

DIGESTIVE ENZYMES HCL

**NORTH
CENTURY
PHARMACY**

Clinical Applications

- Contains Ingredients Traditionally Used to Support Digestion*
- May Contribute to a Healthy Digestive pH*
- Supports Digestive Comfort*

*Digestive Enzymes HCL combines key ingredients to aid each phase of digestion. This formula is designed for individuals who can benefit from comprehensive digestive support or who experience unpleasant after-meal symptoms associated with digestion.**

All North Century Pharmacy Formulas Meet or Exceed cGMP Quality Standards

Discussion

Healthy digestive function depends on the complex interaction between motor and secretory functions within the gastrointestinal (GI) tract. Normal aging, overuse of acid-suppressing medications, illness, infection, smoking, psychological distress, genetics, and other factors can negatively impact digestive processes or the production of digestive juices, including bile, potentially creating digestive discomfort.¹⁻³ Furthermore, insufficiency in any phase (cephalic, gastric, intestinal) of digestion can limit the absorption of macronutrients, micronutrients, and other compounds, such as phytonutrients, from the diet even when intake is sufficient.¹ Digestive Enzymes HCL provides gentian root extract, betaine HCl, pancreatin, and ox bile to support each phase of digestion.*

Gentian (*Gentiana lutea*)

In herbal medicine traditions, bitter herbs or plant extracts (bitters) are used to assist digestion and relieve digestive complaints.^{1,4} Gentian is well known for its bitter properties, which are due to its secoiridoid-glycoside constituents, including swertiamarin, gentiopicroside, amarogentin, and sweroside.⁴ The mechanism underlying the traditional use of bitters is thought to be cephalic phase responses elicited through bitter receptors found in the taste buds of the tongue and throughout the GI tract.⁵ Cephalic responses, such as influencing digestive juice production and blood flow to the gut, prepare the GI tract for food processing.*⁵

Betaine HCl

When ingested, betaine HCl dissociates into free betaine and hydrochloric acid (HCl)—the primary acid that comprises gastric digestive juices.⁶ Hydrochloric acid has several critical functions, including: 1) to create a hostile environment for ingested pathogens by maintaining a healthy gastric pH; 2) to convert pepsinogen into pepsin, its active enzyme form; 3) to denature proteins, thereby revealing their polypeptide chain and making them more accessible for enzymatic degradation by pepsin; and 4) to promote absorption of micronutrients, including calcium, iron, folate, and vitamins B6 and B12.^{1,7} In addition, the contributions of HCl and pepsin during the initial steps of protein digestion help reduce the relative risk of food allergenicity that is associated with incomplete protein digestion due to low stomach acid.^{1,8} In human studies of induced hypochlorhydria (pH > 5), supplementation with 1500 mg of betaine HCl just before a test meal successfully reacidified gastric pH (pH < 3) 12 to 30 minutes after ingestion and sustained this effect for approximately 60 minutes.^{6,9} Oral supplementation with solid-form betaine HCl allows for ease of administration and avoids direct acid exposure to the mouth and esophageal tissues; these qualities make betaine HCl a good option for reacidification support.*^{6,8}

Pancreatin

As digestion continues in the small intestine, pancreatic enzymes take the predominant role. These enzymes support the body's further breakdown of carbohydrates (amylase), proteins (proteases), and fats (lipase) to absorb their component parts.^{7,10} Orally administered pancreatic enzymes have been obtainable as digestive aids since the 19th century, and the scientific literature has discussed their efficacy for decades.¹¹ Research has suggested that oral pancreatic enzyme preparations are useful in healthy individuals with transient deficiencies in digestive enzymes.¹¹ Such individuals may experience digestive complaints, such as epigastric burning, postprandial fullness, bloating, frequent flatus, and nausea.^{11,12} Pancreatin is a representative example of an orally administered pancreatic enzyme supplement that supplies protease, amylase, lipase, trypsin, and chymotrypsin.*

Ox Bile

In the upper intestine, lipase and bile mix with chyme (partially digested food) and work together to emulsify and further digest fats so that lipids and fat-soluble vitamins can be absorbed.⁷ In addition, as an alkaline fluid, bile reduces the acidity of chyme, allowing enzymes, such as trypsin and chymotrypsin, to continue breaking down peptides.^{7,10} Ox bile is an exogenous source of bile with a long history of use, particularly in traditional Chinese medicine, wherein it was sometimes compounded with gentian root.¹³ Traditional use in the West includes a 1913 paper that describes using 0.25 g of ox bile along with diet modification for digestive complaints.¹⁴ Traditional use suggests that ox bile may be a solution for some people who experience minor digestive discomfort, especially related to fat ingestion. The ox bile in Digestive Enzymes HCL is standardized to a minimum of 45% cholic acid. In humans, cholic acid is a major component of the total bile acid pool.*

