



Find new value in meat protein hydrolysates

Increase yield, quality and flavor

40%

of humanity's total protein consumption is animal-derived – and this is expected to increase substantially by 2050

– Trends in Food Science and Technology



Market trends

Global meat production has tripled over the past three decades and is predicted to **double by 2050**

200%

So there are large amounts of protein-rich co-products available to be converted into meat protein extract.

- Stanford Report



22%

of the meat consumed in
the U.S. is processed

– Trends in Food Science and Technology

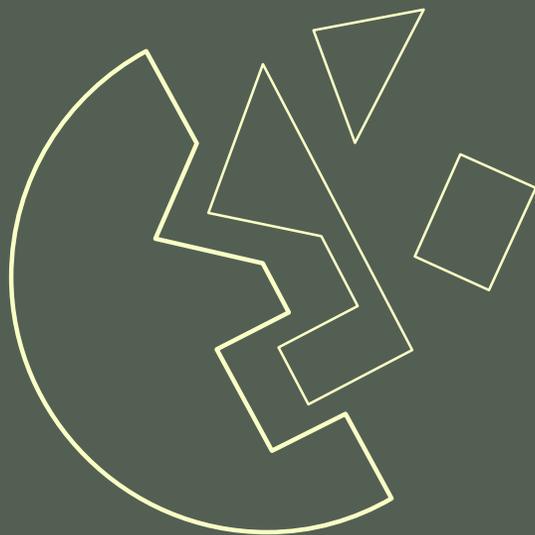




Many protein-rich co-products are wasted when processing meat

It can be challenging to hydrolyze meat trimmings

- It is a highly physical process, and the raw material can stick to the mixer
- It is difficult to completely solubilize meat trimmings, and there is often a lot of sediment in the final product
- If a quality product cannot be made, the meat trimmings are wasted – and the meat processing industry is already considered to be unsustainable



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

- **Create new, high-value, differentiated ingredients**
 - Flavour enhancers
 - Protein fortifiers
 - Pet food
 - Animal feed
- **High processability**
 - The enzymatic process effectively liquefies the trimmings and secures cleaner processing.
- **Yield improvement**
- **Natural processing aid**
- **Reduce process time/energy/costs**
 - Meat processing extracts can be sold as a food ingredient to benefit your process economy – and by avoiding waste, your meat processing is more environmentally friendly.

Products

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

Novozymes product	Description
Alcalase® 2.4 L FG	Broad-spectrum endoprotease, liquid
Alcalase® 2.5 L PF	Broad-spectrum endoprotease, liquid, suitable for pet or animal feed
Flavourzyme® 1000 L	Flavor-modifying exopeptidase, liquid
Flavourzyme® 500 MG	Flavor-modifying exopeptidase, granulate
Protamex®	Very broad-spectrum endoprotease, liquid
Protana® Uboost	Glutaminase
Protana® Prime	Flavor-modifying exopeptidase, liquid

