

A man in a blue and white checkered shirt and a bright blue apron is grilling food on a black barbecue. He is using tongs to handle the food. In the background, another man in a red and white checkered shirt and an orange apron is also grilling. A woman in a white dress is walking away in the background. The scene is outdoors on a grassy area with trees in the distance.

# 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

Meat protein extracts





# 22%

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

– Trends in Food Science and Technology



A photograph of two chefs in a professional kitchen. The chef in the foreground is wearing a white chef's coat and a black hat, looking intently at a large piece of meat being held by a metal fork. The chef in the background is also wearing a white chef's coat and a white hat, looking down at the meat. The kitchen environment is visible in the background with various equipment and lights.

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

# Grinding or chopping



## Hydrolysis



## Separation



## Evaporation



## Usage

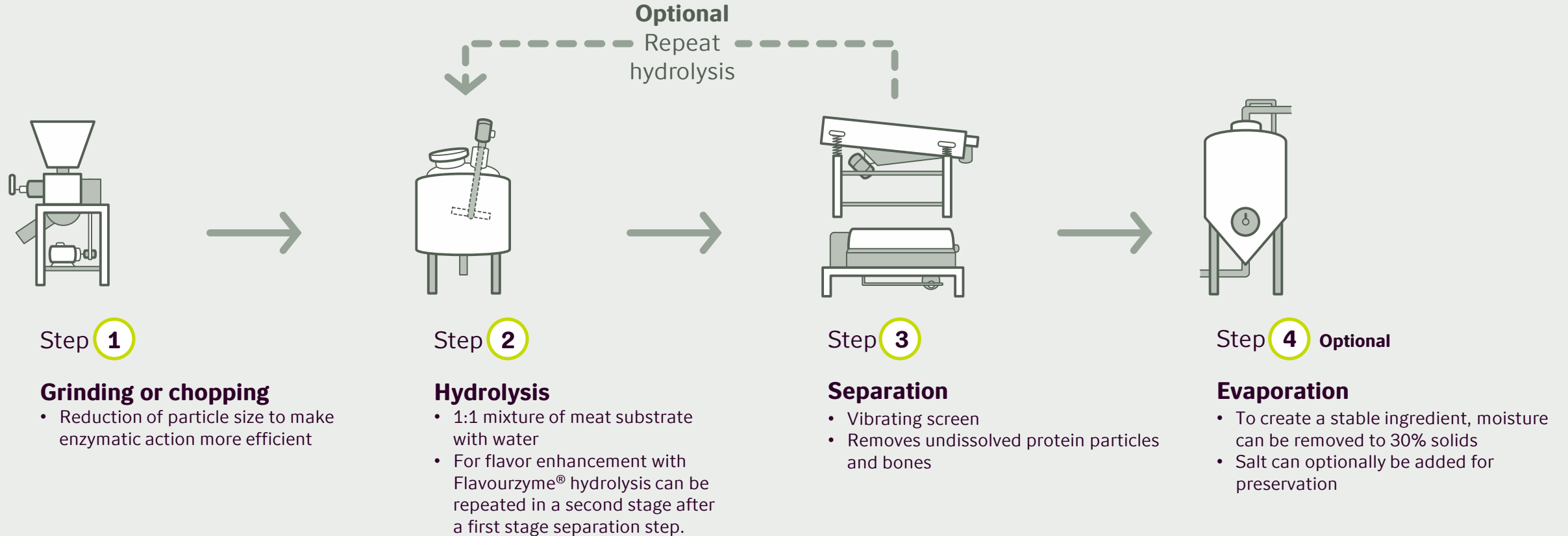
- Three process variations are possible based on goal for finished MPE
  - Simple process for MPE to be used immediately in-house
  - Separation process for pure MPE to be used immediately in-house
  - Concentrated and preserved MPE to be stored or distributed
- Enzyme selection can be optimized for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

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



# Usage of microbial enzymes

## Meat protein extracts



# Partner to expand your meat protein capabilities

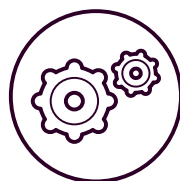


## Differentiate

### 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.

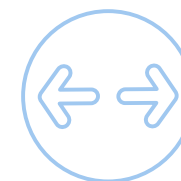


## Optimize

### 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