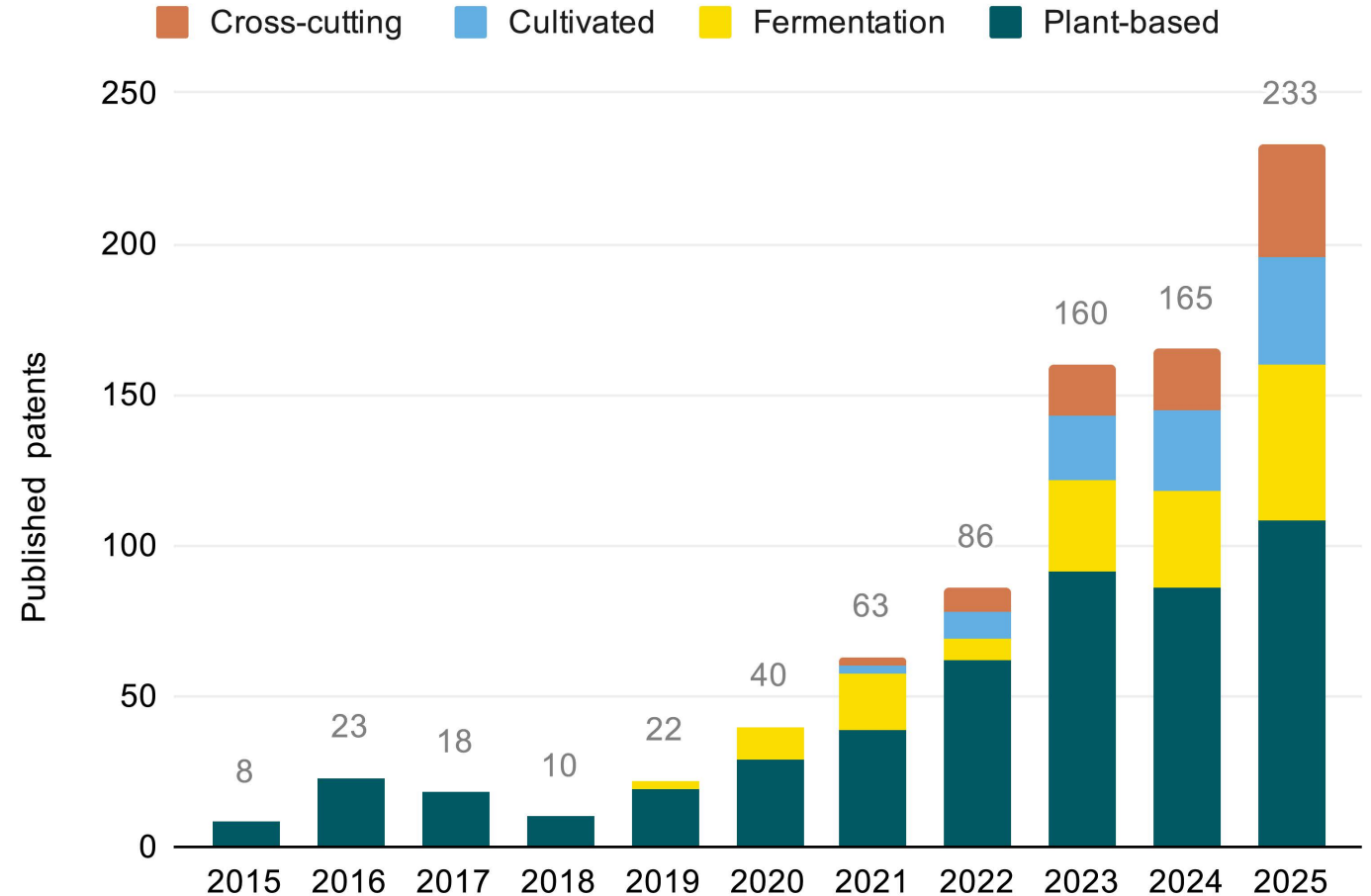
**This chart shows the overall number of alternative protein patents published by German innovators in the years 2015-2025 inclusive, stratified by alternative protein pillar.**

The number of patents published increased each year from 2018, peaking at 233 in 2025.

There were 828 total patents published by German innovators in the period 2015-2025 – the fourth highest total in Europe.

Breakdown of patents by alternative protein pillar:

- 60% plant-based proteins
- 19% fermentation-made proteins and ingredients
- 12% cultivated meat and seafood
- 10% cross-cutting topics



