



Your partner
in progress

Alternative Proteins: Towards a Sustainable Food Future

How innovation, standards and policy
can shape the next food revolution

BSI Whitepaper



Contents

1 Setting the Scene: The Rise of Alternative Proteins

2 Introduction: The Case for Alternative Proteins

3 The Growing Impact of Alternative Proteins

4 A Closer Look at New Protein Alternatives

4.1 Cultivated meat

4.2 Plant-based protein

4.3 Fermentation-derived protein

4.4 Insect-based protein

5 The Road to Market: Turning Innovation into Everyday Food Choices

6 The Role of Regulation and Standards: Balancing Innovation and Safety

7 A Promising Outlook for Alternative Proteins

8 Why BSI?

9 Appendix

1 Setting the Scene: The Rise of Alternative Proteins



The food industry has come a long way since meat and dairy alternatives were mere afterthoughts. Now, alternative proteins are earning prime shelf space and prominent menu placement through genuine innovations in variety, taste and texture.

As they become a more regular feature of everyday diets and a smart solution to feeding a growing population sustainably, the opportunities for businesses to benefit from alternative proteins are on the rise.

This whitepaper explores the topic of alternative proteins and their role in a sustainable food future, taking a holistic view of a range of alternative protein innovations – their potential, the challenges they face and the regulatory landscapes they are operating in.

We also explore how these innovations are creating real opportunities for businesses and investors. We look at the technologies making it possible, the companies leading the way, and the market and regulatory forces creating change.

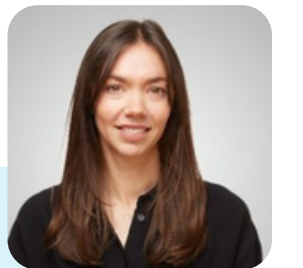


“Alternative proteins represent a pivotal shift in how we feed the planet, offering the promise of reduced environmental impact, improved animal welfare, and enhanced food security.

Yet their path to mainstream acceptance hinges on overcoming challenges in nutrition, consumer trust, and equitable access.

As innovation accelerates, the focus must remain on creating protein solutions that are not only sustainable, but also inclusive, affordable, and culturally relevant.”

Todd Redwood, Global Managing Director – Consumer, Retail and Food, BSI



“Alternative proteins support a shift towards more sustainable food systems, providing solutions that can be healthier for both people and the planet. Standards are a critical tool for supporting these emerging products and innovations, ensuring they deliver on the promise they offer society.”

Emily Field, Food Sector Lead, BSI

2 Introduction

The case for alternative proteins

The numbers tell a compelling story. By 2050, we'll need to feed nearly 10 billion people.¹ That's two billion more mouths than today, all while tackling climate change and preserving our natural resources.

Traditional livestock farming, a major supplier of the world's protein, takes a heavy toll on the environment, contributing up to 20% of global greenhouse gas emissions.² The industry also faces challenges from inefficient land use, accelerated biodiversity loss and changing consumer preferences for ethical animal welfare practices. Intensive livestock grazing has reduced plant species by 70% in heavily grazed areas,³ and under current trends, global biodiversity in rangelands is projected to decline by 10-15% by 2050.⁴

Add to this potential supply chain disruptions (as seen during the COVID-19 pandemic), fluctuations in feed prices due to climate change and geopolitical conflicts, and the effect of threatened trade barriers.

As these factors intensify, our current protein production methods may struggle to keep pace with demand, putting food security at risk.

These combined challenges make it clear that diversifying our protein sources is becoming a real necessity for a resilient food system.



“Alternative proteins provide a tasty, easy, and more environmentally friendly alternative to animal products. With clear, consistent standards and smart regulation, we can ensure these foods are trusted, safe, and understood — accelerating their growth and supporting a shift to healthier, more sustainable diets.”

Christopher Bryant, PhD,
Alternative Protein Association

3 The Growing Impact of Alternative Proteins

The good news is that we're already experiencing a massive shift towards identifying new protein sources, with scientists and food companies developing advances in traditional protein substitutes.

They're using precision fermentation to craft dairy proteins without cows, growing real meat cells in labs, and turning insects into nutrient-rich ingredients. These are exciting scientific achievements and practical solutions already appearing on supermarket shelves and the menus of cafes and restaurants around the world.

Governments and investors are taking notice. The UK has invested £75 million in alternative protein research since 2021, establishing four major research centers dedicated to improving and expanding these technologies.⁵

This investment signals a serious commitment to making alternative proteins a vital part of the future food supply.

As researchers point out, investing in alternative (particularly plant-based) proteins is critical because they deliver more climate benefits per pound than many other green technologies, including sustainable construction and electric vehicles.⁶

BSI and NAPIC: partnering to build support for alternative proteins

The National Alternative Protein Innovation Centre (NAPIC) is addressing the urgent need for sustainable and secure food systems by championing alternative proteins as a critical solution to climate change, biodiversity loss and food insecurity.

"Traditional animal farming has a significant environmental footprint," explains Sameera Rafiq, NAPIC's Communications and Outreach Manager.

"By expanding our protein sources to include plants, fungi, algae, insects, and cultured meat, we can reduce environmental impact while improving food security and offering healthier choices."

NAPIC brings together more than 120 partners from across the UK, including universities, businesses, government bodies, and non-profits.

Led by the University of Leeds, Imperial College London, the University of Sheffield, and the James Hutton Institute, it's creating a powerful network for innovation.

BSI plays a crucial role as an active NAPIC partner through its Policy and Regulations Advisory Group, helping develop the standards and frameworks this growing sector needs.

"We're excited to work with NAPIC as it develops protein solutions that are scalable, safe, affordable, and appealing to consumers," says Emily Field, BSI's Food Sector Lead.

"We believe clear standards are essential for alternative proteins to reach their full potential. They build consumer trust, ensure safety and quality, and help support regulatory approval."

Together, NAPIC and BSI are creating the frameworks needed to help alternative proteins move more quickly from innovation to market acceptance.



4 A closer look at new protein alternatives

Scientists and food innovators are working on a range of interesting initiatives. These include everything from traditional fermentation methods to advanced biotechnology to create new proteins that are good for the planet and appealing to consumers.

