

Innovation with Oat Protein



Introduction

Dietary protein plays essential roles in the body, both structurally and functionally, contributing to the healthy growth and maintenance of cells, as well as biochemical processes, neurotransmission and circulation. With mainstream consumers increasingly looking to incorporate plant-based foods into their diet, food and drink manufacturers are seeking alternative forms of protein which they can use to create and enrich their products, while also taking into account other criteria, such as taste, price and sustainability.

One such alternative protein is PrOatein, a natural oat protein concentrate from the Swedish agricultural cooperative, Lantmännen. This white paper will look in more detail at PrOatein oat protein, examining its nutritional benefits and how it can help both new product developers and marketers meet the fast-growing consumer demand for products containing both oats and protein.



What is PrOatein?

PrOatein oat protein is a clean-label, oat-based protein concentrate, made from non-GMO, Swedish oats. Containing, on average, a protein concentration of 55%, PrOatein is a fine, free-flowing, light-brown powder with a taste and aroma typical of oatmeal. It does not stick, does not add viscosity and has good wettability.

PrOatein can be used in a wide variety of food applications and nutritional supplements, ranging from meat analogues to dairy alternatives, and bread to protein bars. It contains many of the amino acids needed for growth and development and in comparison to many other plant-based proteins, it is rich in leucine, isoleucine and valine. These are branched-chain amino acids (BCAAs) known to be involved in muscle protein synthesis.

As will be seen later in this white paper, PrOatein can be combined with other plant proteins, such as pea protein, to deliver both texture and a more complete amino acid profile, while still retaining the finished product's plant-based credentials.

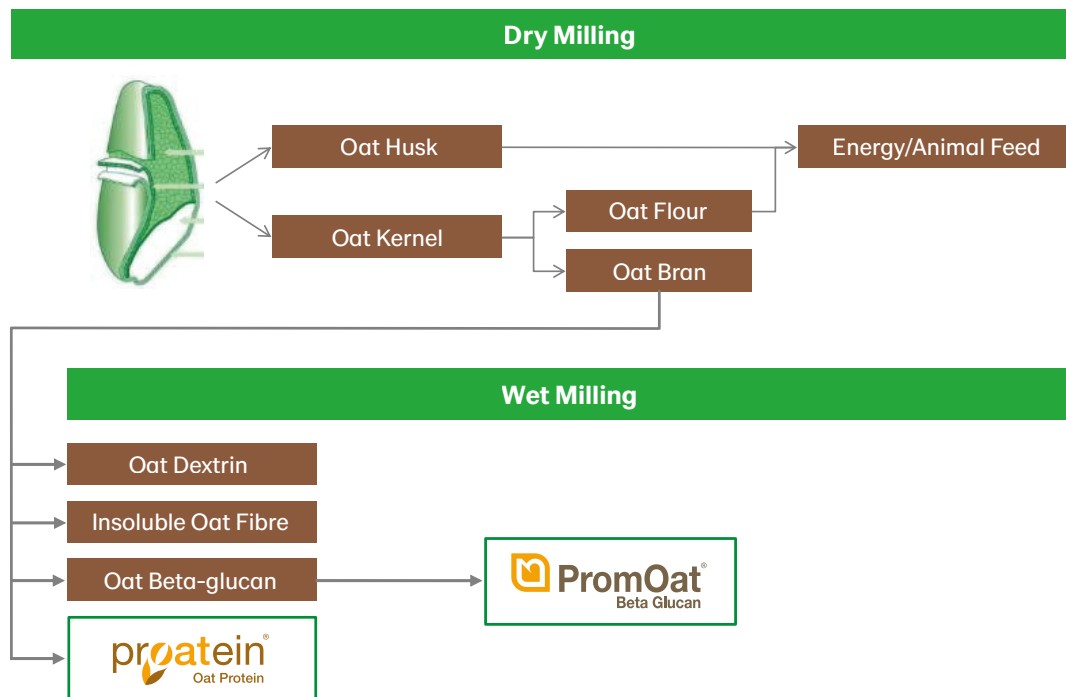
Process for the production of PrOatein

PrOatein oat protein is produced using a two-stage dry milling and wet milling process. No chemicals are used during this process, nor are any present in PrOatein itself, meaning it can be declared as “clean-label”. This unique process also results in four other streams:

- Beta-glucans (soluble oat fibre)
- Oat dextrins
- Insoluble oat fibre
- Oat flour