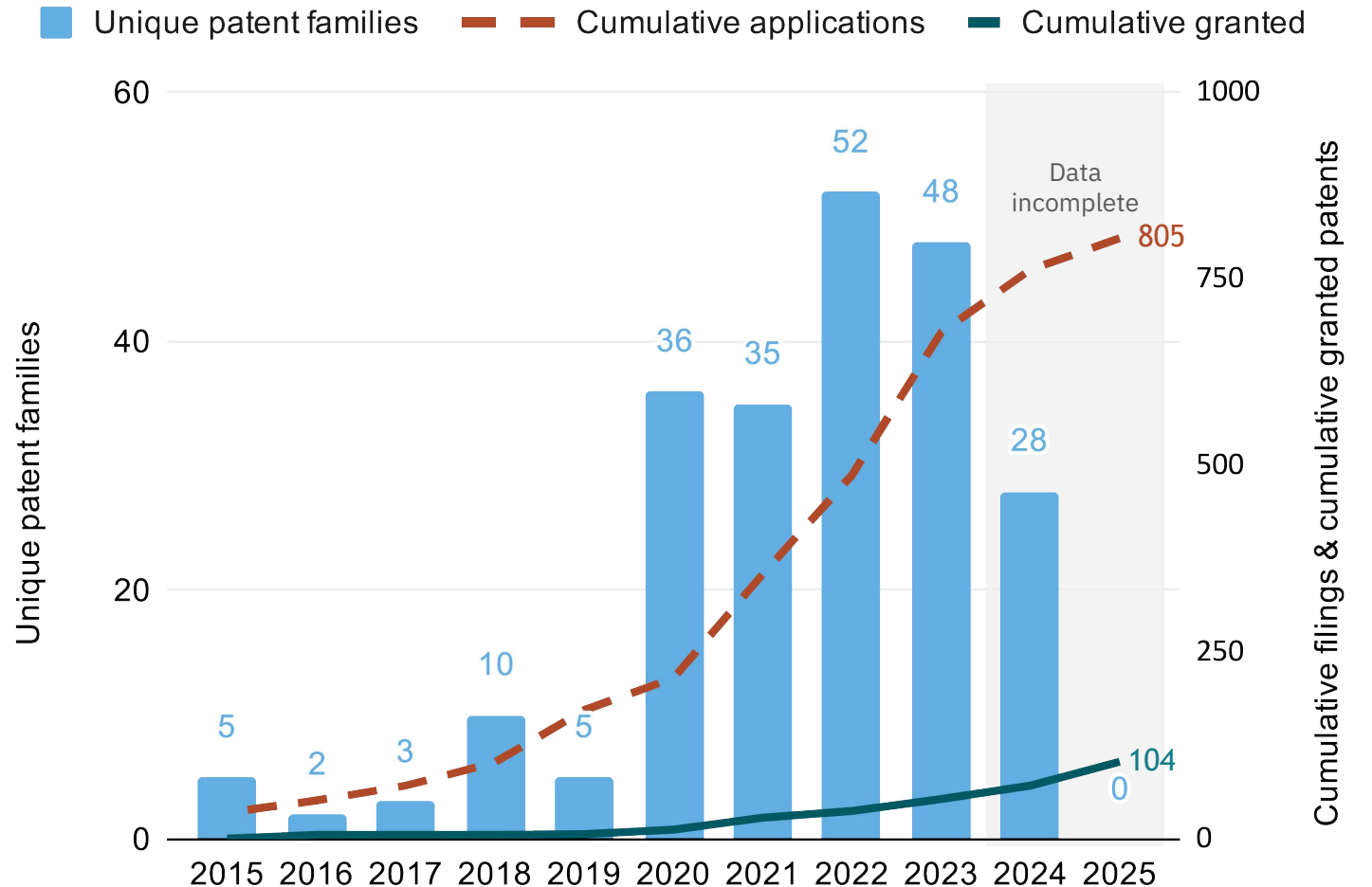
## Patents: overall trends

**This chart shows trends in unique patent families and cumulative patent filings by German 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 – began to rise significantly in 2020 and peaked at 52 in 2022.

Overall, a total of 805 patents have been filed since 2015, with 2023 seeing the highest number of filings at 191.

The number of patents granted has also risen, reaching 32 in 2025, with 104 patents granted in total.



# 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 Germany.*



# Research categories: Plant-based



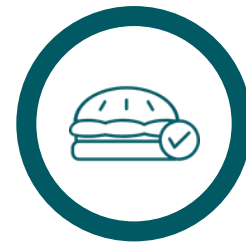
## Crop development

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



## 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.



## Impact assessments

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



## Health and nutrition

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



## 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.



## Food safety and quality

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



## Consumer and market research

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



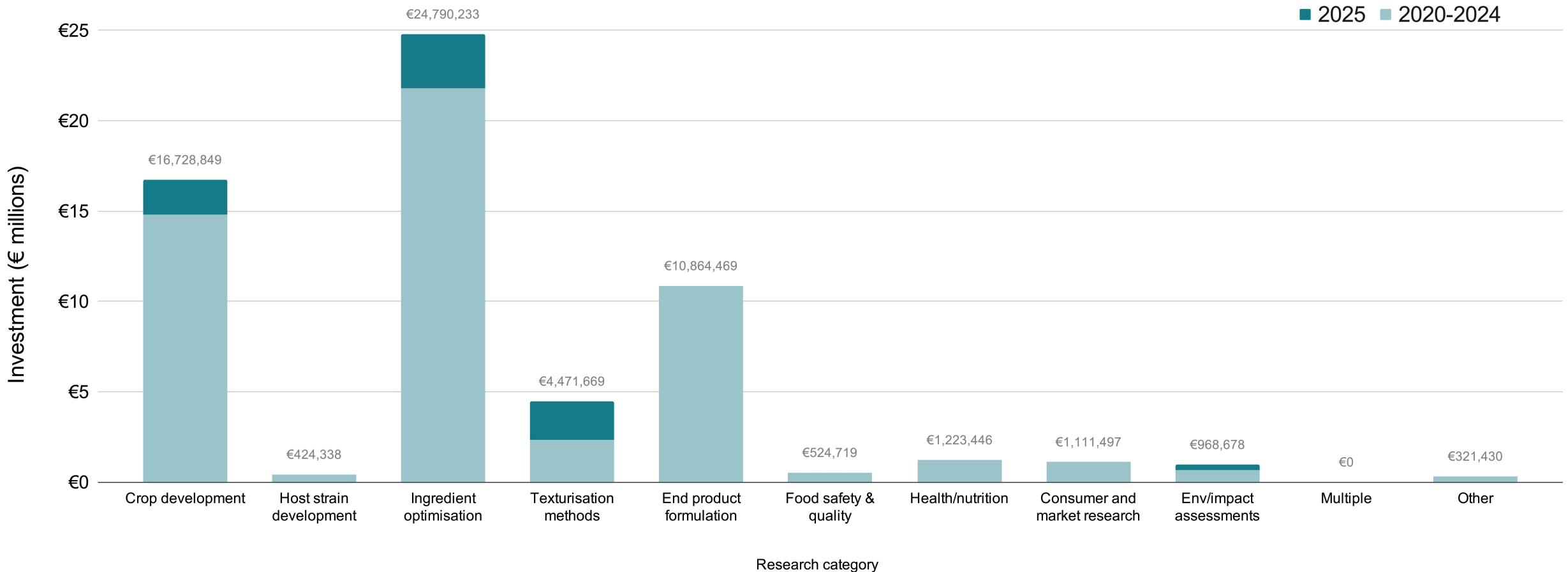
## Strain development

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

# Plant-based funding: research categories

## Plant-based investment in Germany, by research category, 2020-2025.

Germany has specialised in crop development and ingredient optimisation, but texturisation methods continued to receive funding in 2025.

