

Dairy and egg-free solutions for bakery and desserts



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n increasing number of consumers are focusing on eating fewer animal products and more plant-based alternatives, but they are not willing to compromise on taste or texture. While supermarket shelves offer an increasing number of meat substitutes, plant-based bakery and desserts are another promising category for food manufacturers. However, replacing dairy or eggs in recipe development can deliver technical challenges. Here, Dr Isabel Trogh, Customer Technical Support Manager at BENEØ, discusses the growing demand for plant-based solutions in these categories and how food producers can create egg- and dairy-free recipes using functional ingredients.

Plant-based appeal

According to BENEØ's latest global plant-based survey, almost 6 in 10 consumers now say that they are interested in plant-based nutrition (59%). It is not surprising therefore that producers are responding with more products that carry a vegan or plant-based claim. In fact, the share of new bakery product launches with such claims rose from 5% in 2018/2019 to 9.5% in 2022/23. And interest in plant-based bakery products continues to increase, with 26% of global consumers saying that they currently buy them and a further 32% saying that, although they don't buy them at present, they would be interested in purchasing them in the future.

In line with this trend, egg and dairy replacement are becoming growing topics of discussion amongst food producers looking to reformulate. This is due to animal welfare, sustainability, health and ethical questions being raised by consumers and the significant price inflation of eggs that

producers have been experiencing over recent years. When it comes to products containing eggs from industrial farming, 37% of consumers are now trying to either avoid them or consume less of them, while 13% refuse to eat them at all. Also, egg prices have risen across the globe, with the EU seeing 30% increases over one year and in the US egg prices doubled. Against such a backdrop of demand for plant-based and vegan bakery and dessert solutions, it is no wonder that many food producers are looking for viable alternatives that deliver technical, nutritional and economic benefits.

Egg replacement

Replacing eggs in baked goods creates a specific set of challenges for recipe formulation due to the fact that eggs have a multi-functional impact on the final product in terms of taste and texture. They can be used for foaming and aeration, texturising, emulsification, colour and flavour, as well as a glazing agent. This is why, depending on the type of application, an egg alternative also has to deliver on this range of technical properties. The BENEØ-Technology Center has been trialling ingredients for successful egg-free recipes and found that faba bean protein



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concentrate can serve as a suitable solution for partial and total replacement of whole eggs, egg whites and egg yolks. At the same time, the ingredient also offers clean label and cost reduction benefits.

Made from de-hulled faba beans via a dry fractionation process, BENEØ's faba bean protein concentrate is a natural and clean label plant-based protein source that is light yellow in colour and has a relatively neutral, mild beany taste. Containing a minimum of 60% protein on dry matter, the concentrate also has an excellent essential amino acids profile and very good emulsifying, foaming, thickening and binding properties, making it the perfect solution for egg replacement.

The BENEØ-Technology Center has been exploring a range of egg replacement recipe formulations and initial successes have included the development of an egg-free plant-based muffin. With a pleasant taste and texture, the muffin contains faba bean protein concentrate at a reduced dosage than would have been needed if eggs were used, resulting in the potential for lower recipe costs. BENEØ's prebiotic chicory root fibre, Orafiti® Oligofructose, was also included to replace milk powder and to contribute to the taste and colour of the final product. At the same time, its use increased the fibre content and allowed a "source of fibre" claim to be made with the muffins. Manufacturers wanting to further improve the nutritional profile of their plant-based muffin, can increase the dosage of Orafiti® Oligofructose to enable sugar reduction.

Egg-free meringues

The next challenge for the application experts at the BENEØ-Technology Center was to develop a viable egg-free meringue that delivered a stable foam and well aerated texture after baking, as well as a pleasant taste. BENEØ's faba bean protein concentrate was ideal for use as an egg white replacer in the meringue recipe, due to its light



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colour, mild taste and good foaming properties. During development, the team found that only 4% of faba bean protein concentrate was needed, compared to 29% egg white, to make the recipe egg-free. As well as being plant-based, this also gives producers the opportunity to make considerable cost savings – in fact, depending on the local raw material prices, cost reductions of more than 50% can be achieved. The end result is a great tasting meringue that delivers in terms of taste, texture and cost-efficiency.

