

Achieving premium textures in clean-label dairy alternatives

Meeting consumer expectations in dairy alternatives

Clean and clear labels in plantbased dairy alternatives help to maximize consumer acceptance. But to succeed in a competitive market, a clean label cannot come at the expense of the rich mouthfeel and creamy texture associated with traditional dairy products. Texture is a crucial driver of palatability in dairy alternatives – if the texture is unappealing, consumers will reject it. This guide explains how oatbased beta-glucan texturizers can provide the ideal solution to the drawbacks of common texturizing solutions for plantbased dairy applications.



Innova's global report on clean label trends in 2023¹ found:



Nearly **two in three** consumers say clean labels have at least some impact on their purchasing decisions



50% of consumers say they would pay more for clean labels



31% of new food and beverage launches in 2022-2023 carried a clean label claim



The challenges of common texturizing solutions



Traditional texturizing ingredients are often classified as E numbers or have unnatural-sounding names that do not align with consumers' desire for familiar, natural, cleanlabel ingredients. Common examples include:

- Gums e.g. guar gum (E412)
- Modified food starches e.g. monostarch phosphate (E1410)
- Pectins from citrus fruits or apples (E440)
- Algal extracts e.g. agar-agar (E406)
- Cellulose derivatives e.g. carboxymethyl cellulose (E466)

The challenges presented by commonly used texturizers include:



Inconsistent performance and solubility issues

 xanthan gum, for example, can exhibit variability in viscosity and stability

Processing



High cost – pectins, for example, are relatively expensive due to the extraction process from fruit peels



climate change and environmental issues can affect availability of raw materials derived from seaweed, for example

Poor taste or

mouthfeel – including grittiness and chalkiness



Oat-based texturizers: the clean-label solution

Oat-based solutions are a natural texturizing option for dairyalternative applications and support the clean and clear labels that consumers prefer.

The advantages of oat-based texturizers include their ability to:

- · Bind water and increase viscosity
- Provide good emulsion stability
- Create foam stability in beverages
- Contribute to particle suspension
- Withstand high temperatures
- Perform well at a broad spectrum of pH levels
- Suit normal dairy processes
- Meet sustainability requirements
- Support health and nutrition claims

PromOat Oat beta-glucan: the natural solution

PromOat Oat beta-glucan from Lantmännen Biorefineries is a natural source of beta-glucan – the fully soluble dietary fibre in oat bran – from high quality non-GMO oats sourced in Sweden.

The white, neutral-tasting powder creates a thick texture with excellent mouthfeel and silky creaminess, without the graininess associated with oats. PromOat can be used in a wide range of dairyalternative applications.

PromOat is made using a unique, chemical-free fractionation process. This preserves the beta-glucan intact in its natural, highmolecular-weight form – enhancing its functional and health properties to enable good results at low concentrations.

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Oat beta-glucan

Oat kernels comprise an insoluble husk, the bran, the starchy endosperm and the germ. Oats contain beta-glucan, a fibre with mixed β -(1 \rightarrow 4) and β -(1 \rightarrow 3) bonds. This structure gives oat beta-glucan the ability to bind water and act as a texturizer.³

Oat kernel composition²

Endosperm: Thin cell walls contain beta-glucan

Bran: Thick cell walls contain beta-glucan

Germ

The benefits of PromOat



Clean label – can be listed on the label as "fibre", "oat bran fibre" or "oat beta-glucan" with no E numbers. It can also be part of an oat base without requiring a separate declaration



Clean taste – has a more neutral taste than other beta-glucan products, enabling seamless integration into recipes

High beta-glucan content (34%) – allows for low inclusion rates, thereby overcoming the technical and cost challenges associated with other beta-glucans

Strong stabilizing properties – has excellent water-binding properties due to the high betaglucan content. This builds viscosity, which thickens the water phase and, as a result, stabilizes emulsions

Highly soluble – unlike some oat texturizers, PromOat has virtually no insoluble fibres, making it ideal for dairy-alternative yoghurts, ice cream, beverages and other liquid or semi-liquid applications such as sauces and dressings

Supports foam stability – particularly useful for desserts such as mousses, and for barista drinks

Increases particle suspension – helps ensure a more uniform texture and creamy mouthfeel, and avoids sedimentation in beverages

Acid- and heat-stable – enables use in a

wide variety of processes and applications, including UHT treatment, high-pressure homogenization and fermentation

Viscosity – not dependent on pH or ionic strength (fig 1)



Easy to use - heat or salts are not required to build texture

Fat substitute – helps to rebalance fat and calorie content due to its fat-mimicking properties, enabling calorie-reduced recipes for indulgent products like ice cream

Nutrition claims – recipe-dependent, these may include "high in fibre", "source of fibre" and "reduced fat"

Health claims – enables EFSA⁴ and FDA⁵ approved health claims for risk-factor reduction in coronary heart disease by actively lowering cholesterol

Fig 1: PromOat viscosity is not dependent on pH or ionic strength



Viscosity at 1, 50 and 100 s⁻¹ for PromOat 3% w/v at different pH

Viscosity at 1, 50 and 100 s⁻¹ for PromOat 3% w/v with increasing ionic strength



The mean viscosity of PromOat 3% w/v at increasing ionic strengths at shear rates 1, 50 and 100 s⁻¹

The error bars show the standard error of mean.

Using PromOat in dairyalternative applications

PromOat integrates easily into dairy-alternative food and beverage recipes to improve the texture and other functional features while also enabling health claims. Here, we present a series of application examples to demonstrate how using PromOat in plant-based dairy products can help product developers create products with optimal textures and clean labels.





