

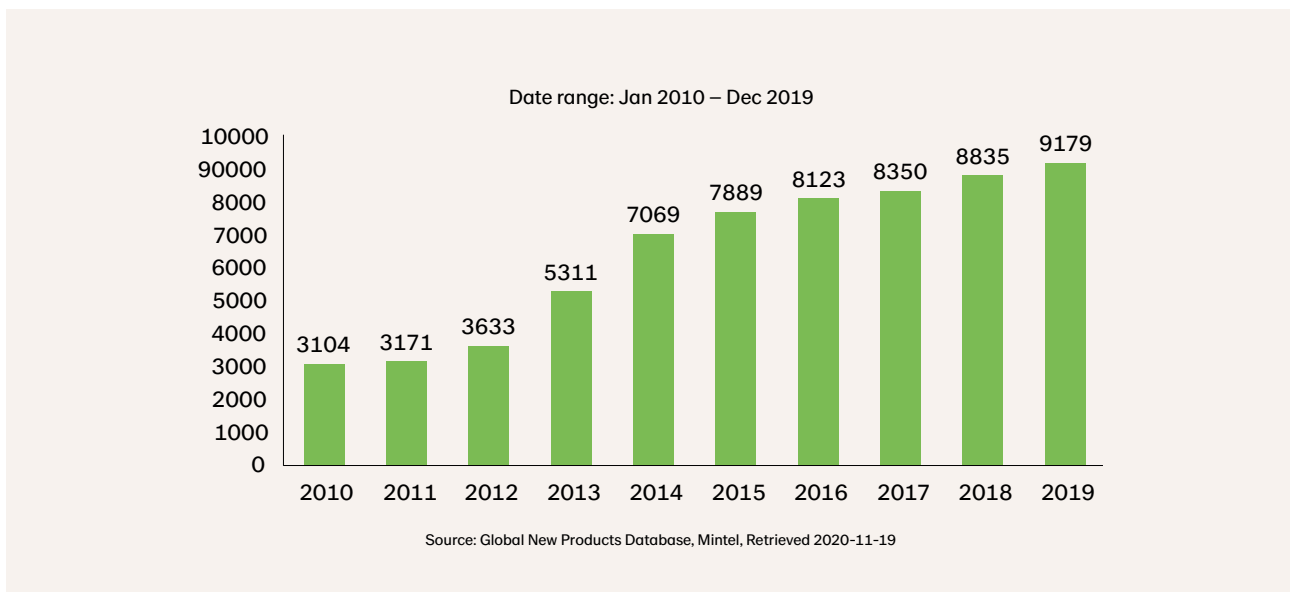
Plant-based Innovation with Oats



Introduction

Despite being a staple part of human diets around the world for many years and widely acknowledged for their health benefits, oats have long lived in the shadow of their more illustrious “superfood” peers. But all that is rapidly changing. Indeed, in the past ten years, the number of new product launches containing oats has almost tripled¹.

Chart 1: Number of product launches containing oats



Nowhere has this been more evident than in the plant-based food and drink sector, where oats are fast becoming the undisputed star of the dairy alternatives world.

The “overnight” success of oats has, in fact, been centuries in the making. Until recently, oats were very much regarded as a breakfast food, a fundamental component of porridge, muesli and breakfast cereals. Occasionally, they would venture out into flapjacks and bread, but generally they did not stray too far from the start of the day.

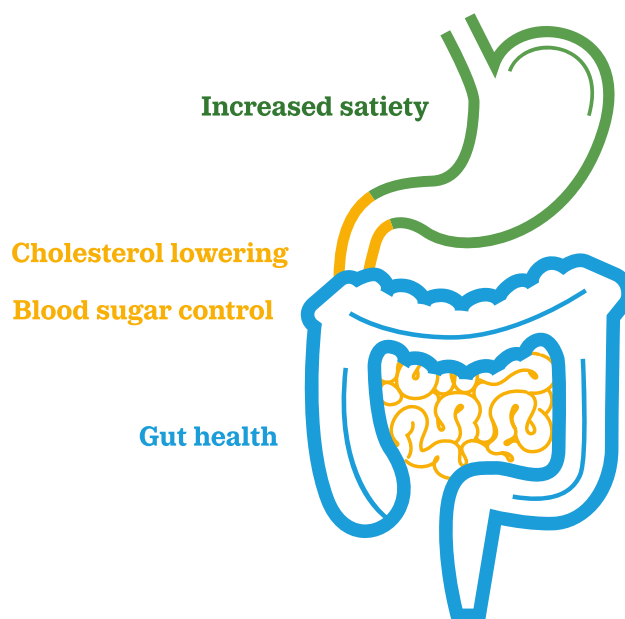
That began to change when certain new oat ingredients became available on the market. These ingredients, such as oat beta-glucan and oat protein, enabled food and drink manufacturers to develop a much broader range of oat-based products, thereby extending the appeal of oats beyond breakfast and throughout the rest of the day.

