

# Umami Unleashed: Tackling Plant-Based Flavour Challenges

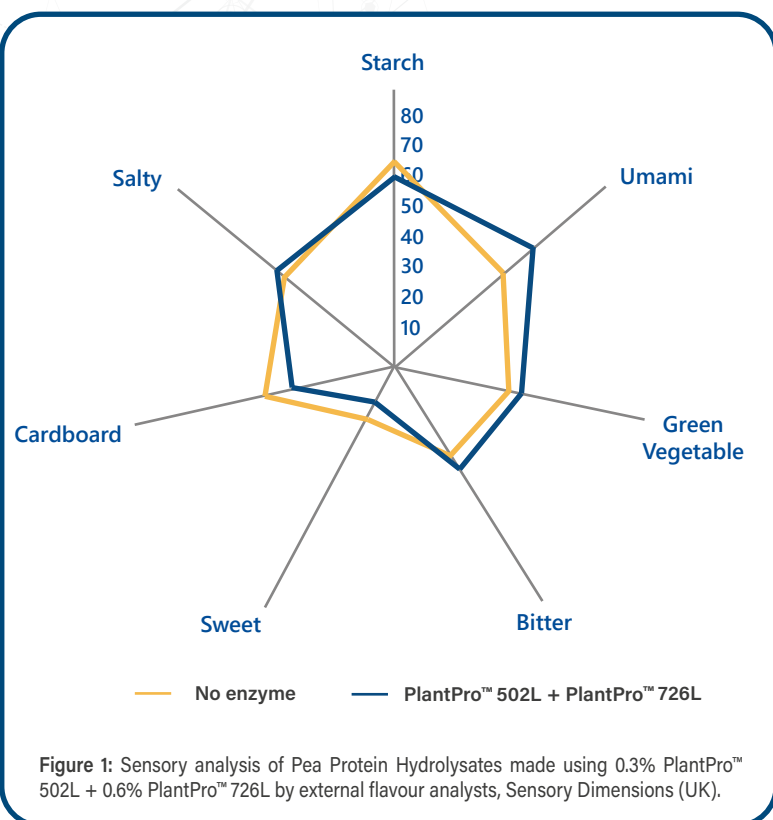
## Enzymatic Solution for Improved Palatability

Biocatalysts Ltd has developed an enzymatic solution precisely for the specific amino acid profiles and compositions of plant protein sources, for generating a strong umami flavour profile for plant protein hydrolysates. Glutamine is an amino acid that can be converted by enzymatic hydrolysis into glutamate and is one of the key factors in contributing a savoury umami taste sensation to food ingredients. The unique combination of activities of **PlantPro™ 502L** and **PlantPro™ 726L** have been crafted and optimised specifically for maximising glutamic acid release from plant-based proteins such as pea, lentil and wheat. **PlantPro™ 502L** (liquid endopeptidase) and **PlantPro™ 726L** (liquid exopeptidase with glutaminase side activity) are added together to hydrolyse plant proteins releasing the amino acids from the peptide bonds. The amount of glutamic acid released is maximised by the glutaminase side activity of **PlantPro™ 726L** to convert the glutamine amino acids released into glutamic acid.

Umami flavours increase the perceived saltiness of a food ingredient contributing depth and richness to a flavour profile. Improving the palatability of plant-based proteins using an enzymatic solution supports innovation in the continually growing plant-based food ingredients market. Ingredient manufacturers can produce plant-based products that deliver an improved sensorial experience and provide a closer match to animal-derived food ingredients promoting wider acceptance from consumers.

## Plant Protein Flavour

Plant-based products struggle with taste primarily due to the inherent flavours of the raw ingredients used. Many plant sources, such as legumes, grains and certain vegetables have natural compounds that impart earthy and bitter notes. Taste and texture play pivotal roles in the overall sensory experience and ultimately influencing their acceptance. Overcoming these taste challenges requires innovative and nutritionally-minded solutions.