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Plant-based beverages

PromOat can provide functional benefits in dairy-alternative beverages to:

- Enhance creaminess and mouthfeel
- Create a smooth texture without affecting the flavour
- Provide emulsion and foam stability
- Contribute to particle suspension

It can also be used as a clean-label texturizer in ready-to-mix beverages to:

- Enhance creaminess and mouthfeel
- Improve particle suspension when reconstituting the beverage

Processing notes

- 0.5-1% PromOat is a good starting point when using PromOat as a stand-alone texturizer
- PromOat can withstand the typical high-pressure homogenization and UHT treatments applied in the beverage industry

Recipe suggestion: Oat drink

In this recipe, PromOat contributes to stability and mouthfeel. PrOatein Fine is included to increase the protein content to 3.4% – similar to cow's milk. PrOatein Fine is a clean-label oat protein powder specifically developed for use in liquid or creamy applications. With an average 55% protein content, reduced particle size and mild flavour, it can be used for protein enrichment without compromising taste or texture.

Ingredients	%	Nutrition	Per 100g	Per serving
Water	85.98	Keel	61	(230g)
Hydrolysed oat flour	7.64	KCOI	10	151
PrOatein Fine	5.36	Protein (g)	3	9
Rapeseed oil	0.52	Carbohydrate (g)	7	19
PromOat Oat beta-glucan	0.5	- of which sugars	3	6
Calcium carbonate for pH adjustment		Fat (g)	2	4
		Fibre (g)	1	3



PromOat can provide functional benefits in dairy-alternative yoghurts and desserts to:

- Enhance creaminess, body and mouthfeel
- Provide emulsion stability
- Contribute to particle suspension

Processing notes

- 0.5-1.5% PromOat is a good starting point for dairy-alternative yoghurts and desserts
- PromOat can be used with different combinations of hydrocolloids to achieve the desired texture for your product (fig 2)
- PromOat is stable at the typical yoghurt pH and has lower viscosity at higher temperatures (fig 3), making it easy to pump the product

Fig 2: Combine ProOat with other hydrocolloids to achieve the desired texture



Fig 3: PromOat viscosity decreases with increasing temperature



Recipe suggestion: Oatgurt

In this recipe, PromOat provides creaminess and mouthfeel, and contributes to emulsion stability due to increased viscosity. PrOatein Fine acts as the oat base and increases the protein content.

%	Nutrition	Per 100g	Per serving (150g)
85.70	Kagl	67	101
5.00	KCUI	07	101
2.97	Protein (g)	3	4
0.93	Carbohydrate (g)	6	9
0.50	– of which sugars	1	1
3.97	Fat (g)	4	6
0.93	Fibre (g)	0.4	0.6
	% 85.70 5.00 2.97 0.93 0.50 3.97 0.93	% Nutrition 85.70 Kcal 5.00 Protein (g) 2.97 Carbohydrate (g) 0.93 Carbohydrate (g) 0.50 Fat (g) 3.97 Fibre (g)	% Nutrition Per 100g 85.70 Kcal 67 5.00 Protein (g) 3 2.97 Carbohydrate (g) 66 0.93 Carbohydrate (g) 1 0.500 Fat (g) 4 0.93 Fibre (g) 0.4





Plant-based cream cheese

PromOat can provide functional benefits in vegan cream cheese recipes to:

- Contribute to emulsion stability and thickness
- Create a creamy, adhesive mouthfeel similar to that of dairy cream cheese
- Reduce or replace other emulsifiers
- · Combine with other hydrocolloids to create different textures

Processing notes

Higher temperatures reduce viscosity, making it easy to pump during production and has lower viscosity at higher temperatures

Recipe suggestion: Oaty cream cheese

In this recipe, PromOat is added to stabilize the emulsion and create a mouthfeel similar to dairy cream cheese. PrOatein Fine is included to provide a protein content of 5.5%, comparable to traditional milk-based version.

Ingredients	%
Water	60.50
Coconut and shea fat	24.00
PrOatein Fine	10.00
Native wheat starch	3.00
PromOat Oat beta-glucan	1.00
Salt	0.80
Cream cheese aroma	0.70

Per 100g	Per serving (20g)	
270	12.5	
5.5	1.1	
4.3	0.8	
25.4	5.0	
0.9	0.2	
	Per 100g 270 5.5 4.3 25.4 0.9	

Plant-based ice cream

PromOat can provide a range of functional benefits in non-dairy ice cream to:

- Ensure better heat-shock resistance while preserving texture, mouthfeel and body
- Improve the melting characteristics for better organoleptic properties
- Create a longer texture to mimic fat characteristics, enabling ice cream with reduced fat content. It also provides enhanced creaminess and cohesiveness in reduced-fat formulations, while its water-binding properties create low-fat ice cream with less ice-crystal formation
- Act as a clean-label emulsifier replacer, providing better organoleptic characteristics than other emulsifiers and emulsifier replacements



Processing notes

The recommended inclusion levels in ice cream are 0.15% to 0.5% PromOat, depending on formulation and the initial viscosity of the recipe.

PromOat[®] Oat beta-glucan

PromOat texturizing solutions for your dairy alternatives

Lantmännen can provide technical support on how to use PromOat Oat beta-glucan in a wide range of clean-label dairy alternatives, including detailed notes and recipe ideas for many applications.

Get in touch to discover more and request a sample:

- ☑ foodingredients@lantmannen.com
- () www.foodingredients.se

About Lantmännen Biorefineries

Lantmännen Biorefineries AB is part of Lantmännen, Northern Europe's leader in agriculture, machinery, bioenergy and food products. An agricultural cooperative owned by 18,000 Swedish farmers, it has 12,000 employees, operations in over 20 countries and brands including AXA, Kungsörnen and FINN CRISP.