Technologies like artificial intelligence (AI) and machine learning (ML) are also contributing to the discovery of new protein sources. Researchers are using AI to pinpoint proteins with the best taste, texture, and nutritional profiles, making it quicker and more cost-effective to develop functional proteins.⁷

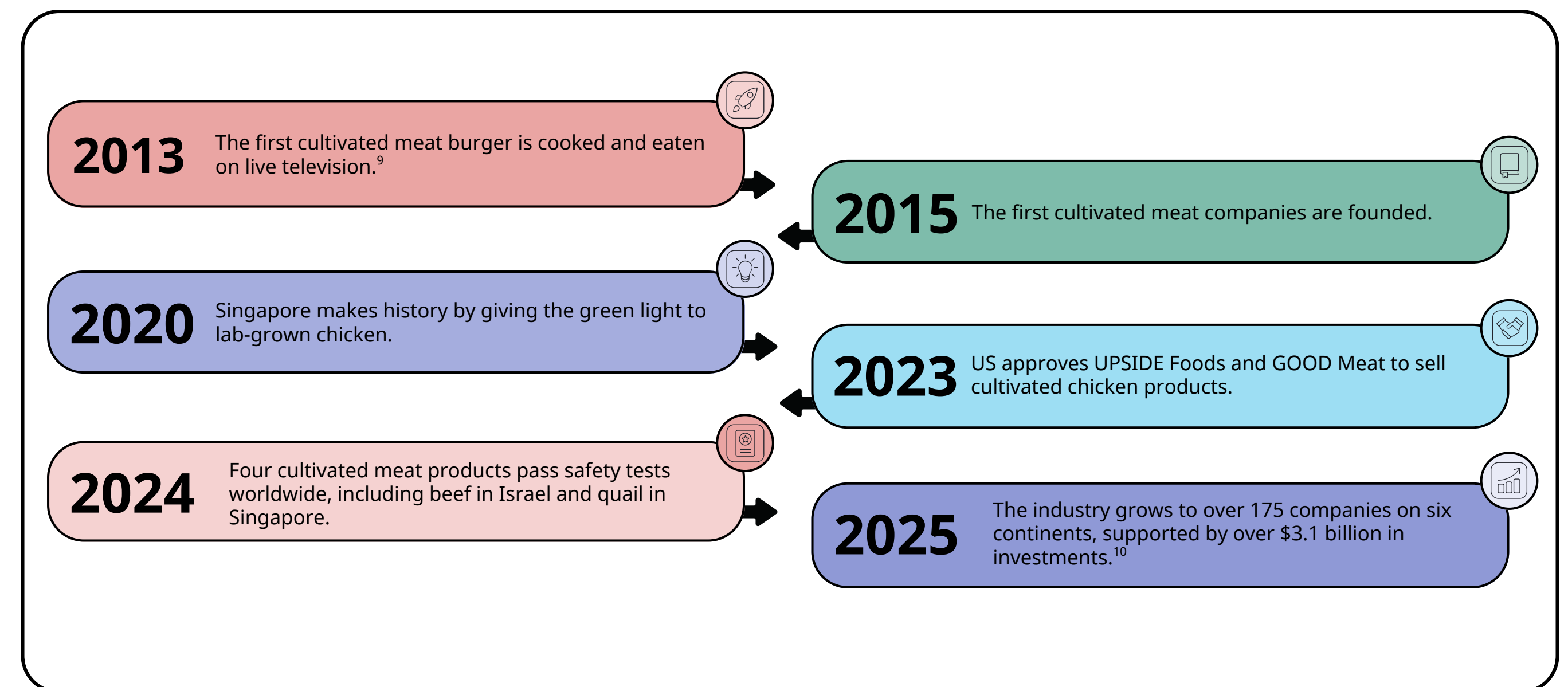
Here's a taste of what's transforming our protein choices:

4.1 Cultivated meat

What is it?

- Cultivated meat, also known as cultured meat, is real meat produced by growing animal cells in a secure and stable environment, eliminating the need to slaughter animals.⁸
- Scientists start with stem cells that they nurture in special bioreactors or 'cultivators'. These cells are fed a carefully crafted nutrient cocktail that helps them multiply and develop into muscle, fat and other tissue. In just two to eight weeks, they become real meat, ready to be harvested and packaged.
- The result is practically identical to conventional meat in terms of nutrition, but it's a more efficient and humane way to satisfy the world's protein demand.

Key Milestones in the Development of the Cultivated Meat Industry



While the cultivated meat industry is hitting its stride, turning innovations into affordable, widely available products isn't simple. There are three main hurdles to overcome:

1. Cost barriers: The special nutrient mix needed to grow the cells costs 10 to 100 times more than raising traditional meat.
2. Technology constraints: The industry is currently using modified pharmaceutical equipment to grow the meat. Pilot facilities now operate at 100-15,000-liter capacities, but commodity-scale plants will need 100,000-plus-liter systems.
3. Agricultural supply chain challenges: Growing cultivated meat requires specialized ingredients that aren't widely available yet, like animal-free growth factors and scaffolding materials.

The good news is that scientists and companies are working together to crack these challenges. According to an analysis by McKinsey, costs can be reduced by around 75% through increased scale and better manufacturing processes, or product adaptations like blending cultivated meats with plant protein.¹¹

Also, industry bodies such as the Cultivated Meat Modeling Consortium are using advanced computer modeling to boost efficiency, with some companies already seeing process improvements and lower costs.¹²

Multus Biotechnology is another business addressing the challenges of moving cultivated meat more quickly from lab to market. It designs feedstocks for growing animal stem cells with formulations that perform better, cost less and remove animal components. This makes cultivated meat production more scalable, sustainable, and commercially viable.

According to Cai Linton, the company's Co-founder and CEO "Sustainable proteins offer a better way to meet growing global meat demand without pushing the planet past its limits. They provide consumers with healthier, more accessible, and more affordable choices while reducing land and water use and eliminating antibiotics from the supply chain."

"Standards can help scale this industry by accelerating regulatory approval, enabling clearer benchmarking, and supporting technology transfer," he adds.

"More open, pre-competitive collaboration—sharing best practices and aligning around appropriate standards—will help cultivated meat companies overcome bottlenecks and bring products to market faster."

Cai Linton, Co-founder and CEO
of Multus Biotechnology

The name game: The debate over labelling alternative meat products

Talk to different people about meat grown from animal cells, and you'll hear a lot of different labels used.

Scientists might call it 'cell-cultured' or 'in vitro', companies in the field typically go with 'cultivated' or 'cultured', and marketers have come up with terms like 'clean meat' and 'slaughter-free'. Food standards authorities are studying the specific terms used to differentiate cell-cultured meat and conventional meat and which terms best aid consumer understanding.¹³

Finding a balance between being too clinical and overly promotional is tricky. The industry hasn't settled on a labelling solution yet, and regulators might end up having the final say.

Whatever the outcome, one thing is clear. People's perceptions about the nature and safety of cultivated meat are key to acceptance. Names are important because they shape how we think about the product and whether we're willing to try it.

Government support and regulation

Public investment and support for cultivated meat have increased in the last five years, and regulatory frameworks are adapting quickly.

