
Probiotics

Foods, Examples, Supplements, Health Benefits, and Side Effects

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Abstract

Probiotics are live microorganisms that, when consumed in adequate amounts, confer health benefits to the host. This comprehensive guide explores the nature of probiotics, their mechanisms of action, types, benefits, dietary sources, supplementation forms, gender-specific considerations, potential side effects, scientific evidence, marketing trends, regulatory status, and concludes with insights into their role in promoting health. The information is presented in straightforward language to ensure clarity and accessibility for all readers.

Introduction

In recent years, probiotics have garnered significant attention for their potential to enhance health and well-being. Found in various foods and supplements, these beneficial bacteria are believed to support digestive health, bolster the immune system, and may even influence mental health. This article aims to provide a detailed understanding of probiotics, their functions, benefits, and considerations for use (1-9).



Probiotics are live, beneficial bacteria and yeasts that naturally reside in the human body, particularly in the digestive system. Image: Depiction of the probiotics bacteria and fungi. Image Credit: Bordo via Canva.com

What are Probiotics?

Probiotics are live, beneficial bacteria and yeasts that naturally reside in the human body, particularly in the digestive system. Unlike harmful bacteria that can cause illness, probiotics play a crucial role in maintaining the balance of the gut microbiome, aiding in digestion, and supporting overall health. Common genera of probiotic bacteria include *Lactobacillus* and *Bifidobacterium*.

Who Needs Probiotics?

Individuals experiencing digestive issues such as bloating, constipation, or diarrhea may benefit from probiotics. Those who have recently completed a course of antibiotics might also consider probiotics to help restore the natural balance of gut bacteria, as antibiotics can disrupt the microbiome. Additionally, people with conditions like irritable bowel syndrome (IBS) or inflammatory bowel disease (IBD) may find relief through probiotic supplementation. However, it is essential to consult a healthcare provider before starting probiotics, especially for individuals with underlying health conditions.

How do Probiotics Work?

Probiotics function by introducing beneficial microorganisms into the gut, which can help restore and maintain a healthy balance of gut flora. They compete with harmful bacteria for nutrients and attachment sites in the intestines, produce substances that inhibit pathogen growth, and stimulate the body's immune response. By enhancing the integrity of the intestinal barrier, probiotics can prevent harmful substances from entering the bloodstream. Additionally, certain probiotic strains can influence gene expression related to immune function and inflammation.

Types of Probiotics

Probiotics are made up of different species and strains of live microorganisms, each offering unique health effects. The two most common types are bacteria and yeast.

Bacteria

Among bacteria, *Lactobacillus* and *Bifidobacterium* species are widely used and studied. *Lactobacillus* species

are naturally present in the human gut and found in many fermented foods. They are known for helping with digestion, particularly in breaking down lactose. Bifidobacterium species also support digestion and play a role in modulating immune responses.

Yeast

In addition to bacteria, yeast species such as *Saccharomyces boulardii* are used as probiotics. This yeast has been found helpful in managing diarrhea and maintaining gut barrier function. The effectiveness of a probiotic often depends on the specific strain, its ability to survive in the digestive tract, and the condition it is intended to support.

Examples of Probiotics

Several specific strains of probiotics are commonly used in foods and supplements. *Lactobacillus acidophilus* is one of the most widely recognized strains and is believed to support gut health and may also help prevent yeast infections. *Bifidobacterium longum* is another important strain, associated with improved digestion and immune system support. *Saccharomyces boulardii* is a yeast-based probiotic known for its ability to treat or prevent diarrhea, especially that caused by antibiotics. Other examples include *Lactobacillus rhamnosus* GG, often used to support gastrointestinal function and prevent travel-related digestive issues, and *Bifidobacterium bifidum*, which is thought to enhance immunity and improve bowel regularity.

Benefits of Probiotics

Probiotics offer a wide range of possible benefits, although the effects can vary depending on the specific strains and the individual using them. One of the most well-established benefits is improved digestive health. Probiotics may help

with conditions like irritable bowel syndrome, antibiotic-associated diarrhea, and general bloating or discomfort. They also play a role in supporting the immune system by enhancing the activity of certain immune cells and promoting the production of protective antibodies.

Some research suggests probiotics might influence mental well-being through the gut-brain axis, potentially helping with symptoms of anxiety and depression. Other studies have indicated that probiotics may support skin health, reduce the frequency of respiratory infections, and even assist in regulating metabolism. However, while these benefits are supported by many smaller studies, the degree of effect often depends on the strain and dosage used, and results are not universal across all populations.

Probiotics Foods

Several foods naturally contain probiotics and can be added to the diet to help maintain a healthy balance of gut bacteria. Yogurt is one of the most common sources, particularly when labeled as containing live or active cultures. Kefir, a fermented milk drink, provides a broader spectrum of probiotic strains and is often well-tolerated even by people who are lactose intolerant.

Sauerkraut and kimchi are fermented vegetables that offer both probiotics and fiber, which helps feed beneficial gut bacteria. Miso, a fermented soybean paste used in soups and sauces, is another probiotic-rich option. Other examples include kombucha, a fermented tea beverage, and certain types of pickles made through natural fermentation. These foods can be incorporated into regular meals as part of a diet focused on digestive and immune health. It is important to note that cooking or processing these foods at high temperatures can kill the live cultures,

so they are most effective when consumed raw or minimally processed.

