

The background image shows a close-up of fish being processed. Several pairs of hands wearing red rubber gloves are visible, sorting through a large pile of fish. The fish are mostly silver with some yellowish-orange hues. A semi-transparent white rectangular box is overlaid on the left side of the image, containing the main title and a sub-headline. A small yellow square is located in the top-left corner of the white box.

Seafood protein hydrolysates

Increase yield, quality and flavor while improving your economy and sustainability profile

In a normal year,
global fish meal production
is estimated to be in the
region of

5 million tons

– IFFO (The Marine Ingredients Organisation)

Seafood derived ingredients



60% wasted

Since the edible flesh of most fish represents only 40% of the total weight, there's a huge opportunity to turn waste into a protein feed resource

– FAO, Fisheries and Aquaculture Department

Meeting customer demands

The **global fish oil market** size was valued at **\$1,9 million** in 2019, and is estimated to reach **\$2,8 million** by 2027 with a CAGR of **5.79%** from 2021 to 2027.

– Allied Market Research

Seafood derived ingredients





Many protein-rich co-products are wasted when processing fish

It can be challenging to find value using acid to produce fish meal

- The resulting fish meal is of low quality, mainly suitable for the production of cheap pet food
- The acid process is energy-intensive and can corrode the equipment
- Acid processing is not environmentally friendly

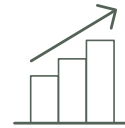


**Derive value from
seafood co-products with
Novozymes' microbial
enzymes to produce
high-value ingredients**



Create new, high-value, differentiated ingredients

- Flavor enhancers
- Protein fortifiers
- Fish oils
- Pet food
- Animal feed



Yield improvement



Natural processing aid



Reduce process time/energy/costs

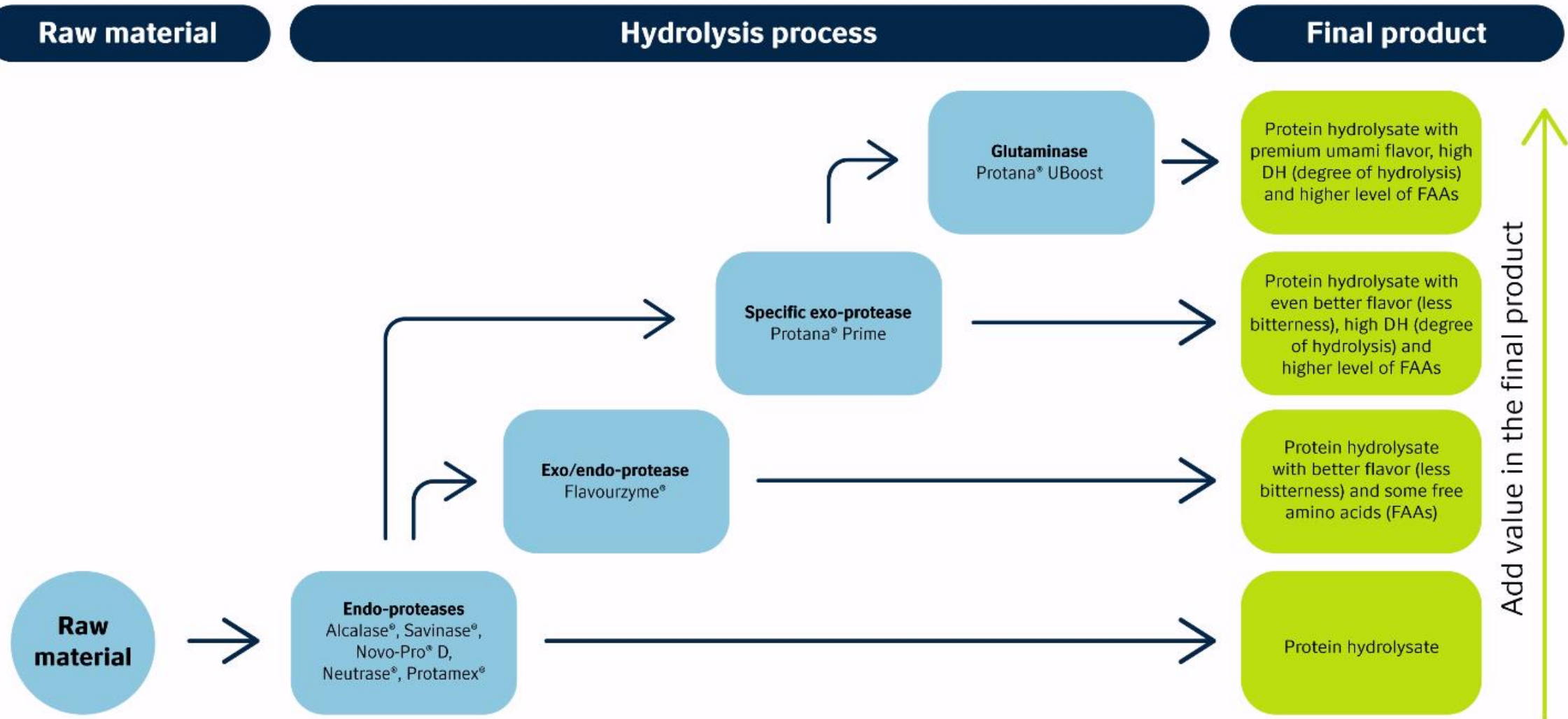
- Fish proteins and flavors can be sold as food ingredients to benefit your overall business – and by avoiding waste, your fish processing is more environmentally friendly.