Initiatives include the promotion of alternative proteins by the United Nations Environment Programme (UNEP), emphasizing cultivated meat's potential to benefit the environment and public health.¹⁴ International coordination and efforts to harmonize standards are also gaining ground through bodies like the Codex Alimentarius Commission.¹⁵

National and regional approaches include:

- United Kingdom: Has invested £75M since 2021 for four research centers focused on plant-based and cultivated proteins.¹⁶
- European Union: A pending application for cultivated foie gras could set a precedent under novel food regulations (see Gourmey case study below).

- United States: The Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA) share oversight, with FDA managing cell cultivation and USDA handling post-harvest processing and labelling.¹⁷
- China, Japan, South Korea, Israel, and others support the creation of new cultivated meat infrastructure and market development.
- Australia's National Reconstruction Fund is considering investments to position the country as a sustainable protein exporter.¹⁸
- There are global disparities in regulatory timelines for cultivated meat. Singapore and the US are leading the way, with approvals being granted between 2020 and 2023. The UK and EU are lagging, and the differences are shaping where companies choose to launch their products first.¹⁹

Case Study

Meatly: A smart solution for pets and the planet

An eye-opening study from the University of Edinburgh revealed that producing dry pet food takes up more land than twice the size of the UK. Even more startling: the pet food industry's annual greenhouse gas emissions exceed those of entire nations like Mozambique and the Philippines.²⁰

The UK-based company Meatly saw an opportunity to tackle this challenge head-on and in a global first, recently saw its cultivated dog treats hit the shelves of major retailer, Pets at Home.

Achieving the milestone with a modest team and limited funding, Meatly also became the first company certified under C-Label, a trademark for cultivated food products.²¹



By choosing to enter the pet food market, Meatly's investors sidestepped some of the hurdles facing companies producing for human consumption, including complex regulatory requirements and consumer hesitation about trying new foods.

Their approach demonstrates how targeting specific market segments can help alternative protein companies scale up more efficiently.

Several US-based cultivated meat businesses are following suit, with CULT Food Science's subsidiary, Further Foods, planning to run the first FDA trial of cultivated meat in a pet food product called Noochies.²²

4.2 Plant-based protein

What is it?

Plant-based proteins come in many forms, from foods that naturally contain protein to innovative products designed to replace or mimic meat.

The main types include:

- Whole foods like beans, lentils, nuts, and protein-rich grains such as quinoa. Even some vegetables, such as broccoli and spinach, contribute meaningful amounts of protein to our diets.
- Ingredients extracted from plants, such as soy and pea protein. These concentrated proteins are the building blocks for many modern food products, and make it possible to create convincing meat alternatives (or plant-based animal product alternatives (PB-APAs) like burgers, sausages, and nuggets.
- Plant-based dairy alternatives, from soy milk to almond-based cheese.

Plant-based protein alternatives represent a win-win for human health and the environment. Health-wise, plant proteins help lower the risk of heart disease, Type 2 Diabetes, and certain cancers.²³ They come packed with fiber and other nutrients that animal proteins don't offer.

For the planet, the numbers are striking. Plant proteins need less land and water, and produce far fewer greenhouse gases than animal proteins.

To put it in perspective:

Producing 1kg of wheat emits 2.5kg of greenhouse gases, while the same amount of beef creates 70kg of emissions.²⁴

Opportunities and challenges

The UK's food landscape has shifted dramatically since 2016, when the [Eatwell Guide](#) first encouraged people to embrace more plant-based proteins and cut back on red and processed meat.²⁵ The numbers show this shift is gaining momentum, with alternative milk products in particular growing by 19% between 2019 and 2022 in the US.²⁶

According to Innovate UK's 2022 roadmap, the UK market for plant-based alternatives is already worth £1 billion, and growth predictions are impressive. Meat alternatives are set to expand by 30% year-on-year, dairy-free milk by 48%, and cheese alternatives by 38%. Much of this growth will come from innovative startups pushing the boundaries of what's possible with plant proteins.²⁷

But there's still work to be done. Producers of plant-based alternatives like Nestlé, for example, have pulled some products citing poor sales and difficult market conditions.²⁸

Other major challenges include finding more diverse crop sources to fuel innovation, developing more sustainable processing methods and improving the end product's taste, texture, and appearance.

The health debate continues too.

While some voice concerns about processing methods and nutritional value, recent studies suggest that plant-based alternatives might actually offer better health outcomes than their processed meat counterparts.²⁹

Government support and regulation

Getting plant-based products from concept to store shelf isn't always straightforward. Read below some of the laws, regulations and standards at play in the EU and UK:

'Novel food' challenges

Before a new plant-based product hits the market, regulators need to be sure it's safe. While common ingredients such as pea and soy protein have already been approved for

consumption, newer innovations like proteins from microalgae need to pass further scrutiny.³⁰

This process, while important for consumer safety, can slow down innovation.

The name game and labelling laws

Whether you can call a plant-based product a 'burger' or 'sausage' has been hotly debated. While the European Parliament agreed to the use of these terms,³¹ France took a different view, worried that they might confuse shoppers. In 2024, Europe's highest court ruled that plant-based products can use meat-related names as long as their composition is clearly stated.³²

The rules get stricter for dairy alternatives.

In the EU, you can't use 'dairy descriptors' like 'milk' or 'cheese', meaning that producers have to use names like 'oat drink' instead of 'oat milk'.³³

The path forward

Since Brexit, the UK has kept many EU rules but is looking to streamline its approach. [The Food Standards Agency](#) wants to make it easier to approve new ingredients while keeping safety and sustainability front and center.

Clear rules help everyone. Companies know what they can and can't do, and consumers know exactly what they're buying. However, finding the right balance between innovation and regulation remains a work in progress.



Case Study

Lidl leads the charge in affordable plant-based eating

German retailer Lidl is proving that affordable prices and sustainable eating can go hand in hand.

Working with the [World Wildlife Fund \(WWF\)](#), Lidl has set an ambitious goal to boost plant-based food sales by 20% across all 31 countries where it operates by 2030. It plans to lower its Scope 3 emissions by 35% over the next decade and believes its plant-based food commitment is the most effective way to achieve this.

Rather than making small changes to its product mix, Lidl is fundamentally rethinking how a major retailer can influence eating habits. Its commitment is even more meaningful when you take Lidl's size into account: its parent company, Schwarz Group, is the largest supermarket group outside the US.



Vemondo, Lidl's plant-based brand offering over 500 products, will be at the center of the transformation. The business is also working to make plant-based options cost the same as traditional products, removing the 'green premium' that often puts sustainable choices out of reach for many shoppers.

The retailer isn't just catering to committed vegetarians and vegans. For customers looking to reduce their meat intake gradually, Lidl offers hybrid products like beef mince blended with pea protein. It has also introduced carbon footprint labels on certain products, helping shoppers understand the environmental impact of their choices.

