

நலநுண்ணுயிரிகளும் அவற்றின் நன்மைகளும்

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Probiotics and Their Health Benefits

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ஆய்வுச்சுருக்கம்

நலநுண்ணுயிரிகள்கள் நேரடி பாக்டீரியாக்கள் ஆகும், அவை போதுமான அளவு நிர்வகிக்கப்படும் போது, ஆரோக்கிய நன்மைகளை வழங்குகின்றன. பெரும்பாலான நலநுண்ணுயிரிகள் லாக்டிக் அமில பாக்டீரியாக்களாகக் (லிகிங்) கருதப்படுகிறது. லாக்டோபாகிலஸ் மற்றும் பிஃபிடோபாக்டீரியம் இனத்தின் வகைமைகள் பெரும்பாலும் நலநுண்ணுயிரியப் பண்புகளுடன் உள்ளன. வழக்கமான நலநுண்ணுயிரிகள் திரிபு உப்பு மற்றும் அமிலங்களை எதிர்க்க வேண்டும், ஹோஸ்ட் எபிதெலியல் செல்களை கடைபிடிக்க வேண்டும், ஆண்டிபயாடிக் எதிர்ப்பு மற்றும் ஹீமோலிசிஸ் பண்புகளைக் கொண்டிருக்கக்கூடாது. மேலும் நுண்ணுயிர் எதிர்ப்பு செயல்பாட்டை விரும்புகிறது. நலநுண்ணுயிரிகள் கொலஸ்ட்ரால்-குறைத்தல், நோயெதிர்ப்பு-தூண்டுதல் பண்புகள் மற்றும் வளர்சிதை மாற்ற நோய்கள் மற்றும் கோளாறுகள், நரம்பியல் மற்றும் அறிவாற்றல் சிக்கல்களை நிர்வகிப்பதற்கான உதவி உள்ளிட்ட பல ஆரோக்கிய நன்மைகளை மனிதர்களுக்குத் தருகின்ற தன்மை கொண்டுள்ளன. தற்போதைய இவ்வாய்வோ நலநுண்ணுயிரிகளின் அடிப்படை பண்புகள் மற்றும் அவற்றின் ஆரோக்கிய நன்மைகளை சுருக்கமாக விவரிக்கிறது.

தேடுசொற்கள் : நலநுண்ணுயிரிகள், பாக்டீரியா, லாக்டோபேசில்லஸ், ஆரோக்கிய நன்மைகள்

Abstract

Probiotics are live bacteria that, when administered adequately, confer health benefits to the host. Most probiotics are considered lactic acid bacteria (LAB). The strains of the genus Lactobacillus and Bifidobacterium are mostly with probiotic properties. Typical probiotics strain must resist salt and acids, must adhere to host epithelial cells, should not have antibiotic resistance and hemolysis properties, and prefer to have antimicrobial activity. Probiotics have several health benefits in humans, including cholesterol-lowering, immune-stimulating properties, and aid in managing metabolic diseases and disorders and neurological and cognitive complications. The present review briefly narrates the basic characteristics of probiotics and their health benefits.

Keywords: Probiotics; Lactobacillus, Bifidobacterium, Lactic acid bacteria; Health benefits.

Introduction

Probiotics are live microorganisms, which when administered in adequate amounts, confer a health benefit on the host (Fijan 2014). Probiotics are claimed to have therapeutic properties, which could cure disease, but the statement is arguable, and controlled clinical studies are needed to confirm the therapeutic abilities of the probiotics. Generally, fermented foods contain probiotics, and the consumption of fermented foods is associated with the beneficial health effects of the host. The positive effects of fermented food consumption are attributed to their ability to positively influence the composition and activities of host intestinal microbiota (Mackowiak et al., 2013).

Lactic acid bacteria (LAB) and bifidobacteria are the most common probiotic microbes; some of the yeasts also reported probiotic properties (Didari et

The characteristics of probiotics

The probiotic strains are of human origin (human gastrointestinal tract) and fermented products. LAB such as *Lactobacillus*, *Bacillus*, *Lactococcus*, *Bifidobacterium*, *Streptococcus*, and *Enterococcus* are considered probiotics isolated from spontaneously fermented products, human gastrointestinal tract, feces, and breast milk (Sornplang and Piyadeatsontorn, 2016).

A typical probiotic strain should be genetically stable, which is a needed trait to trust the strain. The genetically unstable microbes might mutate and become a threat to the host. Thus, genetically stable, and human-origin strains are preferable. The probiotic strain should be non-pathogenic, and the lack of virulence genes in their genome is manda-