This White Paper will look at how these oat ingredients are opening up a vast array of new product development (NPD) opportunities for the food and drink industry, delivering both functional and health benefits, as well as satisfying consumer demand for oat-based products.

Oat-based Innovation: Health and Nutrition

With levels of obesity, heart disease and diabetes mellitus on the increase, many consumers are now refocusing on the importance of living a healthy, sustainable lifestyle, which incorporates a healthy diet. Rather than relying on medications to control these diseases, consumers are increasingly turning to the foods and drinks they consume to deliver health benefits, creating new innovation opportunities for an innovative industry.

Beta-glucan is the soluble fibre found in oats. Chemically, oat beta-glucan is a mixed linkage (1->3), (1->4)- β -D glucan and a linear, homopolymer (polysaccharide) of glucose. The β -linkages in the polymer chain render it non-digestible and, therefore, a soluble fibre.



The natural, soluble oat beta-glucan fibre is scientifically proven to lower cholesterol by actively absorbing bile acids and bile salts in the intestines and carrying them out of the body. The body of research to support the beneficial effects of oat beta-glucan in reducing cholesterol levels, and thereby helping to reduce the risk of heart disease, is so strong that it has been granted health claims by both the European Food Safety Authority (EFSA)² and the US Food and Drug Administration (FDA)³, as well as in many other countries.

Both authorities stipulate that 3 g of oat beta-glucan per day must be consumed, in order to fully benefit from its cholesterol-lowering effect. In Europe, this can be spread across three servings per day, meaning that each must contain at least 1g of oat beta-glucan, while in the US it can be spread across four servings per day, so that each serving should contain at least 0.75 g of oat beta-glucan.

In Europe, EFSA has also granted a second health claim to oat beta-glucan for a reduction in post-prandial glycaemic response⁴. Products designed to moderate blood sugar levels in this way should contain 4 g of oat beta-glucan for each 30 g of available carbohydrate consumed per meal. This is an amount which can easily be incorporated into two slices of bread or a bowl of pasta and opens up innovation opportunities for products designed to avoid excessive spikes in blood sugar.

Importantly, thanks to the chemical-free way in which PromOat is produced, its beta-glucan component retains its native form with a high molecular weight, thereby maximizing its functional health benefits. Together with its high concentration of beta-glucan and lack of insoluble fibres, this makes it easy to include PromOat in a diverse range of products with health claims. These include biscuits, bread, breakfast cereals, crackers, nutritional bars and pasta.



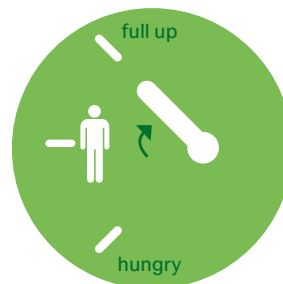
It is not just food that has benefitted from the renewed consumer demand for healthier products, but also powdered supplements and meal replacement products. PromOat Instant is especially designed for use in these types of powdered applications and is the first-ever, fully-soluble oat beta-glucan, making it ideally suited for use in powdered and ready-to-drink products.

Another recent innovation has been the launch of PromOat Gluten-Free. This allows consumers who are unable or have chosen not to consume gluten to enjoy the health and functional benefits of products containing PromOat.

The role of digestive health in overall human health is becoming increasingly apparent and oat beta-glucan has a role to play here too. As a prebiotic, oat beta-glucan tends to favour the production of butyric acid during colonic fermentation. Cells in the colon need butyrate to remain healthy and maintain normal function⁵. Thanks to its high molecular weight, the fermentation of PromOat in the colon is slower and gentler than that seen for low molecular weight prebiotics, such as inulin⁶.

