

Optipep[®]

Whey Protein Hydrolysates

for Clinical Nutrition



carbery.com/nutrition



What is a protein hydrolysate?

A protein hydrolysate is when the long protein chains in the whey protein have been broken down into shorter chains called peptides. This makes the whey protein more easily absorbed by the body and may reduce the potential for allergic reactions. The hydrolysis process does not reduce the nutritional quality of the whey protein.

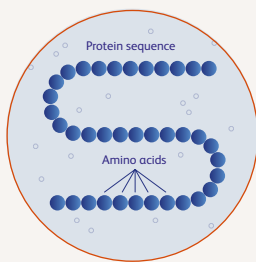
PROTEIN HYDROLYSATES OFFER THREE MAIN BENEFITS:

- Reduced allergenic potential compared to intact proteins
- Easier digestion compared to intact protein and free amino acids
- Faster absorption compared to intact proteins

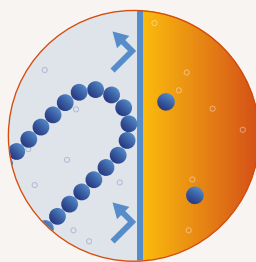
Enzymatic hydrolysis is similar to the natural breakdown of proteins that takes place in the gastrointestinal system during digestion of a protein meal. For this reason, hydrolysed protein is seen as 'pre-digested' and a more rapidly absorbed source of protein for the human body.

Protein absorption

WITHOUT HYDROLYSIS

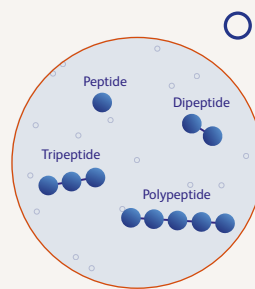


Primary protein structure is a chain of Amino Acids

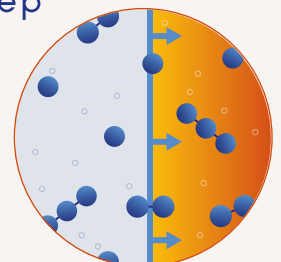


Impaired digestion, absorption, malnutrition

AFTER HYDROLYSIS



Primary protein structure is broken down into protein hydrolysates



Protein hydrolysates are more easily absorbed while maintaining nutritional quality



Protein hydrolysates in clinical nutrition

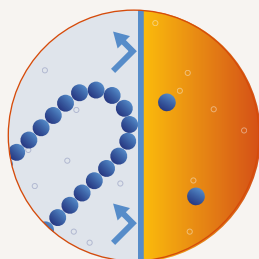
The provision of timely and sufficient nutritional support is of utmost importance in patients with acute and chronic diseases to secure optimal body functions, improved outcome and fast recovery. The digestion and absorption of nutrients, especially protein, can be impaired in such patients to a varying degree.

There are several underlying causes of this pathologically induced protein maldigestion and mal-absorption (inadequate assimilation of protein due to defects in digestion, absorption, or transport.) However, both conditions compromise nutritional status and patient outcome.

Critical illness dramatically increases muscle proteolysis, making free amino acids available for new protein synthesis at sites of tissue injury and at other locations in the body to regulate inflammatory and immune responses, and more than doubles the dietary protein requirement.¹

Daily amounts of 1.2-1.5 g/kg of protein have been suggested for older persons with acute or chronic illness^{2,3} and up to 2.0 g/kg body weight a day in case of severe illness, injury or malnutrition.²

Rationale for clinical nutrition support



Impaired digestion,
absorption, malnutrition

Optipep®



Pre-digested high quality whey
protein hydrolysate



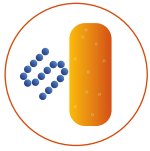
Clinical nutrition improves
patient outcome

Enteral nutrition products, are designed to feed patients with specific diseases, disorders or medical conditions, and who have nutritional needs that cannot be met by consuming standard foods.

It has been suggested that proteins in the form of peptides provide an advantage for certain critically ill patient groups with increased protein and energy requirements, with/or at risk of maldigestion and malabsorption, and impaired digestive function.

- 1 **Decreased length of hospital stay and reduced rates of readmissions**
- 2 **Maintains GI Tract structure, integrity and function**
- 3 **Improved wound healing**
- 4 **Decreased risk of complications**
- 5 **Enhances intestinal immune function**

Optipep[®] specialised whey protein hydrolysates have also shown positive nutritional benefits in specific conditions and need states, such as...



PROTEIN MALNUTRITION

Protein-energy malnutrition is a common problem in hospital patients. Studies have reported 40% of surgical and medical patients to be malnourished on admission to hospital. Nutritional support leads to improved nutritional status and clinical outcome in severely depleted patients.⁴

Whey protein is considered one of the highest quality dietary proteins. Whey protein hydrolysates have a faster absorption rate compared to intact protein and free amino acids and are therefore very suitable to help prevent protein malnutrition.



