

KERRY

Reinventing food
and beverages with
innovative protein
technologies



Reinventing food and beverages with innovative protein technologies

COVID-19, A Catalyst For Change

The advent of COVID-19 in 2020 has accelerated the consumer search for food and beverages that are not only “good-for-you” but which are also environmentally friendly, and which can help in the fight against climate change.

Whilst consumers had already become dramatically more proactive over the past decade about health and wellness, the COVID-19 pandemic exponentially heightened their focus on **nutrition and health**. Satisfying the health-conscious consumer is a growing business.

Globally, 50% of consumers have increased their consumption of fortified food and beverages in the last 12 months.¹

In parallel, the pandemic has had a significant impact on people’s mental health, with prolonged periods of stress and anxiety. This has driven many to turn to **comfort food** to feel safe and in control.

The spike in popularity was evident with an increase of sales for cookies, ice-cream, sugar confectioneries and many other comfort foods categories.²

Another trend of note is consumers’ increased awareness of their impact on the environment. Alongside the renewed focus on health, this concern is leading many to increase their **plant-based food** intake. Plant-based alternatives are perceived as being a more environmentally friendly protein source.

Plant-based sales were +90% in Q1 2020 compared to the same period in the prior year as consumers stockpiled pantries and freezers with healthier food options.³

Plant and dairy protein ingredients have the ability to address many of these increased consumer demands through the following strategies:

ADDED FUNCTIONALITY

Adding protein to daily food and beverages to improve health and nutrition benefits.

PERMISSIBLE INDULGENCE

Improving comfort food properties using protein ingredients to support “free from” or “source of” claims and fuel the rise of “permissible indulgence”

FILL THE GAP

Improving the nutrition of plant-based protein, bridging the nutritional gap with animal based protein

In this booklet, we share case studies that detail how Kerry has partnered with food and beverage manufacturers to drive innovation with protein, leveraging the most recent science and processing methods.

¹Innova - 2021

²Innova – 2021

³FoodDive – 2020

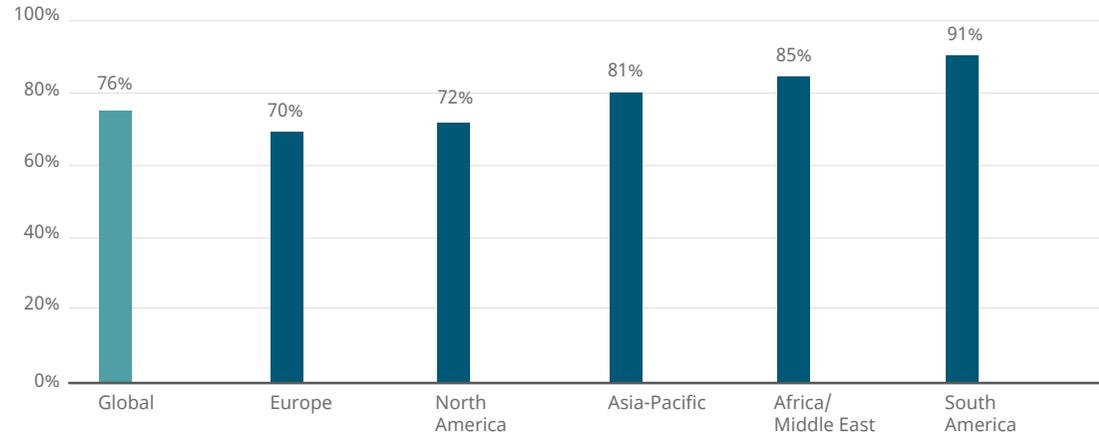
Added functionality

A need to diversify protein foods and beverages offerings with high-quality proteins

76% of global consumers say they plan to eat and drink more healthfully as a result of COVID-19.⁴

Consumers' needs are driven by health priorities, so understanding their concerns is key to successful innovation.