A common problem with inulin is its tendency to ferment too rapidly in the first (proximal) part of the colon, which can cause excess gas, bloating and discomfort. The use of PromOat instead of or in combination with inulin can help to overcome these issues.

A number of studies have also shown the impact that foods and drinks containing oat beta-glucan may have on satiety, the feeling of being satisfied after consuming food^{7,8}. With the obesity rate in the USA above 42%⁹, tackling this epidemic-like issue is more important than ever. PromOat can easily be incorporated into a variety of different products, which are designed to help manage weight and keep the consumer feeling fuller for longer.



Oat-based Innovation: Texture

The tectonic shift taking place in the food and drink industry, as consumers adjust their diets away from animal products and towards plant-based products, is creating unparalleled opportunities for innovation. What was once the domain of vegans and vegetarians only is rapidly becoming a mainstream phenomenon, with many consumers identifying themselves as “flexitarians” – consumers of a flexible diet, which includes both animal- and plant-based products. They are often influenced by health, both of them-selves, as individuals, and of the planet, perceiving plant-based foods to be healthier and more sustainable¹⁰.

For many years, acceptance and uptake of plant-based foods by consumers was held back by the quality of products available. In particular, manufacturers struggled to recreate the texture of the original products. This was especially true in dairy alternatives, where plant-based milks and yogurts lacked the mouthfeel and creamy texture that consumers were seeking.



PromOat oat beta-glucan, which is produced from non-GMO, Swedish oats, using a unique, chemical-free, fractionation method, contains 34% oat beta-glucan, giving it very strong water-binding properties. PromOat actively thickens and stabilises the water phase in emulsified systems, enabling it to stabilise emulsions and create a creamy mouth-feel. This allows it to mimic the full-fat, organoleptic properties of dairy products but in a reduced-fat, plant-based context. An excellent demonstration of this can be seen in this video:

https://www.youtube.com/watch?v=CaJ-_HDCaMM&t=2s

[YouTube Link](#)



The video shows how PromOat can be used to make the base for a vegan mayonnaise. Not only is the mayonnaise 100% plant-based, it is also entirely clean-label and much lower in fat than a traditional, egg-based version. This provides a significant marketing benefit and avoids a lengthy, artificial-sounding ingredients list.

PromOat provides similar benefits in dairy-alternative products, adding a full-fat-mimicking mouthfeel to oat milk or a deliciously thick, creamy texture to a plant-based yogurt.

The technical functionality that PromOat delivers is a result of several unique features that it possesses. Firstly, it is a neutral-tasting, creamy-white powder, which integrates easily into a wide range of recipes. In addition, it contains virtually no insoluble fibres, meaning it works just as well in “wet” applications, such as dairy alternatives, dressings and ice-cream, as in “dry” applications, such as meat analogues and bread. Finally, its relatively high concentration of oat beta-glucan allows for low inclusion rates, thereby overcoming the technical and cost challenges encountered by other beta-glucans in the past.