Looking ahead, Lidl aims to align its entire product range with Planetary Health Diet guidelines by 2050.

4.3 Fermentation-derived protein

What is it?

Fermentation is nature's way of transforming simple ingredients into protein-rich foods. Food companies are using these methods to create everything from meatballs to bacon alternatives.

The process is being used in three main ways:

- **Traditional fermentation:** This process has been around for centuries. It uses microorganisms to transform plant ingredients, creating foods like tempeh from soybeans and tangy plant-based yogurts.
- **Biomass fermentation:** Where the microorganisms and mycoproteins themselves become the protein source. Companies like Quorn and Meati Foods grow these organisms quickly to create meat alternatives that are packed with protein.
- **Precision fermentation:** A novel approach where engineered microbes produce specific proteins that are identical to those found in animal products. Companies like Perfect Day and EVERY are using this method to create dairy proteins without cows and egg proteins without chickens, for example.

These approaches offer some significant advantages: they're faster than raising animals, easier to scale up and typically much better for the environment.



Opportunities

The numbers for fermentation-based proteins look promising. The global market is set to double from approximately £510 million in 2023 to £1.02 billion by 2033 (converted from USD using the average 2023 exchange rate), with strong growth expected in Europe and the UK.³⁴

Investors and businesses are excited because of the potential of these proteins to reduce land use and cut greenhouse gas emissions.³⁵ They're also quicker to produce than proteins from traditional farming. Plus, they're versatile and are being used in everything from meat alternatives to dairy-free products.

The fact that major players like Nestlé and Danone are already investing in fermentation technology to secure their future supply chains is a further boost to the industry.³⁶

Challenges

But there are still hurdles to overcome.

Production costs remain high, though McKinsey predicts that process improvements alone could help achieve 40-60% reductions.³⁷ Some consumers are unfamiliar with these products, and others are unsure about taste, texture, and health benefits. While the technology is promising, large-scale production facilities are expensive to build, and some essential ingredients are hard to source.

Government support and regulation

Many countries are backing fermentation-based foods with substantial support. Examples include the UK government's £12 million investment in the Microbial Food Hub, announced in 2024.³⁸ Others are following suit, with Canada, Australia, and New Zealand all putting serious money and support behind fermentation businesses and startups.³⁹

But even with this momentum, getting new products to market isn't straightforward. In the EU, innovative ingredients can get stuck in regulatory reviews for up to two years before reaching store shelves. And with different countries following different rules, companies often face a complex maze of approvals to sell their products internationally.

To get around this, food policy experts point to the need for smart, standardized regulations that protect consumers while helping innovative products reach the market faster.⁴⁰

Major players like Nestlé and Danone are already investing in fermentation technology to secure their future supply chains.

Case Study

Calysta and Promyc are pushing boundaries in fermentation science

US-based Calysta and Belgium's Promyc (Mycorena) are leaders in using fermentation to bring nutritious and sustainable proteins to market.

Calysta created FeedKind, a protein ingredient perfect for fish, livestock and pet food. In 2022, it launched the world's first industrial-scale facility in China, using gas fermentation for production. The company has already distributed major shipments of the product globally and has plans to ramp up production to 200,000 metric tons a year.⁴¹

Promyc is a vegan protein made from filamentous fungi with 60% protein and 12% fiber, offering a greener option than soy or pea proteins. Promyc is being used in everything from meat alternatives to foods that simply need an extra protein boost. The company has raised over €35 million and has rolled out products to consumers in six EU countries. In 2022, it expanded its facility in Gothenburg, Sweden, making it Europe's largest demo production site for mycoprotein.⁴²

Both companies are stepping up to meet the demand for sustainable proteins while lowering the environmental impact of traditional methods.



4.4 Insect-based protein

What is it?

Insect-based proteins hold huge potential for improving global food security by offering a plentiful and eco-friendly protein source. These proteins come from edible insects like black soldier fly larvae, mealworms, crickets and grasshoppers.

Although getting Western consumers on board might be challenging, insects are already a dietary staple for around two billion people in Asia, Africa and Central America.⁴³

While efforts are being made to promote the benefits of insects as food for humans, businesses are already capitalizing on the extensive opportunities of using insect proteins in the animal and pet food markets.



