

Review Article

Probiotics Drinks: Balancing the Benefits with Possible Side-Effects

Rojina Khatun¹, Malavika Bhattacharya²

^{1,2}Department of Biotechnology, Techno India University, West Bengal, India.

²Corresponding Author : malavikab@gmail.com

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Abstract - Drinks containing probiotics have grown in popularity in recent years because of potential health benefits. Live beneficial bacteria included in these drinks are believed to enhance general health and intestinal health. The most popular probiotic drinks are kefir, kombucha, and yogurt-based drinks. The capacity of probiotic beverages to restore a normal balance of bacteria in the stomach is one of its main benefits. Immunity, digestion, and even mental health can all benefit from this. Additionally, probiotics have been connected to improved weight management, healthier skin, and a decreased risk of certain illnesses like inflammatory bowel disease and irritable bowel syndrome. Remember that not all probiotic beverages are made equal and that the advantages could change based on the particular strains and mixes that are utilized. Certain probiotic beverages might not have enough live bacteria in them or might not be able to survive digestion, which would prevent them from offering the desired health advantages. Drinks with probiotics may also have unintended consequences. When starting probiotics, some people may have digestive problems such as gas, bloating, or diarrhea. Before including probiotic drinks into their diet, people with weakened immune systems or those on specific drugs should consult a healthcare professional. It is best to select probiotic beverages that have undergone scientific testing to determine their efficacy and contain a variety of strains. Reading product labels and researching the specific strains used can help ensure that you are getting high-quality probiotic drinks.

Keywords - Fermented foods, Gut health, Healthy bacteria, Immune system, Microbiome.

1. Introduction

Live, nonpathogenic bacteria called probiotics are given to patients to help balance the microbial community, especially in the gastrointestinal system. They are governed as dietary supplements and foods and comprise lactic acid bacteria, such as *Lactobacillus* and *Bifidobacterium* species or *Saccharomyces boulardii* yeast. Probiotics have several ways of working, such as reducing the pH of the gut, preventing the colonization and invasion of harmful organisms, and altering the host's immunological response. [1].

Probiotics enhance digestive health by assisting in the maintenance of a balanced population of gut flora. They can promote regularity, improve nutrition absorption, and lessen the symptoms of digestive disorders such as Inflammatory Bowel Disease (IBD) and Irritable Bowel Syndrome (IBS) [2]. Studies have indicated that probiotics enhance the immune system through the stimulation of antibody production, reduction of inflammatory mediators, and maintenance of the intestinal barrier's integrity. This can help avoid infections and promote overall immune health [3].

Drinks containing probiotics have grown in popularity recently due to their many health advantages. These drinks are teeming with live beneficial bacteria that can strengthen the immune system, facilitate better digestion, and promote general gut health. Probiotics are available as supplements, but a nice and easy method to add these good bacteria to your daily routine is to have a probiotic drink [4]. The capacity of probiotic drinks to enhance digestion is one of its main advantages. These beverages include live bacteria that can aid in reestablishing the proper balance of gut flora, which is necessary to preserve the health of the digestive system. This may result in a decrease in digestive problems and symptoms such as gas, bloating, and diarrhea [5]. Drinks containing probiotics are also well known for strengthening immunity. Much of the immune system of the body resides in the gut, and immune function depends on the gut's bacteria remaining in a balanced and healthful manner [6]. You can boost your immunity and lower your chance of illness by routinely eating probiotic drinks. Probiotic drinks can also benefit mental health. The stomach and the brain are tightly related, according to research, and preserving a healthy gut flora can help elevate mood and lessen depressive and anxious symptoms [7].



Although there are many advantages to probiotic drinks, it is vital to be aware of any possible negative effects. When initiating probiotic drinks, some people may have gastrointestinal distress because the live bacteria may temporarily alter gut flora. Additionally, before including probiotic drinks in their diet, people with compromised immune systems or certain medical disorders should speak with a healthcare provider [8]. To sum up, probiotic drinks are a delightful and practical approach to strengthen immunity, promote digestive health, and enhance general well-being. You may be proactive in keeping your immune system strong and your gut healthy by including these drinks in your regular regimen [9].