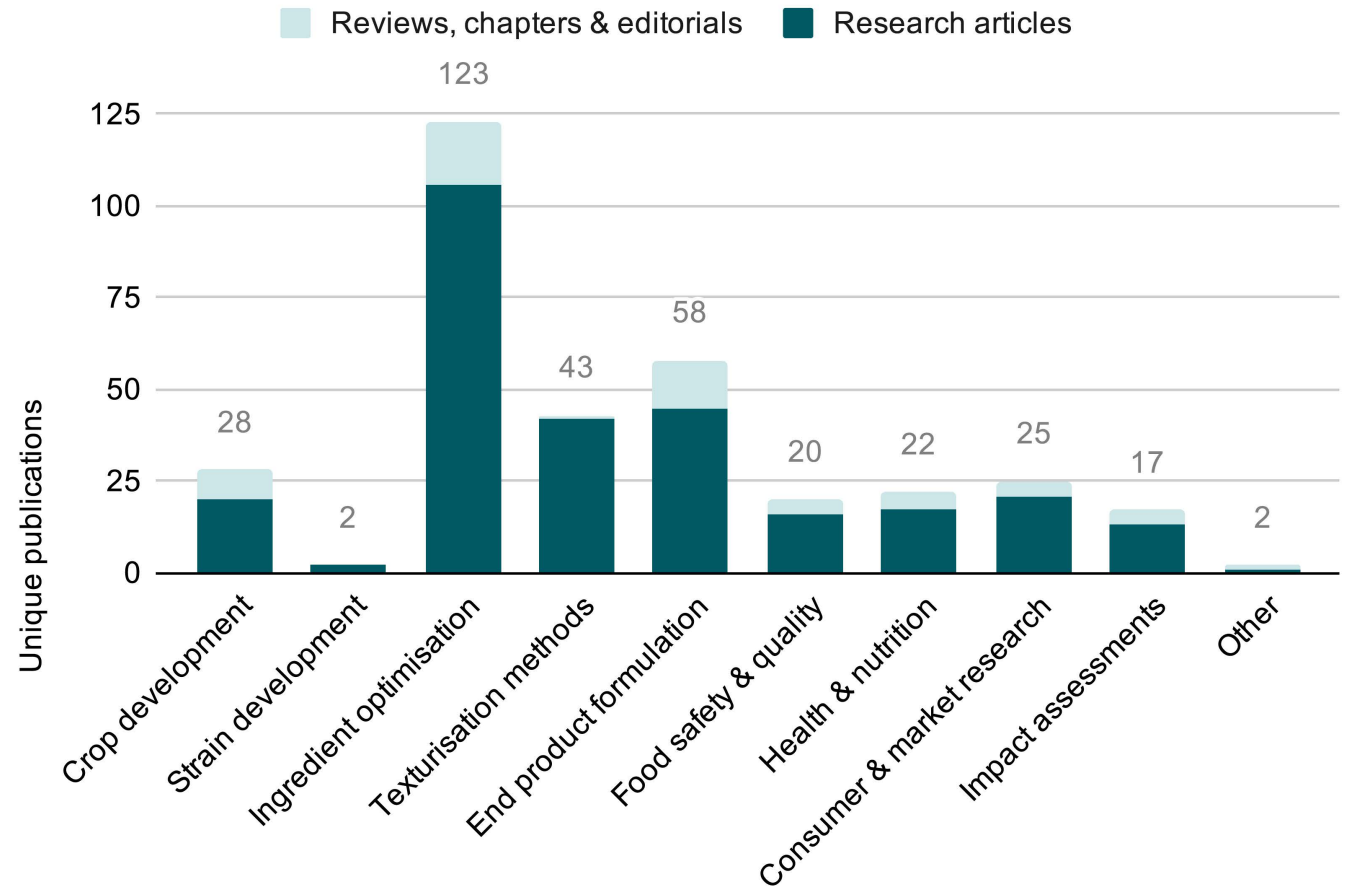


## Plant-based publications: research categories

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

Ingredient optimisation and end product formulation were the most common plant-based categories, accounting for 36% and 17% of publications, respectively.

German researchers also explored more neglected technology areas such as crop development and texturisation methods.

