PROTEOLYTIC ENZYMES

Providing breakthroughs in repairing microbiomes and improved patient gut health

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MOST PATIENTS CONSUME MEALS AND SNACKS WITHOUT ANY THOUGHT of how their bodies extract healthful nutrients from these food items. This is the role of digestive enzymes within the gastrointestinal tract, and when this tract is healthy, it offers many system-wide benefits as a result of supplemental microbiome ingredients.

Benefits of a healthy gastrointestinal tract

A healthy gastrointestinal tract is often associated with more effective digestion. But the microbes in the gut have been connected with several other facets of human health, including those related to immunity and metabolic health.[1]

Some studies link gut health with obesity. In a 2020 article published in *Preventive Nutrition and Food Science*, authors explain that this is due to the microbiome's effect on energy expenditure and the metabolism of nutrients.[2] In this way, a healthier gastrointestinal tract can help support a healthier weight in patients via a microbiome-enhancing supplement.

The role of enzymes in a healthy microbiome

The body's natural digestive enzymes play a critical role in gastrointestinal function. They are responsible for breaking down the foods we eat, enabling us to better absorb the nutrients these items contain, and are further promoted by supplementational microbiome ingredients that support the body's natural response to inflammation.

The enzyme amylase breaks down carbohydrates, fats are broken down by lipase, and protease enzymes break down proteins. Other enzymes help reduce additional substances into more digestible forms. Lactase is one that breaks down lactose. Sucrase is another and breaks down sucrose.

If any of these enzymes are deficient, it can lead to gastrointestinal dysfunction, sometimes even contributing to the development of a gastrointestinal disorder. At a minimum, digestive enzyme insufficiency can cause irritation within the gastrointestinal tract, resulting in symptoms such as bloating, cramps, diarrhea, and gas.[3] Taking a supplement containing digestive enzymes may help fill the gap by altering gastric motility, or increasing the movement of food through the intestines and out of the body.

Interest in digestive enzyme supplements on the rise

Microbiome interest and research are growing exponentially. The global digestive enzyme supplement market is projected to experience a 7.7% compound annual growth rate (CAGR) between 2022-28.[4] If these projections are correct, this type of supplement will bring in revenues of $1.5 billion annually by the end of this period, with North America accounting for a majority of the market share.

Factors contributing to this rate of growth include evidence suggesting that certain digestive enzymes can ease irritable bowel syndrome (IBS) and improve the body's inflammatory response, along with the fast-growing 55+ population in the U.S.

Recent science for specific digestive enzymes

Several recent studies have looked at individual enzymes to better understand their impact on the microbiome and gastrointestinal health. Here's what they discovered:

- **Bromelain**. A 2021 review explains that bromelain is a protease-based enzyme that is mainly absorbed in the digestive tract.[5] It is known to have anti-inflammatory properties which help ease inflammatory bowel disease symptoms, along with helping to inhibit the production of gastrointestinal cancer cells. Bromelain is also low in toxicity and has good absorption rates according to this review, maintaining its "high biological activity" during the digestive process.
- **Papain**. According to a 2021 article in *Neurogastroenterology & Motility*, papain's gastrointestinal benefits come from its ability to alter gastric motility in a manner that provides positive effects on specific regions of the digestive tract.[6] Specifically, digestive enzymes contract some muscle strips and relax others, a microbiome ingredient that helps move food along in the digestive system.
- **Trypsin**. A 2020 study found that using trypsin to hydrolyze whey protein concentrate resulted in the creation of peptides with strong antioxidant and cytoprotective properties.[7] Thus, researchers concluded that this in supplementation form could help improve consumer health.

Other studies have looked at the effects of supplementing with several digestive enzymes at once and found that this can lead to even more powerful effects.

This was the case with a 2020 study published in the *Journal of Bioscience and Bioengineering*. Researchers noted that when amylase, lipase, and protease enzymes were combined, their activity and ability were "significantly higher" than each one on its own.[8]

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4 Marqual IT Solutions Pvt. Ltd (KBV Research). Global Digestive Enzyme Supplements Market 2022. https://www.researchandmarkets.com/reports/5659134/global-digestive-enzyme-supplements-market-size

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8 Aydemir D et al. Synthesis and characterization of a triple enzyme-inorganic hybrid nanoflower (TrpE@ihNF) as a combination of three pancreatic digestive enzymes amylase, protease and lipase. J Biosci Bioengineer. 2020;129(6):679-686. doi:10.1016/j.jbiosc.2020.01.008