



Plant-based Beverages

The booming interest in plant proteins is driven both by changes in lifestyles and a deepening awareness of the importance of health, wellness, and sustainability. Contributed by Henk Hoogenkamp.

It has taken some time, but legacy food companies now consider plant protein-formulated dairy alternatives as a high-growth category.

For example, Nestle currently offers a variety of plant-based milk beverages made from rice, pea, coconut, oat and almonds. These products are not only lactose-free and suitable for vegan diets, but also for taste, highly nutritious, as well as environmentally-friendly. They have also launched a pea protein-based dairy milk alternative that is marketed under the name Wunda, while pea milk is sold in Sweden under the Sproud brand name.

And GoPeasy by the Fooditive Group is a pea protein-based dairy-free beverage. This product contains no added sugars and is free of lactose. As a sweetener, upcycled apple and pear by-products are used.

Tea With Benefits

Tea-based formulas are a beverage category that is leaning into the health trend. Sparkling tea beverages come in many flavours like white tea, ginger, green tea, hibiscus, cucumber, and grapefruit. Additionally, beverages like kefir and kombucha are infused with prebiotics, which contribute to gut health and contain anti-inflammatory benefits.

Tea and kombucha have been the drink of choice for people around the world for many centuries. These beverages have a powerful association with longevity and wellness. In the past, protein beverages usually come in thick viscosities.

However, novel protein modification technologies now allow for dairy and plant proteins to be delivered in clear formats and they can be infused into drinks.

For example, ET Protein (China) has mild-tasting and odorless rice protein and 'clear' pea protein isolate in their portfolio, which are uniquely suitable for clear protein-infused beverages.

Plant Milk

Food industry experts and market research firms, such as Euromonitor and marketresearch.com, find that the plant milk market is growing strong in the Asia Pacific region. Plant protein-formulated beverages such as soymilk, barley milk, rice milk, oat milk, and almond milk, along with plant yoghurt and plant cheese, comprise a category that is growing faster than plant-based meat products.

Oat milk has become the fastest-growing milk alternative in the world. While consumer preference moves away from dairy, oat milk is seen as the closest to dairy in texture and taste. It is also a non-GMO clean beverage.

Oat milk is more sustainable than other milk alternatives such as almond milk and soy milk. Moreover, oat milk is an ideal product for consumers who have allergy sensitivities.



The Plant-based Milk Landscape

For plant milk, it is important that the beverages keep the richness and creaminess of conventional cow's milk. To accomplish these properties, yeast extracts are usually utilised to fine-tune the desired characteristics.

Pea milk is another new market entry that will expand the alternative dairy market category even more. Most plant-formulated beverages contain a long list of additives like carrageenan, lecithin, gums, potassium citrates, and phosphates. The fractioning or isolation of plant protein ingredients routinely uses a variety of chemical and mechanical 'tricks' to optimize organoleptic and processing properties.

Rice milk is hypoallergenic, although the viscosity and mouthfeel can leave a watery impression. To improve palatability and give the plant-based milk a creamier and velvety mouthfeel, boosters like polyols artificial sweeteners, guar gum, xanthan gum, or carrageenan are added. However, some of these ingredients have been linked to allergic reactions or a digestive problem, hence, the FDA has warned against giving anything containing xanthan gum to infants.

At present, soymilk continues to dominate the plant-based milk alternative market. However, although soymilk has much stronger nutritional credentials than most other plant-based milk beverages, the reality is that soymilk has lost some of its lustre because younger consumers, in particular millennials, prefer alternatives like oat milk and almond milk. Vanilla and milk chocolate are the top flavours in dairy alternative beverages, while coffee lattes have seen a huge sales increase because consumers prefer oat more than soy-infused coffees.

Single plant protein-formulated beverages and blended protein containing more than one type of protein will gain market traction. For example, coconut and almond concoctions deliver superb flavor creations. But make no mistake, soy foods and soy beverages should not be written off. Improved versions of designer enzyme-treated soy protein isolates that will demonstrate excellent flow characteristics, dispersibility, mouthfeel, flavour, and taste are expected to become available in time to come.

Nourishment Issues

The labelling of some plant-based beverage products may have consumers believe that those products have the same key nutritional attributes as conventional dairy products, even if they vary widely in their nutritional content.

Switching to plant-based products can contribute to under-consumption of key nutrients like premium protein sources, calcium, and vitamin B. This is especially concerning for children whose parents substitute certain plant-based beverages for milk. Children in general have less diverse diets than adults, with fewer opportunities for other foods to provide the essential nutrients that they need for growth.

On another note, an increasing number of consumers may prefer to drink plant-based milks than milk that come from animals. Of all plant milk beverages, coconut milk and almond milk may be the least nutritious with hardly any protein content present, with typically only small amounts of added calcium.

Hydrocolloids & Sedimentation

Sediment is one of the biggest problems to solve for beverages as it accumulates at the bottom of the packaging. To reduce or eliminate plant protein sedimentation, membrane filtration technology to purify the plant protein such as, for example, pea protein and barley protein, will create a high grit-free smooth texture, as well as high solubility and low viscosity.

