

# Probiotics: Facts and Myths

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## ABSTRACT

*Probiotics square measure live microorganisms that, once administered in adequate amounts, confer a health profit on the host (FAO, 2014). Bifidobacterium and strains of carboxylic acid microorganism square measure the foremost wide used microorganism that exhibit prebiotic properties and square measure enclosed in several practical foods and dietary supplements (Diaz et al. 2019). The gut is a glorious place responsible for our digestive health and our overall well-being, including our mental health. A good gut leads to a strong immune system, less stress, and even higher serotonin levels (Leghari et al., 2021). According to scientific research, specific strains of probiotic microbes impart health advantages to the host and are safe for human consumption. However, because these effects are strain-specific, this information cannot be generalized to other strains. Probiotics may provide health advantages for problems like gastrointestinal infections, genitourinary infections, allergies, and some bowel disorders, which affect a large section of the world's population (Daliri et al., 2019). Increased awareness and knowledge of gut-healthy foods and the availability of a variety of gut-healthy foods at all levels of Indian society can improve overall health and avoid chronic diseases.*

**Keywords:** Probiotics, Bifidobacterium, Microorganism, Foods.

## INTRODUCTION

Probiotics square measure live microorganisms that confer a health profit on the host once administered in adequate amounts. Metchnikoff's pioneering work in the early 1900s can be credited with the discovery of the helpful role of some bacteria, which suggested that these beneficial bacteria could be administered to replace harmful germs with

useful ones. Lilly and Stillwell invented the phrase probiotic, which means "for life," in the 1960s (Senok, Ismael and Botta, 2005). Probiotics embrace a gaggle of microorganisms with varied effects, acting as traditional flora and masking binding sites of pathogens and inhibition of their formation (Ghasemian et al., 2018).

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Bifidobacterium and strains of carboxylic acid microorganisms square measure the foremost wide used microorganism that exhibit prebiotic properties and square measure enclosed in several practical foods and dietary supplements (Diaz et al., 2019). The gut is a glorious place responsible not only for our digestive health but our overall well-being, including our mental health. A good gut leads to a strong immune system, less stress, and even higher serotonin levels (Leghari et al., 2021). In recent years, there has been associate upsurge in analysis into probiotics, still as growing industrial interest within the probiotic food idea. This increased analysis has resulted in vital advances in our understanding and talent to characterize specific probiotic organisms, still attempting to verify their attributed health edges. Probiotic food constitutes a sizeable part of the useful market (Senok et al., 2005). According to scientific research, specific strains of probiotic microbes impart health advantages to the host and are safe for human consumption. However, because these effects are strain-specific, this information cannot be generalized to other strains. Probiotics may provide health advantages for problems like gastrointestinal infections, genitourinary infections, allergies, and some bowel disorders, which affect a large section of the world's population (Daliri et al., 2019). Increased awareness and knowledge of gut-healthy foods and the availability of a variety of gut-healthy foods at all levels of Indian society can improve overall health and avoid chronic diseases.

#### **Probiotics mode of action**

Probiotics have numerous advantages for the human species. Their main advantage is that they influence the expansion of the microbiota of the body, guaranteeing a correct balance between pathogens and bacterium that's needed for the organism's traditional operation (Johnston et al., 2006). Another function is to combat pathogenic gut microbial activity brought in from the polluted environment. Probiotics will probably stop sickness by inhibiting the expansion of pathogens like

*Campylobacter jejuni* (Schoster et al., 2013), and Gartner's bacillus (Cameron & Carter, 1992), *Shigella* (Hussain et al., 2017), and *Staphylococcus* (Sirkoska et al., 2013). Probiotics work in various ways to provide health advantages: Through the synthesis of antimicrobial compounds, antagonism is created. TLR interactions with probiotics and cell cascade signalling (Diaz et al., 2019), The host's immune system is modulated. Competition with pathogens for epithelial adherence and nutrition (Hill et al., 2014), and inhibition of bacterial toxin production (Hill et al., 2014). (Sharma et al., 2020). Enhancement of the epithelial barrier, increased adherence to the intestinal mucosa, concurrent reduction of pathogen adhesion, competitive exclusion of pathogenic microorganisms, generation of anti-microorganism chemicals, and immune system regulation are all major probiotic modes of action (Mtasher et al., 2018).