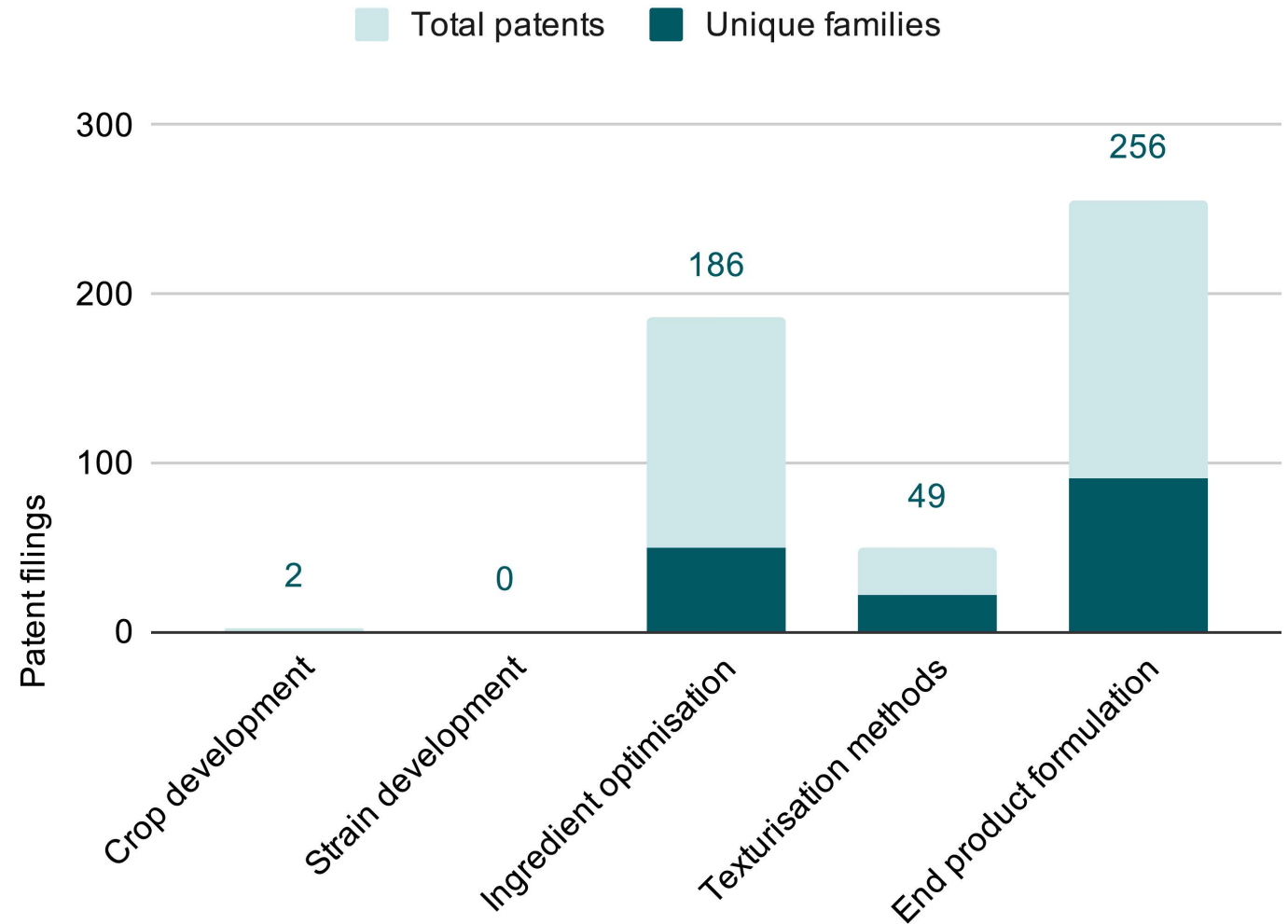


## Plant-based patents: research categories

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

German innovators filed patent applications mostly in relation to end product formulation (52% of all filings) and ingredient optimisation (38%).

Innovations in novel protein crops and strains for modifying plant protein characteristics remain neglected by German innovators.