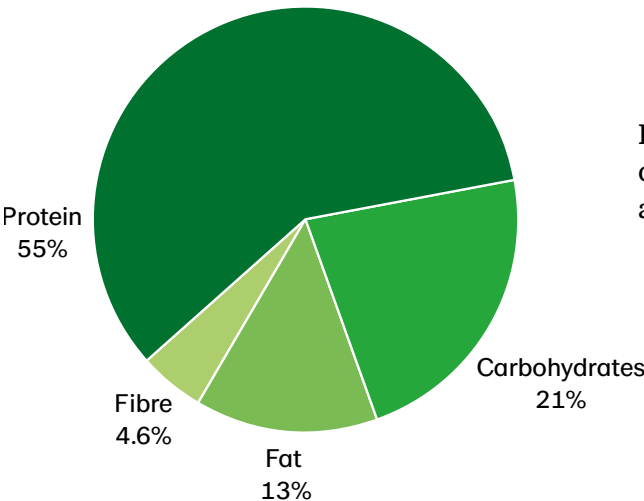
Beta-glucans are sold under the registered trademark PromOat and available in four different versions: PromOat Original, PromOat Instant, PromOat Gluten-Free, and PromOat Gluten-Free Organic.

Further information can be found at www.promoat.com.



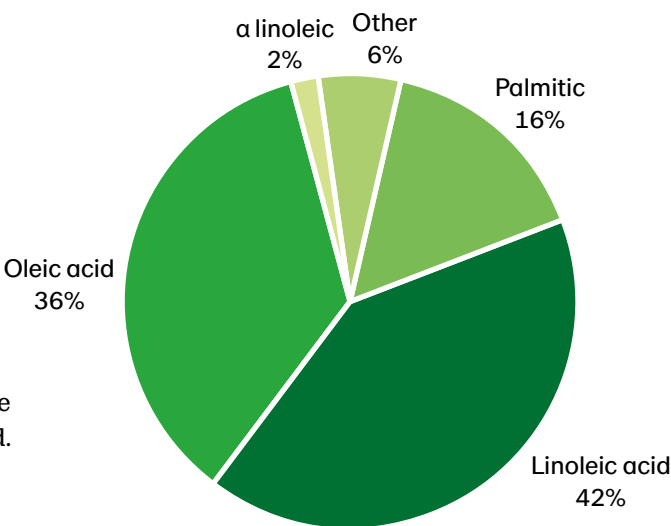
Nutritional properties of PrOatein oat protein

In addition to its protein content, PrOatein oat protein also typically contains 13% oat oil (which is composed primarily of palmitic, oleic and linoleic fatty acids), naturally-occurring oat maltodextrins (20-24% by weight) and a small amount (0.5-3%) of oat beta-glucan soluble fibre.



PrOatein has a protein content of 55% (+/- 5%), carbohydrate content of 21%, fat content of 13% and fibre content of 4.6%.

PrOatein's naturally-occurring oat oil content is made up largely of linoleic acid, oleic acid and palmitic acid. See further information in the figure to the right.



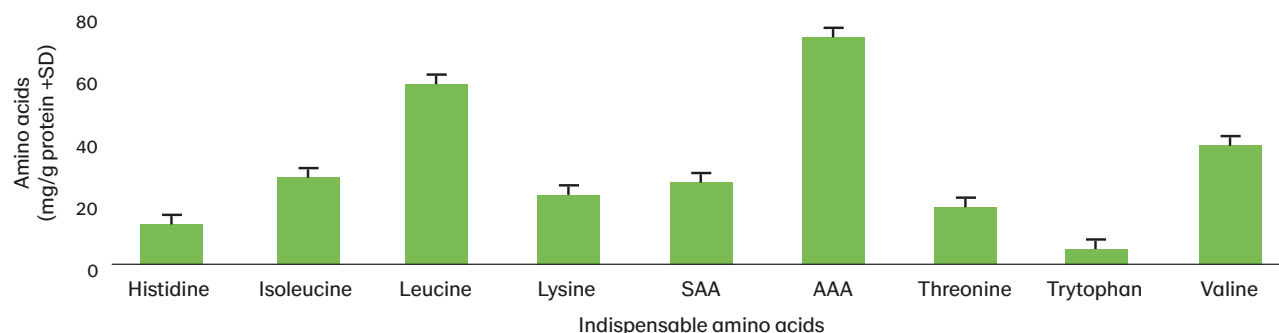
PrOatein compared to other plant-based proteins

	PrOatein	Pea Conc.	Pea Isolate	Soy Isolate
Protein (%)	53	56	88	87
Fat (%)	13	5	3	0
Carbohydrate	21	35	5	8
Ash	3	5	4	5

Amino Acid profile of PrOatein oat protein

PrOatein meets nearly all of the WHO 2007 amino acids pattern requirements for adults, except for lysine, the limiting amino acid in oat protein. PrOatein contains at least 10% more sulfur amino acids (SAA) than pea protein; more SAAs and valine than soy protein; and has more of each indispensable amino acid compared to wheat. Combining plant proteins can create a more complete amino acid content in finished food products.