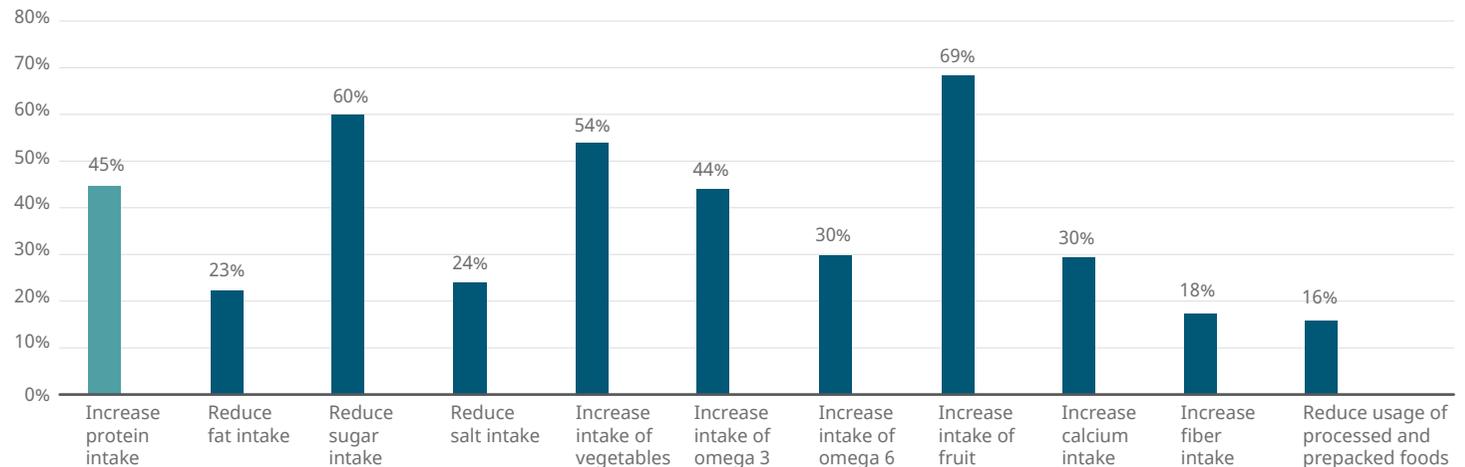
The percentage of consumers who plan to eat and drink more healthily varies by region and is highest in South American, where over 90% plan to do so.



Increasing protein intake is a key strategy for consumers who want to adopt a healthier diet

Protein is a star in the functional ingredients arena, held in high regard by the public as a vital asset in maintaining a healthy diet and lifestyle.⁴

When we ask consumers what it means to eat more healthfully, 45% point to a desire to increase protein intake.

