



Revolutionising health: Plant-based dairy alternatives take the lead

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Plant-based dairy is a thriving category. 48% of global consumers now follow diets that involve the reduction or removal of meat and/or dairy¹, while 23% of them are already meat-free². These lifestyle choices are not only increasing the demand for dairy alternatives — they are also raising product expectations. Consumers will no longer simply accept dairy mimicry; they are looking for better variety and improved innovation. Alongside this, wider considerations around a product's nutritional profile and sustainability credentials — as well as taste, texture and price point — are now impacting purchasing behaviour. To take advantage of the growing opportunities in plant-based products, manufacturers need to focus innovation both on increasing variety within the category and delivering on these key consumer drivers.

What do consumers look for in plant-based alternatives?

Research shows the number one reason consumers consider plant-based alternatives is they are seen as healthy and nutritious. We also know that 52% of Europeans make decisions about



what to eat or drink based on their health³. But the picture is more complex. Alongside health, there are other factors that are driving consumers to opt for plant-based alternatives. Sustainability continues to be an important consideration and remains the main influence after health, in the latest 2023 data. However, taste and value for money have become more important over the last 12 months – reflecting challenging economic conditions and the impact of rising costs and inflationary pressures on shopping habits⁴. In short, consumers expect a lot from their dairy alternative products. Clean taste and high nutritional value. Great mouthfeel and eating experience. Not to mention, sustainable ingredients and a good price point!

Today's consumers are demanding more and more variety in dairy alternatives and this means finding solutions that balance taste, texture, nutrition and sustainability preferences in the optimal combination

Overcoming plant-based formulation challenges in dairy alternatives

So, what does this mean for manufacturers? How is it possible to balance meeting these consumer demands with the formulation challenges of plant-based and the tough manufacturing conditions of dairy to create on-trend products that really resonate with shoppers? At Ingredion, we 'Own the AND™' by helping manufacturers deliver products that meet complex consumer demands such as plant-based and sustainable, while accelerating innovation and delivering on taste and texture demands. It's about combining the right plant-based portfolio of sustainably-grown ingredients — derived from non-soy raw materials — with the right technical know-how and formulation expertise. Through this powerful combination, manufacturers can overcome recipe and production challenges and deliver appealing and innovative products.

Challenge #1: Balancing texture AND nutritional value

Replacing the functionality of traditional dairy ingredients is challenging. In order to successfully formulate plant-based alternatives, we must first understand the functional components we're replacing. Casein, whey, and lactose are very functional. These ingredients bring emulsification, gelation, viscosity and creaminess to yoghurts, milks, and cheeses. In order to replace these impressive dairy components, we must look at a solutions approach of plant-based proteins, stabilisers and sweeteners to achieve the best eating experience.

Let's take a look at a plant-based cheese alternative where texture is all-important, but so too is nutrition. Whether it's a high protein snacking cheese with that just-right-bite, or a sliced or shredded cheese that delivers on firmness, stretch and meltability — rebuilding the structure of natural cheese is a technical balancing act. And



it's one that, at Ingredion, we get asked about a lot. Higher protein levels can impact firmness and shred-ability, and viscosity is typically higher, which in turn impacts processing requirements. In addition, pulse proteins are often associated with bitter and beany notes and have a dark colour. Our experience shows that rebuilding cheese structure in a way that successfully replaces functional dairy



components requires a careful blend of starches, gums and plant-based proteins. Combined at the correct levels, it is possible to overcome plant-based cheese formulation challenges with the right melting, gelling and elasticity.

Challenge #2: Creating a great eating experience AND the right viscosity

Category opportunities in dairy alternatives are increasing, with non-dairy spoonable yoghurt one of the fastest growing sub-categories, at 26% CAGR⁵. The creamy mouthfeel of yoghurt is one of its most essential, and challenging, characteristics. Whey, lactose, and casein are responsible for creating our delicious pot of dairy yoghurt. As the milk in your formulation is pasteurised, the heat denatures the whey and builds a protein network. Lactose feeds the cultures, dropping the pH and converting lactose to lactic acid. This drop in pH is responsible for bringing casein proteins to their isoelectric point, aggregating, and forming the semi-solid gelled texture you expect. When we formulate dairy alternatives we utilise starches, hydrocolloids, and proteins to build back the viscosity and gelation. Dextrose can be used as a food source for the cultures, allowing for a pH drop and the expected taste and texture to develop.