Novozymes protease range

The following enzymes are suitable for production of fish processing extracts:

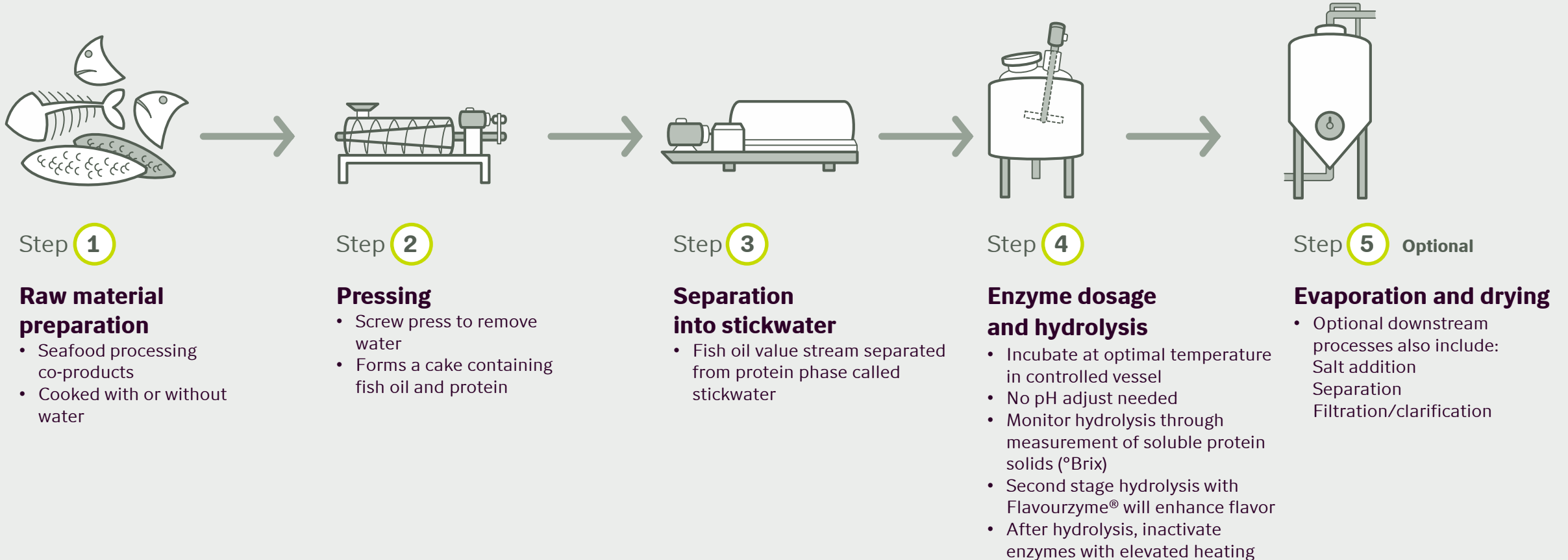
	Available strengths (range)	Hydrolysis action	Generation of peptides or single amino acids	Debittering	Savory flavor generation	Working pH range*	Working temperature range (°C)*	Quality grade
Granulate Liquid Alcalase® Go to product page	2,4-4,0 AU-A/g	Aggressive	Peptides	—	✓	6.5 - 10	60 - 75	Food, feed and tech grade
Granulate Liquid Flavourzyme® Go to product page	500-100 LAPU/g	Aggressive	Peptides and amino acids	✓	✓	4-8	30-65	Food grade
Granulate Liquid Neutrase® Go to product page	0,8-1,5 AU-N/g	Less Aggressive	Peptides	—	✓	6-9	30-65	Food grade
Liquid Protana® Prime Go to product page	1067 LAPU/g 979 CPDU(A)/g	Aggressive	Small peptides and amino acids	✓	✓	3-7	20-55	Food grade

How to add value to final products with proteases



Microbial enzyme usage

Fish meal processing



Novozymes is your partner to improve your fish processing

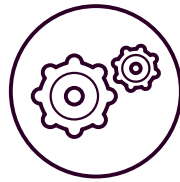


Differentiate

Understanding market demands

Fish-derived co-products are rich in nutritional and bioactive compounds that are in high demand in several industries globally. Fish protein extract and natural flavors are sustainable ways to derive value from fish co-products.

By working with Novozymes' experts, you can unlock the value within these process streams and win in the marketplace.

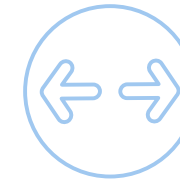


Optimize

Optimizing your product with enzymes

Protease technology has unique and versatile functional benefits. Through experimentation, we can select the optimal balance and dosage of enzymes to develop your new ingredient.

The enzymes that can boost the value of your fish co-products are Alcalase®, Flavourzyme®, Neutrase® and Protana®.



Expand

Winning customers and sales

Fish processing can boost sustainability by extracting the maximum value from every fish. Novozymes helps you meet your production and launch goals with a partnership mentality.

You have access to a wealth of expertise, from labeling and regulatory to technical services, supply chain and commercial account management. Together we ensure that your fish extracts are a commercial success.

Go to <https://biosolutions.novozymes.com/en/animal-protein>
and click on Contact us to get in touch with our experts

novozymes® 

Rethink Tomorrow