Grinding or chopping



Hydrolysis



Separation



Evaporation



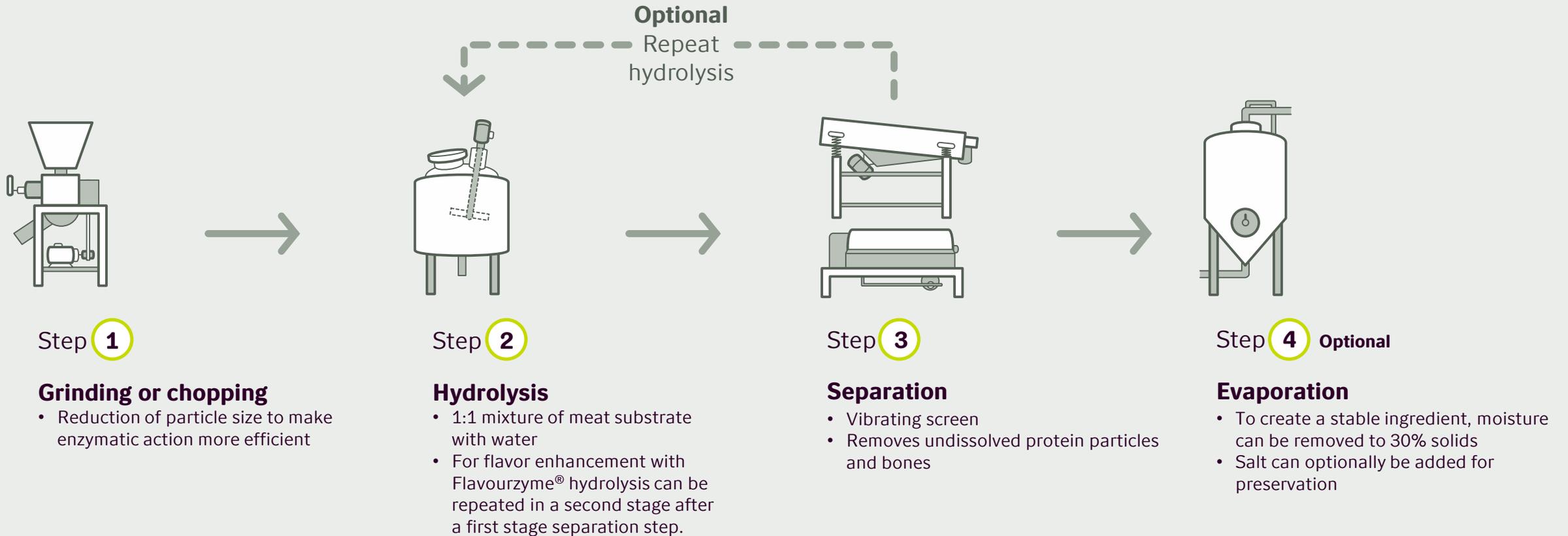
Usage

- Three process variations are possible based on goal for finished MPE
 - Simple process for MPE to be used immediately in-house
 - Separation process for pure MPE to be used immediately in-house
 - Concentrated and preserved MPE to be stored or distributed
- Enzyme selection can be optimized for desired performance

Desired product	Enzymes	Performance
MPE with basic meat flavor	Protamex®	<ul style="list-style-type: none"> • Increases yield • Provides high DH% and more rapid hydrolysis
MPE with enhanced meat flavor	Protamex® + Protana® Flavourzyme®	<ul style="list-style-type: none"> • Improves the flavor quality • Provides high DH% and more rapid hydrolysis
MPE process with maximum efficiency	Alcalase® + Protana® Flavourzyme®	<ul style="list-style-type: none"> • Highest DH% • Reduce sediment in liquefaction process

Usage of microbial enzymes

Meat protein extracts



Partner to expand your meat protein capabilities



Differentiate

Understanding market demands

The demand for clean label formulation of foods is growing, while the quality and sensory requirements are no less demanding. Meat protein extract is a sustainable way to derive more value from meat trimmings.

By working with Novozymes' experts, you can design the optimal ingredient that helps you win in the marketplace.



Optimize

Optimizing your product with enzymes

Enzyme technology has unique and versatile functional benefits. Through experimentation, we select the optimal balance and dosage of enzymes to develop your new meat protein extract.

The enzymes that can boost the value of your meat trimmings are Alcalase[®], Flavourzyme[®], Protamex[®] and Protana[®].



Expand

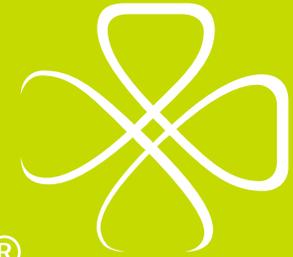
Winning customers and sales

You can improve your sustainability profile by extracting the maximum value from your raw materials. 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 meat protein extract is a commercial success.

Go to <https://new.novozymes.com/food-beverages/animal-protein>
and click on contact us to get in touch with our experts

novozymes[®]



Rethink Tomorrow