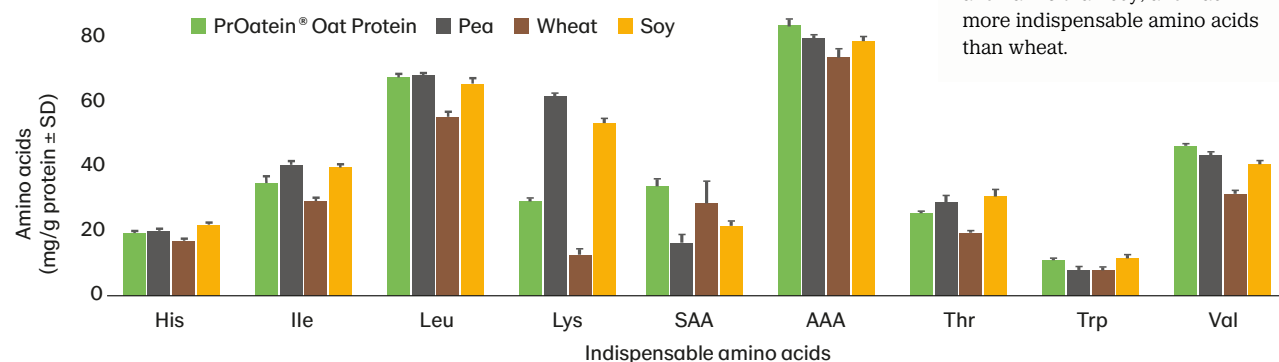
Indispensable amino acid contents of PrOatein Oat Protein



^a Average of six independently tested lots of PrOatein® Protein.

Amino Acid profile of oat protein compared to pea, wheat and soy proteins

Indispensable amino acid content



Oat protein contains more SAA and tryptophan than pea; SAA and valine than soy; and has more indispensable amino acids than wheat.

SAA = Sulphur Amino Acids (Methionine and Cysteine)

AAA = Aromatic Amino Acids (Phenylalanine and Tyrosine)

Each comparison protein profile represents 3 tested lots of ingredient.

PrOatein® amino acid profile represents 6 tested lots of ingredient.

Analysis performed at Medallion Laboratories, using AOAC 994.12 (for amino acids) and 992.15 (protein by Dumas)

AA for proteins other than oat protein are indicative for illustration purposes and based on selected market proteins and may not represent the composition of each and every product.

Physical properties

- Free flowing powder
- Good wettability
- pH 6.3
- 10% of the particles larger than 127 micrometers, measured by laser diffraction.



Uses and applications of PrOatein oat protein

Oat-based dairy alternatives and protein-enriched foods are both seeing very strong demand from consumers, so the use of PrOatein oat protein in a single product is an extremely powerful proposition from a marketing perspective. Oats carry an “oat halo” - widely recognised as being healthy and natural – and new products can benefit from this by incorporating PrOatein into them.

Thanks to its mild cereal taste, which gives it a significant advantage compared to most other plant-based proteins, PrOatein is easy to work with in a wide range of product applications. These range from “dry applications”, such as bread, pasta and protein bars, to “wet applications”, such as dairy alternatives.

An exciting, recent development is the use of PrOatein in Textured Vegetable Protein (TVP) for meat analogues. Application research work with PrOatein in TVP has been carried out both by Lantmännen and an independent European research institute (more information is available by contacting foodingredients@lantmannen.com). Both studies showed the functional and sensory benefits of combining PrOatein oat protein and pea protein in TVP, with the resultant product scoring very highly in terms of taste and texture.

PrOatein oat protein and pea protein also work well together in plant-based protein powders, nutritional supplements and meal replacement products, with PrOatein contributing to a more complete amino acid profile than if pea protein were used on its own.





Conclusion

At a time when more mainstream consumers than ever before are seeking foods containing plant-based proteins, PrOatein oat protein offers an ideal solution for product application specialists. Its combination of oats and protein delivers both marketing benefits and protein fortification in a single ingredient. In addition, its combination with pea protein in both meat analogues and nutritional supplements provides exciting potential for new product development in these fast-growing categories.

More information

To learn more about how Lantmännen's oat protein ingredient, PrOatein, can add value, please visit: www.lantmannenbiorefineries.com/proatein or email foodingredients@lantmannen.com.

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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