Drinks with probiotics may be beneficial to your health. To optimize the potential advantages, it is crucial to select goods carefully and be aware of any possible adverse effects. More research is required to comprehend the effects of probiotic drinks on health properly and to identify the best formulations for various people [10].

2. Review of Literature

The potential health advantages of probiotic drinks have drawn much attention, especially with regard to the immune system and gut health. Probiotics have been shown to have positive effects on gut microbiota health in numerous studies that have been published in scholarly journals. Probiotics have been demonstrated to enhance nutritional absorption, aid digestion, and support gut health in general.

Plaza-Diaz et al. (2019) conducted a study that emphasized the various health advantages of probiotics, such as their capacity to regulate the immune system and diminish inflammation [11]. According to scientists, probiotics are crucial for maintaining the gut-brain axis, which can affect mental health and cognitive performance. Probiotics have also been linked to a lower chance of developing some illnesses, including metabolic and cardiovascular diseases [12].

Smith et al. (2016) underlined the significance of weighing the advantages of probiotics against any possible drawbacks in their thorough review. They recommended that in order to reduce the possibility of negative effects, individual factors like age, underlying medical conditions, and the particular probiotic strains used should be taken into account. It can be ensured that the advantages of probiotic supplements exceed any possible hazards by speaking with a healthcare provider prior to beginning use.

There is a dearth of thorough studies on the possible negative consequences of using probiotic drinks despite their increasing popularity due to their apparent health advantages. Probiotics have been associated with enhancements in immune response, digestion, and gut health; however, little is known about potential side effects. In addition, the research

that has been done on probiotics and their adverse effects has produced mixed results. For example, some studies have suggested that taking too many probiotics may cause gastrointestinal problems such as gas, bloating, and diarrhea. To further understand the ideal probiotic strains, dosage, and duration that are both safe and effective for each individual, more study is necessary.

Furthermore, less is known about the long-term effects of ingesting probiotic drinks, especially when it comes to susceptible groups, including newborns, pregnant women, and those with weakened immune systems. To make sure that probiotic products are safe for everyone to use, it is critical to evaluate the possible dangers related to probiotic use.

Moreover, the long-term effects of consuming probiotic drinks are not well understood, particularly in vulnerable populations such as pregnant women, infants, and individuals with compromised immune systems. It is important to assess the potential risks associated with probiotic consumption to ensure that these products are safe for all individuals to use [13].

3. Types of Probiotic Drinks

Probiotic drinks are beverages that contain live beneficial bacteria that are known to promote a healthy gut microbiome when consumed. These drinks come in a variety of forms and flavors, providing consumers with a convenient and tasty way to incorporate probiotics into their diet. Here are some common types of probiotic drinks:

3.1. Yakult

Yakult is a well-known probiotic beverage that has gained global popularity, having originated in Japan. *Lactobacillus casei* Shirota is a probiotic strain that is helpful and is present in this fermented dairy drink. Yakult is popular among both adults and kids due to its sweet and tangy flavor. A probiotic strain called *Lactobacillus casei* Shirota has been the subject of much research due to its potential health advantages, especially with regard to maintaining digestive health [14]. This particular type of bacteria may thrive in the stomach's acidic environment and make its way into the intestines, where it can support the proper balance of gut flora. Regular Yakult consumption can strengthen the immune system, facilitate better digestion, and promote gut health in general [15].

Yakult is a popular choice among those who want to easily maintain a healthy microbiome and add probiotics to their diet on a daily basis. Yakult is convenient to take with you wherever you go and incorporate into your daily routine because it comes in compact, single-serve bottles [16]. Healthcare practitioners frequently recommend it to people who may be having digestive problems or who want to boost their digestive system [17]. In conclusion, Yakult is a tasty

and practical probiotic beverage that includes the advantageous *Lactobacillus casei* Shirota strain, which is well-known for fostering gut health. You may easily add good bacteria to your system to improve general well-being by using Yakult in your diet [18].