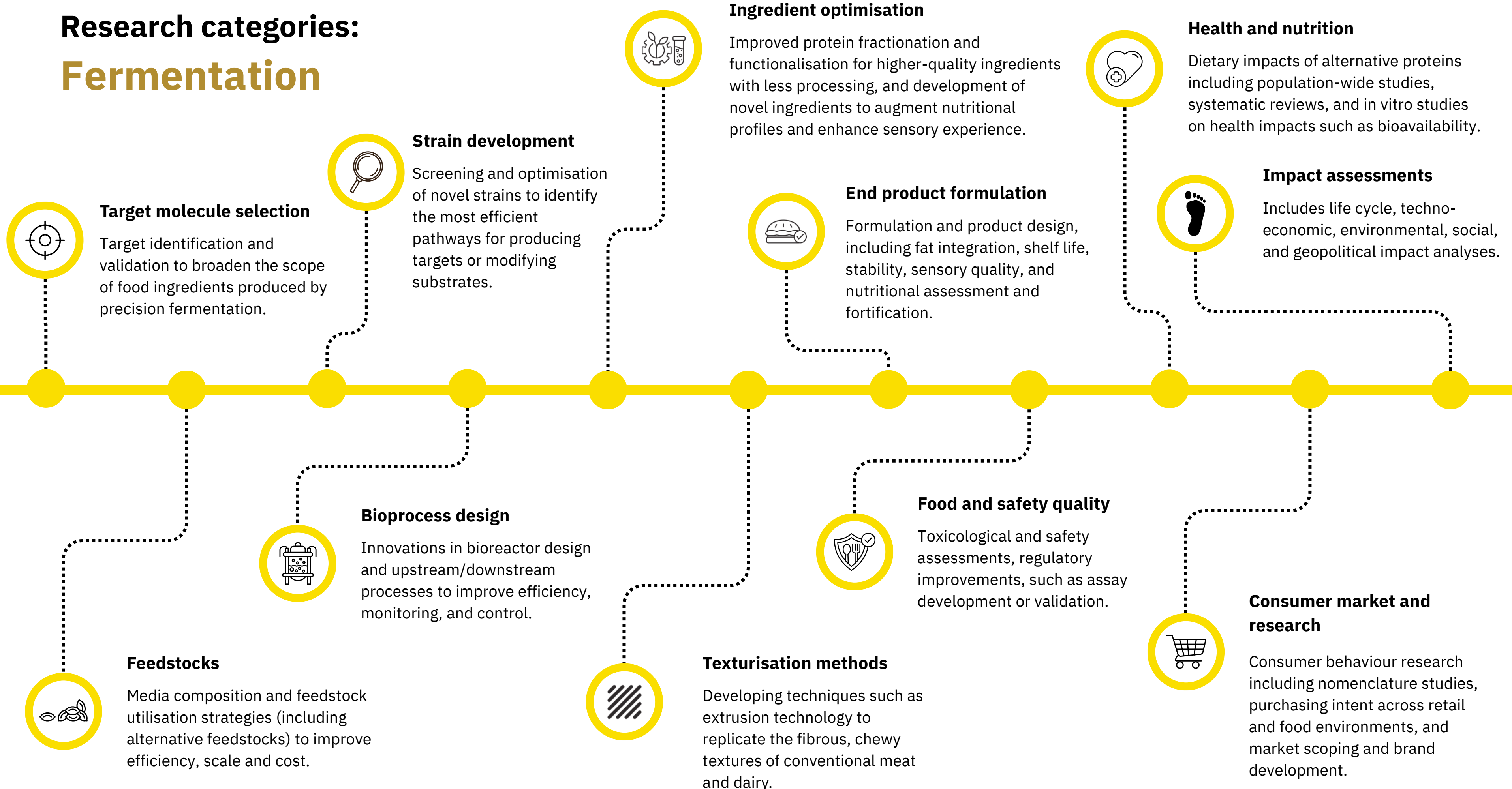


# Deep-dive: Fermentation

*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 Germany.*



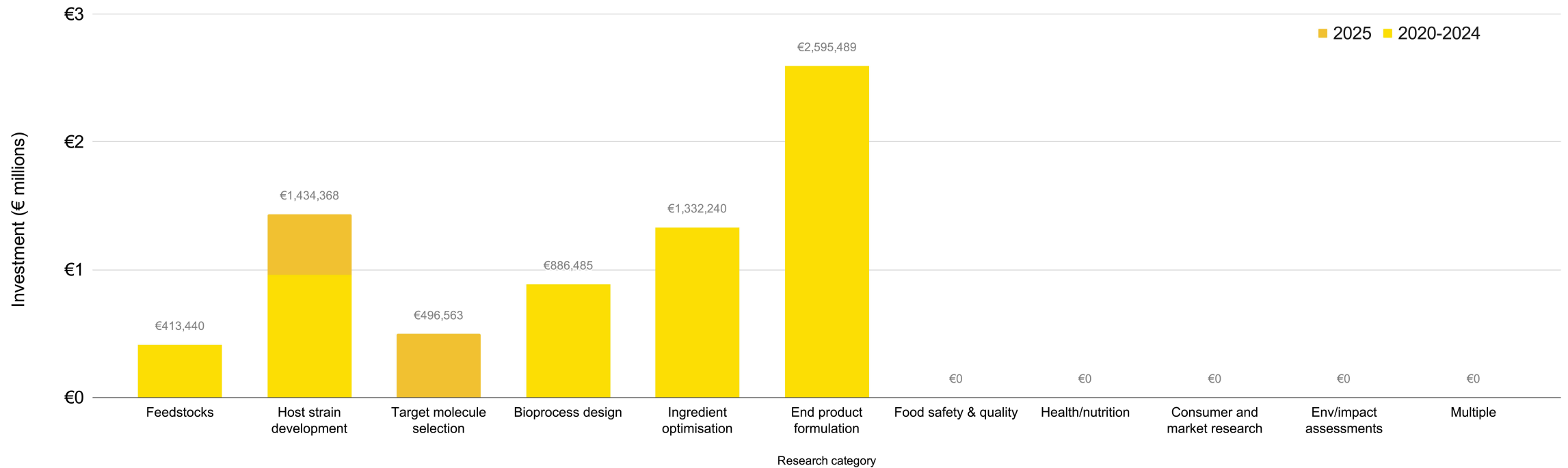
# Research categories: Fermentation



# Fermentation funding: research categories

## Fermentation investment in Germany, by research category, 2020-2025.

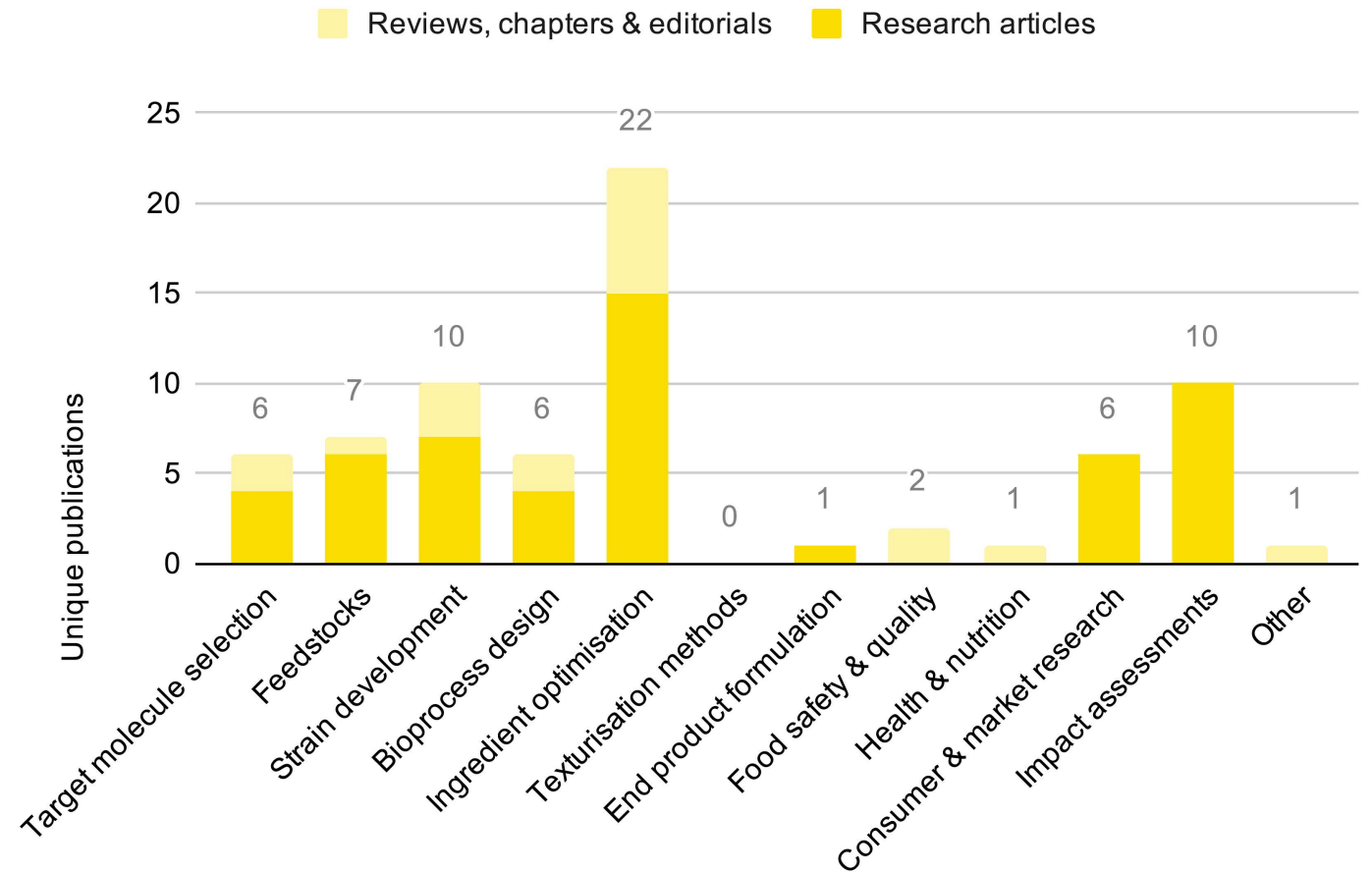
German funding in fermentation has, somewhat unusually, led in end product formulation. More upstream topics such as feedstock use are comparatively neglected, and projects looking at technology impact and safety have seen little investment.