#### **Desirable probiotic properties**

To exert its therapeutic benefits, a potential probiotic strain is thought to exhibit certain ideal features. Adhesion to mucosal and epithelial surfaces, a key feature for effective immune regulation, and acid and bile tolerance, which appears to be crucial for oral administration. In vitro assays are currently used to detect pathogen competitive exclusion, pathogen adhesion and colonization prevention, antibacterial action against pathogenic bacteria, and bile salt hydrolase activity. (Kechagia et al., 2012).

#### **Microorganisms used as probiotic**

There are numerous bacteria species that may have probiotic effects. Only strains categorized as lactic acid bacteria are relevant in terms of nutrition, and those belonging to the genera *Lactococcus* and *Bifidobacterium* have the most important features in an applied environment (Santosa et al., 2006). The following are some of the more important representatives of *Lactobacillus* species and *Bifidobacterium* species, respectively, *Lactobacillus bulgaricus*, *Lactobacillus crispatus*, *Lactobacillus acidophilus*, *Lactobacillus gasseri*, *Lactobacillus acidophilus*, *Lactobacillus johnsonii*,

Lactobacillus casei, Lactobacillus lactis, Lactobacillus Plantarum, Lactobacillus fermentum, Lactobacillus reuteri, Lactobacillus rhamnosus Bifidobacterium animalis, Bifidobacterium breve, Bifidobacterium adolescentis, Bifidobacterium infantis, Bifidobacterium lactis, Bifidobacterium longum (Doron *et al*, 2006). Some other important bacteria used are Bacillus cereus, Enterococcus faecalis, Escherichia coli Nissie, Streptococcus thermophilus (Kechagia et al., 2012)

### Health benefits of probiotics

The benefits of probiotics, such as enhanced gut health, improved immune response, lower blood cholesterol, and cancer prevention, are gaining popularity. These health characteristics vary by strain and are regulated by the mechanisms indicated above. While some of the health benefits have been established, others require further investigation. In reality, while there is enough evidence to recommend probiotics for the treatment of acute diarrheal disorders, the avoidance of antibiotic-associated diarrhea, and the enhancement of lactose metabolism, there is inadequate data to recommend them for other clinical situations. While there is sufficient evidence to recommend probiotics for the treatment of acute diarrheal illnesses, the prevention of antibiotic-associated diarrhea, and the increase of lactose metabolism, there is insufficient evidence to recommend them for other clinical situations (Kechagia et al., 2013).

### Probiotics for diarrhea:

An infection within the gut could be a common explanation for looseness of the bowels (bowel). If the looseness of the bowels is not severe, merely drinking enough fluids to be hydrous and awaiting the infection to clear up is typically enough. Fluid loss, on the opposite hand, will quickly become important in tiny infants and also the senior, exigent special treatment. critical cases of looseness of the bowels, on the opposite hand, square measure uncommon in industrialized countries (Guandalini, 2011).

In delicate cases, individuals square measure generally suggested to require probiotic supplements additionally to drinking many water. Microorganisms like microorganisms and yeast square measure found in probiotic merchandise. These square measure thought to form their approach into the abdomen, wherever they assist the body's defences by suppressing the microorganisms that cause diarrhea. The foremost well-known probiotics square measure carboxylic acid microorganism (lactobacilli). Natural yoghourt and different farm merchandise contain them as some dietary supplements. Probiotics square measure helpful within the following ways that, consistent with the research: They scale back the length of the disorder by a mean of 1 day. Researchers in numerous studies counted what percentage of participants had no additional diarrhoeas once 3 days. within the absence of treatment: once 3 days, thirty four out of one hundred persons World Health Organization didn't take probiotics were diarrhoea-free. once 3 days, just about fifty five out of one hundred persons World Health Organization took probiotics were diarrhoea-free (Kechagia et al., 2013).

### Probiotics and Allergy

Recent analysis suggests that early-life exposure to microorganisms could shield against hypersensitivity reaction, and during this case, probiotics could offer a secure different microbic stimulation for newborns' growing immune systems. At a similar time, they increase tissue layer barrier perform, that is assumed to assist within the modulation of allergic responses. The importance of enteric microbiota in hypersensitivity reaction is confirmed by studies of quantitative and qualitative variations between kids and infants with allergies and healthy kids and infants, with the previous showing organization by a additional adult-like variety of microflora.

