Food, health, and the microbiome

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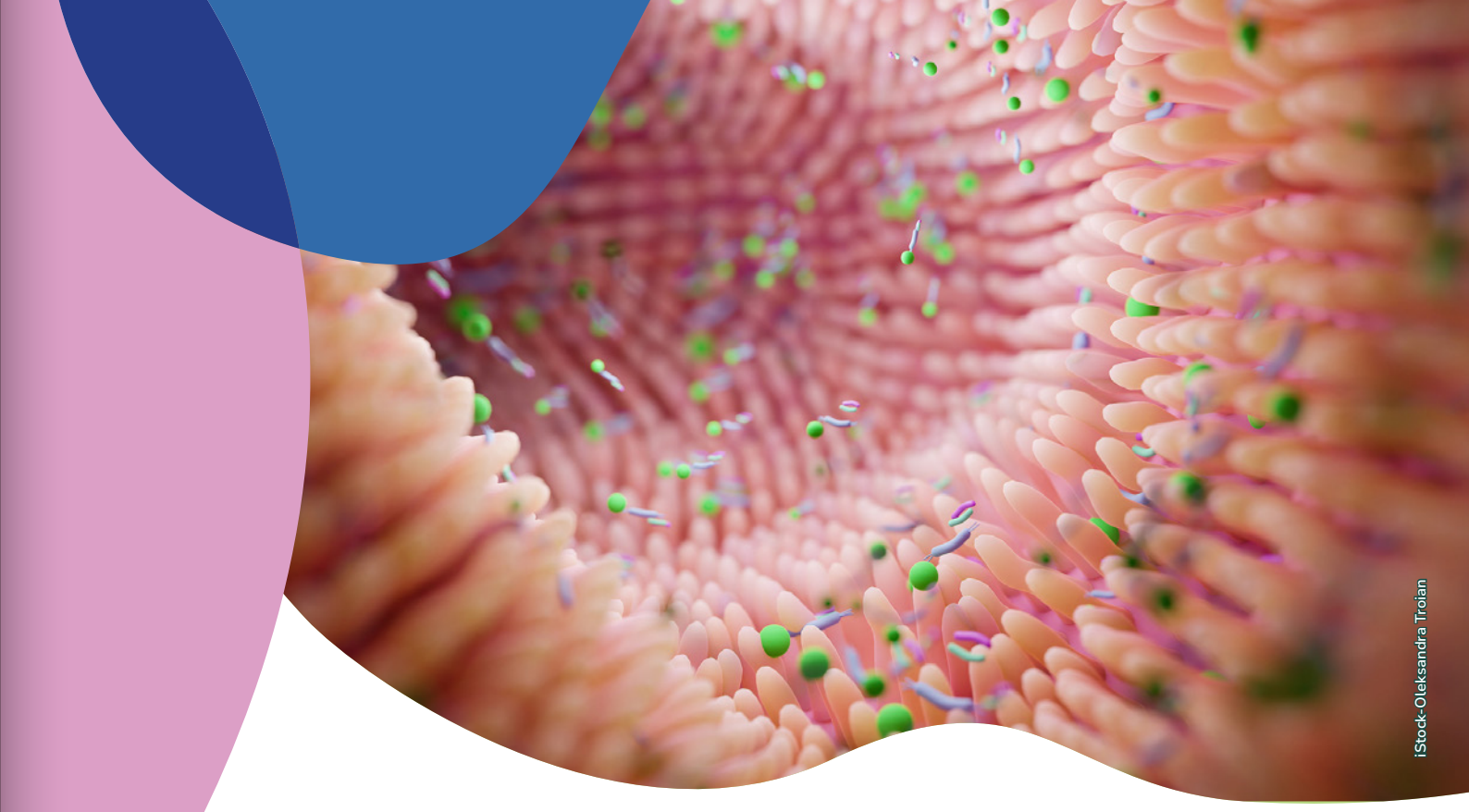

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Food, health, and the microbiome: A market overview

