

Plant Enzymes SAP

Science-based enzyme complex for optimal digestive health

Plant Enzymes SAP is a combination of plant-based enzymes designed to assist the body in breaking down fats, carbohydrates, protein, starches, and grain. Foods in their natural raw state contain enzymes that assist the body in breaking down the food and accessing the foods' nutrients. Often, with our food transportation and preparation, these important enzymes are denatured or broken down, which makes it more difficult for us to properly digest our foods. **Plant Enzymes SAP** may also help reduce incidences of dyspepsia and inflammation in the gastrointestinal tract.^{[1][2][8][9]}

ACTIVE INGREDIENTS

Each vegetable capsule contains:

Vegetable digestive enzyme blend	260 mg
alpha-Galactosidase	20 FCC GalU
Amylase	11800 FCC DU
Cellulase	1260 FCC CU
Glucosylase	50 FCC AG
Hemicellulase	30 FCC HCU
Invertase	400 FCC SU
Lactase	540 FCC ALU
Lipase	600 FCC LU
Maltase	130 FCC DP
Pectinase	60 endo-PGU
Phytase	2.5 FCC FTU
Fungal protease (protease)	40000 FCC HUT
Fungal protease (acid protease)	50 FCC SAP
Bacterial protease (neutral protease)	4500 FCC PC
Dipeptidyl-peptidase IV	2050 FCC HUT
Xylanase	300 FCC XU
Bromelain (<i>Ananas comosus</i> stem)	2400 GDU/g.
Papain (<i>Carica papaya</i>)	2400000 FCC PU

Other ingredients: Microcrystalline cellulose, vegetable magnesium stearate, and silicon dioxide in a capsule composed of vegetable carbohydrate gum and purified water.

This product is non-GMO and vegetarian friendly.

Contains no: Eggs, citrus, artificial flavour or colour.

Plant Enzymes SAP contains 90 capsules per bottle.

Store in a tightly closed, light-resistant container in a cool, dry place.

DIRECTIONS FOR USE

Adults: Take 1 capsule with each meal three times daily or as directed by your healthcare practitioner.

For occasional use only. Consult a healthcare practitioner for prolonged use.

INDICATIONS

Plant Enzymes SAP:

- Provides support for the relief of symptoms of dyspepsia, including abdominal bloating or pain, epigastric burning, and diarrhea.
- Supports absorption of fats, proteins, carbohydrates, and other nutrients.
- Supports a healthy inflammatory response in the gastrointestinal system.
- May help reduce flatulence after consuming fermentable carbohydrates.
- May improve gastrointestinal symptoms once gluten is removed from the diet in gluten-sensitive disorders.

PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for all **Plant Enzymes SAP** lot numbers have been tested by a third-party laboratory for identity, potency, and purity.



Scientific Advisory Panel (SAP):
adding nutraceutical research
to achieve optimum health



351, Rue Joseph-Carrier, Vaudreuil-Dorion, Quebec, J7V 5V5
T 1 866 510 3123 • F 1 866 510 3130 • nfh.ca

PANCREATIC INSUFFICIENCY

Pancreatic secretion changes in humans with aging.^[1] In a study exploring pancreatic exocrine secretion, researchers collected duodenal juice in two 15-minute fractions after a single intravenous injection of 1 U/kg seretin + 3 U/kg CCK.^[1] Researchers then measured volume, maximal concentration, and output of bicarbonate, lipase, phospholipase, and chymotrypsin, as well as chloride and calcium.^[1] Each parameter was plotted against age, and charting revealed a linear increase in output up to the third decade, and thereafter a linear decrease.^[1] Researchers concluded that pancreatic secretion is altered during aging, seen with a decrease in flow rate, bicarbonate, and enzyme secretion.^[1]

Nutrient malabsorption is a concern in patients with acquired immunodeficiency syndrome (AIDS), and recent studies have shown that pancreatic insufficiency is a codetermining factor of malabsorption.^[2] In an open-label trial, researchers looked to determine the efficacy of oral pancreatic enzyme supplementation in patients with AIDS and fat malabsorption.^[2] Faecal fat loss was evaluated by steatocrit assay at study entry, after two weeks without pancreatic enzyme treatment, and after a further two weeks of treatment with pancreatic extracts.^[2] Researchers found that pancreatic enzyme supplementation therapy is highly effective in reducing faecal fat loss in patients with AIDS and nutrient malabsorption.^[2]

In a double-blind, crossover study, researchers monitored the effects of microencapsulated pancreatic enzymes with regards to symptoms experienced by healthy volunteers after a high-calorie, high-fat meal.^[3] Patients ate 185 g of cookies, containing 1196 calories and 72 g of fat, with either placebo or three capsules of pancrelipase.^[3] The severity of symptoms for the following 17 hours were recorded including gastrointestinal symptoms, flatus, as well as collecting end-alveolar samples.^[3] The patients who received the enzymes had significant reductions in bloating, gas, and fullness during the dinner-to-bedtime period.^[3] These findings suggest that pancreatic supplementation may reduce postprandial symptoms in healthy subjects, and that they may also be beneficial in irritable bowel syndrome.^[3]

