



Premium pet food flavor enhancement

DID YOU KNOW?

that the value of pet food imported into EU from the rest of the world has more than doubled since 2011 ¹?

Facts:

70%


of European pet owners reported a stronger relationship with their pets during the pandemic². Besides the pandemic, animal welfare programs across the world have also encouraged the humanization of pets.

62%

of European pet owners are more concerned about quality than low prices and are therefore willing to pay more for quality-driven pet food³.

2nd

largest pet food market in the world, Europe is seeing a great surge in pet food revenue. The increasing humanization of pets and the growing disposable personal income (DPI) of pet owners across European countries enables more pet owners to spend lavishly on their dear pets⁴.



**Premium pet food
produced from balanced
flavors with minimal
waste is ideal**



Derive value from animal co-products with Novozymes' microbial enzymes to produce high-value pet food ingredients

What are enzymes?

Enzymes are natural proteins that act as biological catalysts to transform chemical reactions. Novozymes enzymes are skillfully engineered to retain their natural benefits while maximizing other gains.

In pet food, the right enzymes can not only upgrade the flavor profile but also help you support claims for organic food and human-grade food.

Why use enzymes?



Create new, high-value pet food ingredients

- Pet food palatants and digests
- Protein-rich pet food



Improved processability

- Through improving liquefaction, mechanical emulsification is no longer needed. A liquid protein hydrolysate is easier to process and can be used to benefit all types of pet food.



High quality pet food palatants

- The more hydrolyzed a protein is, the more bitter it tastes. Enzymes can help reduce bitterness and increase the savory flavor.



Natural processing aid



Sustainability

- Convert animal co-products into valuable pet foods while reducing waste and improving the process economy of meat production.

How exactly can enzymes upgrade pet food flavor?

It can be a challenge to transform animal co-products into high-quality protein that is also tasty. Why?

Because the more hydrolyzed a protein is, the more bitter it usually tastes. Enzymes from Novozymes help reduce bitterness and increase the savory flavor that pets love.

These enzymes help turn bovine, poultry and porcine co-products into hydrolysates, a valuable ingredient in pet food. Hydrolysates have multiple applications; they are often used inside dry kibble to improve taste or in wet pet foods as an overall flavor system. They can also be sprayed on the outside of the kibble to boost flavor and palatability.

How can enzymes benefit your business?

Flavor and color-boosting enzymes for pet food makers:

Novozymes pet food enzymes portfolio offers enzyme solutions that enrich both the flavor and production process. When you use flavor generating/debittering enzymes in your pet food, they help create a flavor profile that can set your brand apart. Tastier, more premium pet food wins you the brand loyalty of both human and fur customers, which ultimately raises your bottom line.

Flavor and process-optimizing enzymes for meat processors:

If you're a meat processing brand, process-optimizing enzymes can help your business make the most of its resources. Enzymes that can do both flavor- and process-optimization help you create superior pet food palatants from leftover animal co-products, helping you generate a new source of income.