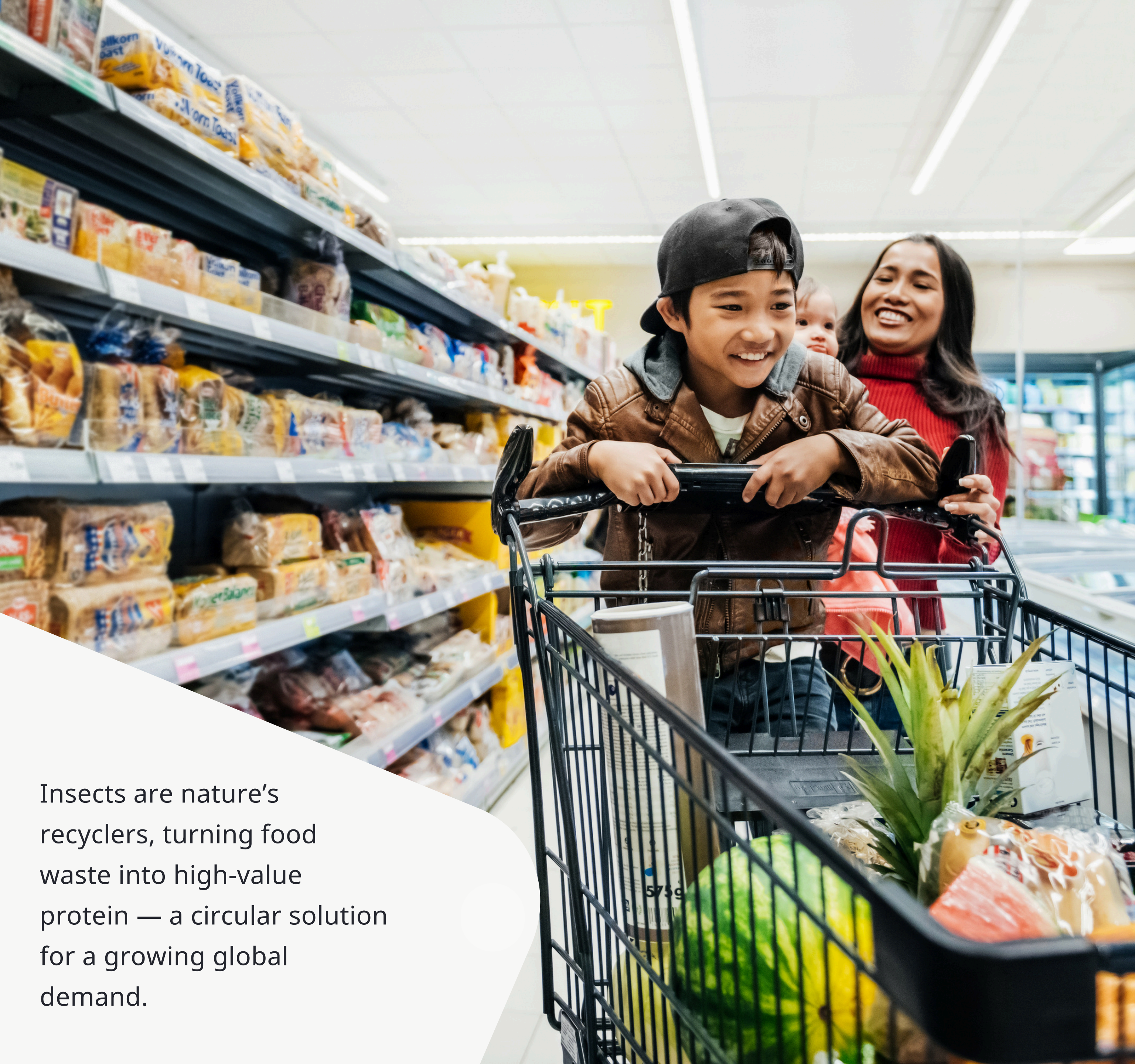
Opportunities and challenges

It's estimated that alternative proteins will make up 33% of global protein consumption by 2054, with insects accounting for approximately 11% of the total market by the same year.⁴⁴

Unfortunately, many Western cultures view insects as pests rather than edible items, which can lead to them being considered unappealing as food. The other main barriers are concerns about taste, texture, and food safety.

However, lots of insects are nature's champion recyclers. Black soldier fly larvae, in particular, can quickly and efficiently turn organic waste from fruit, vegetables and brewery leftovers into valuable protein.⁴⁵

For businesses, this presents a double opportunity. First, they're helping solve the growing problem of food waste. Second, they're creating valuable products for the booming alternative protein market. It's a perfect example of circular economy principles in action – taking what would have been discarded and turning it into a valuable resource.



Insects are nature's recyclers, turning food waste into high-value protein — a circular solution for a growing global demand.

Safety and regulation

Admittedly, regulating insect-based foods can be complex.

Unlike traditional meat and fish, where global safety standards are more established, insect farming brings new challenges. Different species, farming methods and insect feed affect food safety, making it harder to create universal rules.

In Europe, insects fall under novel food legislation, meaning they need special approval before being marketed or sold as food. So far, house crickets, yellow mealworms, and grasshoppers have been given the green light, with lesser mealworms waiting for clearance.⁴⁶

In the US, the FDA oversees insect production, requiring proof that insects were specifically bred for human consumption and meet their safety standards.⁴⁷

These different rules across countries make it tricky for companies trying to sell their products internationally. While the industry pushes forward, regulatory frameworks are still evolving to catch up with this innovative protein source.



Case Study

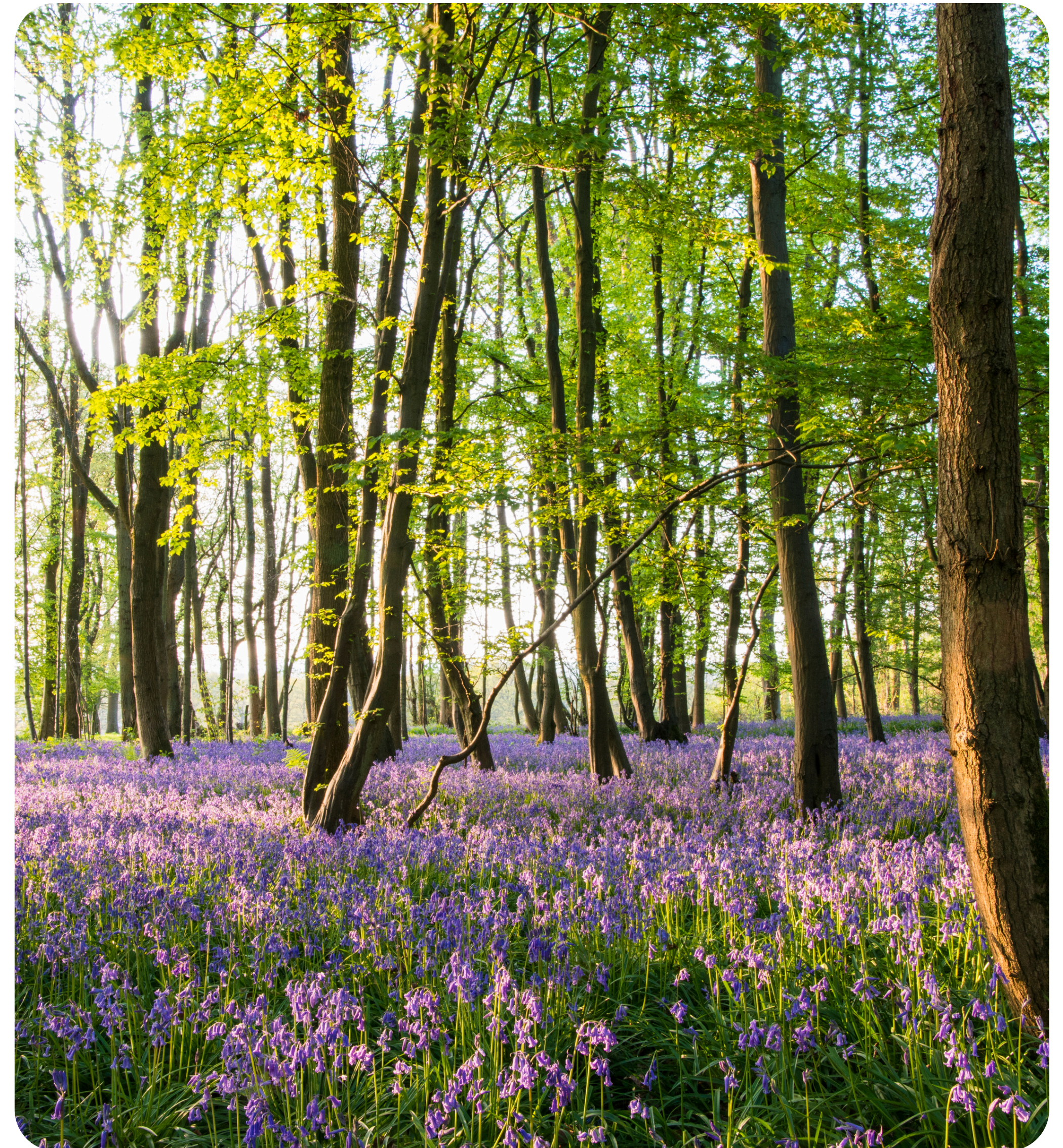
Entocycle spearheads the UK's insect farming sector

Founded in 2016, Entocycle is leading the charge in sustainable animal feed by breeding black soldier flies. The company arose after recognizing the environmental impact of the soy industry. With its products traveling vast distances, the soy industry is a major driver of deforestation and carbon emissions.⁴⁸

Entocycle's innovative technology and modular farm systems harness insect-sourced protein to lessen the industry's dependence on soy, significantly cutting its carbon footprint.