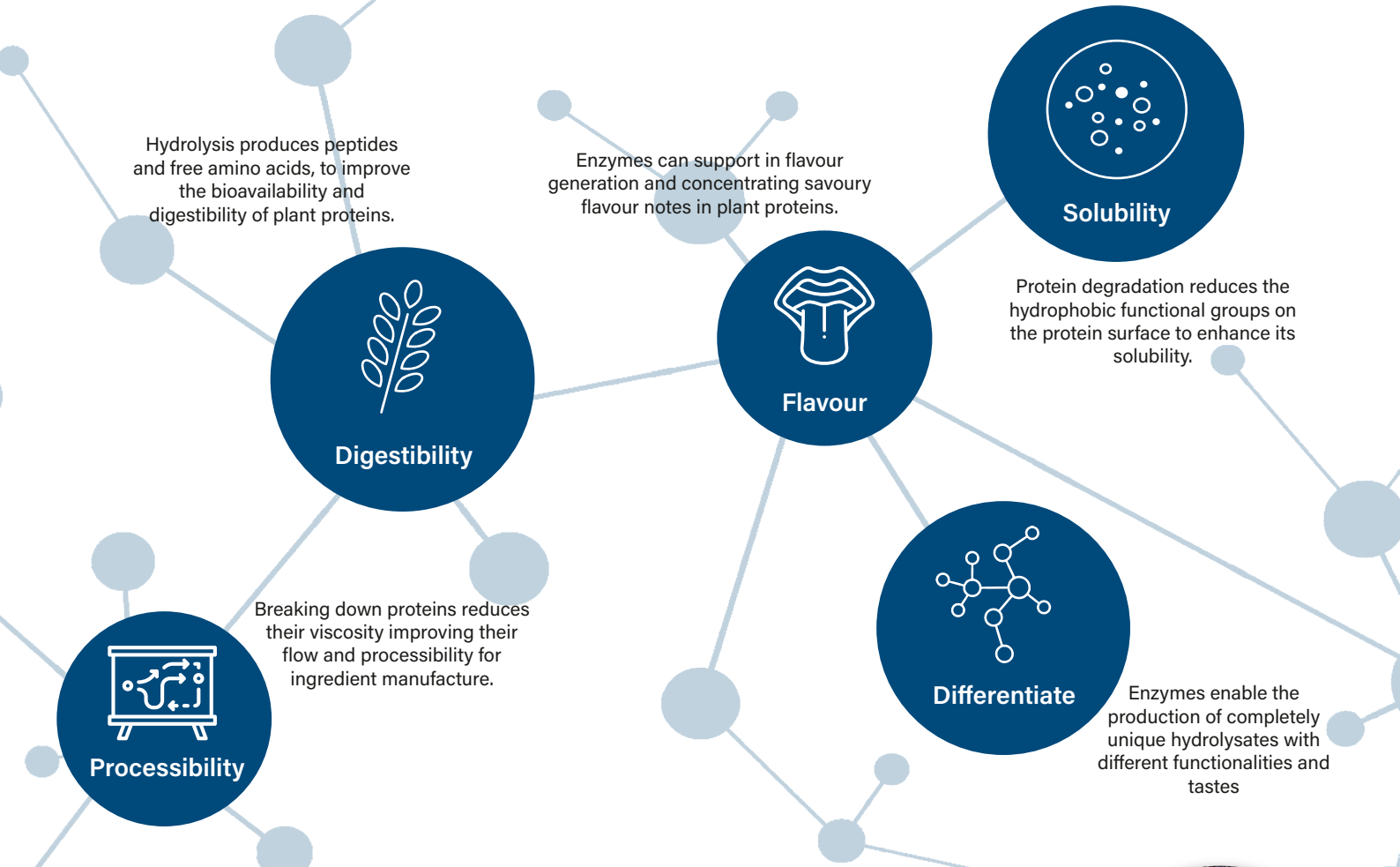


## Umami Flavours in Pea Protein

Plant-based protein manufacturers target a neutral and well-balanced flavour profile to encourage adoption of plant-derived alternative food ingredients. Sensorial analysis of an unflavoured and untreated pea protein isolate displayed elevated unfavourable cardboard and starch flavours (Figure 1.). Applying Biocatalysts Ltd's optimised enzymatic solution for plant proteins at a dosage of 0.3% **PlantPro™ 502L** and 0.6% **PlantPro™ 726L** w/w protein in the sample, incubated at 55°C for 4 hours, followed by deactivation at 85°C for 15 minutes, the pea protein hydrolysate had a considerably increased umami flavour profile. A heightened umami flavour characterises a more savoury and meaty taste and delivers depth and richness to plant-based food ingredients. This unique combination of enzyme activities as a one-step solution offers a more natural, targeted and label-friendly approach for improving the palatability of plant proteins in comparison to the addition of flavour enhancers and masking agents.

Figure 1: Sensory analysis of Pea Protein Hydrolysates made using 0.3% PlantPro™ 502L + 0.6% PlantPro™ 726L by external flavour analysts, Sensory Dimensions (UK).

# Selecting Optimal Enzymes for Plant Protein Functionality



Many plant proteins have poor solubility in water which limits their use as a food ingredient. Proteases can be used to partially hydrolyse plant proteins thus improving the solubility and application potential of the protein. In addition to improving the proteins solubility and developing different flavour profiles, enzymes can also be used to improve texture, foaming, emulsification and bioactive properties of plant proteins.

The functional properties of a plant protein hydrolysate will vary depending on the protein type, enzyme type, enzyme dose, pH, temperature and enzyme hydrolysis time. Biocatalysts Ltd. can recommend the most suitable protease product from our PlantPro™ range to meet your end product requirements.



## Your Vision, Our Expertise: Partnering for optimal solutions

Are you using a different plant protein, or interested in understanding the impact of different process parameters? Reach out to our team of experts and let us work with you in identifying optimal conditions for umami savoury flavour generation for you. We offer a comprehensive technical application service to test our enzymes in your specific substrates. Our goal is to help you achieve optimal performance, efficiency and quality in your products to deliver your vision.