How to add value to final products with proteases

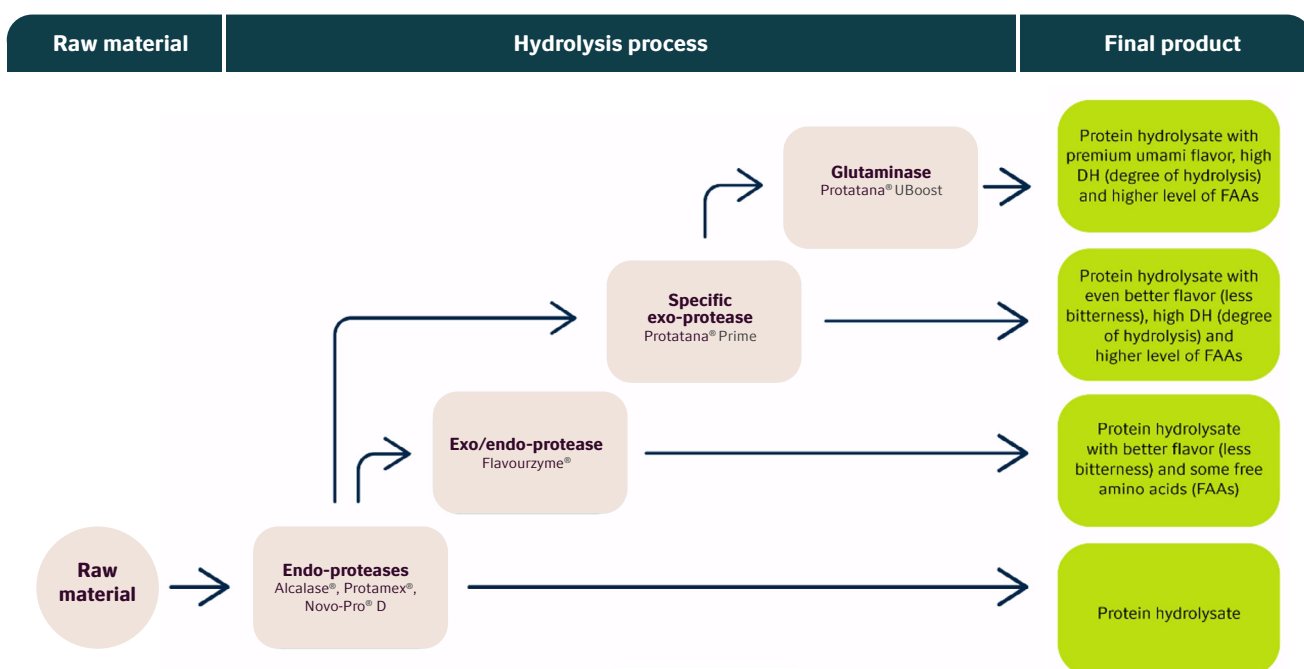


Fig. 1. Hydrolysis process steps and added value in the final product.



How to get the best out of your enzymes

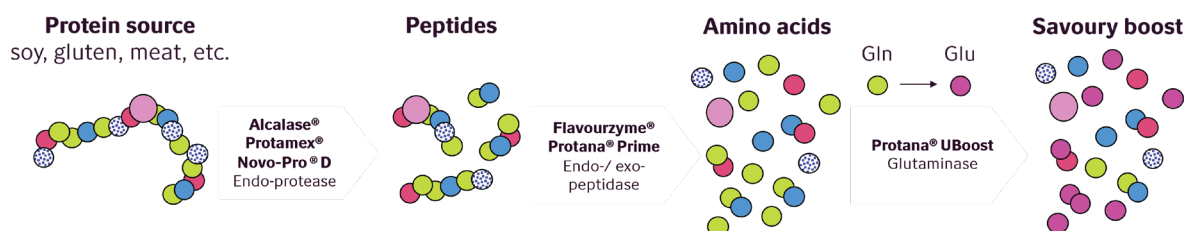


Fig. 2. Protein hydrolysis with endo-protease, exo-peptidase and glutaminase.

Explore our solutions within pet food

Find the right solution for you in our global portfolio, shown below. To find out more about products available in your region, [get in touch](#) with your local Novozymes representative.

	Available strengths (range)	Hydrolysis action	Savory flavor generation	Suitable for organic products
Granulate, Liquid Alcalase® Go to product page	2,4-4,0 AU-A/g	Aggressive	✓	✓
Granulate Protamex® Go to product page	1,5 AU-A/g	Aggressive	✓	✓
Granulate, Liquid Flavourzyme® Go to product page	500-100 LAPU/g	Aggressive	✓	✓
Liquid Protana® Prime Go to product page	1067 LAPU/g 979 CPDU(A)/g	Aggressive	✓	—
Liquid Protana® UBoost Go to product page	100 EGLU-A/g	Mild	✓	—
Liquid Novo-Pro® D Go to product page	16 KNPU-S/g	Aggressive	✓	—

Table 1: Novozymes enzymatic solutions within pet food.