Table 1. Composition of yakult

Waters
Skimmed Milk Power
Sugar
Glucose-Fructose Syrup
<i>Lactobacillus casei</i> Shirota Strain
Flavourings
Stabilizers
Preservatives

3.2. Yogurt

Probiotic yogurt is both nutritious and tasty, making it a fantastic choice for promoting gut health. This yogurt contains live bacteria and yeasts, often known as probiotics, which can help to maintain a healthy gut flora, boost immunity, and ease digestion [19].

Fermenting milk with live bacterial cultures produces yogurt, a popular probiotic beverage. *Lactobacillus bulgaricus* and *Streptococcus thermophilus* are the most commonly used bacteria in yogurt fermentation; however, other probiotic strains can be added for additional health benefits [20]. Yogurt has a lot of probiotics, or healthy bacteria, which help with digestion and keep your gut flora in balance. Yogurt is available in a variety of flavors, including Greek yogurt, conventional yogurt, and dairy-free options such as almond milk or coconut yogurt [21]. These yogurts come in a variety of flavors and textures to cater to a wide range of preferences. Extra probiotic strains such as *Lactobacillus acidophilus* or *Bifidobacterium lactis* can be added to yogurt to improve its probiotic content [22].

All things considered, yogurt is a tasty and adaptable probiotic beverage that can be consumed on its own or added to parfaits, smoothies, dressings, and other dishes. Yogurt is a low-complexity means of introducing probiotics into your diet and supporting gut-healthy microbiota. To sum up, yogurt is a probiotic beverage that may be consumed in a variety of ways to promote digestive health and general well-being. It also has many other health benefits [23].

Table 2. Composition of yogurt

Milk
Live Active Cultures
Sweeteners
Fruit of Flavorings
Stabilizers
Preservatives

3.3. Kefir

Probiotic-rich fermented dairy products are called kefir. Kefir grains are added to milk to ferment the milk's sugars and create a sour, slightly carbonated beverage [24]. Numerous probiotic strains found in kefir, such as *Lactobacillus* and *Bifidobacterium*, can strengthen the immune system, support gastrointestinal health, and enhance digestion. Regular kefir use can enhance general health and sustain a balanced population of gut flora [25].

Kefir is a nutrient-dense addition to a diet since it contains probiotics as well as calcium, vitamins, and protein [26]. However, when adding kefir to their diet for the first time, some people may have stomach issues like gas or bloating [27]. To give the gut flora time to acclimate, it is advised to start with small amounts of kefir and increase consumption gradually [28].

Table 3. Composition of kefir

Lactic acid bacteria
Yeasts
Proteins
Vitamins and minerals
Organic acids

3.4. Kombucha

Kombucha is a fermented tea beverage that has gained popularity in recent years due to its possible health advantages. It is prepared by combining a yeast and bacteria culture with sweetened tea and leaving it to ferment for some time [29]. The outcome is a slightly effervescent, acidic drink that is thought to have probiotic characteristics due to the presence of helpful microorganisms [30]. Kombucha is also reported to contain antioxidant effects, which may ease digestion and strengthen the immune system [31].

Apart from probiotics, kombucha also has organic acids and antioxidants, which have been demonstrated to have antibacterial and anti-inflammatory effects [32]. On the other hand, kombucha can also have certain drawbacks, like being heavy in sugar and having traces of alcohol. It is crucial to take kombucha in moderation to prevent any unfavourable side effects, such as upset stomach or blood sugar swings [33].

Table 4. Composition of kombucha

Tea
Sugar
SCOBY
Acids and Enzymes
Vitamins and Minerals

3.5. Probiotic Shots

Probiotic shots are short servings of concentrated beverages that are rich in probiotic microorganisms. These shots can be an easy way to receive your daily dose of

probiotics and are frequently convenient for on-the-go consumption [34]. Strains including *Lactobacillus acidophilus*, *Bifidobacterium bifidum*, and *Saccharomyces boulardii*, which have been demonstrated to support healthy gut flora and improve digestive health, are commonly found in probiotic injections [35].

