

## THE USE OF ENZYMES FOR SUPERIOR PALATABILITY OF PET FOOD

Pet foods are primarily made from meat and fish by-products and feed grains. These by-products can be modified to increase their value in creating a higher quality pet food ingredient. The addition of enzymes can be used to valorise these by-products to improve the nutritional profile, concentrate and enhance savoury flavour generation as well as reducing processing cost and waste.

Humanisation is driving the introduction of plant-based proteins into pet food products and will continue to grow in popularity over the coming years. Plant-based protein sources present new challenges in enhancing their taste, texture and digestive properties for pet nutrition.

Aroma is the primary driver that makes food appealing to cats and dogs. However, texture also plays a key role in the attractiveness of the food. Pet food texture can be impacted by processing conditions, nutritional content, ingredient formulation and the use of palatants. Getting the right combination of taste and texture for pet food products is a complex and challenging process, as both sensory attributes need to be developed simultaneously as they interinfluence each other.

Enzymes provide uniquely specific and controlled solutions through chemical and physical interactions for improving the texture, nutrition and palatability of pet food products.



## WHY ENZYMATIC HYDROLYSIS FOR PET FOOD INGREDIENTS?



**Improved digestibility**



**Flavour Generation**



**Enhanced Processibility**



**Increased Accessible Protein**

## ENZYMES FOR IMPROVING TEXTURE AND PALATABILITY

Meat and fish by-products contain varying nutritional profiles, with different ratios of protein and fat contents. Similarly, plant-based proteins each have unique amino acid profiles, functional, nutritional and sensorial properties. Each protein substrate contributes specific value to pet food ingredients. Combinations of proteases and lipases can be used to hydrolyse meat by-products and plant-based proteins to produce palatants.

Palatants are flavours specifically produced by enzymically breaking down animal fats and proteins to give a sensory boost to pet food. More recently non-animal derived palatants are being produced from yeast and yeast-based products. Palatants themselves are affected by the texture of the pet food. Liquid and dry powder palatants both contribute differently to the aroma, mouthfeel and taste depending on the fat content, shape and surface area of kibble.

Particle size and ratio of fat, protein, fibre and starch of by-products also contribute to the texture of pet food ingredients. Protease and lipase enzymes can be used to modify meat and fish by-products and plant-based proteins to enhance their physicochemical properties to create the desired flavour and texture attributes.

### PROTEASES

Proteases break down the linear chains of amino acids in proteins into smaller peptides improving the digestibility of the protein.



protease



protein molecule

Breaking these peptide bonds releases the amino acids improving its accessible protein content and increasing its nutritional intake. Using proteases to improve digestibility is particularly important in differentiating pet food ingredients by life stage of the animal and their dietary requirements.

Enzymatic hydrolysis improves the processibility of protein by modifying its physicochemical properties. An increased solubility and reduced viscosity allows wider suitability in different applications for pet food.

Smaller peptides produced through enzymatic degradation of proteins often contribute a savoury meaty flavour. Peptidase activities targeting specific amino acids, such as glutamic acid release can contribute umami flavours and overall enhance flavour generation for pet food ingredients.

High levels of DH (degree of hydrolysis) >15% can create bitter peptides, using an exopeptidase in conjunction with an endopeptidase can reduce high levels of bitter flavour generation, to produce a balanced, premium flavour profile.



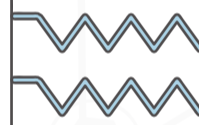
Figure 1. Proteases hydrolysing protein molecule into separate amino acids

### LIPASES

Lipases can be used in the production of pet food ingredients, where meat and fish by-products or alternative ingredients contain fats. Lipases are effective in breaking down fats to release free fatty acids from the lipid molecule.



lipase



lipid



free fatty acids

Increasing the level of free fatty acids contributes a lipolysed flavour, producing unique and concentrated flavour profiles. The intense flavours generated through use of lipase enzymes enhance the palatability of proteins and pet food ingredients.