Probiotics Supplements

For those who may not obtain sufficient probiotics from food, supplements are available in various forms, including capsules, tablets, powders, and liquids. When selecting a probiotic supplement, it is important to consider the specific strains included, the number of colony-forming units (CFUs), and the product's storage requirements. Consulting with a healthcare provider can help determine the most appropriate supplement based on individual health needs.

Probiotics Tablets

Probiotic tablets offer a convenient way to consume beneficial bacteria. They are designed to deliver live microorganisms to the gut, where they can colonize and exert health benefits. It is crucial to follow the manufacturer's instructions regarding dosage and storage to ensure the viability of the probiotics.

Probiotics for Men and Women: Is there a Difference?

While the fundamental benefits of probiotics apply to both men and women, certain strains may offer gender-specific advantages. For example, some probiotics are formulated to support vaginal health in women by maintaining an optimal balance of bacteria and preventing infections. Men may benefit from probiotics that support prostate health and reduce the risk of urinary tract infections. However, more research is needed to fully understand gender-specific probiotic benefits, as most current studies are general or based on small sample sizes. Both men and

women can benefit from maintaining a balanced gut microbiome, and any probiotic supplement should be chosen based on individual health needs rather than gender alone.

Side Effects of Probiotics

Although probiotics are generally considered safe for healthy individuals, they can sometimes cause mild side effects, particularly when someone starts taking them for the first time. These effects may include bloating, gas, or a slight change in bowel habits. These symptoms often subside as the body adjusts. However, in rare cases, especially in people with weakened immune systems, central venous catheters, or serious illnesses, probiotics may cause infections.

For example, cases of *Lactobacillus* or *Saccharomyces* infections have been reported in immunocompromised individuals. People with critical illnesses, those undergoing chemotherapy, or patients with recent surgery should consult a healthcare professional before using probiotics. Additionally, because probiotics are live organisms, product quality and contamination risks must also be considered when choosing a supplement.

Scientific Evidence on Probiotics

There is a growing body of scientific research investigating the health effects of probiotics. Numerous laboratory and small-scale clinical studies have shown promising results. Some probiotic strains have been associated with reduced symptoms of irritable bowel syndrome, better control of infectious diarrhea, and enhanced immune responses. Certain studies also suggest benefits in managing eczema, respiratory infections, and even mental health disorders through the gut-brain axis.

However, it is important to recognize that much of this evidence comes from laboratory experiments or small, short-term human trials. There is a lack of large, long-term population-based studies that can definitively confirm these findings across diverse groups. Not all probiotic strains have the same effects, and benefits observed in one study may not apply to another. Furthermore, differences in product formulation, dosage, and delivery method make it difficult to compare outcomes. While the early research is promising, more high-quality, large-scale studies are needed to confirm the effectiveness and safety of probiotics for specific health conditions.

Marketing and Probiotics Popularity

The popularity of probiotics has skyrocketed over the past decade, driven largely by aggressive marketing campaigns and increased public interest in gut health. Probiotics are now promoted as solutions for a wide range of issues, from digestive troubles and immune support to skin health and weight management. This marketing is not always backed by solid scientific evidence, and many claims remain unverified.

Some products promote vague benefits without identifying specific strains or providing evidence for their effectiveness. The widespread availability of probiotic supplements in pharmacies, health food stores, and online platforms has made them easily accessible, but not all products are created equal. The rise in functional foods—such as yogurts, protein bars, and beverages fortified with probiotics—has also added to the trend. While some of these products can be helpful, others contain too few live organisms or are processed in ways that kill beneficial bacteria.

Consumers are encouraged to be skeptical of exaggerated health claims and to choose products that list clearly identified strains and quantities.

Are Probiotics Regulated?

Regulation of probiotics varies by country. In the United States, probiotics are typically sold as dietary supplements and are regulated by the Food and Drug Administration (FDA) under the Dietary Supplement Health and Education Act (DSHEA). This means that manufacturers are responsible for ensuring product safety and labeling accuracy, but they do not need to prove the effectiveness of their products before marketing them.

In Europe, probiotic health claims are regulated more strictly by the European Food Safety Authority (EFSA), and many claims have been rejected due to insufficient scientific evidence. In other regions, regulatory frameworks differ widely, and some markets have little to no oversight. As a result, the quality, potency, and purity of probiotic products can vary significantly between brands and countries.

Consumers should look for products that have been tested for safety and efficacy, ideally supported by published clinical trials. Independent third-party certifications or quality seals can also indicate higher manufacturing standards. Because regulatory standards are still developing, it is wise to consult with a healthcare provider when considering probiotic use for specific health concerns.

Conclusion

Probiotics are live microorganisms that play an important role in supporting gut health and possibly influencing other systems in the body such as immunity and mental health. Found naturally in certain foods and available as supplements, probiotics are increasingly recognized for their potential to help with digestive disorders, immune regulation, and overall wellness.

While the benefits of probiotics are promising, it is essential to understand that not all products are equal, and not every health claim is supported by strong evidence. The scientific research, though encouraging, is still developing, and many findings are based on laboratory studies rather than large-scale population data. Probiotics may cause mild side effects in some people and could be risky for those with weakened immune systems.

Regulatory oversight is limited in many regions, making it important to choose products carefully and seek professional advice when needed. Despite the growing interest and widespread marketing, probiotics should not be seen as a cure-all but rather as one tool among many for maintaining and improving health.

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