Digestive Enzymes HCL is intended as general support, providing ingredients that may be particularly beneficial to digestion (or digestive processes) after consuming high-protein or high-fat meals as well as foods that typically cause gas or bloating. These ingredients can also support individuals who experience digestive challenges associated with natural aging or everyday factors that affect their digestion.*

***These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.**


NORTH CENTURY
PHARMACY
Distributed By: North Century Pharmacy
3058 Campbellville Rd
Columbia, KY 42728

DIGESTIVE ENZYMES HCL

Supplement Facts

Serving Size: 1 Capsule
Servings Per Container: 90

	Amount Per Serving	%DV
Betaine HCl	300 mg	**
Ox Bile (45% cholic acid)	150 mg	**
Pancreatin 10x (from porcine)	100 mg	**
Protease	25,000 USP	**
Amylase	25,000 USP	**
Trypsin	25,000 USP	**
Chymotrypsin	7,500 USP	**
Lipase	2,000 USP	**
Gentian 4:1 Extract (<i>Gentiana lutea</i>)(root)	20 mg	**

**Daily Value (DV) not established.

Other Ingredients: Capsule (hypromellose and water), ascorbyl palmitate, hydroxypropyl cellulose, and silica.

Directions

Take one capsule with meals, or use as directed by your healthcare professional.

Consult your healthcare professional before use. Individuals taking medication should discuss potential interactions with their healthcare professional. Do not use if tamper seal is damaged.

References

1. Guillems TG, Drake LE. *Integr Med (Encinitas)*. 2020;19(1):32-36.
2. Talley NJ. *Korean J Intern Med*. 2016;31(3):444-456. doi:10.3904/kjim.2016.091
3. Symptoms & causes of indigestion. National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK): National Institutes of Health. Accessed January 27, 2023. <https://www.niddk.nih.gov/health-information/digestive-diseases/indigestion-dyspepsia/symptoms-causes>
4. Prakash O, Singh R, Kumar S, et al. *J Ayu Herb Med*. 2017;3(3):175-181.
5. McMullen MK, Whitehouse JM, Whitton PA, et al. *J Ethnopharmacol*. 2014;154(3):719-727. doi:10.1016/j.jep.2014.04.041
6. Yago MR, Frymoyer A, Benet LZ, et al. *AAPS J*. 2014;16(6):1358-1365. doi:10.1208/s12248-014-9673-9
7. Patricia JJ, Dhamoon AS. Physiology, Digestion. In: *StatPearls*. StatPearls Publishing; 2022. Updated September 12, 2022. Accessed January 24, 2023. <https://www.ncbi.nlm.nih.gov/books/NBK544242/>
8. Untersmayr E, Jensen-Jarolim E. *J Allergy Clin Immunol*. 2008;121(6):1301-1310. doi:10.1016/j.jaci.2008.04.025
9. Yago MR, Frymoyer AR, Smelick GS, et al. *Mol Pharm*. 2013;10(11):4032-4037. doi:10.1021/mp4003738
10. Callahan A, Leaoanard H, Powell T. Protein digestion and absorption in nutrition: science and everyday application, v 10. Accessed January 16, 2023. <https://openoregon.pressbooks.pub/nutritionscience/chapter/6d-protein-digestion-absorption/>
11. Park HJ, Lee HJ. *J Pharm Investig*. Published online December 14, 2022. doi:10.1007/s40005-022-00605-8
12. Levine ME, Koch SY, Koch KL. *Gut Liver*. 2015;9(4):464-469. doi:10.5009/gnl14005
13. Wang DQ, Carey MC. *World J Gastroenterol*. 2014;20(29):9952-9975. doi:10.3748/wjg.v20.i29.9952
14. Palfrey FW. *Am J Med Sci*. 1913;145(6):796-801.

Formulated To Exclude

Wheat, gluten, corn, yeast, soy, dairy products, fish, shellfish, peanuts, tree nuts, egg, sesame, ingredients derived from genetically modified organisms (GMOs), artificial colors, and artificial sweeteners.

***These statements have not been evaluated by the Food and Drug Administration.
This product is not intended to diagnose, treat, cure, or prevent any disease.**



NORTH CENTURY
PHARMACY

Distributed By: North Century Pharmacy
3058 Campbellsville Rd
Columbia, KY 42728

DRS-352
REV. 07/26/23