Shots of probiotics can help reduce gastrointestinal symptoms like bloating, constipation, and diarrhea [36]. However, because probiotic strains in the gut are increasing quickly, some people may have bloating or stomach pain when they first start taking probiotic shots. It is recommended to start with small amounts of probiotic shots and gradually increase consumption to allow the gut microbiota to adapt [37].

Table 5. Composition of probiotic shorts

Lactobacillus acidophilus
Bifidobacterium lactis
Lactobacillus casei
Streptococcus thermophilus
Prebiotics
Vitamins
Minarels

4. Benefits of Probiotics Drinks

Live yeast and good bacteria are included in drinks labeled as probiotics, and they have been shown to provide a multitude of health advantages [38]. These beverages have grown in popularity recently because of their capacity to strengthen the immune system, promote digestive health, and improve overall well-being [39]. An overview of some of the main advantages of probiotic beverages can be seen below:

4.1. Improved Mental Health

Better constipation, the right balance of good bacteria in the stomach, is supported by probiotic drinks, which are widely recognized to help with digestion and guard against problems like gas, bloating, and constipation. Irritable Bowel Syndrome (IBS) and Inflammatory Bowel Disease (IBD) symptoms can also be lessened by them [40].

4.2. Enhanced Immunity

Since the gut contains the majority of our immune system, keeping the proper balance of bacteria there is essential to immune system health. Probiotic drinks strengthen the immune system by encouraging the growth of good bacteria that can protect the body from illnesses and dangerous diseases [41].

4.3. Better Mental Health

An increasing body of research indicates a close connection between mental and digestive health. Probiotic drinks have been demonstrated to reduce symptoms of

anxiety and depression by increasing the production of neurotransmitters like serotonin, which are essential for mood regulation [42].

4.4. Enhanced Nutrient Absorption

For the best possible nutrient absorption, a balanced population of gut flora is necessary. Drinks containing probiotics aid in maintaining this equilibrium and make sure the body can properly absorb the important vitamins and minerals found in meals [43].

4.5. Weight Management

Studies have indicated that gut microbial balance may be related to weight control. Drinks with probiotics may aid in the breakdown of fats and encourage a healthy metabolism, which may improve weight loss attempts [44].

4.6. Improved Skin Health

Because gastrointestinal inflammation can present as skin problems, there is a direct relationship between the health of our gut and our skin. Drinking probiotics can help you have clearer, healthier skin by lowering inflammation and promoting a balanced bacterial population [45].

4.7. Promotes Cardiovascular Health

Studies on probiotic drinks have indicated that they can lower blood pressure, cholesterol, and inflammation—all of which are heart disease risk factors. Probiotics may assist general cardiovascular health by fostering a balanced population of gut flora [46].

In summary, there are numerous health advantages to drinking probiotic drinks, ranging from better immune system and digestive system performance to better mental and physical well-being and weight control. You can enhance your general well-being and lead a happier, healthier life by incorporating these drinks into your diet [47].

5. Mechanism of Action of Probiotics

Consuming live beneficial bacteria and yeasts, known as probiotics, can yield numerous health advantages. Probiotics have a wide range of intricate and multidimensional modes of action [48]. Here are a few main mechanisms of action of probiotics in the body:

5.1. Restoring Gut Microbiota Balance

The primary way that probiotics work is by helping to maintain and restore a healthy balance of gut microbiota. The gut is home to trillions of bacteria that are vital to digestion, immunity, and overall health [49].

Illnesses, antibiotic use, unbalanced diets, and stressful environments can bring on an overpopulation of harmful bacteria. Probiotics replenish the gut with beneficial bacteria, which promotes a more diverse and well-balanced microbiota [50].