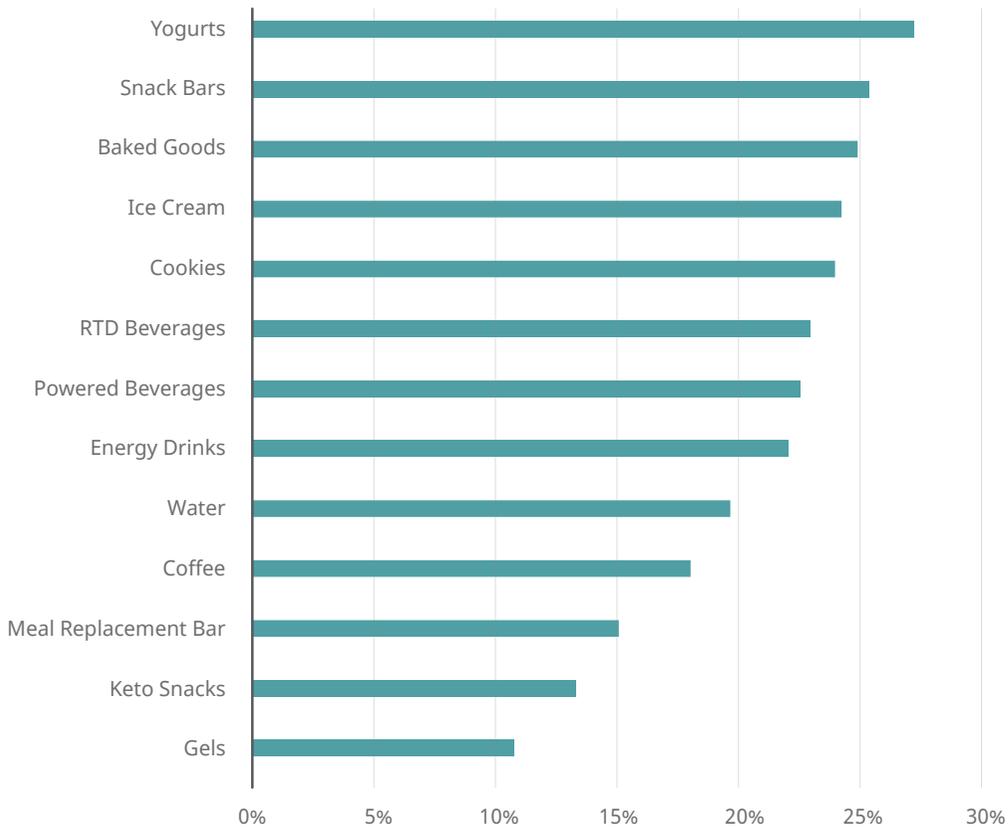


⁴FMCG Gurus - How Has COVID-19 Changed Consumer Behaviour - 2021

Consumers need more diversity in protein-fortified food and beverages category

A need for new protein food and beverage formats is also something consumers are seeking out. Diversifying protein-enriched food and beverage offerings presents a great opportunity to drive sales. Many new applications, such as waters, baked goods and coffee, hold excellent potential.

Categories that global consumers are seeking added protein⁵



⁵FMCG Gurus – Active Wellness Report - 2020



CASE STUDY 1

Vegan Protein Water

Opportunity

Willing to move away from the classic protein shake in order to diversify their beverage offerings, a sports and fitness nutrition company wished to launch a vegan protein water.

Key considerations

- Delivering a clear protein that would be completely soluble in water
- Ensuring that the solubility profile offered a refreshing, thirst-quenching result
- Providing a clean taste and appealing flavour
- Retaining good mouthfeel through low viscosity
- Low pH stability
- High processability

Kerry's solution

Kerry used its clean label solution **ProDiem™ Refresh**, a clear plant protein solution perfect for water and energy drinks.

Developed to be soluble and stable at low pH levels, and provide clarity during processing and over shelf life, **ProDiem™ Refresh** does not require the use of traditional stabilisers which can negatively impact labelling. Unlike other proteins at reduced pH, it is low in viscosity and has a clean taste.

ProDiem™ Refresh enabled our customer to develop a new range of plant protein waters with unique and refreshing flavours.

Impact

- **Before:** Classic protein beverage
- **After:** Innovative, light and refreshing plant protein beverage



“Our customer was looking to deliver a refreshing alternative to traditional protein shakes.

Using Kerry’s ProDiem™ Refresh, our unique, clear, soluble vegan protein, the customer was able not only to meet the needs of the new wellness consumer seeking novel plant-based protein products, but also to enjoy their most successful plant-based product launch to date.

Plant protein waters have great potential, and Kerry is well positioned to support beverage manufacturers wishing to innovate in the vegan space.”

Conor Power, Senior Business Development Manager, Proteins, Kerry



CASE STUDY 2

Foodservice Plant Protein Latte Coffee

Opportunity

A global foodservice company wanted to develop a latte coffee beverage nutritionally fortified with plant protein.

Key considerations

- Clean taste and good flavour
- Great solubility and stability in hot beverages
- Excellent dispersibility
- Convenient format that can be used easily in coffee shops

Kerry's solution

Kerry's solution **ProDiem™ PSF** is a pea and sunflower protein solution that has been optimised for taste, texture and nutrition, making it highly suitable for use in a wide range of food and beverage applications.

With Kerry's taste-masking and processing technology, this protein delivers a clean taste and appealing mouthfeel in application.

Impact

- **Before:** Classic latte coffee beverage
- **After:** Fortified latte coffee beverage with a "source of protein" claim



"With our ProDiem™ PSF solution—a combination of pea and sunflower protein with an inbuilt flavour masker—we enabled our customer to launch an industry-leading innovation into the food service beverage space.