Bacteria in the gut outnumber human cells, so it is little wonder that they affect the health of our microbiome.[1] But it is only in the past few years that we have begun to unravel their myriad mechanisms of action, and to reveal their impact on all the systems of the body, from digestion to heart health and immune response, to our risk of inflammatory disease, and even our mental health, behaviour and mood.[2]

As a result, the market for gut health foods and ingredients is booming, with an estimated value of around $48.4 billion a year, and a compound annual growth rate (CAGR) of 8.2% expected for at least the next 10 years.[3]

Probiotics and fibre continue to dominate the gut health space, as some of the most well-researched and well-recognised ingredients for digestive wellbeing, but a range of other ingredients is starting to make headway, including other biotics, such as prebiotics (food for probiotic bacteria) and synbiotics (combinations of the two), plant polyphenols, spices, certain fruits, vegetables and grains, and fermented foods.[4]

The main areas of interest continue to be digestive health and immune support, but as consumers become increasingly aware of how their microbiome affects their disease risk, mental health, skin health and how they age, it is becoming clear that the market potential goes far beyond digestion and immunity.[5]

This report looks at the role of foods and ingredients in nurturing a healthy gut microbiome, how to communicate their benefits with consumers, their potential in various food applications and markets, as well as possible pitfalls for manufacturers.


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Tracking consumer awareness levels

Our understanding of the effects of food, drink, and lifestyle on the gut microbiome has taken off in recent years with new research picking up pace.[6] A growing number of consumers is aware of the foods and ingredients that contribute to a healthy microbiome, as well as those that may adversely affect gut health, such as saturated fats, sugar, refined grains, excess alcohol, and certain food additives.[7] 'Eating clean' therefore is becoming an additional focus for many consumers concerned with the health of their gut microbiome.[8]

The most sought-after foods for digestive health include probiotics, especially in dairy products, and foods labelled as high in fibre, while prebiotic foods have seen mixed results.[9] The Kellogg Company, for instance, discontinued its All-Bran Prebiotic Oaty Clusters cereals in the UK in 2023, after only four years on the market.[10]

According to Julian Mellentin, director and founder of New Nutrition Business, the term 'prebiotics' is still challenging for large food companies.[11]

He writes: "People struggle to differentiate between 'probiotics' and 'prebiotics' despite 20 years of industry efforts to explain prebiotics as 'what feeds the good bacteria in the gut and makes them grow'. Prebiotic has meaning to very few consumers. It is not a motivator to purchase for more than a niche of consumers and they skew strongly 50+."

Still, prebiotics are well-supported by science and appeal to a significant consumer niche. [12] [13] The German prebiotics market – Europe's largest – is expected to surpass US$930 million by 2026, driven not only by messaging around fibre and digestion, but also the promise of better absorption of nutrients such as calcium and magnesium.[14]

Even a high-fibre message is at risk of getting stuck in a niche, however, as it tends to appeal most strongly to older consumers.[15] According to Mellentin, one successful strategy is to hitch fibre claims to other product attributes that consumers find just as important, if not more so, such as low-sugar or high-protein.[16]

Consumer understanding also depends on the type of fibre used, and a survey from Leatherhead Food Research found respondents were most aware of pectin, wheat bran and cellulose, but less familiar with beta-glucan, polydextrose, inulin, psyllium, and pea fibre.[17]

Meanwhile, consumer interest in naturally probiotic-rich fermented foods has taken off in recent years, including fermented vegetables such as sauerkraut and kimchi; fermented soy products like Japanese natto and Indonesian tempeh; kefir, made from fermented milk; and the fermented tea kombucha, all of which have entered the mainstream to varying degrees.[18] Google searches for kimchi, for instance, hit an all-time high in January 2024, while interest in kombucha spiked in January 2020 and has remained strong ever since.

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Opportunities for personalisation in the gut health space

There is a significant opportunity for personalisation in the gut health space, considering that everyone's gut microbiome differs and food ingredients do not always result in the same metabolic responses.[19] A range of diets and testing kits that help individuals understand their gut health could create opportunities for microbiota-focused products.