Their model is inspiring other businesses to explore alternative insect protein ventures. Highlighting the efficiency of their approach, a 2020 study by Stellenbosch University in South Africa showed that just half a hectare of larvae can yield more protein than 52 hectares of soybeans.⁴⁹

Half a hectare of black soldier fly larvae can produce more protein than 52 hectares of soybeans.



5 The Road to Market: Turning Innovation into Everyday Food Choices

The science behind alternative proteins is impressive, but getting innovations from labs and factories to the table involves overcoming some challenges.

Here are some of the major hurdles alternative protein businesses currently face – from costs and consumer acceptance to clear health communication – and how they're overcoming these to turn promising concepts into products people actually want to buy and eat.

Closing the sensory experience gap

Food is more than fuel. It's about celebration, comfort and connection. We don't just eat to survive, we eat because food brings us joy.

This simple truth creates a challenge for alternative protein producers. They need to create foods that not only match the nutrition of conventional proteins but also deliver the flavors, textures, and satisfaction people expect from their meals.

Some alternatives have already bridged the gap. Plant-based products made from oats and nuts succeeded because they could closely match the taste and texture of conventional milk and yogurts without complex processing. Figures showing category growth for traditional dairy alternatives support this.⁵⁰

But plant-based meats face a tougher challenge. They're struggling to replicate juiciness, fat marbling and rich umami flavors of conventional meat. In the US, for example, more than half of surveyed consumers who gave up on them cited unmet taste expectations as their main reason.⁵¹



Cultivated meats face even bigger hurdles.

Current production methods can result in spongy textures, and getting consistent flavors from cell cultures remains tricky.⁵²

Thankfully, innovative solutions are emerging. Food scientists are amping up the umami factor of plant-based beef and chicken by using seasonings like nutritional yeast.⁵³ They're improving texture and tenderness by using different categories and combinations of plant-based proteins and fat.

Also, companies are using precision fermentation to create 'heme proteins' (like Impossible Foods' leghemoglobin) that are better at mimicking the taste and color of meat and increasing the nutritional value and iron absorption properties.

Others, like Meati Foods, use mycelium to naturally create fibrous, meat-like textures. Some are even combining approaches, blending plant proteins with fermentation-derived fats to improve mouthfeel and juiciness.

Solving the price premium problem

Alternative proteins can cost between 20-100% more than conventional options. One example is Beyond Meat's burgers, which retail at £10.22/kg, compared to Tesco's premium beef burgers, which are priced at £8.81/kg.⁵³ Consumers are asking why these gaps exist and how long they will be asked to accommodate higher prices.

Small-scale production, complex supply chains and expensive ingredients all play a part in alternative protein premiums. While some companies have achieved price parity in dairy products, meat alternatives are still catching up, facing high research and development costs and regulatory delays.

The cost-of-living crisis makes this especially challenging since 38% of Europeans say price is their main reason for not buying plant-based meats.⁵⁴

Some businesses, including Gourmey, are getting around the price issue by taking a different approach, deliberately targeting premium markets where consumers are willing to pay more for innovative products. Others – including Lidl – are focusing on process improvements or economies of scale to reduce production and distribution costs.

The cost-of-living crisis makes this especially challenging since 38% of Europeans say price is their main reason for not buying plant-based meats.



Encouraging repeat purchase

While many consumers are open to trying protein alternatives, getting them to become repeat buyers and supporting the growth and profitability of alternative protein businesses remains a challenge.

An added factor is that willingness to regularly buy alternative proteins varies across countries and cultures. For instance, consumers in China and India are more inclined to make regular purchases compared to those in the US, where 25% of respondents said they were unlikely to buy meat and protein alternatives regularly.⁵⁵

The potential is there. While the numbers of vegetarians and vegans haven't significantly increased, the rise of 'flexitarians' – people who switch between meat and non-meat eating – has driven demand for meat alternatives and created a sizable, untapped market.⁵⁶

As companies make steady progress on taste, affordability and proven health benefits, alternative proteins are likely to win more of this market share and larger numbers of loyal long-term customers.

Highlighting real health benefits

Some media coverage frames alternative proteins as 'ultra-processed' and nutritionally inferior.⁵⁷ The fact that tastes and textures have often been boosted by the use of additives is also a problem for consumers.

Long lists of unfamiliar ingredients lead many to perceive the products as suspicious or unhealthy.⁵⁸

When it comes to the health benefits of alternative proteins, perception and reality often clash. Studies show that plant-based meats can reduce saturated fat intake and dietary mortality risks by 8-11%.⁵⁹

Plus, 70% of plant-based meats match or exceed the protein content of animal meats, and businesses are addressing nutrient gaps by adding essential vitamins and minerals.⁶⁰

Brands like THIS and Oumph! emphasize simple ingredient lists with fewer than 10 components, and others are creating hybrid products with traditional ingredients that are 'closer to nature'.

Success means combining the best of different approaches. Ultimately, alternative protein producers need to work together to improve taste and texture, scale up production to lower costs, and clearly communicate health benefits to counter misconceptions.

Studies show that plant-based meats can reduce saturated fat intake and dietary mortality risks by 8-11%.



6 The Role of Regulation and Standards: Balancing Innovation and Safety

Regulations and standards play a vital role in helping alternative proteins move from innovation to market-ready products. The UK has shown strong support for the sector, investing £75 million in alternative protein innovation since 2021.⁶¹

This makes Britain Europe's second-largest public research funder in the field, supporting four major research centers where scientists, entrepreneurs and industry leaders work together to advance plant-based, cultivated meat and fermentation-derived proteins.

Harmonizing regulations

Regulatory approval remains the gateway for getting novel proteins to market, but approaches vary worldwide, and making efforts to harmonize laws will be key to effective commercialization.⁶²

So far, cultivated meat has received the green light in Singapore, the US and Israel.

Several other nations, including Australia, New Zealand, the UK and Switzerland, are actively reviewing applications. Australia has already approved cultivated quail as safe for consumption, while South Korea has updated its regulations to welcome cultivated meat applications.