ProDiem™ PSF delivered on taste and the critical required functionality to meet a 'source of protein' claim for the targeted beverage.

It was heartening to see consumers responding with excitement to our customer's new, nutritionally enhanced menu offerings.

Kerry is innovating intensively to bring such easy-to use protein solutions to its foodservice partners, in the form of powders and syrups, in an effort to support customers wishing to bring more functionality to their menus by answering the calls of health-conscious consumers."

John Patrick Kelly, Senior Marketing manager, Beverages, Kerry

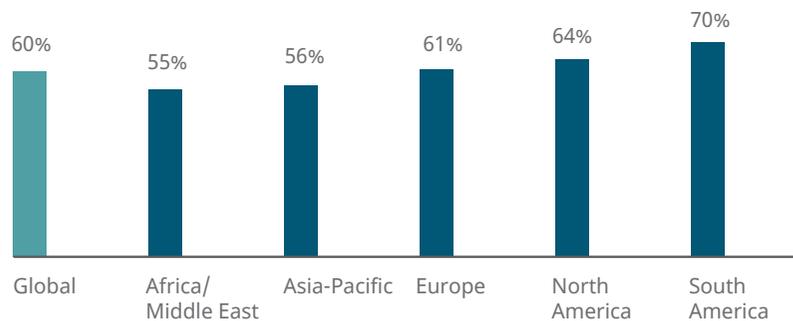


Permissible indulgence

A need for comfort food without compromising on health

Food has long been used to help boost mood and COVID-19 has only reinforced this behaviour. While consumers are looking to adopt healthier diets, sales of comfort foods such as confectioneries and ice cream are growing apace. With stress and anxiety on the rise due to the pandemic, the public is seeking products that can also help them to feel calmer and happier. This leads naturally to some contradictory behaviours as consumers opt for both healthier products and pure indulgence treats concurrently. Globally, 60% of consumers say they have purchased more comfort foods than usual in the past few months.⁶

Consumers who say they have purchased more comfort food in the past few months⁶



These contradictory—yet highly understandable—behaviours are driving demand for products that help marry the two needs, guilt-free products that offer moments of escapism without conflicting with wider health goals are indeed filling the bill. As such, comfort foods positioned around a variety of “free from” or “fortified with” claims are sure to hold high appeal to the public throughout 2021 and beyond.

SUGAR CONFECTIONERIES

Gelatin removal—another claim gaining favour—is key to “better for you” recipes. In 2020, 16% of new products carried a direct claim relating to the absence of gelatin, and the global CAGR between 2016 and 2020 for confectioneries with vegan/gelatin-free claims was 18%.⁷

ICE CREAM

Delivering healthier formulations is a growing “ask” in the category as suppliers continue to innovate and seek new ways to build successful “lite” choices that are also enriched. Globally, protein enrichment boomed in 2018, as a matter of fact, and kept growing to reach a penetration of 6% in 2020.⁸

⁶FMCG Gurus - How Has COVID-19 Changed Consumer Behaviour - 2021

⁷Innova - Plant Based Trends in Chocolate & Confectionery - 2021

⁸Innova - Trends in Dairy & Non-Dairy Ice-Cream - 2021



Gelatin-free Vegan Sugar Confectionery

Opportunity

A US sugar confectionery manufacturer was looking to replace gelatin in marshmallows in order to facilitate cleaner labelling and add a vegan claim that appeals to growing market segment. Driven by health, environment concerns and animal welfare, many consumers are moving towards a plant-based diet. In North-America, 23% of consumers claim to be flexitarian, 9% vegetarian and 2% vegan.⁹

Key considerations

- Delivering the same characteristics as a marshmallow made with animal gelatin (i.e., texture; taste; mouthfeel; the ability to melt on roasting, baking or in a hot drink; and fluffiness)
- Ensuring a finished product with non-GMO and kosher certification, and a limited number of recognisable ingredients
- Providing a low-dose, cost-effective solution that is easy to factory-process
- Maintaining consistent aerating properties in order to avoid waste when the whipping process must be interrupted

Kerry's solution

Kerry used **Hyfoama™**, a natural great-tasting and highly functional pea protein hydrolysate that exhibits exceptionally consistent whipping performance in sugar confectionery.