According to Mintel's associate director of food science Stephanie Mattucci: "Microbiota-based diets will become a new extension of personalised health. This will allow new opportunities for products that support a healthy gut microbiota and potentially improve overall health."[20]

One standout company in personalised nutrition for improved gut health is Zoe, a UK-based health tech startup that uses at-home tests to better understand users' metabolic baseline and gut microbiota. An AI-powered app uses these personal results combined with real-time guidance for foods and meals to help improve microbial diversity for individual users.[21]

Other companies taking a similar approach include the Danish firm Gutxy, US-based Day Two and Viome Life Sciences, all of which use various tests and personalised dietary interventions with the promise of better digestive health, leading to better overall health.

According to Euromonitor International: "Gut health is increasingly recognised as a crucial factor in personalised nutrition...This growing understanding has led to the integration of gut health analysis in personalised nutrition approaches, enabling tailored dietary recommendations and interventions that aim to optimise the gut microbiota composition for improved health outcomes."[22]

Its 2023 Health and Nutrition Survey found 39% of European consumers were extremely or very comfortable using online or app-based services for personalised nutrition recommendations.[23]

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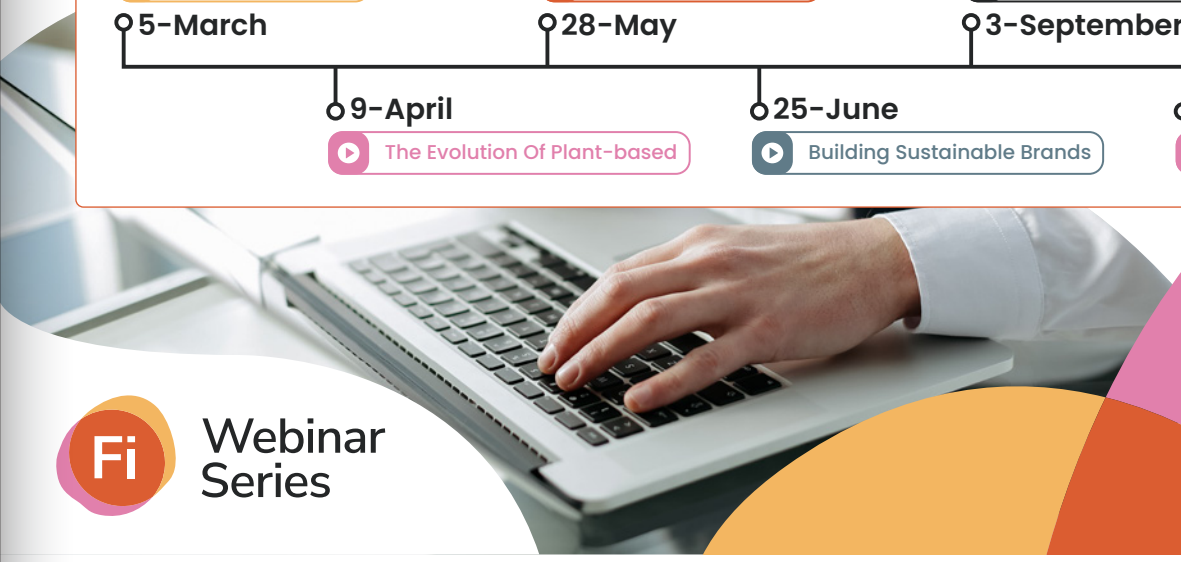
- 3-September — Dairy And Dairy Alternatives
- 1-October — Salt And Fat Reduction



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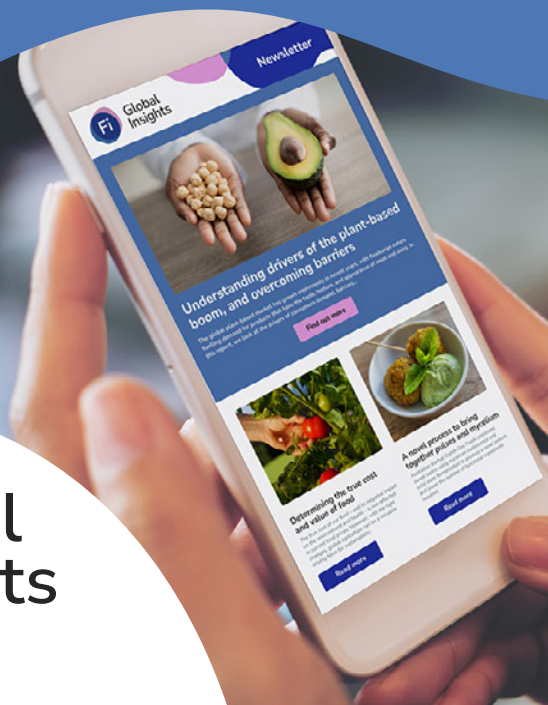

