

Prebio SAP

Science-based prebiotic formulation for optimal gastrointestinal health*

Prebiotics have been widely studied for their beneficial effects on the gut microbiome and their contribution to overall maintenance of health. Several clinical studies have proven that prebiotics selectively increase levels of *Bifidobacterium* and even *Lactobacillus* species in the gut while inhibiting pathogenic microbial species.* This mechanism of action is what makes prebiotics ideal for improving gastrointestinal health.* Prebiotic supplementation has been shown to alleviate diarrhea in infants and children, as well as cure chronic constipation in formula-fed infants.* Adults consuming prebiotics show significant increases in levels of *Bifidobacterium* in their gut microbiota, in addition to other butyrate-producing bacteria such as *Ruminococcus*, *Oscillospira*, and *Faecalibacterium*, while showing inhibition of pathogenic *Shigella* and *Escherichia coli* species.* In addition to modifying the gut microbiome, prebiotics can also modulate immunological markers by influencing inflammatory pathways.* These effects have further implications, where prebiotic supplementation has been shown to improve serum high density lipoprotein cholesterol levels while decreasing low density lipoprotein cholesterol levels in diabetic patients and patients suffering from chronic kidney disease.* Further research should help establish a stronger link between prebiotics and a host of other health benefits.

Prebio SAP is a unique combination of 5 different prebiotics that can enhance gastrointestinal health.*

ACTIVE INGREDIENTS

Serving Size: 1 Level Scoop (approx. 10 g)

	Amount per serving	Servings: 30 % Daily Value
Calories	18	
Total Carbohydrate	9 g	3%
Dietary Fiber	6 g	21%
Total Sugars	<1 g	<1%
Resistant starch-RS2 (<i>Solanum tuberosum</i>)	3.5 g	**
Xylooligosaccharides	1.5 g	**
Fructooligosaccharides	1 g	**
Arabinogalactan	1 g	**
Galactooligosaccharides	1 g	**

**Daily value not established

Other ingredients: Natural tropical punch flavor (natural cherry, orange, and raspberry flavors), natural lemon flavor, malic acid, silicon dioxide, stevia rebaudiana leaf extract.

Contains no: Gluten, soy, wheat, eggs, corn protein, yeast, preservatives, artificial colors and flavors, or sugar.

This product is non-GMO and vegetarian friendly.

Do not use if seal is broken. Keep out of reach of children

DIRECTIONS FOR USE

Adults: Mix 1 level scoop (approx. 10 g) in 250 ml water or other cold beverage once daily or as directed by your healthcare practitioner. **Stir well prior to drinking.** Take 2 hours before or after taking other medications and/or natural health products. Maintain adequate fluid intake.

INDICATIONS

Prebio SAP can help:

- Improve bowel movement and constipation
- Foster a healthy gut microflora
- Enhance immune function
- Mitigate gastrointestinal inflammation
- Improve lipid profile
- Manage blood glucose levels

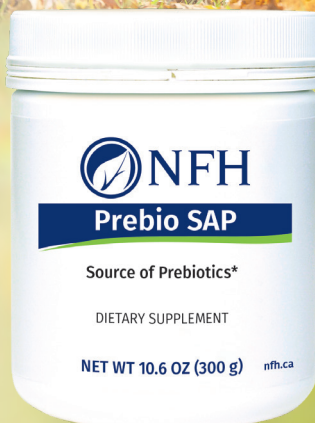
CAUTIONS AND WARNINGS

Consult a healthcare practitioner prior to use if you are taking medications which inhibit peristaltic movement (e.g. opioids, loperamide), if you have symptoms such as abdominal pain, nausea, vomiting or fever, if you are experiencing a sudden change in bowel habits that has persisted for more than 2 weeks, undiagnosed rectal bleeding, or have failed to defecate following the use of a laxative product. May cause mild gastro-intestinal discomfort (such as gas, bloating, cramps). If you have a milk allergy, do not use this product.

PURITY, CLEANLINESS & STABILITY

All ingredients listed for each **Prebio SAP** lot have been tested by an ISO 17025 accredited third-party laboratory for identity, potency, and purity.

