



# The emerging power of PREbiotics

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These supporting players, prebiotics, which are primarily non-digestible carbohydrates (such as soluble fibers), are now seen as vital to the overall gut health equation and may even be among the most promising ingredients now making their way into consumer products.

### PREBIOTICS RISING

As consumers gain recognition of the synergistic value of probiotics and prebiotics, awareness and demand for foods with prebiotics is on the rise.

- Prebiotics market is predicted to reach **\$7.11 billion** by 2024.\*
- **A third of Americans** are trying to consume probiotics.\*\*
- **10% of American** are now trying to consume prebiotics.\*\*

\* Grand View Research. Prebiotics market Projected to Reach \$7.11 billion by 2024. Accessed at <http://www.grandviewresearch.com/press-release/global-prebiotics-market>

\*\* International Food Information Council Foundation Food and Health Survey 2016, Accessed at [http://www.foodinsight.org/sites/default/files/2016\\_executivesummary\\_final\\_web.pdf](http://www.foodinsight.org/sites/default/files/2016_executivesummary_final_web.pdf)

In fact, emerging research now indicates that prebiotics not only contribute to microbiome balance and digestive health, they also offer many other health benefits in their own right, from boosting calcium absorption for support of healthy bones to maintaining healthy blood glucose levels.<sup>2</sup>

#### ***So what's the difference between probiotics and prebiotics?***

Probiotics are “helpful” living bacteria and yeasts that populate your digestive system and keep things balanced and working smoothly. They are found naturally in your body, but are also present in many foods and supplements.

Prebiotics, on the other hand, are non-digestible carbohydrates that serve as food for the beneficial living bacteria in the gut — but not for the pathogenic (non-beneficial) bacteria.<sup>1</sup> They must be available to be fermented in the gut, so they are not broken down by stomach acid or human digestive enzymes and they are not absorbed by the body without being broken down first by gut bacteria.<sup>2,3</sup>

Well-known prebiotics are carbohydrates such as fructooligosaccharides (FOS), including inulin and galactooligosaccharides (GOS). Both of these are found in foods such as chicory root fiber, Jerusalem artichoke, asparagus, onions, Belgian endive, leeks and garlic. Other naturally prebiotic-rich foods are bananas, garlic and whole grains.

Part of the fructan family, chicory root fiber is a naturally sourced prebiotic ingredient, which includes various fibers, such as inulin, short chain inulin (oligofructose), FOS and GOS, which are well studied prebiotics.<sup>4,5,6</sup>

Chicory root fiber is a versatile ingredient, working well in a variety of applications, such as baby food, bars, bakery items, beverages, cereals, confectionery and dairy products. Because it resists digestion, it adds bulk to a product with fewer calories than digestible carbohydrates (i.e. low impact on glycemic response) and is suitable in products that are dairy-free, low-fat and free of gluten. FOS from chicory root is also an emerging ingredient for weight loss products because it increases a product's satiety effect.<sup>7,8</sup>

### Prebiotics aid calcium absorption and more

Scientists have long known about prebiotics, although they have typically been the more misunderstood younger sibling in the ingredients for digestive health family. But all that may be changing. While probiotics have traditionally been at the center of scientific interest, much of the newer research on gut health is now focusing on the broader function of prebiotics.

One of the most surprising and well-studied areas is the role of prebiotics in enhancing calcium absorption to improve bone mineral density.<sup>9</sup> Since the early 2000s, researchers have been demonstrating how prebiotics can help boost calcium absorption.<sup>10,11,12,13</sup> Scientists have also worked to confirm that consuming FOS increases calcium absorption in adolescent boys and girls. A study by Abrams et al 2005<sup>14</sup> that involved supplementing pubertal adolescents' high-calcium diet with eight g/d inulin-type fructans showed a significant increase in calcium absorption at eight weeks and a significant increase in whole-body bone mineral density after one year, compared to the group taking a placebo. The researchers concluded that if calcium absorption can be increased it may have a positive impact on helping to prevent bone loss or osteoporosis later in life. Additionally, increased calcium and magnesium absorption has been observed in postmenopausal women after six weeks of treatment with FOS (10g/d).<sup>15</sup>

A number of studies have also focused on the impact of prebiotics in the early markers of cardiovascular and metabolic diseases. While some of the results have been mixed, most recent animal research is promising. Scientists in France and Belgium, in 2017, using an original mouse model, have demonstrated for the first time that inulin-type fructans may improve host endothelial dysfunction, an early key marker of cardiovascular disease, through changes in the gut microbiota.<sup>16</sup> These findings, if replicated in humans, could support positioning prebiotics as a novel dietary approach to the management of metabolic disorders related to cardiovascular disease.

Newer research is focusing on prebiotics' role in other health areas. A 2015 human study, for example, noted that prebiotics may impact brain function affecting both emotional processing and stress hormone (e.g. cortisol) levels.<sup>17</sup> The researchers found that ingestion of non-digestible GOS, compared to a placebo, lowered salivary cortisol awakening in healthy volunteers as well as decreased attentional vigilance to negative versus positive information. It has previously been established in animal studies that both probiotics and prebiotics, together with gut function may play a role in the symptoms of stress, but this is the first study to demonstrate this effect of prebiotics in humans.

There are also investigations into the synergistic benefits between probiotics and prebiotics in food products. A 2017 study published in *Advanced Nutrition* suggests that intake of products such as yogurt and fruit provide probiotics, prebiotics, high-quality protein, important fatty acids, and a mixture of vitamins and minerals that have the potential to create a synergistic effect on health.<sup>18</sup> They note this dietary strategy warrants further exploration.

## Product Developers Take Notice

While many questions remain about how prebiotics support the healthy balance of microflora in the gut and health overall, enough evidence now suggests that a diet with ample sources of these key soluble fibers are an important element of an overall healthy lifestyle. Product formulators are catching on. Chicory root fiber has a large portfolio of scientific support and works well in many food and beverage applications, bars in particular where it helps to bind and keep the bar shelf stable and fresh tasting.

And it stands up from a health benefit perspective too. Cargill's Oliggo-Fiber® chicory root fiber, for example, has been shown to be an effective prebiotic stimulating bifidobacteria at a dosage of just five grams per day.<sup>19,20</sup>

These supporting players may be taking center stage in product development sooner rather than later.

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