CRITICAL CARE

Whey proteins are recognised as high nutritional quality proteins that support nutritional status in patients and help speed up recovery after illness. Prolonged bed rest decreases skeletal muscle and whole body protein synthesis.⁵ Whey proteins are furthermore able to help maintain muscle mass during illness and bed rest due to a strong stimulation of muscle synthesis. Whey protein hydrolysates may improve nutritional status in specific patient groups and help prevent loss of lean body mass during hospitalisation and shorten hospital stays.



GASTROINTESTINAL DISORDERS

Patients with gastrointestinal disorders are at risk of nutritional depletion from inadequate nutritional intake, surgical stress and the subsequent increase in metabolic rate.^(6,7)

Hydrolysed proteins are digested and absorbed more rapidly than intact protein, and are ideal for patients who experience digestive discomfort due to a sensitivity or poor tolerance of proteins.



TYPE 2 DIABETES

Several clinical studies indicate that a high intake of milk and dairy products may reduce the risk of developing Type 2 diabetes, obesity and cardiovascular disease, with a possible protective mechanism ascribed to the protein fraction. Whey protein hydrolysates may also help improve blood glucose control in persons with the metabolic syndrome or type 2 diabetes due to a superior insulinotropic effect compared to intact proteins.^(8,9)



SARCOPENIA

Based on the high nutritional quality of whey proteins, foods/enteral nutrition products formulated with whey proteins can help improve the physical status and sarcopenic biomarkers of frail individuals or those suffering or at risk of sarcopenia.¹⁰ Whey protein is superior to other high quality protein sources like casein for muscle synthesis in the elderly due to higher leucine content and faster absorption rate. ^(10,11)



Introducing Optipep[®] whey protein hydrolysates

Our dedicated range of hydrolysed whey proteins for clinical nutrition are specifically designed and tested for important quality descriptors such as antigenicity, molecular weight distribution and degree of hydrolysis and taste to ensure a consistent quality to this sensitive consumer group.

We offer forms from mild to extensively hydrolysed whey proteins, which brings different health effects and application possibilities.

We work closely with our customers across the globe to develop and customise products to meet the nutritional requirements of different patient cohorts.

OPTIPEP[®] product range for clinical nutrition

Product name	Benefits	Protein source	Degree of hydrolysis (DH)	Protein content (%)
OPTIPEP[®] RTD 8051	Lightly hydrolysed, heat stable hydrolysate offering a low bitter taste profile. Suitable for use in RTD beverages and UHT applications.	Whey	5	80
OPTIPEP[®] RTD 8008	Mildly hydrolysed, heat stable hydrolysate offering a medium bitter taste profile. Suitable for use in RTD beverages and UHT applications	Whey	14	80
OPTIPEP[®] RTD 9026	Mildly hydrolysed, heat stable hydrolysate offering a medium bitter taste profile. Suitable for use in RTD beverages and UHT applications	Whey	13	90

NOTE: Low lactose versions are available on request

Key benefits

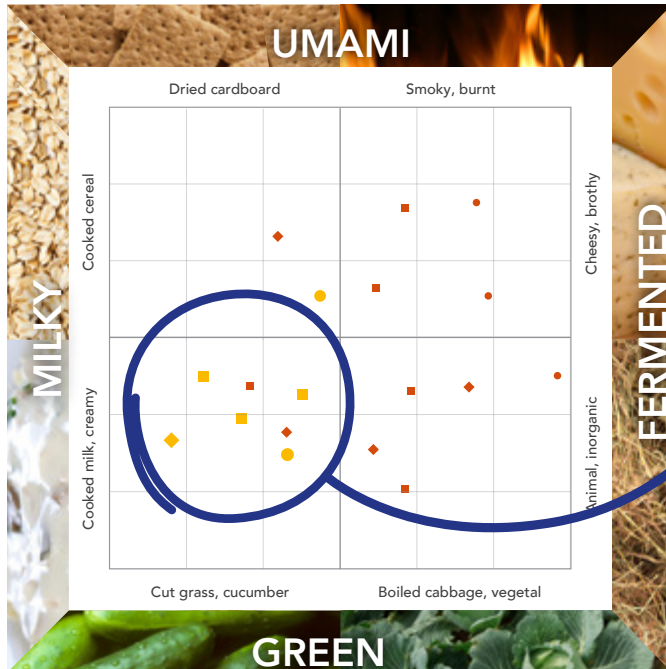
NUTRITIONAL BENEFITS

- Superior whey protein source
- Excellent nutritional quality (DIAAS >1)
- Enhanced digestibility
- Rich source of essential amino acids (EAA)
- Naturally high in BCAAs: Leucine, Isoleucine and Valine
- Optimised peptide profile for enhanced bioactivity
- Fast gastric emptying and rapid absorption
- Insulinotropic effect
- Stimulation of muscle protein synthesis that helps prevent muscle disuse atrophy