*** 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.**



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



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The importance of a healthy gut microbiome in the overall maintenance of physical and mental well-being has been well established. Several clinical studies have established the link between probiotic consumption and its beneficial effects on the gut and beyond. In addition to probiotics, prebiotics have been extensively studied for their ability to help beneficial microbes flourish, thereby facilitating improved health of the individual.

[1] As per Rutherford and Gibson in 1995, prebiotics are defined as 'non-digestible food components that are resistant to the action of hydrolytic enzymes at the top of the gastrointestinal tract, pass into the colon in the unchanged state, and beneficially affect the microflora of the host organism by selectively stimulating the growth and/or activity of one or limited number of bacteria in the colon and thus improving the host health'. This definition was later refined to include the fact that prebiotics are selectively fermented and not altogether non-digestible.[2] Rather, the most recent definition put forth by the International Scientific Association for Probiotics and Prebiotics (ISAPP) in 2017 recognizes that prebiotics are substrates upon which the beneficial microbes in our gut thrive and in turn provide significant health benefits to humans.[1] Prebiotics, for the most part, tend to be non-digestible carbohydrates such as lignin, as well as non-starch polysaccharides which include pectins, hemicellulose, cellulose, hydrocolloids such as β glucan, gums, and mucilages. Prebiotics also include fructooligosaccharides (FOS) and galactooligosaccharides (GOS), which act as substrates for *Lactobacillus* and *Bifidobacterium* species.[1, 2] Several clinical studies have been conducted to study the effect of prebiotics alone and in combination with probiotics. Evidence from these studies underscores the importance of prebiotics in supporting a healthy gut microbiome.

GASTROINTESTINAL HEALTH

There is substantial evidence showing the beneficial effects of prebiotics on gastrointestinal health. In a randomized, placebo-controlled study conducted with 107 children aged 3 to 36 months, acute diarrhea was treated over 72 hours with a combination of 500 mg arabinogalactan, 700 mg xylooligosaccharides (XOS), and 2.5×10^9 CFU *Lactobacillus paracasei* B21060 twice a day. The treatment showed significant reduction in the duration of diarrhea and improved stool consistency.[3] In addition, prebiotic treatment also appears to improve constipation in infants. In a trial looking at 36 infants suffering from constipation, a 4-week intervention with FOS supplementation (6 g for 6 to 8.9 kg, 9 g for 9 to 11.9 kg, and 12 g for body weight over 12 kg) was carried out. FOS group showed softer stool consistency, less straining during bowel movements, faster gastrointestinal transit time, and an increase in *Bifidobacterium* species in the gut.[4] The substrate function of prebiotics can thus be utilized for providing infant formulas that are more gut-friendly with less gastrointestinal distress. This was demonstrated by a study that used a partially fermented formula containing GOS and FOS, in a ratio of 9:1, administered with probiotics as part of an infant formula, with breastfed infants used as a reference. The group of 200 infants enrolled in the study showed that prebiotic-enriched formula brought about better stool consistency in infants compared with the conventional formula, and stool consistency was closer to that of breastfed infants, with no significant adverse events observed.[5] These studies show the importance of prebiotics in providing a sustainable beneficial gut environment.

These benefits have been observed in adult populations as well. The primary mechanism of action of prebiotics is their ability to increase the proliferation of beneficial gut microbial species. Supplementation with either 1.4 g or 2.8 g of XOS, or placebo daily to 32 healthy adults for 8 weeks showed a dose-dependent increase in *Bifidobacterium* counts in stool samples.[6] Similarly, a study with 80 adults for 210 days administered 2.5, 5, or 10 g/day FOS showed an increase in levels of *Bifidobacterium* and *Lactobacillus* compared with the control maltodextrin. FOS also appeared to favour proliferation of *Lactobacillus* as well as butyrate-producing bacteria such as *Oscillospira*, *Faecalibacterium*, and *Ruminococcus*.^[7] Arabinogalactan is another prebiotic that showed beneficial effects on the gut microbiome. Administration of 15 g or 30 g of arabinogalactan (AOS) to 20 adults for 6 weeks showed a significant increase in total anaerobic count and increased levels of *Lactobacillus* species regardless of dose. A decrease in fecal ammonia levels was also observed with both doses.[8] A study conducted with the potato resistant starch showed similar microbiome modulating capabilities. In this study with 42 elderly and 42 middle-aged adults, consumption of 30 g/day of potato resistant starch for 12 weeks appeared to reduce levels of pathogenic *Proteobacteria* (*Shigella* and *Escherichia coli*) in elderly adults, and increased levels of *Bifidobacterium* in both groups of adults. Elderly adults also showed an increase in levels of short chain fatty acids (SCFAs) butyrate in the stool.[9]