Food allergies and atopic eczema seem to be significantly suffering from probiotic actions. The latter could be a common chronic reverting skin sickness of childhood, with heritable predisposition similarly because the individual's exposure to

environmental allergens enjoying a job in its aetiology. Solely a number of strains are investigated for his or her effectualness within the treatment and bar of newborn hypersensitivity reaction. *B. lactis* and *L. rhamnosus* GG were found to be helpful in reducing the severity of dermatitis during a recent trial of nursed infants with dermatitis (Furrie, 2005).

#### **Probiotics for the heart:**

The microbiota that lives within the human digestive tube has been shown to own a considerable impact on one's health. Recent analysis suggests that gut microbial imbalance could play a job in disorder aetiology (CVD). As a result, a variety of studies have looked into dynamical gut microbiota with probiotics as the simplest way to forestall and/or treat CVD. Probiotics are live bacterium that, once taken in decent proportions, have a useful result on a personality's health, consistent with the planet Health Organization.

The current study examines human dietary interventions with probiotic strains and their effects on vessel risk factors like symptoms, cardiovascular disease, obesity, and kind a pair of polygenic diseases. Probiotics are shown to lower cholesterol and enhance the LDL/HDL quantitative relation, also as lower vital signs, inflammatory mediators, glucose levels, and body mass index, consistent with growing information. As a result, probiotics have the potential to become dietary supplements with vessel health blessings. However, there's uncertainty not solely regarding the precise strains and dosages of probiotics that may give favourable health effects however conjointly regarding factors like medical specialty and biology that will influence probiotic efficaciousness. As a result, a lot of analysis is required not simply to grasp the processes through that probiotics could profit the vascular system however conjointly rule out any potential harmful health effects. The aim of this study is to assess the complexness of the prevailing analysis on the vessel advantages of probiotics (Thushara et al., 2016).

#### **Probiotics for cancer:**

Probiotics metabolites like short-chain fatty acids (SCFAs) and carboxylic acid play a vital perform. A recent study incontestible that many probiotic metabolites influence host physiology via activating G protein-coupled receptors (GPCRs) victimization forward chemical screening. supported probiotics' contribution to viscus health, it's currently thought that the key purpose of probiotic management is to keep up healthy microorganisms and promote a healthy system via nonspecific and specific physiological actions, severally (Gorska et al., 2016).

SCFAs give energy to colon cells whereas additionally protect the intestine's acidic setting, limiting the event of excessive quantities of secondary gall acids and inspiring neoplastic cell pathology and death. Butanoic acid is one among them, and it aids in the balance of colon cell proliferation, division, and death. Colon cell metabolism produces concerning 70%–90% of butyrate, and patients with large intestine cancer have a plain visit this kind of acid in their stool compared to healthy folks. Though SCFAs square measure obtained from the microorganism, the quantity made might not be enough to forestall large intestine cancer because of individual variances. As a result, taking probiotics will aid in increasing SCFA production on a routine. In in vitro experiments, carboxylic acid and butanoic acid pent-up the expression of invasive genes encoded by *Salmonella typhimurium*, thereby preventing its attack on healthy cells (Slizewaska et al., 2021).

#### **ARE PROBIOTICS SAFE?**

Live probiotic bacteria must be taken in vast quantities and over a long length of time to have therapeutic effects, so the question of their safety becomes a major problem. Probiotics, especially lactobacilli, have long been used in food preparation without causing major harm to humans. Certain probiotics, such as *Enterococcus* and *Saccharomyces* spp., have been linked to isolated occurrences of opportunistic infections in recent years. Because of their growing importance as a

source of nosocomial infection and rising antibiotic resistance, enterococci are of significant medical importance. Because certain *Enterococcus* strains have a long history of being used safely as starting cultures in dairy fermentation, they are being marketed as probiotics. However, it has now been established that virulence factors can be genetically transferred from medical strains to culture starting strains through a natural conjugation process. Probiotic strains should be tested for antibiotic susceptibility patterns, toxin generation, metabolic and haemolytic activities, infectivity in immunocompromised animal models, side effects, and adverse occurrences in humans, according to current FAO/WHO guidelines (Senok et al., 2005).