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Fibre: Weighing up the pros and cons

One of the most important dietary elements for gut health is fibre.[24] Different types of fibre have different benefits, with insoluble fibre known to increase stool bulk, for example, while soluble fibre has been shown to reduce blood cholesterol levels and help regulate blood sugar.[25]

Although fibre recommendations vary slightly globally, few people in developed countries get enough by any measure. The UK's Scientific Advisory Committee on Nutrition (SACN) advises an intake of 30 grams per day for adults, while the European Food Safety Authority (EFSA) suggests that 25 grams is adequate.[26] However, British intakes are around 20 grams a day[27], while the average American consumes just 15 grams day.[28]

This could have even more serious consequences than previously thought, as a growing body of research links inadequate fibre intake and increased risk of various inflammatory diseases, including type 2 diabetes, obesity, cardiovascular disease, and even cancer.[29] Some researchers suggest an inextricable link between fibre and these diseases, with gut microbes playing a key role.[30]

Bord Bia, the Irish Food Board, says increasing fibre intake is "one of the simplest and often forgotten ways" to improve digestive health, and as more consumers consider the health of their gut microbiome, brands have an opportunity to stand out among the many health and wellness products on offer.[31]

Mintel also highlights an opportunity for brands to link fibre content with other important food attributes, such as low-sugar.[32]

Neha Srivastava, Food and Drink Patent Analyst at Mintel, said: "Consumers are aware of the importance of fibres in maintaining gut health. Brands can leverage this awareness by repositioning them as a multifunctional health ingredient that helps reduce sugar content in food and drink whilst improving gut health."[33]

The beverage market may be one area with particular potential for this combination. Recent Mintel research found 29% of British consumers were interested in more fruit juices, juice drinks, and smoothies with high fibre content.[34]

In 2023, Mintel highlighted oat fibre, which is a source of both soluble beta-glucans and insoluble fibre, as an ingredient to watch.

However, some consumers are hesitant to buy high-fibre foods, and the growing popularity of low-carb and keto-style diets makes it even more challenging for some consumers to meet their recommended intake.[35]

According to registered dietitian Lauren Harris-Pincus, writing in Today's Dietitian: "Other challenges to adequate fibre consumption among clients include perceptions that fibre-rich foods lack taste, are too expensive, and require extra time and skill to prepare. Some clients and consumers are hesitant to eat higher-fibre foods due to negative digestive symptoms such as gas and bloating, either actual or perceived."[36]

Which fibre ingredients can brands leverage?

Whole foods, including nuts, seeds, pulses, fruits, vegetables, and whole grains, are some of the most useful sources of prebiotic fibre to feed the microbiome, and some are higher in fibre than others. Among the best sources are Jerusalem artichokes, leeks, onions and asparagus.[37]

Alongside the two main types of fibre, soluble and insoluble, resistant starch now is also considered a fibre, and is found naturally in foods like bananas, potatoes, grains, and beans.[38] It can form in some starchy foods such as rice and potatoes when they are cooked and then cooled, and is also added to certain foods.