Usage of microbial enzymes

Enzymatic hydrolysis of pet foods

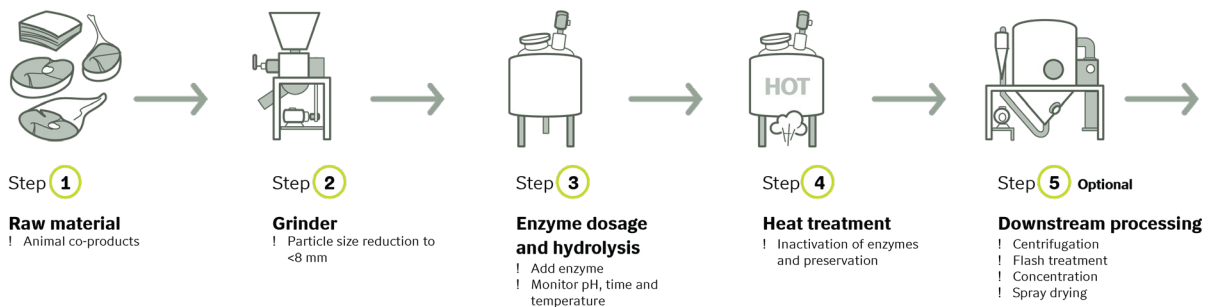


Fig. 3. Flow chart of pet food production and usage of enzymes.

Study cases

In one example application, using Protamex® for the hydrolysis of chicken hearts, livers and lungs (CHLL) improves the palatability of dry dog food. 1 kg of Protamex® per ton of raw material with hydrolysis conditions of 30 minutes at 60°C/140°F improves liquefaction and eliminates the need for mechanical emulsification. Palatability tests using 20 dogs over 4 days show that there is a significant preference for the dog food treated by Protamex® compared to the control dog food, as can be seen in figure 4.

Total daily consumption

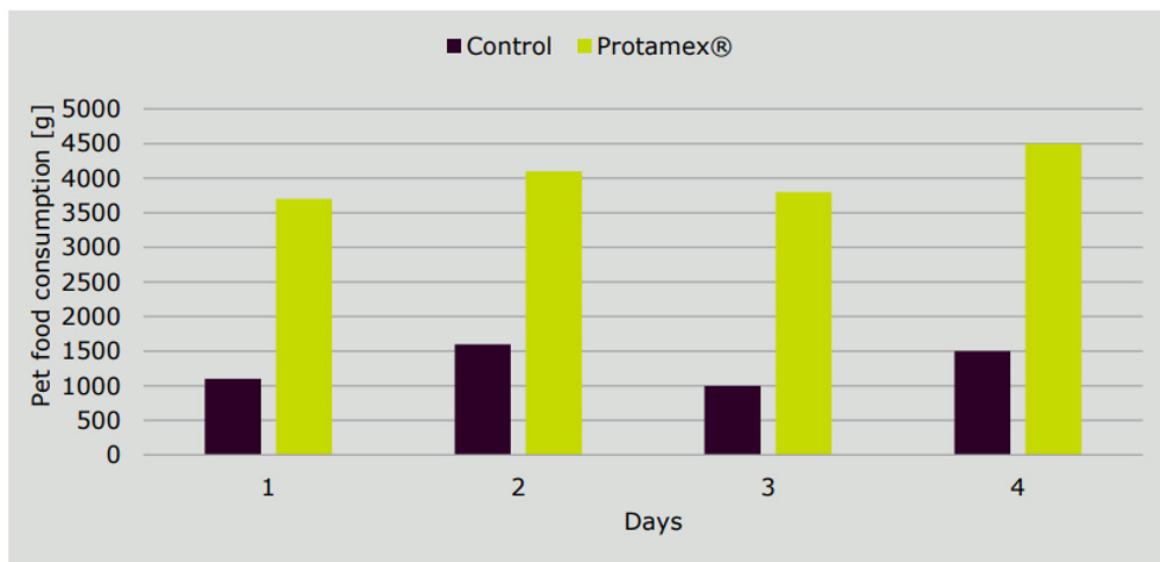


Fig. 4. Total daily consumption of two pet food formulas

Higher degrees of hydrolysis (%DH) can be achieved by combining endo- and exopeptidases or by combining different types of endopeptidases. Figure 5 illustrates the degree of hydrolysis achievable in beef using different single enzymes or a combination. In this example, the hydrolysis occurred over four hours at 50°C/122°F and at an initial pH of 7.0. The %DH increases in the order of Protamex® and Alcalase®, ranging from 13 to 23%. The hydrolysis reaches a plateau when the peptides are too small for continuous affinity for the enzyme active site. By combining Alcalase® with Flavourzyme® 1000 L, the degree of hydrolysis can increase to over 50% in some cases by generating free amino acids from the terminal end of each new peptide created.