India is taking a progressive approach. Under its Non-Specified Food Regulation, the country has approved several innovative proteins, including mycoprotein, non-animal whey protein, algae protein, and nutritional fungal protein. Companies need to secure approval before manufacturing or importing these novel products and then apply for licensing to reach consumers.⁶³

As the market for alternative protein products becomes more global, aligned regulations across countries will be central to reducing trade barriers and ensuring fair competition.

Setting clear standards

For alternative proteins to succeed commercially, they need clear standards for safety, transparency and sustainability.

Initiatives are underway in the UK, with the UK's Food Standards Agency (FSA) developing specific guidance for companies preparing safety documentation across different protein categories, from plant-based products to cultivated meat.⁶⁴ This guidance aims to make the assessment process clearer for companies and streamline the assessment process for regulators.

Making labels and traceability more transparent

Clear and accurate labelling plays a critical role in building consumer trust by providing the information needed to make informed choices.

For alternative protein products, which are often new and unfamiliar to many shoppers, labelling is especially important. It helps consumers understand what they're buying – whether they want to know the origin, source, nutritional content or sustainability benefits.

Proper labelling also addresses potential allergens and dietary restrictions, which is essential for health-conscious shoppers. Labels that highlight certifications, like 'non-GMO' or 'organic' can further reassure buyers about the quality and safety of the products they're considering.

Inconsistencies or ambiguity in labelling can lead to confusion and skepticism, which can get in the way of broad adoption.



Measuring environmental impact

Studies have consistently shown that alternative proteins can dramatically reduce greenhouse gas emissions and require far less land than traditional animal farming.⁶⁵

However, without common metrics, it's challenging for companies to convey their products' sustainability advantages and for consumers and investors to compare options effectively.

Establishing industry-wide standards for measuring factors including carbon footprint, water usage and land use would make a big difference.

Companies could reliably demonstrate their environmental credentials, giving them a competitive edge and building trust with consumers who are increasingly eco-conscious. Investors in alternative proteins would also have the data they need to support businesses that align with their sustainability goals.

What's more, standardized reporting can help identify areas for improvement across the industry, driving innovation and encouraging all players to adopt best practices.

It creates a level playing field where companies are recognized for genuine environmental contributions rather than just marketing claims.

The alternative protein sector needs regulators, industry leaders, and researchers working together to create rules that protect consumers while encouraging innovation.

Moving forward together

The alternative protein sector needs regulators, industry leaders, and researchers working together to create rules that protect consumers while encouraging innovation.

Recent UK initiatives show promise. Work by the new Regulatory Innovation Office (RIO) and the FSA's regulatory sandbox will help companies address key questions before launching products.⁶⁶



7 A Promising Outlook for Alternative Proteins

Consumers are embracing alternatives to meat in larger numbers, presenting significant opportunities for food manufacturers and retailers. In the UK, meat consumption declined by an estimated 17% between 2008 and 2019, showing that many people are significantly moderating the amount of animal protein they eat and actively looking for alternatives.⁶⁷

As the market for alternative protein evolves, the question of which category will scale first remains. Plant-based proteins have a head start in market presence and consumer familiarity, but fermentation-based and cultivated proteins are rapidly gaining ground. The front-runner will be the category that most effectively tackles the critical challenges of taste, cost and consumer acceptance.

Building consumer trust will be crucial for success. This means being completely open about how these proteins are made, what benefits they offer for our health and how they help the environment.

Companies need to cut through confusion and misinformation by maintaining transparent, traceable processes that give consumers confidence to try alternative proteins while showing how these innovations can help feed our growing world sustainably.

Money matters too – both public and private.⁶⁸

Government support is essential, from creating national strategies,⁶⁹ to tackling the big challenges of making these products affordable, tasty and widely available. This means funding research, offering tax breaks, or providing grants to promising companies. Just as importantly, governments need to create rules that encourage innovation while keeping products safe.

Private investors have already put billions into alternative proteins, and they'll keep playing a vital role. Their support helps both established companies and innovative startups improve their technology and bring down production costs.

Success won't come from any single group alone. Regulators, food producers, and biotech companies all need to move in the same direction, creating an environment where innovation thrives while maintaining high standards for safety and quality.

By establishing transparent processes and best practices, organisations like BSI will be central to helping businesses in the alternative protein sector improve performance, reduce risk and achieve sustainable growth.

When collaboration grows and companies create products that people genuinely want to eat, alternative proteins can move from being a small part of our food system to a mainstream food source. In doing so, they could help transform how we feed the world.





8 Why BSI?



Emily Field, Food Sector Lead, BSI

“Alternative proteins present a powerful opportunity to transform the global food system – reducing environmental impact, improving food security, and driving sustainable economic growth. However, realising this potential will require more than innovation alone. It will depend on collaboration, regulatory clarity, and trusted frameworks that support safe, scalable development.

As the UK’s National Standards Body, BSI plays a vital role in enabling this progress. We work across government, industry and research to develop consensus-based standards that foster innovation while protecting consumers and the environment. These frameworks help accelerate regulatory approval, support investment, and build public trust in emerging technologies.

Through our work with the National Alternative Protein Innovation Centre (NAPIC), we are contributing to the development of guidance and best practice that will underpin the responsible growth of this sector – from terminology and labelling to transparency and traceability”.

BSI offers an open invitation to any organisation or individual involved in the development, regulation or commercialisation of alternative proteins to engage with us. Whether you are a start-up, investor, policymaker or research body, your expertise can help shape the standards that will support the long-term success of this sector.

To discuss how you can contribute to this important work or learn more, please get in touch with emily.field@bsigroup.com.