# Fermentation publications: research categories

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

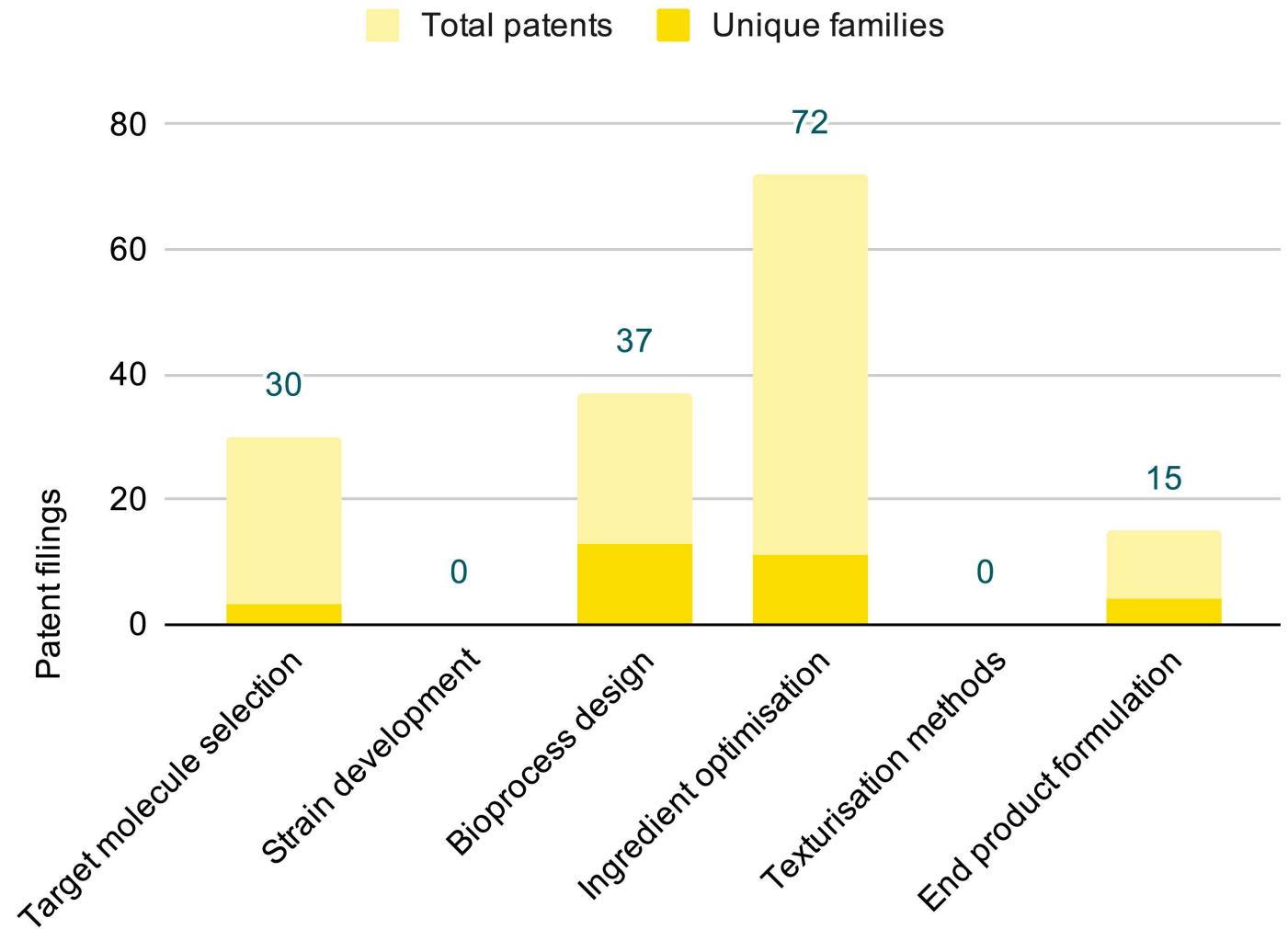
German fermentation researchers mostly focused on ingredient optimisation (31% of all publications), followed by strain development and impact assessments (both on 14%).



## Fermentation patents: research categories

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

Ingredient optimisation, bioprocess design, and target molecule selection were the most common categories, on 47%, 24%, and 19% of publications, respectively.