Understanding the tough processing conditions of dairy, often involving high heat, is a key part of formulation success. There are several challenges that must be considered when formulating plant-based yoghurt.

First, we cannot expect that a cultured plant-based protein slurry will have the same creaminess and mouthfeel as dairy yoghurt, so we must build back this texture with the support of starches and hydrocolloids.



Second, we must keep in mind that depending on the plant-based protein being used, viscosity development during heating may be high. You will need to remember this when pasteurising your mix. Pulse ingredients can contribute bitter, beany flavour profiles and also a yellower colour. Natural flavours, maskers, and protein binders can help overcome these. Stability must be considered when creating your process and formulation, as well as nutrition. Depending on your protein source, you may have an easier or more challenging time reaching higher protein levels.

Challenge #3: Formulating for stability AND shelf life

The global plant-based beverages market is estimated to be worth c.US\$28 billion, and is expected to hit around US\$73 billion by 2032⁶. This includes the growing plant-based ready-to-drink (RTD) category. Some of the main formulation challenges we are asked about at Ingredion are around stability, particularly creaming and sedimentation based on fat and protein instability.

Ingredient selection is critical — not all plant-based isolates are suitable for RTD beverages. Sedimentation and creaming prevention through proper hydrocolloid selection allows for the creation of a stable emulsion and a stable, fluid and elastic gel.

Because of the way these products are used and consumed, the appearance and of plant-based beverages is important. Ingredion's solutions for barista beverages have been developed with this in mind, delivering excellent foam volume, quality and stability — even once incorporated into hot drinks.



Own the ANDSM with Ingredion's plant-based proteins

VITESSENCE[®] Prista is Ingredion's latest range of pea and fava bean protein concentrates, designed to help new product developers build the right taste, texture and nutritional profile in non-dairy formulations, while delivering on sustainability demands.

The concentrates are manufactured via a proprietary de-flavouring

Ingredion's ultra-performance, VITESSENCE[®] Prista range of protein concentrates and flours were recognised at the 2022 Plant Based World Expo, held in New York, for advancements in sustainable processing methods to enable manufacturers to achieve taste, nutrition and functionality in their products

process, which reduces the bitter taste and raw plant flavour associated with conventional dry-milled pulse ingredients. Ingredion's dry-milling process is one that does not use chemicals or additives while consuming significantly less water (0.2%) and energy (5.5%) in comparison to traditional pea protein production, according to our own proprietary data⁷.

Perfect for use in dairy alternative applications, including protein fortified vegan cheese, non-dairy yoghurts and desserts and plant-based RTD beverages as a cost-effective nutrition source, the range delivers pristine taste and functionality. The range supports 'protein,' 'plant-based' and 'gluten-free' product positioning.

Plant-based innovation for the dairy consumer

Today's consumers are demanding more and more variety in dairy alternatives, but finding solutions that balance taste, texture, nutrition and sustainability preferences in the right combination isn't easy. Formulating plant-based options for yoghurt, cheese, beverages and other applications takes both ingredient and processing



know-how. Ingredion's large team of experts, proven go-to-market capability and portfolio of functional, plant-based ingredients can help you navigate these challenges successfully.

To learn more about Ingredion's plant-based expertise and our VITESSENCE[®] Prista range, please visit <https://ingredion.com/emea/eu-uk/html>

References:

- 1 Innova Market Insights, 2023
- 2 Innova Market Insights, 2023
- 3 IFIC, Food and Health Survey, 2020
- 4 Innova Trends Survey 2021, 2022 and 2023 – "Why would you consider plant-based alternatives?"
- 5 Innova Database, 2020
- 6 Plant-based Beverages Market Size, Trends, Report By 2032 (precedenceresearch.com)
- 7 Ingredion proprietary data, 2023



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