There is still a theoretical limit to the %DH with this combination, as some amino acids may block further exo- peptidase action due to the amino acid size, charge, or polarity.

% degree of hydrolysis

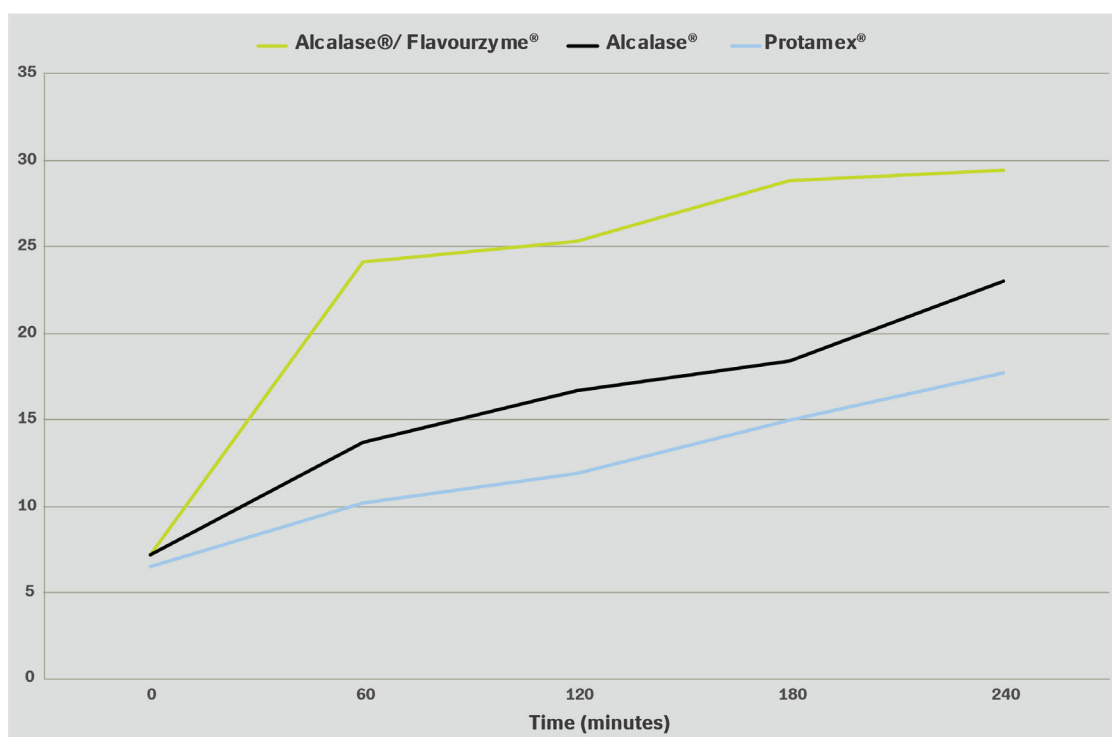


Fig. 5. Hydrolysis of ground using different Novozymes proteases at their optimum pH and temperature



Get in touch

Email: MACA@novozymes.com website: [Visit our website](#)

Get ahead

Staying ahead of the dynamic food and beverage market requires the best technology and expertise to become even more flexible, efficient and profitable. With our solutions and know-how, Novozymes can support you on that journey. Let's transform the quality and sustainability of your business together.

About Novozymes

Novozymes is the world leader in biological solutions. Together with customers, partners and the global community, we improve industrial performance while preserving the planet's resources and helping to build better lives. As the world's largest provider of enzyme and microbial technologies, our bioinnovation enables higher agricultural yields, low-temperature washing, energy-efficient production, renewable fuel and many other benefits that we rely on today and in the future. We call it Rethink Tomorrow.

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