

Digestive enzymes and other dietary ingredients for digestive support



*It's not so much that "you are what you eat", but rather, you are what you **digest**. As you age, or with medical conditions, your ability to break down food and assimilate nutrients declines. Following is a great summary from my friends at **Protocol for Life Balance**, addressing important questions about digestive enzymes—what they do, why quality matters, and what might be right for you.*

—Dr. Ronald Hoffman

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The gastrointestinal (GI) tract is made of an extraordinarily complex system of organs working together to ensure that our foods are smoothly and properly digested. It is also a powerful barrier against environmental aggressors, as well as the host of an abundant symbiotic microbiota. The GI tract must be permeable enough to let nutrients reach the general circulation and, at the same time, selective enough to prevent unwanted chemicals and microorganisms to penetrate the body. With such an

arduous task to complete, our GI tracts can really benefit from dietary supplements that help to maintain the integrity of the GI lining and ensure a smooth digestive process.*

It would not be possible to list all the dietary supplements available to support a healthy GI tract in one article, so we will focus here on a few compounds that work in different ways to support a healthy digestion: digestive enzymes, betaine HCl and ox bile.*

As we age, the production of pancreatic enzymes tends to decrease, which may impair our ability to absorb all the nutrients we need to meet our energy needs and to maintain a healthy weight and muscle mass. In these cases, an intake of digestive enzymes in the form of supplements can be useful.¹

Digestive enzymes constitute a large category of popular dietary supplements. Enzymes are proteins that act as biological catalysts (facilitators) by accelerating chemical reactions.* In dietary supplements they are typically lipases, proteases, and carbohydrases. Lipases break down large molecules of fat into smaller fatty acids, proteases break down proteins into smaller peptides, and carbohydrases complex sugars into simpler sugars.* This process liberates elemental macronutrients into the digestive tract to allow for a better absorption of these nutrients into the bloodstream.*

Supplemental enzymes such as lipases, proteases and cellulase (an enzyme breaking down cellulose) may also have a beneficial effect on gut microbiota; indeed in preclinical experiments, *Aspergillus*-derived protease, lipase, and cellulase preparations have bifidogenic effects on rats fed a high-fat diet.* These results need to be confirmed in human clinical trials but suggest that dietary supplementation with enzymes could have a prebiotic-like effect.^{2,3*}

An important aspect to consider when choosing a dietary supplement comprised of digestive enzymes is quality. The supplement fact panel should display the weight of enzymes (usually in milligrams) included in the product, and it should also show the enzymatic activity for each enzyme. The enzyme activities are displayed in different units (USP Units, GDU, SAPU, FIP...) that have been established for each type of enzyme. These units refer to the potency of the enzyme and its ability to break down a standardized amount of substrate for a period of time at a specific temperature and pH. It is also important to choose a reputable brand of dietary supplements that follows rigorous quality and good manufacturing practices since recent industry testing of products bought online has shown that some products containing bromelain had little or even no enzymatic activity.

Other dietary ingredients that work well with enzymes to support a healthy digestion and an optimal absorption of nutrients are betaine HCl and ox bile extract. Betaine HCl, due to its hydrochloric acid, is used as a pH regulator to support the healthy low pH necessary for the stomach to function adequately.* About 10% of healthy adults over the age of 70 have elevated stomach pH (>5.0) which can negatively impact their ability to properly digest food and absorb nutrients, including vitamins.⁴ Altered gastric pH is also known to negatively affect intestinal microbiota; it is therefore important to maintain a healthy low pH in the stomach to preserve the delicate balance of commensal bacteria⁵ lining the small and large intestines. By contributing to the maintenance of a healthy pH in the stomach betaine HCl may indirectly contribute to the maintenance of a healthy gut flora.*⁵

Ox bile has a long history of use to support digestion.*⁶ Ox bile has a complex composition. The ox bile used in dietary supplements is often standardized to a percentage of cholic acids. During the normal digestion process, a minimal

concentration of endogenous bile acids is necessary for the proper digestion and absorption of fats. Endogenous bile acids play also a role in the regulation of colonic water transport.⁷ Dietary supplementation with ox bile may contribute to the healthy digestion of fats.*

Protocol For Life Balance® offers several formulations with enzymes, betaine HCl, and ox bile. Our BioCore® Enhanced Enzymes™ features a blend of fungal-derived enzymes that will aid in the digestion of most foods, including beans and cruciferous vegetables.* The vegetarian enzymes in BioCore® Enhanced Enzymes™ have been tested in a controlled laboratory study using a digestive model for their activity throughout the entire pH range of the digestive system and have been shown not to be degraded by acid in the stomach.* We also have Enzymes-HCl™, a comprehensive enzyme formula designed to support both gastric and intestinal digestive functions.* Betaine HCl helps to start digestion by the stomach and prepares the correct pH to stimulate intestinal function.* A full spectrum of proteases further assists the intestine in the complete breakdown of food for enhanced absorption.* Ox bile extract completes this formula for added digestive support.*

When you are looking for smooth digestion, especially after a heavy meal, supplements are here to support your digestive tract daily, when you need it.*

***These statements have not been evaluated by the Food Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.**

□ Commensal bacteria are the bacteria that reside on the surface of the mucosa without harming human health.

References:

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