The study with potato resistant starch also points to the ability of prebiotics not only to stimulate beneficial bacterial growth, but also inhibit pathogenic bacteria in the gut. This shows promising evidence that prebiotics can be used in other gastrointestinal disorders. In a trial conducted with 103 patients suffering from Crohn's disease, administration of 15 g/day of FOS for 4 weeks had reduced levels of interleukin (IL) 6 and increased expression of IL-10 in dendritic cells, indicating that FOS may influence cytokine production to result in less inflammation independent of changes in gut microbiome, but these observations need to be tested further to explore the potential safe use of prebiotics in Crohn's disease patients.[10]

IMMUNE FUNCTION

The previously mentioned study about Crohn's disease does however point to potential immunomodulating properties of prebiotics. This potential benefit has been tested in other ways with prebiotic supplementation. A study compared the effects of three

treatments - XOS 8 g/day, or *Bifidobacterium animalis subsp. Lactis* 10^9 CFU/day, or both together, administered to 41 adults for 21 days. XOS supplementation increased number of bowel movements and reported patient vitality and happiness. XOS also increased *Bifidobacterium* levels and increased plasma high density cholesterol levels, and reduced expression of natural killer T cells and IL-10, indicating that prebiotic supplementation was able to modulate immune function markers.[11] A combination of prebiotics appeared to have a more pronounced effect on immune function. A treatment of 5 g/day XOS or 1 g XOS + 3 g inulin supplementation for 4 weeks showed that XOS alone increased *Bifidobacterium* counts and butyrate levels in the stool, increased activity of β glucuronidase and α glucosidase, and reduced concentrations of p-cresol and acetate. XOS + inulin supplementation, however, decreased LPS concentrations and modulated gene expression of IL-1 β and IL-13 in blood, thereby helping in the management of inflammatory effects of high-fat diet in healthy adults.[12] Another study assessed the supplementation of 140 colorectal cancer patients with 30 g/day of prebiotics containing FOS, XOS, polydextrose, and resistant dextrin for 7 days, showing that supplementation with prebiotics significantly improved immunologic markers in the serum.[13] Further research and clinical trials should help elucidate the impact of different prebiotics on immune markers.

LIFESTYLE DISORDERS

Due to the gut microbiome and immune modulating properties of prebiotics, they have been tested for therapeutic potential against various lifestyle disorders. A systematic review of 26 trials with a total of 831 participants found that dietary prebiotic supplementation increased satiety feeling and reduced levels of insulin and post prandial glucose.[14] These results were supported by another meta-analysis of 13 randomized clinical trials with 513 patients, where prebiotic supplementation reduced levels of total cholesterol, low density lipoprotein cholesterol (LDL-C), and increased levels of high-density lipoprotein cholesterol (HDL-C) in diabetic patients.[15] The cholesterol-modifying properties of prebiotics are also observed with the use of potato resistant starch in a randomized placebo-controlled study where 75 participants were given 30 g/day of prebiotics for 12 weeks. An increase in levels of *Parasutterella* in the gut coupled with reduction in levels of LDL-C were observed in the prebiotic supplemented group compared with the placebo group. Other metabolic parameters influenced by prebiotics include toxins associated with chronic kidney disease. Administration of FOS (12 g/day for 3 months) to 46 non-dialysis dependent chronic kidney disease patients reduced serum and total levels of p-cresyl sulfate, a uremic toxin associated with chronic kidney disease.[17] Further research should help elucidate the importance of prebiotics in addressing metabolic and lifestyle disorders.

SYNERGISM FOR OPTIMAL EFFICIENCY

Research evidence suggests that supplementing a combination of prebiotics such as XOS, FOS, AOS, GOS, and resistant starch can support the general maintenance of health and provide increased benefits.[3,12]

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