# 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 Germany.*

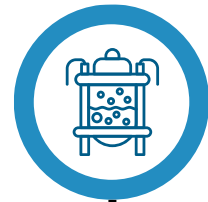


# Research categories: Cultivated



## 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.



## 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.



## Consumer market and research

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



## Food safety and quality

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



## Scaffolding

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



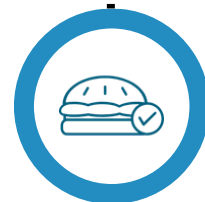
## Health and nutrition

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



## 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.



## End product formulation

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

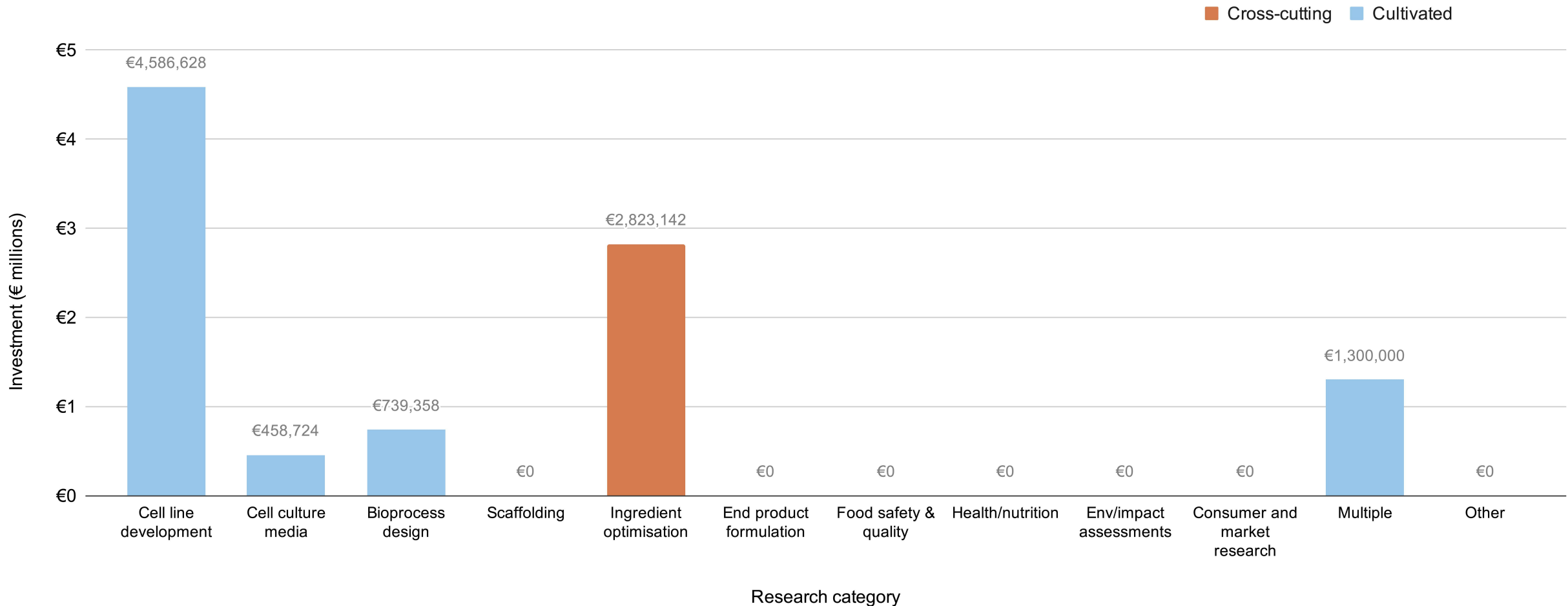


## Impact assessments

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

# Cultivated funding: research categories

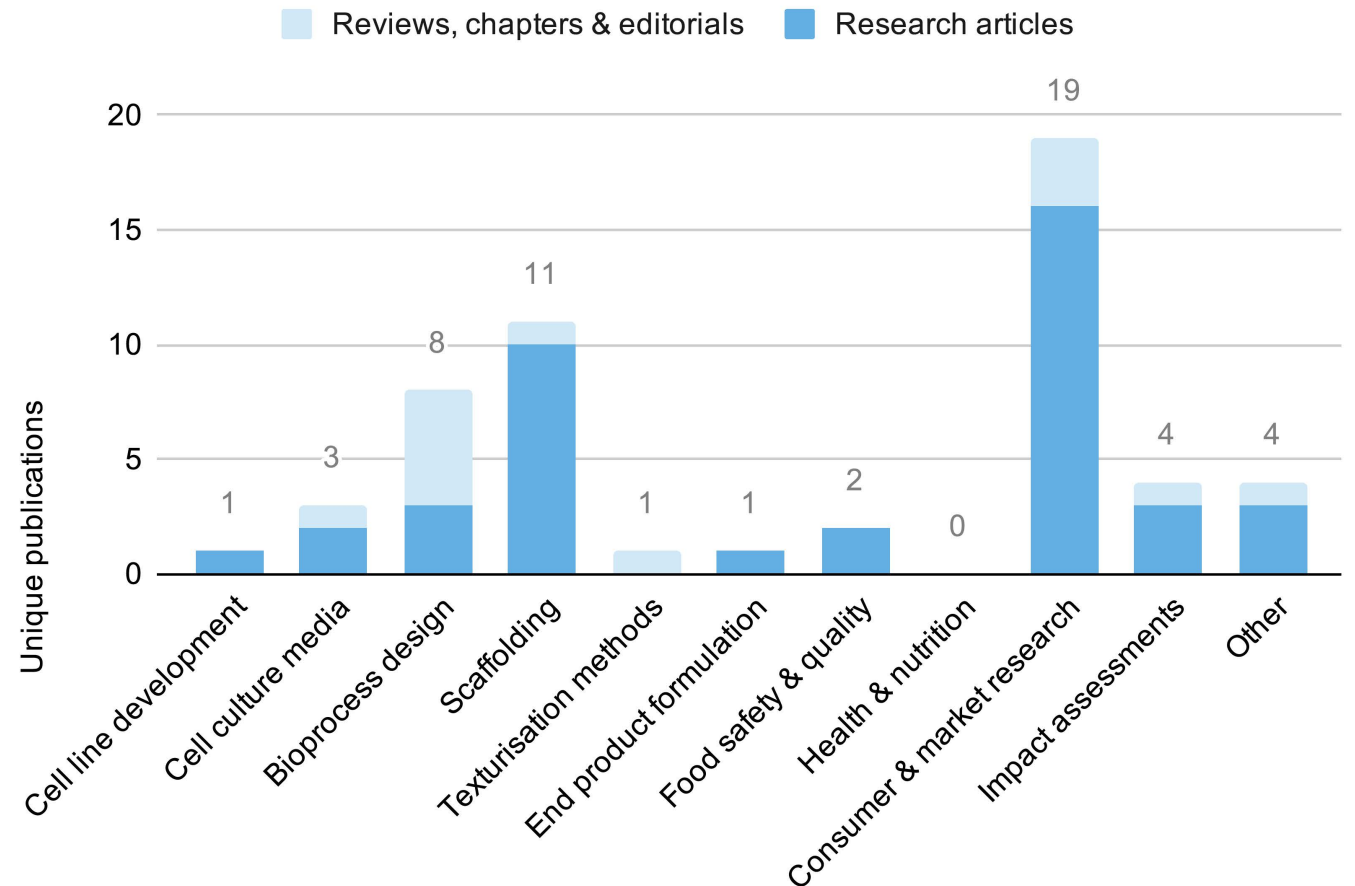
**Cultivated investment in Germany, by research category, 2020-2025.** Similarly to many countries across Europe, cultivated research in Germany has largely focused on upstream research categories such as cell line development.