#### Characteristics of safe probiotics

Some characteristics to consider when taking probiotics for maximum effectiveness are: strains used for human use must be of human origin. They're taken from a healthy human gastrointestinal tract. They have a track record of not being pathogenic. They have no history of being linked to diseases like infective endocarditis or gastrointestinal issues. They do not contain deconjugate bile salts (deconjugation or dehydroxylation of bile salts would be a bad feature in the small bowel). They don't have antibiotic resistance genes that can be passed down (Saarela et al., 2000).

#### Facts of probiotics

There are a few facts which are attached to probiotics these are: There are 10 times more probiotics than the cell in our body, probiotics live throughout our entire body, breakfast is the best time to take your probiotics, and probiotics are responsible for 70% of our immune response, probiotics fight cancer (Senok et al., 2019).

#### Myths of probiotics

With the increase in the use of probiotics, some myths about probiotics also increased. Some of them are that all probiotics are the same, all Fermented Foods Are probiotics (Heller, 2001), more Is better, multi-strain probiotics are better than targeted single strain probiotics (Ouwehand et al., 2018), do not take

probiotics when you are taking prescription antibiotics (Hussain et al., 2014), enteric coatings helps probiotics (Yus et al., 2019), probiotics are only beneficial to people with health issues, probiotics change your gut immediately after taking those (Senok et al., 2019).

#### CONCLUSION

Probiotics are helpful microorganisms, and there's scientific proof that certain strains of probiotic microorganisms improve the host's health and are safe for human use. Probiotics have the potential to assist individuals with epithelial duct infections, viscus infections, allergies, and a few gut diseases, all of that have an effect on an outsized section of the world's population. However, there's still a great deal of additional work to prove these blessings. Researchers ought to use a scientific approach supported the rules planned by the Joint FAO/WHO knowledgeable Consultation.

#### REFERENCES

- Daliri, M. E., Lee, H. B., and Deog, H. O. (2019). Safety of probiotics in health and disease. *The Role of Functional Food Security in Global Health*. 3:602-622.
- Diaz, P. J., Ojeda, R. J. F., Campos G. M., and Gil, A. (2019). Mechanism of action of probiotics. *Advances in Nutrition*. 10: 49-66. <https://doi.org/10.1016/B978-0-12-813148-0.00034-7>.
- Doron, S., Gorbach, S. L. (2006). Probiotics: their role in the treatment and prevention of disease. *Expert Review Anti Infective Therapy*. 4: 261-275. <https://doi.org/10.1586/14787210.4.2.261>.
- Furrie E. (2005). Probiotics and allergy. *Proceedings of the Nutrition Society*. 64:465-469.
- Guarino, A., Gaundalini, S., Vecchio L. A. (2011). Probiotics for prevention and treatment of diarrhea. *Journal of Clinical Gastroenterology*. 45: 149-153.