5.2. Competitive Exclusion of Pathogens

By competing with dangerous pathogens for nutrients and space in the gut, probiotics stop the colonization and growth of these infections. Probiotics aid in maintaining a healthy gut environment and lower the risk of infections and illnesses by displacing harmful bacteria [51].

5.3. Short-Chain Fatty Acid (SCFA) Production

In the gut, probiotics ferment indigestible carbohydrates and dietary fibers, producing Short-Chain Fatty Acids (SCFAs) such as butyrate, propionate, and acetate. Because they decrease inflammation, encourage the growth of good bacteria, and give colon cells energy, SCFAs are essential for gut health [52].

5.4. Modulation of Immune Response

By interacting with the immune system in the gut, probiotics support the maintenance of a healthy immune system and make it easier to modulate immunological reactions. They enhance immune system function by promoting the production of anti-inflammatory cytokines and blocking pro-inflammatory pathways [53].

5.5. Production of Bioactive Molecules

Probiotic strains that possess the ability to create bioactive compounds, including vitamins, enzymes, and antimicrobial peptides, are known to exist. Probiotics are associated with a number of health advantages, including antibacterial, anti-inflammatory, and antioxidant qualities [54].

5.6. Enhancement of Barrier Function

By encouraging the synthesis of mucus and tight junction proteins, which stop hazardous chemicals from passing from the gut into the bloodstream, probiotics aid in strengthening the intestinal barrier. In order to defend against infections, allergies, and inflammation, the intestinal barrier must be in good health [55].

5.7. Metabolism of Dietary Compounds

The metabolism of dietary constituents can be influenced by certain probiotic bacteria, which can break down fiber, carbs, and lipids to produce metabolites. These metabolites can have an impact on weight control and energy metabolism, among other aspects of health [56].

In conclusion, probiotics work through a combination of mechanisms that support gut health, immune function, and overall well-being. By understanding how probiotics exert their effects, we can better appreciate their potential benefits and incorporate them into our diets to promote optimal health [57].

6. Side-Effects of Probiotics Drinks

While most people consider probiotic drinks safe, some people may have negative effects from them. Though they

are typically transient and moderate, some side effects can occasionally be more serious. The following are a few possible negative effects of probiotic drinks:

6.1. Digestive Problems

When drinking probiotic beverages for the first time, some people may have moderate digestive problems like bloating, gas, and stomach cramps. These symptoms usually go away within a few days as the body adjusts, and this is mainly caused by the introduction of new bacteria into the stomach [58].

6.2. Allergic Reactions

Probiotic drinks occasionally contain chemicals that, in sensitive people, can cause allergic responses. Probiotic drinks frequently contain dairy, soy, and gluten allergies. Read the label carefully before ingesting probiotic drinks if you have a history of allergies to any of these substances [59].

6.3. Infections

Consuming probiotic beverages may lead to infections on occasion, particularly in those with compromised immune systems or underlying medical disorders. This is more frequent when homemade probiotic drinks are tainted with dangerous bacteria. It is advisable to stick to commercially manufactured probiotic drinks from trustworthy companies to lower your chance of illness [60].

6.4. Interactions with Medications

Live bacteria present in probiotic drinks may interact negatively with some drugs, including antibiotics. It is essential that you speak with your doctor before ingesting probiotic drinks if you are on any drugs, as the probiotics in them may reduce the effectiveness of antibiotics or other treatments [61].

Probiotic drinks generally have minor and temporary negative effects, so most individuals can safely include them in a balanced diet. On the other hand, it is crucial to cease taking probiotics and see a doctor if you suffer from severe or ongoing negative effects [58].

7. Recommendations for Optimal Consumption

Probiotic drinks are a popular way to incorporate beneficial bacteria into a diet and support digestive health. To ensure optimal consumption of probiotic drinks, here are some recommendations to consider:

7.1. Choose the Right Probiotic Drink

When selecting a probiotic drink, look for one that contains a variety of strains of good bacteria, such as lactobacillus and bifidobacterium. Make sure also to check the expiration date and ensure that the product has live and active cultures.