α-GALACTOSIDASE

Researchers conducted a double-blind, placebo-controlled study exploring the effect of α-galactosidase on bloating, abdominal distension, and flatulence after consuming fermentable carbohydrates.^[4] Healthy volunteers ingested 300 or 1200 GalU of α-galactosidase or placebo during a test meal of 420 g of cooked beans.^[4] For eight hours following the meal, breath hydrogen excretion, occurrence of bloating, abdominal pain, discomfort, flatulence, and diarrhea were measured.^[4] The group receiving 1200 GalU of α-galactosidase experienced a significant reduction of severity of flatulence and breath hydrogen excretion.^[4] Both the 300 and 1200 GalU groups had significant reduction in total symptom score.^[4] Researchers concluded that α-galactosidase reduced the production of gas after a meal high in fermentable carbohydrates, and may be helpful for patients with symptoms of gas.^[4]

FUNGAL/BACTERIAL PROTEASE

Fungal extracts rich in prolyl endopeptidases produced by a species like *Aspergillus oryzae*, which are used in food fermentation, are also of interest for the development of oral enzyme therapy product in patients affected by intolerance to gluten.^[5] AoS28A and AoS28B have been identified when this fungus is grown at acidic pH in a medium containing soy protein or wheat gliadin as the source of nitrogen, and are able to cleave N-terminally-blocked proline substrates.^[5] Both enzymes are able to efficiently digest the proline-rich 33-mer of gliadin, which is the most representative immune-toxic peptide deriving from gliadin.^[5]

In patients with celiac disease, gluten is poorly digested by gastrointestinal proteases, therefore fairly long gluten peptides enter the small-intestinal lumen and come into contact with the mucosal epithelium, causing several deleterious downstream effects.^[6] Supplementing enzyme therapy using either bacterial or fungal endopeptidases or proteases has been proposed to promote complete digestion of prolamins and destroy disease-inducing gluten peptides.^[6] One major advantage of these proteases is that they work within the lumen of the small intestine and do not take part in the immunological cascade in the lamina propria; they are therefore unlikely to cause harmful side effects to the host.^[6]

BROMELAIN

Bromelain is a family of sulfhydryl-containing proteolytic enzymes sourced from the fruit and stem of pineapple.^[7] Bromelain can provide proteolytic activity in the stomach as well as the small intestine by working across a pH range of 4.5–9.8.^[7] Because of this, bromelain can be used as a supplement in cases of pepsin and/or trypsin deficiency.^[7] There have been examples of bromelain being used in combination with pancreatic enzymes to assist digestion in cases of exocrine pancreatic insufficiency.^[7] In a study of patients with pancreatic steatorrhoea, supplementing a formula consisting of ox bile, pancreatin, and bromelain resulted in a decrease in stool fat excretion and a resultant weight gain in some patients, as well as an improvement in symptoms such as pain, excess flatulence, and diarrhea.^[7]

Several studies have suggested that bromelain may have anti-inflammatory activity in vivo, including a potential efficacy in inflammatory bowel disease.^[8] Researchers wanted to determine if ingestion of bromelain retains its proteolytic activity in the murine gastrointestinal tract in vivo.^[8] In vitro proteolytic activity was determined using immunofluorescence assays of different dosages administered orally to mice.^[8] Bromelain was found to retain substantial proteolytic activity throughout the gastrointestinal tract. Bromelain concentrations within the colon were dependent on both dose and formulation, which were sufficient to remove bromelain-sensitive molecules from both leukocytes and colon epithelial cells, with the peak activity at four hours.^[8] These studies demonstrate that bromelain enzymes can remain intact and proteolytically active within the murine gastrointestinal tract.^[8] Researchers hypothesize that oral bromelain may potentially modify inflammation within the gastrointestinal tract via local proteolytic activity within the colon environment.^[8]

PAPAIN

Papain is sourced from the papaya fruit and purified from the dried latex.^[7] It is a complex of multiple enzymes that have amylolytic, proteolytic, and minor lipolytic activity.^[7] Papain is used mainly to aid in protein digestion.^[7] Proteolytic enzymes such as papain may also be effective in cases of gluten intolerance and aid patients with celiac disease.^[7] In a case study of a patient with celiac disease, once the patient was placed on a gluten-free diet, general digestive symptoms improved and the patient was able to gain weight. However, the patient did continue to experience persistent steatorrhea.^[7] The patient then took 1,800 mg of papain enzyme tablets with each meal, and after one month no longer experienced loose stools.^[7]

PROTEASE, AMYLASE, AND CELLULASE

Researchers in a study set out to explore the use of Combizym (protease 10 FIP units, amylase 170 FIP units, cellulase 70 FIP units) in patients with dyspepsia.^[9] The study was a multicentre, randomized, placebo-controlled, crossover study, with 151 patients who had dyspepsia not relieved by placebos.^[9] Patients were randomly assigned into the placebo or treatment group receiving two tablets postmeal three times per day for two weeks, with a one-week washout followed by two weeks of placebo treatment.^[9] The severity of dyspepsia symptoms was evaluated before and after each treatment phase.^[9] Results found that compared to placebo, the two weeks of Combizym treatment significantly decreased the severity index of dyspepsia symptoms. Reported efficacy rates of Combizym and placebo on dyspepsia were 89.63% and 21.68%, respectively.^[9] Symptoms that improved included abdominal distension, belching, diarrhea, abdominal pain, and epigastric burning, with no patients reporting an adverse event during the study.^[9] Researchers concluded that Combizym treatment effectively helps symptoms of dyspepsia in patients.^[9]

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