For food and beverage companies, there is a range of fibre ingredients available, each with its own benefits, not only for gut health, but also for the structure and composition of foods. According to Leatherhead Food International, fibre ingredients traditionally have been plant-based, obtained from cereals, vegetables and other sources.[39]

Pectin, with its long history in jam-making, is useful for its gelling properties in many applications, while cellulose and its derivatives help create a thick, creamy texture in paste-like products. Citrus fibre is water-binding and emulsifies, making it useful for mouthfeel in reduced-fat products, and inulin and beta-glucan are popular dietary fibres for increasing nutritional value.[40]

In the beverage sector, a growing number of brands is using soluble fibres to qualify for high-fibre claims while also reducing sugar, including the chicory root fibres inulin and oligofructose, acacia gum, and polydextrose.[41]

According to Leatherhead Food International: "There is a range of new and emerging ingredients that have functional as well as health benefits; fibres are very versatile ingredients used currently in sugar reduction but with promising effects for fat reduction. In essence, dietary fibres are the forgotten hero with so much potential."[42]

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Spotlight on probiotics

The International Scientific Association for Probiotics and Prebiotics (ISAPP) defines probiotics as "live microorganisms that, when administered in adequate amounts, confer a health benefit on the host."[43] They are mainly bacteria (but also include yeasts) and there are seven that are most often used in probiotic products: *Lactobacillus*, *Bifidobacterium*, *Saccharomyces*, *Streptococcus*, *Enterococcus*, *Escherichia*, and *Bacillus.*[44]

Researchers have linked various strains with wide-ranging health benefits, from digestive health to skin health, gum health, and vaginal health – and a growing body of research links probiotic consumption with a healthy gut microbiome, which is known to reduce risk of chronic bacterial infections, inflammatory bowel diseases, and general digestive difficulties.[45] Further research is beginning to reveal more complex links between a healthy gut and immune response, risk of inflammatory disease, and even mental health, behaviour, and mood.[46]

Probiotics are far and away the most popular ingredients for gut health worldwide, accounting for 82% of the total digestive health market, according to Market.Us.[47] Dairy products are the most popular application, with 55% of market share by revenue, followed by non-alcoholic beverages, bakery products and cereals, and supplements.[48]

Following on from dairy's dominance, probiotics also are making their way into plant-based foods, helping to boost the nutritional profile of dairy alternatives in particular.[49] Examples include Califia Probiotic Dairy Free Yoghurt in the US and Coyo Organic Coconut Milk Kefir in the UK.

According to Euromonitor International, brands are expected to move from a focus on probiotics alone to prebiotics and synbiotics for their broader gut health benefits.[50]

How to communicate the benefits of food for gut health

For brands, the focus is on incorporating science-backed, gut-healthy ingredients into products such as fibre ingredients, fibre-rich fruits and vegetables, and pro- and prebiotics. Working with a nutrition expert, like a registered dietitian, can help provide credibility, according to UK PR firm The PHA Group, as can focusing on what differentiates the product from others on the market, whether that is the taste, the founder's expertise, or well-known fans of the product.[51]

A 2023 study found that consumers get most information on gut health from social media and social circles, and people prefer these platforms rather than government publications. The researchers noted that social media channels allow information to be shared in a timely, engaging, and cost-effective manner - although they voiced concern over inaccurate information.[52]

Research organisation Listen + Learn suggests this could be an enormous – and largely untapped – opportunity for brands to lead the conversation about the importance of what we feed our gut bacteria.[53]

In addition, combining gut health ingredients with other, broader product attributes, such as low-sugar and high-protein could help brands attract a larger market share than focusing on gut health alone.[54]

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The regulatory landscape

Communication around health benefits is dictated to a large extent by a country's or a region's regulatory environment.

In Europe, foods and beverages must contain at least six grams of fibre per 100 grams in order to make a high-fibre claim, for instance, while a 'source of fibre' claim requires at least three grams of fibre per 100 grams.[55] In the US, meanwhile, products should contain at least 10% of the daily value or 2.5 grams of fibre per serving to claim they are a 'good source of fibre' and those containing at least 20% of the daily value of fibre or 5 grams or more of fibre per serving can carry a high-fibre claim.[56]

However, it is worth bearing in mind the claims most likely to resonate with consumers. According to Euromonitor International, many brands prefer to highlight whole grains rather than fibre for that reason.[57]

