

# Pushing the boundaries of plant-based at Fi Europe 2023



Global  
Insights

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# Introduction

A dietary shift towards plant-based food consumption patterns is advocated for sustainable, health and ethical reasons. Global consumers are responding, with a growing proportion of people following diets centred around the avoidance or moderation of animal produce and a greater focus on plant-based food solutions, according to FMCG Gurus<sup>1</sup>.

Indeed, sales of plant-based foods in the US market eclipsed \$7.4 billion in 2021, growing at a rate three times higher than all other grocery store food, according to data from SPINS, the Plant-Based Foods Association (PFBA) and the Good Food Institute (GFI)<sup>2</sup>.

However, challenges remain when creating plant-based products that replicate the taste, texture, appearance,

and even nutritional profile of meat, dairy, eggs, fish, and seafood.

At [Fi Europe](#), the leading ingredient trade show that brings together over 1,200 exhibitors from the food, beverage, and nutrition sectors and thousands of visitors every year, manufacturers can scout out the latest plant-based ingredients that will help them create winning products.

Visitors to [Fi Europe](#) can also explore the latest insights, challenges, and solutions within the plant-based category thanks to the expert sessions, panel discussions, and fireside chats held at the Future of Nutrition Summit, Fi Europe Conference, Innovation Hub, Sustainability Hub, and more.

<sup>1</sup> FMCG Gurus, "Meat and Plant-based Report in 2022 – Global Report," 2022

<sup>2</sup> <https://www.prnewswire.com/news-releases/us-plant-based-food-retail-sales-hit-7-4-billion-outpacing-total-retail-sales-despite-supply-chain-interruptions-and-pandemic-restrictions-creating-widespread-volatility-in-the-food-industry-301509566.html>



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# Daring to replicate dairy

Product developers creating plant-based dairy alternatives have a large and growing range of ingredients they can use, from soy, oat, coconut, almond, and pea to rice, spelt, sesame, quinoa, hazelnut, and more.

Recent product launches include Dug's drinking milk alternative made with potato protein in the UK; Planti's plant-based milk made with broad beans in Sweden; and Lavva's vegan yoghurt made with pili nuts in the US.

The products found on supermarket shelves today are a huge improvement on the first iterations from several decades ago. However, many of these products are still not like-for-like dairy replacements when it comes to taste, texture, and appearance, spurring industry to continue developing novel ingredients that can replicate the sensory attributes of dairy fat and protein in plant-based applications.

Nevertheless, R&D is happening at a fast-pace with many next-generation, novel ingredients are being developed by startups.

Swiss startup Cultivated Biosciences, for example, uses biomass fermentation to produce an oleaginous yeast in bioreactors. The yeast accumulates fat in the form of "a complex mixture" – in other words, the ingredient is

not a single compound – "that is like a cream", according to CEO Tomas Turner. The GM-free, yeast-based fat is then extracted and can be used as an ingredient.<sup>3</sup>

US startup Nature's Fynd makes dairy-free cream cheese using a fungus-based, high-fibre and high-protein ingredient. The ingredient, grown via a biomass fermentation process, is *Fusarium strain flavolapis* – a natural fungus that was originally discovered in the hot springs of Yellowstone National Park in the US. The name, *flavolapis*, means "yellow stone" in Latin.<sup>4</sup>

The vegan ingredient, which the company has commercialised under the brand name *Fy*, contains 50% protein with all 20 amino acids – including the nine essential ones – as well as 30% fibre that includes beta-glucans. It is also low in fat and cholesterol-free.

Meanwhile, Wageningen University spin-off *Time-Travelling Milkman* is developing a creamy, seed-based fat to replicate the creaminess of milk fat.

Its ingredient uses oleosomes, the naturally occurring fat droplets inside plant seeds that are covered by proteins. The presence of this compact, protein membrane makes oleosome droplets highly creamy in a similar way to milk fat droplets, it says.<sup>5</sup>

Unlike vegetable oils, which are extracted from oilseeds such as rape and sunflower by pressing the seeds, *Time-Travelling Milkman* has developed a method to extract fat from the cells in seeds while keeping their natural structure intact.