Appendix

- 1: <https://www.wri.org/insights/how-sustainably-feed-10-billion-people-2050-21-charts>
- 2: <https://frostandsullivaninstitute.org/the-future-of-food-how-alternative-proteins-can-wipe-out-livestock-emissions/>
- 3: <https://www.pnas.org/doi/full/10.1073/pnas.1011013108>
- 4: <https://www.pnas.org/doi/full/10.1073/pnas.1011013108>
- 5: <https://www.foodmanufacture.co.uk/Article/2025/02/05/uk-government-has-invested-75m-into-alternative-proteins-to-date/>
- 6: <https://www.bcg.com/ja-jp/publications/2022/combating-climate-crisis-with-alternative-protein>
- 7: <https://www.greyb.com/blog/alternative-protein-trends/>
- 8: <https://gfi.org/science/the-science-of-cultivated-meat/>
- 9: <https://www.bbc.co.uk/news/science-environment-23576143>
- 10: <https://gfi.org/resource/cultivated-meat-seafood-and-ingredients-state-of-the-industry/>
- 11: <https://www.mckinsey.com/industries/agriculture/our-insights/cultivated-meat-out-of-the-lab-into-the-frying-pan>
- 12: <https://thecmmc.org/>
- 13: <https://www.foodstandards.gov.au/sites/default/files/2023-12/SD2%20-%20Consumer%20literature%20review.pdf>
- 14: <https://www.unep.org/resources/whats-cooking-assessment-potential-impacts-selected-novel-alternatives-conventional>
- 15: <https://www.artixio.com/post/global-regulation-of-cultivated-meat>
- 16: <https://gfi.org/science/the-science-of-cultivated-meat/>
- 17: <https://www.congress.gov/crs-product/R47697>
- 18: <https://www.countryman.com.au/countryman/news/cultivated-meat-industry-chases-federal-government-support-c-17311047>
- 19: <https://gfi-apac.org/novel-food-regulations-around-the-world/>
- 20: <https://www.ed.ac.uk/news/2020/area-twice-size-of-uk-needed-to-feed-worlds-pets>
- 21: <https://www.greenqueen.com.hk/meatly-lab-grown-meat-cultivated-dog-food-pets-at-home-the-pack/>
- 22: <https://www.foodnavigator.com/Article/2024/08/01/the-race-to-incorporate-cultivated-meat-in-pet-food/>
- 23: <https://www.consumerreports.org/health/nutrition-healthy-eating/the-case-for-eating-more-plant-based-protein-a1206771019/>
- 24: <https://skoot.eco/articles/carbon-footprint-of-everyday-things>
- 25: <https://www.nhs.uk/live-well/eat-well/food-guidelines-and-food-labels/the-eatwell-guide/>
- 26: <https://vegconomist.com/food-and-beverage/milk-and-dairy-alternatives/plant-milks-ascendancy-dairy-landscape/>
- 27: <https://www.ukri.org/wp-content/uploads/2022/06/IUK-100622-AlternativeProteinsReport-FINAL.pdf>
- 28: <https://www.just-food.com/features/nestle-inflicts-yet-more-wounds-on-limping-plant-based-protein-category/>
- 29: <https://www.sciencedirect.com/science/article/pii/S2666833522000612>
- 30: <https://www.proteinproductiontechnology.com/innovation-insights/the-regulation-of-alternative-proteins-around-the-world-whos-holding-the-recipe-to-success>

Appendix

- 31: <https://www.eunews.it/en/2024/10/04/eu-court-plant-products-can-be-called-steak-meatballs-or-sausages/>
- 32: <https://www.rpclegal.com/thinking/food-and-drink/european-parliament-votes-on-plant-based-food-labels/>
- 33: <https://www.proteinproductiontechnology.com/innovation-insights/the-regulation-of-alternative-proteins-around-the-world-whos-holding-the-recipe-to-success>
- 34: <https://www.futuremarketinsights.com/reports/fermented-protein-market>
- 35: <https://sustainablenutritioninitiative.com/do-the-environmental-impacts-of-fermentation-produced-protein-outweigh-those-of-conventional-protein-sources/>
- 36: <https://thegoodfoodinstitute.substack.com/p/how-to-build-a-thriving-alt-protein>
- 37: <https://www.greenqueen.com.hk/mckinsey-fermentation-protein-novel-food-investment-global-biotech/>
- 38: <https://cultivated-x.com/politics-law/uk-government-12m-fermentation-hub-alternative-proteins/>
- 39: <https://futurealternative.com.au/gfi-launches-state-of-alt-proteins-policy-report/>
- 40: <http://rolandberger.com/en/Insights/Publications/Unleashing-the-potential-of-protein-fermentation.html>
- 41: <https://www.fishfarmingexpert.com/aquafeed-calyseo-calysta/gas-to-feed-plant-switched-on-in-china/1444943>
- 42: www.promyc.com/sites/naplasol/files/uploads/paragraphs/layout_usp/pg_file/Sustainability%20report%20Promyc-WEB.pdf
- 43: <https://www.worldatlas.com/articles/top-regions-in-the-global-edible-insect-market.html>
- 44: <http://eitfood.eu/blog/insect-protein-future-of-food-and-feed-in-europe>
- 45: <https://anteja-ecg.com/transforming-organic-waste-into-proteins-with-insect-larvae/>
- 46: https://food.ec.europa.eu/food-safety/novel-food/authorisations/approval-insect-novel-food_en
- 47: <https://www.mofo.com/resources/insights/211028-alternative-protein-industry-series>
- 48: <https://www.theguardian.com/business/article/2024/aug/03/british-firms-strive-to-create-a-buzz-around-insect-farming>
- 49: <https://pubmed.ncbi.nlm.nih.gov/33336973/>
- 50: <https://www.fairr.org/news-events/insights/from-niche-to-norm-the-decade-of-alternative-proteins>
- 51: <https://www.fairr.org/news-events/insights/from-niche-to-norm-the-decade-of-alternative-proteins>
- 52: <https://foodfakty.pl/the-sensory-puzzle-of-cultivated-meat-navigating-taste-texture-and-the-path-to-consumer-acceptance>
- 53: <https://www.vegmeup.com.au/9-vegan-plant-based-umami-sources/>
- 54: <http://proveg.org/article/economic-impacts-of-price-parity-examining-the-potential-market-shift-in-retail/>
- 55: <https://www.iastatedigitalpress.com/mmb/article/id/11225/>
- 56: <https://www.iastatedigitalpress.com/mmb/article/id/11225/>
- 57: <https://www.greenqueen.com.hk/plant-based-meat-vegan-ultra-processed-food-upf-heart-disease-lancet/>
- 58: <https://www.pnas.org/doi/10.1073/pnas.2319010121>
- 59: <https://www.medicalnewstoday.com/articles/lower-cholesterol-linked-to-shift-to-plant-based-meat-alternatives>
- 60: <https://www.sciencedirect.com/science/article/pii/S2214799322001217>

Appendix

61: <https://www.proteinproductiontechnology.com/post/uk-invests-ps75-million-in-alternative-protein-innovation-since-2021>

62: <https://gfi-india.org/novel-food-regulations-around-the-world/>

63: <https://gfi-india.org/novel-food-regulations-around-the-world/>

64: <https://www.foodstandards.gov.scot/news-and-alerts/paving-the-way-for-alternative-proteins>

65: <https://gfi.org/resource/environmental-impacts-of-alternative-proteins/>

66: <https://www.osborneclarke.com/insights/Regulatory-Outlook-january-2025-food-law>

67: https://www.wwf.org.uk/sites/default/files/2023-05/Eating_For_Net_Zero_Full_Report.pdf

68: <https://www.openphilanthropy.org/research/how-can-governments-advance-alternative-proteins/>

69: <https://www.greenqueen.com.hk/alternative-protein-national-strategy-gfi-israel-plant-based-lab-grown-meat/>



Your partner
in progress

BSI Group 389 Chiswick
High Road London, W4
4AL United Kingdom
+44 345 080 9000
bsigroup.com