It is highly valued for replacing the aerating properties of egg white or gelatin in applications such as nougat, marshmallow, bird's milk, aerated jellies, chew.

Taking advantage of the **Hyfoama™** solution and Kerry's application expertise in sugar confectionery, our customer succeeded in developing a "gelatin-free" and vegan product that tasted and performed identically to a marshmallow made with animal gelatin.

Impact

- **Before:** Classic marshmallow with animal gelatin
- **After:** Tasty, gelatin-free vegan marshmallow



"Kerry's Hyfoama™, an innovative, hydrolysed plant-based protein, enabled our customer to quickly launch a gelatin-free vegan marshmallow.

Kerry's solution helped the customer meet all of their label requirements in a cost-effective manner, and our deep understanding of foaming proteins allowed us to support the customer even further by providing processing and regulatory advice, as well as recommending processing solutions.

Hyfoama™ is a great solution to support sugar confectionery manufacturers to develop products free from animal-derived ingredients, making them suitable for vegans with cleaner labels."

Jacqueline Finegan, Business Development Manager, Protein, Kerry

⁹FMCG Gurus - Understanding the growing increase of plant-based-diets- 2020

CASE STUDY 4

Protein-Enriched Ice Cream



Opportunity

An ice cream manufacturer wished to develop a “guilt-free” ice-cream with low sugar, low fat content and enriched in protein, in order to meet the needs of health-focused consumers.

Key considerations

- Good solubility in the ice cream mix
- Appealing taste, texture and mouthfeel
- High stability in processing

Kerry's solution

To reach the objective, Kerry employed its **Ultramor™ MPI**, a milk protein isolate sourced from the milk of grass-fed dairy cows in Ireland—a country renowned for its natural and sustainable dairy industry.

Ultramor MPI provides a clean taste and superior heat stability, making it highly versatile and suitable in a wide variety of food and beverage applications.

In this case, our solution provided superior taste and texture, and in fact was the only solution identified that dissolved correctly into the ice cream mix, did not stick, and did not burn in contact of the heat exchanger plates during pasteurisation of the ice cream mix.

Impact

- **Before:** Classic ice cream with high fat and sugar content
- **After:** A guilt-free, tasty ice cream with 30% less fat, 30% less sugar and enriched with protein



“Our grass-fed milk protein isolate, Ultramor™ MPI, enabled this customer to deliver a high-quality protein in a ‘better-for-you’ ice cream product that delivered on taste, texture and mouthfeel, all while meeting the demands of the health-centred consumer.

Protein fortification is growing in the ice cream category, and Kerry has a wide portfolio of protein solutions to enhance dairy and plant-based ice creams, frozen yoghurts, frozen desserts and sorbets.”

Mindy Leveille, Strategic Marketing Manager, Proteins, Kerry

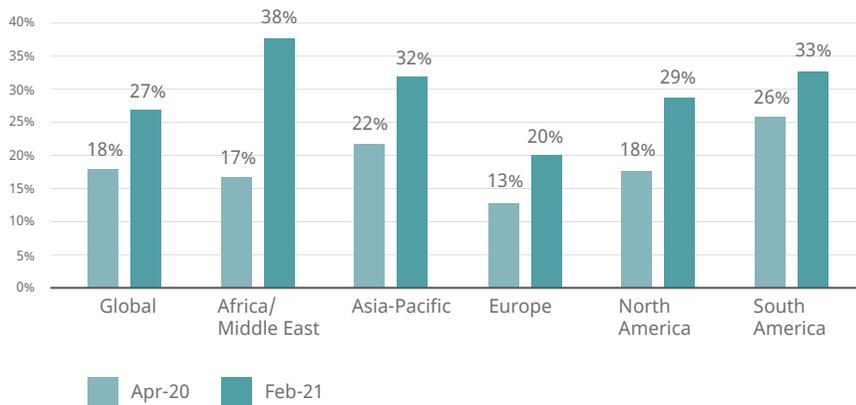


Fill the gap

An emerging need for plant-based foods and beverages with enhanced nutrition

The widespread consumer move toward plant-based foods and beverages has been reinforced since the beginning of the pandemic. Driven by an acceleration in concern for animal welfare, health and the environment, the number of consumers who plan to include more plant-based food in results of COVID-19 has grown by 9% globally.¹⁰

Consumers who plan to include more plant-based food in results of COVID-19¹⁰



Although the plant-based sector has a general “health halo”, consumers are now more nutritionally astute than ever before. They expect plant-based products to have clean labels and deliver a quality source of protein and nutrition.