<sup>3</sup> <https://insights.figlobal.com/startups/using-oleaginous-yeast-replicate-texture-dairy-fat>

<sup>4</sup> <https://insights.figlobal.com/plant-based/nutrient-packed-volcanic-fungi-protein-whole-food-protein-alternative-says-natures-fynd>

<sup>5</sup> <https://start-life.nl/time-travelling-milkman-receives-550k-euro-investment-for-plant-based-dairy-fat/>







# Keep it clean – or risk the ultra-processed backlash

While there is currently a health halo around the term plant-based, the media has begun to question some of the possible health impacts – particularly with some of the unhealthier and more processed dishes. Data from a 2021 Mintel report suggest almost half of consumers believe meat substitutes are “too processed”.<sup>6</sup>

"This raises questions for consumers," said Susie Stannard, consumer insight manager at the UK's Agriculture and Horticulture Development Board (AHDB).

"Consumers want reassurance that meat alternatives contain real ingredients that they recognise and trust," said Mike Hughes, head of research and insight at FMCG Gurus, noting that research from the company shows that more than three-quarters of consumers believe plant-based products should be made with familiar and well-known ingredients.

"This indicates that brands must provide consumers with streamlined and concise ingredient lists that have

fewer ingredients, without making exaggerated claims. By doing this, brands will begin to break down these negative stereotypes of plant-based foods," said Hughes.

Steve Osborn, food technology scout and commercial development director at The Aurora Ceres Partnership warned that the excitement over the food tech investment opportunity in the plant-based category has begun to tail off.

Some companies that have focused on raising large rounds of investment are now struggling to get results in the space as consumer backlash over perceptions of ultra-processed foods have hit hard.

<sup>6</sup>Mintel, "UK Meat Substitutes Market Report 2021"

## “Consumers want reassurance that meat alternatives contain real ingredients that they recognise and trust.”

**Mike Hughes**

Head of Research and Insight, FMCG Gurus

“You've got the big investment companies [that] have been throwing big money at companies like Impossible and Beyond, but there's been a bit of a backlash to that now,” Osborn noted, adding that such products are relatively costly, and may not be clean label.

“We've seen that sort of massive shift in in terms of acceptability,” he said.

According to Aurore de Monclin, managing partner and head of consulting at the Healthy Marketing Team

(HMT), creating a simple ingredients list is a challenge for manufacturers of plant-based products but it is “highly desirable” for consumers.

Consider new ingredients that consumers are currently looking for, as well as those that are more familiar. Consumers are increasingly rejecting overly processed and artificial ingredients,” she said.<sup>7</sup>

<sup>7</sup> The Plant-based Quarterly Digest 2023, Q1: Category expansion - Innovating with plant-based dairy

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# Meat me in the middle: The importance of familiar formats

Just as important as a clean label ingredient list is familiarity with the format. Brands may wish to connect their products with cultural origins and established culinary traditions.

Peter Wennstrom, founder and lead consultant at HMT, warned that an important consideration is familiarity, noting that more traditional whole food recipes for plant-based products – such as a bean burger – are clearly seen as a food recipe and are tied to cultural understandings of food.

“Food comes from recipes,” Wennstrom said. “If you look at it from the cultural [perspective], one way we accept new meals and dishes is to understand that it comes from somewhere; you eat Thai food or you eat Japanese or you eat a poke bowl.”

**“Suddenly you're actually eating almost plant-based meals, but you don't think about it because you're just eating, say a poke bowl, and that's trendy and it tastes good. It's nice food that comes from somewhere.”**

Wennstrom cited the growth in seitan protein as a great example of how to connect to a food and a recipe rather than a functional ‘substitute’: “The best way to sell it is as Asian – with Asian origin and to come with Asian recipes – because then it's exciting. It has to do with food, otherwise, it's just some kind of replacement.”



# Health halo or nutritional no-go?

Can plant-based dairy alternatives compete with dairy in terms of nutrition? Not according to the scientists behind a 2022 Swiss study published in *Frontiers in Nutrition*, which looked at the quantitative and qualitative nutritional value of 27 plant-based drinks and compared them with cow's milk.<sup>8</sup>

The dairy-alternative products were made from eight different plant species (almond, cashew, coconut, hemp, oat, rice, soy, and spelt) but did not include blends.

The researchers found that cow's milk contained more energy, fat, carbohydrate, biotin, pantothenic acid, calcium, phosphorus, and iodine than most of the plant-based drinks. It also contained more vitamins C, B2, B12, and A.

Milk also won for protein quality, as measured by true ileal amino acid digestibility (TIAAD) and digestible indispensable amino acid scores (DIAAS).