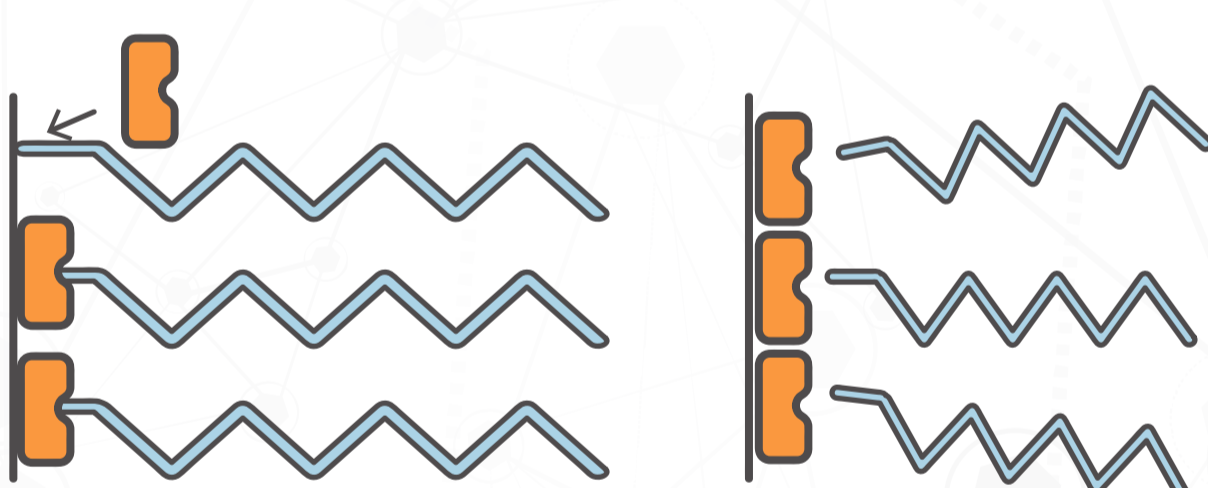


Figure 2. Lipases breaking down lipids into free fatty acids

## BIOCATALYSTS' RANGE OF PET FOOD ENZYMES

### Promod® 324L (P324L)

Highly efficient microbial endopeptidase.  
Solubilisation of meat and fish proteins.  
Particularly active on animal tissue.  
Reduces viscosity of animal viscera.

Ideal for the extraction of chondroitin sulphate.

Food grade enzyme.

### Promod® 971MDP (P971MDP)

Cost effective microbial endopeptidase.  
Effective hydrolysis of meat & fish protein.  
Reduces viscosity of animal viscera.  
Increase solubility by production of amino acids.

Production of savoury meat flavours.

Food grade enzyme.

### Promod® 439L (P439L)

High performance endopeptidase.  
Microbially derived.  
Particularly active on protein and yeast.

Powerful solubilising action.

Pet food palatants production.

Neutral to alkaline pH activity.

Food grade enzyme.

### Promod® 671L (P671L)

Endopeptidase with broad substrate specificity.  
Powerful solubilising action.

Ideal for the hydrolysis of animal tissue.

Highly palatable meat hydrolysates.

Partially hydrolyses collagen.

Food grade enzyme.

### Lipomod® 888MPD (L888MPD)

Microbial alternative to pancreatic lipase.  
Good for general fat hydrolysis.

Effective in breaking down animal fats.

Generates concentrated flavour compounds.

Food grade enzyme.

### Flavorpro® Umami (F852MDP)

Microbial exopeptidase, with endopeptidase and glutaminase activity.

High release of glutamic acid.

Enhanced Savoury / Umami flavour generation.

Reduce bitterness flavour.

Food grade enzyme.

Biocatalysts Ltd.'s products have unique activities for diversity in performance. Different levels and specificities of enzymatic hydrolysis will be required depending on the protein source and the desired pet food ingredients attributes. To arrange a free sample of our enzymes or for more information on our products please contact Biocatalysts Ltd.

### LOOKING FOR SOMETHING UNIQUE?

#### Enzyme Customisation at Biocatalysts Ltd

Depending on your meat substrates or pet type, Biocatalysts Ltd can compose the right mix of enzyme specificities and activities to provide a customised enzyme solution for you. Contact Biocatalysts Ltd to discuss your specific enzyme requirements.

### Developing #BiobasedValue

Contact Biocatalysts' scientists to learn more about enzymes for improving pet food texture and palatability or to create something bespoke to your application.