Consumer awareness is growing regarding the nutritional gap of plant-based food and beverages versus their animal-based counterparts, with media increasingly highlighting this important difference.

An unprecedented opportunity exists for plant-based food and beverage manufacturers to differentiate by improving the nutritional profiles of their plant-based offerings. By fortifying and combining plant protein from different sources, producers can offer enhanced nutritional value.

Protein content per glass of milk (250 ml)¹¹

Protein content varies greatly across plant protein sources.

	Dairy Milk	Soy Milk	Oat Milk	Almond Milk	Rice Milk	Coconut Milk	Hazelnut Milk
Average Protein Content (g)	8.5	8.3	3.5	1.5	0.7	0.5	1.0

¹⁰FMCG Gurus - How Has COVID-19 Changed Consumer Behaviour – 2021

¹¹US Department of Agriculture – FoodData Central - 2021



CASE STUDY 5

Nutritional Optimisation of Plant-Based Milk

Opportunity

A European company specializing in organic and plant-based foods and beverages was seeking to optimise the nutritional profile of its almond milk.

Key considerations

- Heat stability
- High solubility and smooth mouthfeel
- Neutral colour
- Clean, neutral taste
- Rapid hydration

Kerry's solution

Kerry used its solution **ProDiem™ Pea**, a high-quality pea protein solution.

With Kerry's proprietary processing techniques, this protein delivers great taste, solubility and texture in many food and beverage applications making it highly suitable for nutritional fortification without impacting the taste, texture and manufacturing process of food and beverages.

Claim

- **Before:** Classic almond milk
- **After:** Optimised almond milk with a "source of protein" claim



"Plant-based milks are highly popular. However, their nutritional gaps have started to become a hot topic as consumer awareness expands.

Optimising plant-based milk by fortifying them with plant protein ingredients like ProDiem™ Pea is a great opportunity to fill this gap.

With our protein technology and applications expertise, Kerry can be a key partner to manufacturers seeking to optimise their products for maximum nutritional benefit."

Celia Ridet, Senior Technologist, Beverages, Europe, Kerry



CASE STUDY 6

Nutritional Optimisation of Plant-based Bolognese

Opportunity

A US food manufacturer needed to increase the protein content of a long-shelf-life, plant-based bolognese sauce without the slowdown in production likely to occur due to increased viscosity and fouling of heat-exchange plates.

The inherent challenge: bolognese sauce is low in pH, and most proteins would sediment and possibly gel at this pH value when heated, slowing down production and leading to a grainy result with marginal flavour. The resulting plant-enhanced sauce needed to have the same texture as a meat-based bolognese sauce.

Key considerations

- Solubility in a low-pH environment (tomato sauce)
- Clean taste
- Heat stability
- High processability
- Low viscosity
- Shelf-life stability

Kerry's solution

Kerry used **Hyprol™** pea, a protein hydrolysate solution that is highly stable and soluble in many food and beverage applications. Additionally, **Hyprol™** has a neutral taste.