The soy-based drinks performed well, providing slightly more protein and markedly more vitamins B1 and B6, folic acid, and vitamins E and D2 (with supplemented vitamin D2) and K1, magnesium, manganese, iron, and copper than cow's milk and the other plant-based drinks. The other plant-based milks fell short, however.

The researchers concluded: "Our results show that the analysed plant-based drinks are not real alternatives to milk in terms of nutrient composition, even if the actual fortification is taken into account.

"Complete replacement of milk with plant-based drinks without adjusting the overall diet can lead to deficiencies of certain important nutrients in the long term."

Some researchers argue that the importance of dairy as a source of certain nutrients such as calcium has been overrated.

Writing in *The Guardian*, professor of genetic epidemiology at King's College London and microbiome researcher Tim Spector said: "Dairy is a massive cause of global heating, and its health benefits, such as strengthening bones, have been overplayed. There are plenty of better sources of calcium, for example, sesame seeds and tahini, dark-green leafy vegetables, and calcium-set tofu."<sup>9</sup>

Nevertheless, Spector has not given up dairy completely for health reasons. "Personally, the only milk I haven't given up is fermented milk, known as kefir, which I make myself and have a little shot of every day for my gut microbiome," he wrote.

<sup>8</sup> <https://www.frontiersin.org/articles/10.3389/fnut.2022.988707/full>

<sup>9</sup> <https://www.theguardian.com/lifeandstyle/2022/oct/28/healthy-appetite-the-best-diet-for-you-and-the-planet-tim-spector>



# Nutrient trade-offs are inevitable – but fortification is key

While the Swiss study determined actual nutrient composition in the products (rather than just comparing information on the nutrient labels), it was limited by the fact the scientists did not analyse blended products, such as rice and soy milk or almond and oat milk. Blending plant proteins is a common formulation strategy to raise the protein quality and amino acid score.

Sandra Einerhand, founder of nutrition consultancy Einerhand Science and Innovation, said there was often a nutritional trade-off when swapping dairy for dairy alternatives.

“[...] plant-based drinks often have a higher [glycaemic index] GI due to the use of sucrose/glucose or fructose instead of lactose and plant-based drinks also often contain starches,” she said. “Cow’s milk has a better omega-6/omega-3 ratio. However, plant-based drink do contain higher amounts of mono- and poly-unsaturated fatty acids compared to cow’s milk.”

Einerhand said there was “certainly room” to further improve the nutritional profile of plant-based milk drinks, not only focusing on protein quality and micronutrients but also carbohydrates and fatty acids.

“Milk provides micronutrients in a bioavailable form, where some micronutrients added to the plant-based drinks on the Swiss market are not always highly bioavailable,” she said. “Therefore, adding rapidly bioavailable sources of such minerals [...] to the levels found in cow’s milk is key.”

Improving the nutrient profile of plant-based dairy alternatives is becoming a growing priority for many brands, particularly as these products begin to comprise a greater share of people’s diet.

In 2022, Danone USA announced a commitment to “increasing the nutrient density” of more than 70% of its plant-based beverages, although it did not say which specific nutrients would be targeted as part of this nutritional overhaul.<sup>10</sup>

**Improving the nutrient profile of plant-based dairy alternatives is becoming a growing priority for many brands.**



<sup>10</sup> <https://www.prnewswire.com/news-releases/danone-north-america-announces-22m-investment-in-nutrition-education-and-accessibility-to-support-better-health-outcomes-301635278.html>best-diet-for-you-and-the-planet-tim-spector

# Key takeaways

- New ingredients and production technologies such as mycoproteins and precision fermentation offer the potential to create finished plant-based products that closely mimic the taste, texture, and appearance of traditional meat, dairy, fish, and eggs.
- While plant-based foods currently benefit from a health halo, both consumers and media have begun to question this – resulting in a backlash against ultra-processed plant-based foods.
- Familiarity is key to consumer acceptance. More than three-quarters of consumers believe plant-based products should be made with familiar and well-known ingredients.
- Nutrition is important. If plant-based brands want their products to occupy the same place in people's diets as conventional dairy, they must ensure their products are as healthy so consumers can substitute dairy without impacting their nutrient intake.
- Plant-based brands should fortify their products with rapidly bioavailable sources of nutrients to the same levels as those found in dairy milk.



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