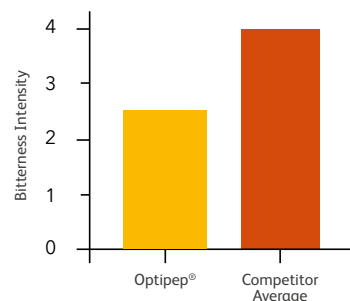
FUNCTIONAL BENEFITS IN APPLICATIONS

- Multiple application possibilities for high protein formulae (>20% Energy)
- Suitable for various UHT drinks (juice-like and milky beverages), gels, shots, tube-feeds and powders
- High solubility compared to intact proteins
- Lower osmolarity compared to free amino acid formulas
- Heat stability
- Emulsification properties
- Kosher & Halal
- Hormone and antibiotic free
- Excellent microbiology
- Uniform quality

Taste preference starts with Optipep®



Protein hydrolysates with the most favourable sensory profile and closest profile to milk



Optipep®
40%
Less bitter
than competitors

Adapted from Leksrisompong et al., J. Agric. Food Chem. 2010 58,6318-6327

Taste benefits

- 1 Clean Taste Profile
- 2 Least Bitter
- 3 Easy to Flavour
- 4 Fresh & Natural Dairy Taste
- 5 Most Palatable
- 6 May improve tolerance and compliance

Innovating for future generations

Our unique disciplinary approach to milk mining leverages the expertise of food scientists, microbiologists and immunologists within our Food for Health Ireland research partnership. We identify, characterise and compare relevant compositions and bioactive fractions in milk to uncover nutritional benefits. Our research programme includes a focus on next generation hydrolysates focused on:

- 1 Malnutrition
- 2 Glycemic Management
- 3 Sarcopenia
- 4 Appetite Modulation
- 5 Immune Protection



Want to find out more?

1. Why critically ill patients are protein deprived.
Journal of Parenteral & Enteral Nutrition 2011.
2. Bauer J, Biolo G, Cederholm T, Cesari M, Cruz-Jentoft AJ, Morley JE, Phillips S, Sieber C, Stehle P, Teta D, Visvanathan R, Volpi E, Boirie Y. **Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROT-AGE Study Group.** J Am Med Dir Assoc. 2013 Aug;14(8):542-59.
3. Deutz NE, Bauer JM, Barazzoni R, et al. **Protein intake and exercise for optimal muscle function with aging: recommendations from the ESPEN Expert Group.** Clin Nutr. 2014;33(6):929-936.
4. Beier-Holgersen SR, Boesby S: **Influence of postoperative enteral nutrition on post surgical infections.** Gut. 1996, 39: 833-5.
5. Ferrando AA, Lane HW, Stuart CA, Davis-Street J, Wolfe RR. **Prolonged bed rest decreases skeletal muscle and whole body protein synthesis.** Am J Physiol. 1996; 270: E627-33.
6. Van der Hulst RR, von Meyenfeldt MF, van Freil BK, Thunnissen FB, Brummer RJ, Arends JW, Soeters PB: **Gut permeability, intestinal morphology, and nutritional depletion.** Nutrition. 1998, 14: 1-6. 10.1016/S0899-9007(97)00385-7.
7. Reddy 2012. **The 4th Parenteral and Enteral Nutrition Society - Protein metabolism in acute conditions, maldigestion and malnourished states.**
8. Linda E Mignone, Tongzhi Wu, Michael Horowitz, and Christopher K Rayner: **Whey protein: The "whey" forward for treatment of type 2 diabetes?**
9. Nongonierma A.B., Gaudel C., Murray B., Flynn S., Kelly P., Newsholme P., FitzGerald R.J.: **Insulinotropic properties of whey protein hydrolysates and impact of peptide fractionation on insulinotropic response** International Dairy Journal (2013) vol 32(2): 163-168.
10. Gilmartin S, O'Brien N, Giblin L. **Whey for Sarcopenia; Can Whey Peptides, Hydrolysates or Proteins Play a Beneficial Role?.** Foods. 2020; 9(6): 750.
11. Pennings B, Boirie Y, Senden JM, Gijsen AP, Kuipers H, van Loon LJ. **Whey protein stimulates postprandial muscle protein accretion more effectively than do casein and casein hydrolysate in older men.** Am J Clin Nutr. 2011 May; 93 (5): 997-1005



All information contained herein (the "Information") is confidential and proprietary to Carbery Food Ingredients Limited ("Carbery") and may not be disclosed to third parties or used without Carbery's prior written consent. The Information is provided in good faith "as is" without any warranty as to accuracy, fitness for purpose, compliance with applicable laws or otherwise. All rights to this Information are reserved.

Research references available on request.

To find out more on our extensive market leading range of whey proteins and fractions, please contact:

Carbery Food Ingredients, Ballineen, Cork, Ireland.

tel: +353 23 8822 200 | **email:** info@carbery.com

carbery.com