Dairy replacement

As with egg replacement, swapping out dairy can significantly impact a product's taste and texture. And for over four out of every five consumers, taste tops the list of factors that are considered when making a dairy-alternative

purchase⁵. The BENEØ-Technology Center team therefore set itself the challenge of creating a tasty, plant-based whipping cream that would deliver all the creaminess of the dairy equivalent.

Rice-based whipping cream

The dairy-free cream needs to be stable in liquid form and have a good shelf-life. The liquid cream developed by the BENEØ-Technology Center delivers a viscosity that remains low and stable for at least four weeks when stored in the fridge. After whipping, a well aerated, firm and stable cream with good mouthfeel and taste is obtained. To achieve these requirements without using dairy, a rice-based whipping cream was developed using BENEØ's rice syrup. This was combined with the company's Orafiti® Inulin chicory root fibre and faba bean protein concentrate. Ideal as clean label texturising ingredients in plant-based dairy, chocolate and dessert alternatives, rice ingredients such as rice syrup can be used to make a dairy-free solution with a pleasant taste. Their neutral taste makes them easy to combine and eliminates the need to balance out off-flavours. Rice is also very well received by consumers, with 7 out of 10 flexitarians seeing rice as an appealing source for both dairy alternatives and bakery and sweets alternatives.

By including Orafiti® Inulin in the recipe, a stable, firm yet creamy mouthfeel was achieved. Adding BENEØ's faba bean protein concentrate further improved the foamability of the plant-based cream, resulting in excellent whipping properties. With a well aerated texture, pleasant light and creamy mouthfeel and excellent stability when piped into swirls, this plant-based whipping cream is ideal for use on pies and other bakery products, as well as in desserts.

Due to the growing demand for plant-based and environmentally conscious purchasing, and producers wanting more economical ways to deliver great tasting bakery and desserts, BENEØ's egg- and dairy-free recipes have significant potential. Thanks to continued development, the BENEØ-Technology Center helps producers overcome the technical challenges of plant-based reformulation, whilst helping them create recipes that will keep consumers coming back for more.

INGREDIENTS (% w/w)	Reference	Test recipe
Sugar	58	60
Water	12	35
Faba bean protein concentrate	-	4
Minor ingredient (e.g. stabiliser, thickener)	-	q.s.
Egg white	29	-



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INGREDIENTS (% w/w)	Test recipe
Water	5
Vegetable fat	12
Rice syrup	10
Sugar	5
Orafti® inulin	2
Fabia bean protein concentrates	1
Minor ingredient (e.g. emulsifier stabiliser, salt, flavour)	q.s.

References:

- 1 BENEØ Global Plant-Based & Meat Hybrids Survey 2023 - Dynata conducted an online quantitative survey in January 2023 in Germany, UK, France, Spain, Poland, USA, Brazil and Thailand (N=6167). Consumer sample scoring their interest level at least at 7/10.
- 2 Mintel GNPD (May 2018-April 2019 and May 2022-April 2023)
- 3 BENEØ Global Plant-Based and Meat Hybrids Survey 2023 (N=6167) Eurostat, 10 March 2023: <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20230310-1>
- 4 The New York Times, 'What's Going On in This Graph? | Price of Eggs', 30 March 2023, commenting on USDA Egg Markets Overview data for Mar 2023.
- 5 FMCG Gurus, Dairy Trends 2022, Filter: Consumers who eat/drink dairy alternatives
- 6 BENEØ Global Plant-Based Survey 2021 - Insites Consulting conducted an online quantitative survey in July 2021 in Spain, France, Germany, Poland, UK, US, Brazil, Australia, China and Russia: 1000 consumers/ country = 11,990 consumers in total. Here: N = 3040 (Filter: Plant-based Dairy, Bakery and Sweets Consumers)

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BENEØ has long-term experience in developing and producing plant-based functional ingredients from natural sources for the food, feed and pharmaceutical industries. By supporting health and optimising taste and texture, they help improve the nutritional and technical properties of a wide variety of products.

Through a unique chain of expertise, BENEØ offers customers advice and inspiration on new product ideas that support a healthy lifestyle in a holistic way. This includes the BENEØ-Institute that provides decisive insights into nutrition science and legislation, and the BENEØ-Technology Center that consults in application technology.

Formed in 2007, BENEØ is active in over 80 countries, employs more than 1000 people and has six state-of-the-art production sites in Belgium, Chile, Germany, Italy and the Netherlands that deliver high-quality ingredients at all times.

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