When it comes to probiotics, EFSA has taken a notoriously tough position, rejecting more than 350 probiotic claims, relating to everything from oral and skin health to immunity, to decreased digestive transit time and supporting healthy gut flora.[58] Until 2018, the term 'probiotic' itself was forbidden throughout the EU, as it was considered to be an implied health claim.[59]

Italy was the first EU country to allow use of the term probiotic on food supplements and a growing number of EU countries have followed suit, including Spain, Denmark, the Czech Republic, and the Netherlands. In January 2023, French authorities announced they would authorise the term and industry insiders have tipped the UK to be next. Nevertheless, pan-EU harmonisation is not currently on the cards and the regulatory landscape remains fragmented.[60]

Pen & Tec Consulting suggests entering other markets first, advising: "North American regulations are much more lenient on claims and countries such as China, South Korea & USA have the biggest markets and high consumer demands for probiotics."[61]

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Other on-trend ingredients: Fermented foods and synbiotics

Fermented foods

It is possible to increase the population of probiotics in the gut microbiome through the foods we eat, and probiotic-rich fermented foods are known to be a particularly effective way of feeding healthy gut bacteria and encouraging them to flourish.[62] One recent study found fermented food consumption also decreased inflammation in healthy adults, including reducing levels of an inflammatory protein linked to rheumatoid arthritis, type 2 diabetes, and chronic stress.[63]

Fermented foods have entered the mainstream in just the past few years, including fermented vegetables like sauerkraut and kimchi, the fermented tea kombucha, and fermented soy products like Indonesian tempeh.[64] Some major food and beverage companies have helped spur market growth, and PepsiCo was among the first with its 2016 acquisition of kombucha and probiotic drinks company KeVita.[65]

In 2023, 757 registered dietitian nutritionists in the US took part in the annual 'What's trending in Nutrition?' survey, naming fermented foods, such as yoghurt, kimchi, kombucha, and pickled vegetables as the top superfood of the year. Non-profit organisation The Fermentation Association noted that this was the sixth year in a row that fermented foods claimed the top spot in this survey, indicating the public's ongoing interest in the health benefits of fermented foods.

Fermented foods do present challenges for food manufacturers, as it is difficult to produce consistent colour, flavour, and texture, which are dependent on factors like where the ingredients are from, when they are harvested, and the bacteria present in each batch.[66]

Synbiotics and postbiotics

Alongside prebiotics and probiotics, some companies are using combinations of both, called synbiotics, which work together to improve the individual ingredients' efficacy.[67] The idea is to provide specific probiotics with the prebiotics they use preferentially as food.

Postbiotics are another emerging area for gut health, and in mid-2021, the International Scientific Association of Probiotics and Prebiotics (ISAPP) officially defined postbiotics as "a preparation of inanimate microorganisms and/or their components that confers a health benefit on the host."[68]

Variously described as the metabolites or waste products of probiotics, these inactivated compounds are of particular interest to manufacturers because they are heat- and pH-stable, meaning they can be used in a variety of unrefrigerated foods and beverages.[69] However, they still face regulatory hurdles in many parts of the world. In Europe, the term 'postbiotic' has yet to be approved for use.[70]

In Japan and Korea, however, postbiotics already are widely accepted with some suppliers having produced postbiotics for up to three decades.

Key takeaways

- The health of the gut microbiome is now thought to impact all systems in the body, including the digestive, cardiovascular, and nervous systems
- Digestive health and immune support are the main functions that consumers seek from gut health products
- Healthy ageing, skin health, reducing overall disease risk, and brain health are other important consumer concerns that they may aim to address via the microbiome
- Probiotics and fibre are the top functional ingredients for gut health, while the benefits of prebiotics have proved more challenging to communicate
- The importance of a healthy gut microbiome increasingly is a crucial factor in personalised nutrition
- Eating more fibre may be one of the simplest ways to improve gut health
- Functional fibres can help manufacturers connect microbiome health with other claims that resonate with consumers, like low-sugar or reduced-fat
- Probiotics account for 82% of the digestive health market, and dairy applications dominate
- Fermented foods have entered the mainstream – but it can be challenging to scale up production
- Postbiotics are yet to take off in the West, but are well-established in Japanese and Korean markets

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