In addition, hydrocolloids (gums) are commonly used for their ability not just to bind water but also to thicken and gel. Over the last years, the role of hydrocolloids has greatly expanded to improving shelf stability as well as manipulating processing tolerances like pH and temperature. Another rapidly emerging advantage of hydrocolloids such as xanthan gum, inulin, carob gum, pectin and functional fibre is the creation of products with a natural status that allows 'clean label' positioning. This is especially true for plant-extracted hydrocolloids as an alternative for chemically sounding bio-gums.

Hydrocolloids are widely used to modify the rheology of food and beverages. Hydrocolloids can be seen as a multifunctional ingredient, especially now that sales of plant-based beverages are surging.

Beverage stabilisers assist in increasing viscosity, stabilize protein networks, emulsify flavors and fat, and act as suspending particles to enhance mouthfeel. It is important to know how to manipulate functionality of essential ingredients and how these interact during the entire processing cycle and maintain optimum integrity during the shelf life of the product. Specific attributes such as maintaining beverage texture, creaminess, and cohesiveness need to be harmonised.

Formulating Considerations

- Protein content
- Nutritional profile
- Texture
- Viscosity
- Calorie analysis
- Processing conditions
- Desired label claims

Functions of Protein and Hydrocolloids

- Build mouthfeel
- Prevention of sedimentation
- Prevention of separation
- True suspension of protein and fill particles
- Stabilize foam
- Delay age gelation

Function of MCT

The premier source of medium-chain-triglycerides (MCT) is derived from coconuts, which can be seen as a quick and clean energy source for body and brain. MCTs are metabolized differently in the body as compared to long chain fatty acids. MCTs have shorter chain length and are directed straight to the liver to stimulate the creation of ketones -another source of fuel for brain and body alike. It is also good to know that MCTs are absorbed as a ready source of energy without being stored as fat in the body.

MCT oil may be used to help reduce body fat, increase fullness, improve intestinal gut health, as well as increase energy, fight bacterial growth, and manage certain neurological conditions. Due to their shorter chain length, MCT are more easily digested than longer-chain fatty acids. There are also strong indications that MCT oil could help manage epilepsy, Alzheimer disease, and autism.

Going forward, MCT will likely become an infused ingredient in plant milk beverages.

Closing Thoughts

Food and beverage manufacturers are constantly looking for new ways to appeal to consumers. New beverage offerings are now focusing on delivering health benefits such as gut, immune, skin, cognitive and mental effects.

To stay relevant, new ingredients are fast-tracked in a rapidly changing plant-based beverage landscape with consumers looking for products like kombuchas with less sugar, keto-friendly smoothies, cultured ciders, as well as a large portfolio of cold-brew and cold-infused coffees. These beverages are created using nitro



infusion, which is gaining popularity as an attractive consumer experience.

Cultured juices like kombucha, boasting digestive health and other trending ingredients such as brain stimulating medium-chain-triglycerides: MCT-oil (Oleo Fats, Philippines) and coconut fat, are a significant part of the transformational innovations. Fermented probiotic-filled protein-formulated plant yoghurt and plant milk beverages specifically cater to younger and time-strained consumers looking for support of their digestive and immune health.

The question is: Will consumers who opt for natural and clean label foods ultimately develop a backlash against plant-protein food products due to false equivalency with unprocessed dairy foods that do not need a long list of labelling ingredients?

Dairy is generally declining in affluent societies, whereas plant-based milk alternatives are filling in the gaps. In terms of nutritional content, plant milk beverages vary widely in their nutritional profiles. It is therefore fair to ask: Which kind of the milk-alternative drinks is more nutritious: soy, coconut, pea, hemp, cashew, flaxseed, almond, barley, hazelnut, oat, or rice?

There is an ongoing scientific debate whether the human body efficiently absorbs added synthetic ingredients like vitamins and minerals as efficiently as the micronutrients that are naturally present in conventional dairy products.

No plant milk is equal to cow's milk. Soy-based beverages often contain as much protein as cow's milk

but without calcium, although many soy-formulated milk products are artificially fortified with calcium and vitamins.

The calcium naturally present in cow's milk is inherent to the milk and may be better absorbed. This is also due to the presence of casein protein and lactose, which help increase the absorption of calcium, and calcium helps to absorb vitamin D. There is synergy between all the micronutrient components in cow's milk. It is generally recommended that children drink cow's milk, unless there is a medical reason that they cannot do so. Drinking 200 ml of cow's milk naturally contains about 9 grams of protein (7 grams casein and 2 grams whey protein).

Lastly, the European Court of Justice had ruled in October 2020 that plant-based dairy imitations cannot be marketed with names like 'milk', 'cream', 'butter', 'cheese', or 'yoghurt'.

How should alternative milk be called if the word 'milk' cannot legally be used? Would consumers accept a different name, like, for example, almond juice or rice beverage or oat liquid?

We leave industry players to ponder these questions and issues. In the meantime, we should continue to watch the plant-based beverage space for more exciting developments.



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