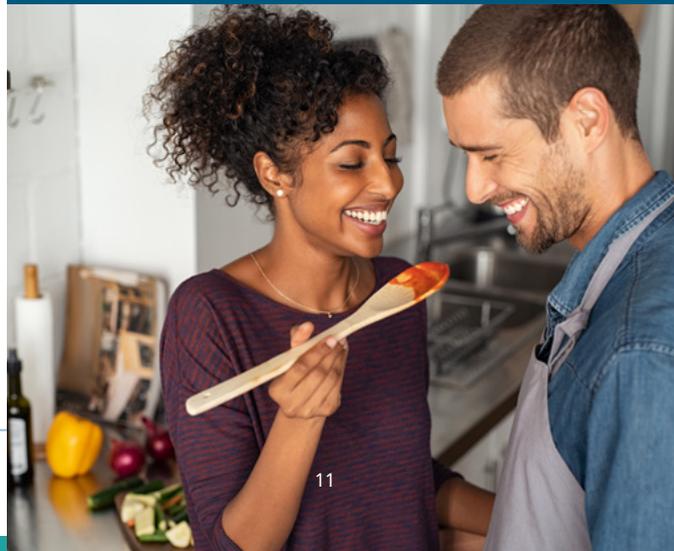
Impact

- **Before:** Plant-based bolognese sauce
- **After:** Optimised plant-based bolognese sauce fortified with protein



"Kerry supported our customer with not only a heat stable, vegan product but also with process knowledge to increase the protein content of their plant-based Bolognese sauce in a cost-effective way."

John Reilly, VP Business Development, Protein, Kerry



Kerry protein solutions for food and beverages

Today's consumer is focused on health and wellness and recognises the importance and value of regular protein intake. Food and beverage companies are responding by including proteins as a core component of their new product development efforts.

Kerry has been a specialist and trusted protein supplier for almost 50 years, delivering high-quality protein solutions to customers around the world that assist in the manufacture of great-tasting, innovative and nutritious products.

We have market-leading protein technology and extensive applications expertise, coupled with broad-based knowledge in taste and in-depth nutritional science capabilities. Our nutritious sustainable proteins are suitable for use in a wide range of food and beverage applications.

As a company with many experts highly experienced in the field, Kerry offers a deep understanding of protein processing. Together with our customers, we embark on a journey by sharing our wide-ranging knowledge of taste, applications science and proteins. Working in partnership, we help our customers create innovative food and beverages.



Ultramor™: Premium Dairy Proteins

A range of high-quality, intact milk proteins produced from the fresh skimmed milk of Irish grass-fed cows.

ProDiam™: Plant Proteins

A unique plant protein portfolio optimised for nutrition, taste and texture. Using high-quality plant sources such as pea, rice and sunflower, ProDiam delivers great taste and texture while enabling the nutritional profile of a protein to be optimised with a Protein Digestibility Corrected Amino-Acid Score (PDCAAS) up to 1, facilitating protein quality that is equal to egg or dairy.

ProDiam™ Refresh: Clear Plant Proteins

A unique range of plant protein hydrolysates that provide outstanding solubility and clarity in solution, as well as excellent shelf-life stability with no need for stabilisers (i.e., cleaner labelling). ProDiam Refresh is currently the only solution on the market providing this performance, making it the best option for refreshing, vegan, clear, low-pH protein beverages (waters, energy drinks, etc.).

Hyprol™: Plant Protein Hydrolysates

Kerry's dairy and plant protein hydrolysate solutions. Using enzymatic hydrolysis to mimic the natural human digestion process, Hyprol proteins are broken down into peptides to deliver optimised taste, texture and solubility in numerous food and beverage applications.

Hyfoama™, Versa-Whip™ and Hygel™: Techno-functional Proteins

A range of dairy and plant protein hydrolysates with aerated properties that are highly valued in replacing the aerating properties of egg white or gelatin in sugar confectionery and ice cream products. These proteins also improve the appearance, texture, mouthfeel and foam stability in beverage applications such as creamers, chocolate, cacao and coffee mixes.



Kerry Overview

Kerry, the world's leading taste and nutrition company, provides sustainable nutrition solutions for the food, beverage and pharmaceutical industries.

Every day over one billion people around the world enjoy food and beverages containing Kerry's taste and nutrition solutions. The company has offices in 31 countries, 149 manufacturing facilities and employs 26,000 people globally, including over 1,000 food scientists.

We aim to be our customers' most valued partner by delivering food and beverage products that meet their consumers' individual taste, nutrition and wellness preferences, while enhancing their lives and contributing to a more sustainable world.

For more information, visit [Kerry.com](https://www.kerry.com).

KERRY