- <https://doi.org/10.1097/mcg.0000000000000349>.
- Ghasemia, A., Eslami, M., Shafiei, M., Najafipour, S., and Rajabi, A. (2018). Probiotics and their increasing importance in human health and infection control. *Medical Microbiology*. 29:153-158. <https://doi.org/10.1097/MRM.0000000000000147>.
- Gorska A, Przystupski, Niemczura J M, Kulbacka J. 2019. probiotic Bacteria: a promising tool in of cancer prevention and therapy. *Current Microbiology*. 76: 939-949. <https://doi.org/10.1007/s00284-019-01679-8>.
- Heller, J. K. (2001). Probiotic bacteria in fermented foods: product characteristics and starter organisms. *The American Journal of Clinical Nutrition*. 73: 374-379. <https://doi.org/10.1093/ajcn/73.2.374s>.
- Hill, C., Guarner, F., Reid, G., Gibson, R. G., Merenstein, J. D., Pot, B., Morelli, L., Canani, B. R., Flint, J. H., Salminen, S., Calder, C. P., Sanders, E. M. (2014). The international scientific association for probiotics and prebiotics consensus statement on the scope and appropriate use of the term probiotic. *Nature Reviews Gastroenterology and Hepatology*. 11:506-14. <https://doi.org/10.1038/nrgastro.2014.66>
- Hussain, A. S., Patil, R. G., Reddi, S., Yadav, V., Pothuraju, R., Singh, B. R., Kapila, S. (2017). Aloe vera (*Aloe barbadensis* Miller) supplemented probiotic Lassi prevents Shinghella infiltration from epithelial barrier into systematic blood flow in mice model. *Microbial Pathogenesis*. 102:143-147. <https://doi.org/10.1016/j.micpath.2016.11.023>
- Johnston, C. B., Supina, L. A., Vohra, S. (2006). Probiotics for pediatric antibiotic-associated diarrhea: a meta-analysis of randomized placebo-controlled trials. *Canadian Medical Association Journal*. 7:175-177. <https://doi.org/10.1503/cmaj.051603>
- Kechagia, M., Basoulis, D., Konstantopoulou, S., Dimitriadi, D., Gyftopoulou, K., Skarmoutsou, N, Fakiri M E. (2013). Health benefits of probiotics: a review. *Journal of ISRN nutrition*. 2013:1-7. <https://doi.org/10.5402/2013/481651>.
- Leghari, A. A., Shahid, S., Farid, S. M., Saeed, M., Hameed, H., Anwar, S., Nishat, Z., Shahid, K. M., and Meraj, A. (2021). Beneficial aspects of probiotics, strain selection criteria and microencapsulation. *Life Science Journal*. 18:30-47. <http://dx.doi.org/10.7537/marslsj180121.05>.
- Mtasher, S. A., Abdhulhussein, J. A., Mutlag, H. S. (2018). Probiotics and prebiotics. *International Journal of Current Research*. 10:75341-52. <http://dx.doi.org/10.24941/ijcr.33164.11.2018>.
- Ouwehand, Arthur, C., Invernici, Marcos, M., Furlaneto, Flavia, A. C., Messori, Michel, R. (2018). Effectiveness of multi-strain versus single- strain probiotics. *Journal of Clinical Gastroenterology*. 52:35-40. 10.1097/MCG.0000000000001052.
- Patil, M. B., Reddy, N. (2006). Bacteria therapy and probiotics in dentistry. *International Journal of Periodontology And Implantology* 2:98-102.
- Saarela, M., Mogensen, G., Fonden, R., Matto, J., Sandholm, M. T. (2000). Probiotic bacteria: safety, functional and technological properties. *Journal of Biotechnology*. 84:197-215. [https://doi.org/10.1016/s0168-1656\(00\)00375-8](https://doi.org/10.1016/s0168-1656(00)00375-8).
- Santosa, S., Farnworth, E., Jones, P J H. (2006). Probiotics and their potential health claims. *Nutrition Reviews*, 64: 265–274.

- <https://doi.org/10.1111/j.1753-4887.2006.tb00209.x>
- Senok, C. A., Ishmaeel, Y. A., Botta, A. G. (2005). Probiotics: facts and myths. *Clinical Microbiology And Infection*. 11: 958-966.  
<https://doi.org/10.1111/j.1469-0691.2005.01228.x>
- Sharma, H., Bajwa, J., Manhas, S., Sarwan, J. (2020). Probiotics:a short review. *Annals of Tropical Medicine and Public Health*. 23: 231-243.  
<http://dx.doi.org/10.36295/ASRO.2020.231543>
- Sirkorska, H., Smoragiewicz, W. (2013). Role of probiotics in the prevention and treatment of meticillin-resistant *Staphylococcus aureus* infections. *International Journal of Antimicrobial Agents*. 42: 475-481.  
<https://doi.org/10.1016/j.ijantimicag.2013.08.003>
- Slizewska, K., Kopec, M. P., Slizewska, W. (2020). The role of probiotics in cancer prevention. *Journal of Cancers*. 13: 1-20.  
<https://dx.doi.org/10.3390%2Fcancers13010020>.
- Thushara, M. R., Gangadaran, S., Solati, Z., Moghadasian, H. M. (2016). Cardiovascular benefits of probiotics: a review of experimental and clinical studies. *Journal of food and function* 7:632-42.  
<https://doi.org/10.1039/c5fo01190f>
- Yus, C., Gracia, R., Larrea, A., Andreu, V., Irusta, S., Sebastian, V., Mendoza, G., Arruebo, M. (2019). Targeted release of probiotics from enteric microparticulate formulations. *Journal of Polymers* 11: 16-68.  
<https://dx.doi.org/10.3390%2Fpolym11101668>.