## Cultivated publications: research categories

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

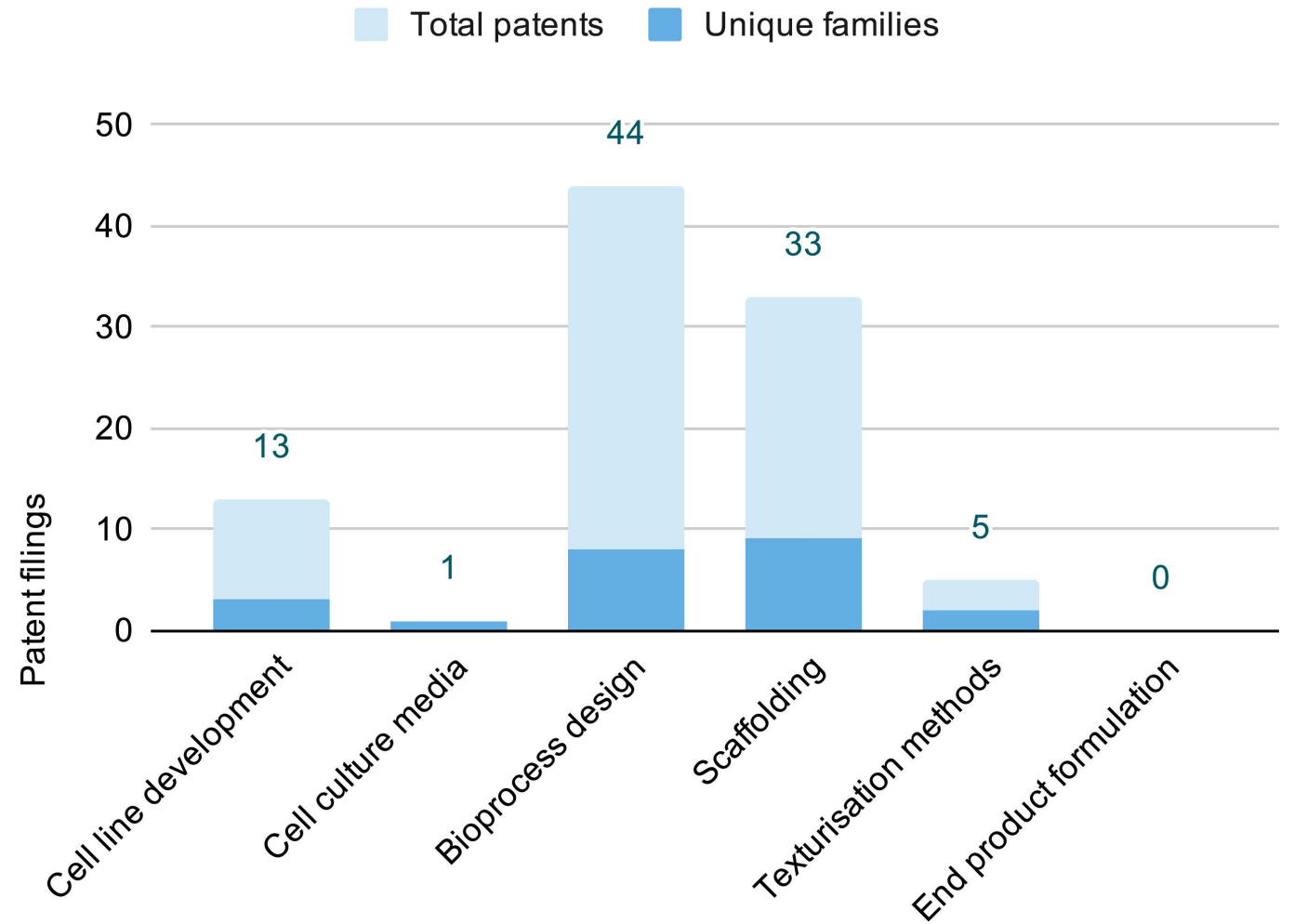
35% of cultivated meat and seafood publications were assigned to the consumer & market research category, but German researchers also explored technical areas such as scaffolding (20%) and bioprocess design (15%).



## Cultivated patents: research categories

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

German innovators filed patents across a number of technical categories in cultivated meat and seafood, with bioprocess design (46% of all patent filings), scaffolding (34%), and cell line development (14%) the most common.



# 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

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

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

<b>Patent</b>	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.
<b>Patent family</b>	A collection of patents covering the same or similar technical content disclosed by a common inventor(s) and patented in more than one country.
<b>Priority date</b>	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.
<b>Filing date</b>	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.
<b>Publication date</b>	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.
<b>Assignee</b>	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.
<b>Jurisdiction</b>	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.
<b>Patent legal status</b>	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](#).

<b>1. Formal examination</b>	The application is examined to ensure it complies with the administrative requirements set by the patent office.
<b>2. Prior art search</b>	A search is conducted to identify prior art that will be relevant in determining the patentability of the claimed invention.
<b>3. Substantive examination</b>	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).
<b>4. Notification</b>	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.
<b>5. Publication of patent application</b>	The patent application is usually published approximately 18 months after the filing date.
<b>6. Granting of patent</b>	If the outcome of the examination is positive, the patent office grants the patent.
<b>7. Publication of granted patent</b>	The granted patent is published and the invention is disclosed to the public.
<b>8. Pre-grant and/or post-grant opposition</b>	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.

## Citation

Child S., Hunt D., State of the alternative protein research and innovation ecosystem in Germany, 2020-2025 (2026). *GFI Europe*.  
DOI: 10.5281/zenodo.20143133.

## Copyright

This work (excluding photo rights) is made available under the Creative Commons Attribution 4.0 International license (CC BY 4.0)  
<https://creativecommons.org/licenses/by/4.0>.

## 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.