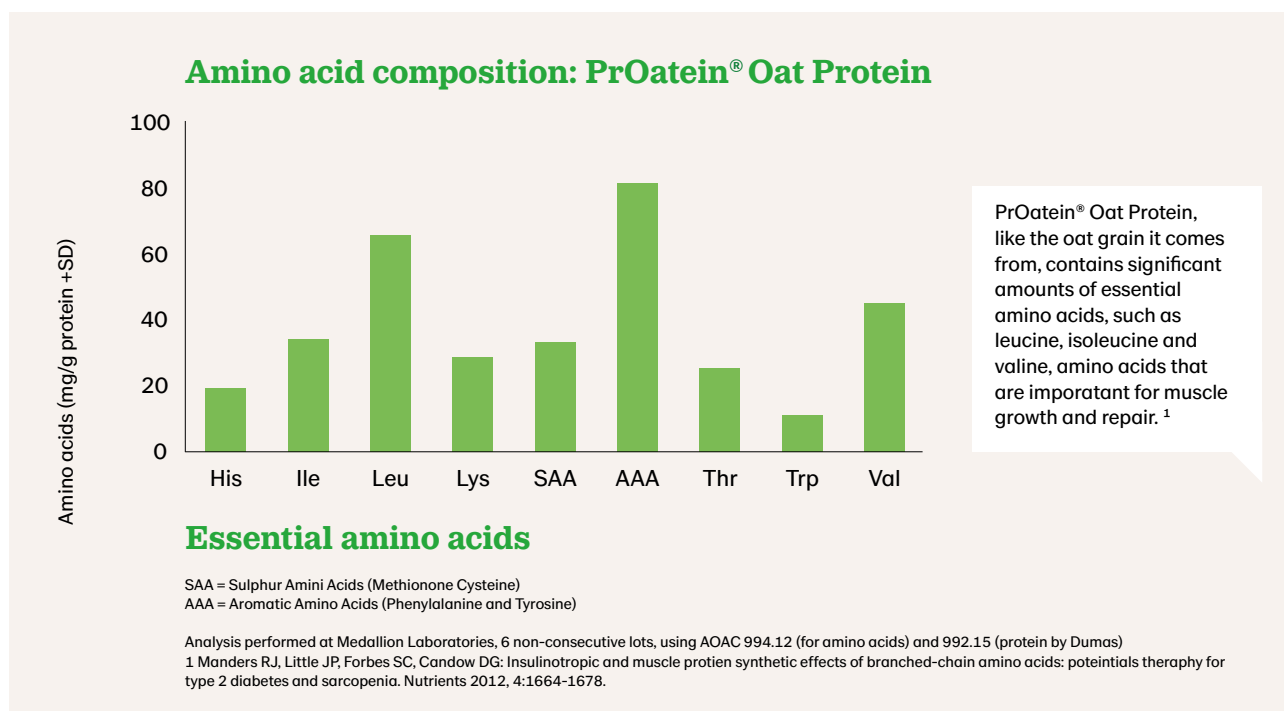


Oat-based Innovation: Alternative Proteins

The surge of consumer interest in plant-based products has led to an unprecedented level of innovation in the food and drink industry. Much of this has been centred on the search for alternative proteins, predominantly from plant-based sources. Not only are these alternative sources of protein deemed to be more sustainable for the planet in the fight against climate change, but many are also perceived by the consumer to be healthier for the individual.

With a variety of plant-based proteins now available, the decision about which alternative protein to use in the NPD process is becoming increasingly

important. Factors influencing this choice include technical functionality, the desire to differentiate a product and wanting to retain a specific marketing focus. PrOatein oat protein provides application developers with a unique opportunity to combine the health halo of oats with a plant-based protein. PrOatein is the only concentrated oat protein available. It is a clean-label, 55% oat protein concentrate, made from non-GMO oats grown by Lantmännen's farmers in Sweden. It is rich in essential, branched-chain amino acids and has an amino acid profile that compares well with other proteins based on grains:



Unlike many other alternative proteins, PrOatein has a familiar, “oaty” taste profile, which does not require disguising with other ingredients. This enables shorter ingredients lists and for it to be easily incorporated into a wide variety of product applications, ranging from protein-enhanced bread and pasta to meat analogues, as well as dairy alternatives, nutritional supplements, sports supplements and bars. The oat oil component of PrOatein can be particularly useful in the latter. In some applications, where additional functionality is required, PrOatein can be combined with pea protein. This blend has proven to be especially effective in meat analogues, where it also provides a more complete essential amino acid profile.



Summary

Innovation in oat ingredients is driving innovation in oat-based consumer products. No longer are oats confined to the breakfast table – they can now be used to make the plant-based burger on your dinner plate and the mayonnaise that goes on top of it. Ingredients such as oat beta-glucan and oat protein are giving NPD teams the tools they need to create great-tasting, clean-label, plant-based products, which combine functionality and health. To learn more about how Lantmännen's oat ingredients, PromOat and PrOatein, can add value to your plant-based NPD, please visit:

www.lantmannenbiorefineries.com/food-ingredients/
or email foodingredients@lantmannen.com

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Innovation from field to fork

Lantmännen Biorefineries AB is part of Lantmännen, an agricultural cooperative and Northern Europe's leader in agriculture, machinery, bioenergy and food products. With research and operations throughout the entire value chain, we take responsibility from field to fork.

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