7.2. Start Slow

When incorporating probiotic drinks into your diet, it is important to start slowly to allow the body to adjust. Begin by drinking small amounts and gradually increase intake over time.

7.3. Consume Regularly

To experience the full benefits of probiotic drinks, it is important to consume them regularly. Aim to have a serving daily or as recommended on the product label.

7.4. Steer Clear of Mixing with Hot Beverages

Since probiotic bacteria are heat-sensitive, it is advisable to steer clear of combining probiotic drinks with hot liquids. Alternatively, savor them cold or at room temperature.

7.5. Pay Out to Additives

Some probiotic drinks could have artificial tastes, extra sugars, or other ingredients that counteract the bacteria's beneficial effects. Make sure to thoroughly study the label and select a product with the fewest possible additives.

7.6. Keep an Eye on Your Feelings

See how the body reacts to probiotic beverages. If you have any adverse symptoms, such as bloating or upset stomach, you might want to try a new brand or reduce intake [18].

Finally, adding probiotic drinks to your diet can help you keep your digestive tract healthy. By choosing a high-quality product, beginning cautiously, taking them frequently, avoiding heat exposure, being careful of additives, and monitoring your body's response may optimize the wellness advantages of probiotic beverages [64].

8. Conclusion

In conclusion, probiotic drinks have gained popularity as a useful and popular way to improve overall health and digestive function. An examination of these fermented beverages' benefits and potential downsides reveals that they have a lot going for them that may be good for our health. Drinking probiotic beverages can boost immunity, enhance nutritional absorption, and support good digestive health by restoring balance to the gut flora. Additionally, they might soothe gastrointestinal issues, lower inflammation, and decrease the risk of catching particular infections. Probiotic drinks are also a delicious alternative to probiotic tablets, and they are simple to incorporate into daily routines.

But, especially if you consume them in excess, it is crucial to be aware of the possible negative effects of probiotic drinks, which include bloating, gas, and upset stomach. While adding probiotic drinks to your diet, it is important to pay attention to your body's signals and proceed cautiously to avoid any negative side effects. It is crucial to

select premium probiotic beverages with a range of strains and to make sure they are stored correctly to preserve their effectiveness. It is also advisable to speak with a healthcare professional to find the ideal probiotic regimen for your unique needs, particularly if you are pregnant or nursing or have underlying medical concerns.

Overall, when ingested in moderation and as part of a balanced diet, probiotic drinks can be a beneficial complement to achieving optimal gut health and overall wellness. Their many advantages exceed any possible drawbacks, which makes them a viable choice for people seeking natural ways to improve their health.

Conflicts of Interest

Profit-Driven Motivation

Businesses that produce and market probiotic drinks could be biased in favor of highlighting the advantages of their goods. To increase sales and profits, they might overstate the benefits of probiotics while downplaying any possible drawbacks.

Research Bias

Companies that manufacture probiotic drinks may support studies on their advantages and disadvantages, which could skew the findings. This may have an impact on the validity and dependability of the study's conclusions.

Regulation and Oversight

There may be a conflict of interest when it comes to regulating and overseeing the marketing and labelling of probiotic drinks. Regulatory bodies may have ties to the probiotic industry, which could influence their decisions and enforcement actions.

Health Professional Endorsements

Some health professionals may have conflicts of interest when recommending probiotic drinks to their patients. They may receive incentives or financial support from probiotic companies, leading to biased recommendations that may not always be in the best interest of the patient.

Consumer Confusion

There are a lot of probiotic drinks available on the market, and consumers may find it difficult to discern between verifiable claims and marketing gimmicks. When it comes to choosing probiotic products, this might cause confusion and sometimes dangerous choices.

All things considered, it is critical that customers thoroughly investigate, assess, and weigh the advantages and possible drawbacks of probiotic drinks. They should also take into account any potential conflicts of interest in the material they find. Making educated choices about adding probiotics to their diet can also be facilitated by speaking with a healthcare provider.

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