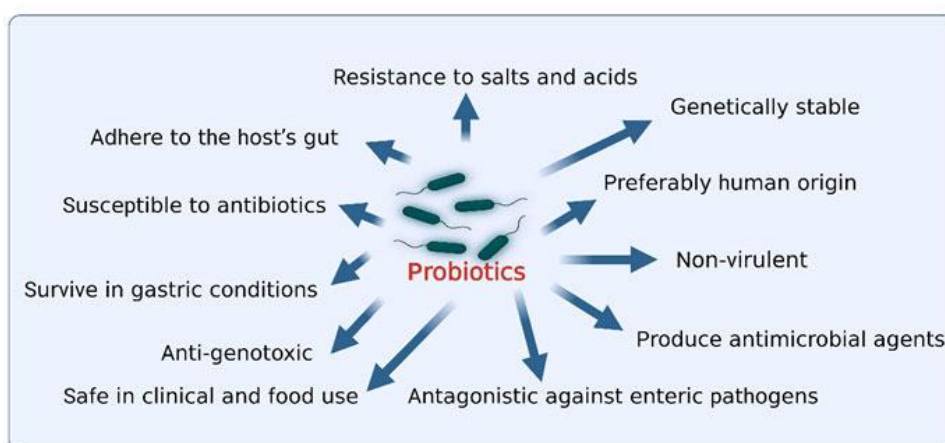


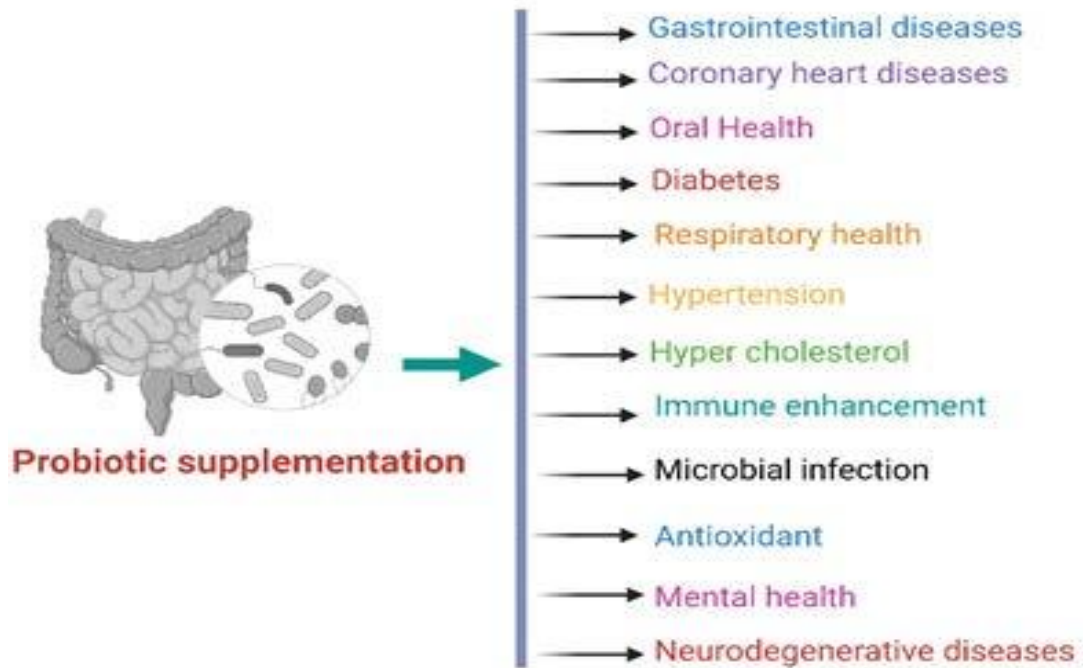
Figure 1. The general characteristics of probiotics (created in BioRender.com; accessed on 10 October 2022).

al., 2014). The probiotic property of the microbes is strain specific; we could not generalize the property of a species. Therefore, appropriate confirmation of the strain using biochemical and molecular techniques is necessary (Azais-Braesco et al., 2010). Probiotics are generally claimed for their functional properties. The results of *in vitro* and *in vivo* studies may not be sufficient to accept the therapeutic property of probiotic strains. The confirmation through *in vitro* and *in vivo* studies in laboratory model systems could be considered for their safety and use in foods. The manuscript summarizes the basic properties and proposed health benefits of probiotics.

The production of antimicrobial substances like bacteriocin and antagonistic activity against enteric pathogens are desirable. It should be resistant to gastric conditions (like resistant to acids and salts) and could adhere to the host's gut epithelial layer. Though the probiotics could show antagonistic activity, the strain should be susceptible to the common antibiotics. Finally, the strain should be safe for foods and clinical setups (Figure 1).

The health benefits of probiotics

Probiotics are effective in managing inflammatory bowel diseases (Sivamaruthi 2018). Treatment of



Lactobacillus strains (*L. acidophilus* CL1285, *L. casei* LBC80R and *L. rhamnosus* CLR2) improved the symptoms associated with inflammatory bowel diseases (Preston et al., 2018). Probiotics are commonly used to manage antibiotic-associated diarrhea, reducing the infection's impact. *Clostridioides difficile* infection is common in antibiotic-associated diarrhea, and *Saccharomyces boulardii* and *L. rhamnosus* GG suppress the infection (Mills, 2018).

Probiotics have been reported to alleviate the risks of CVD by improving cardiovascular markers, including total cholesterol and low-density lipoprotein (LDL) cholesterol (Sivamaruthi et al., 2021). Regularly consuming probiotic-containing foods or probiotic supplements could enhance cognitive function, stress management, and decision-making (Sivamaruthi et al., 2018). Probiotic supplementation enhances the health status of the person with a diabetic condition by improving fasting blood glucose, insulin sensitivity, and antioxidant and inflammatory system. The probiotic intervention also improved the gut microbiota (Kesika et al., 2019). Similarly, the probiotic intervention improved the obese condition by altering the gut microbiota and expression of genes related to thermogenesis, glucose, and

lipid metabolism, restoring energy metabolism, and modifying the parasympathetic nerve activity (Sivamaruthi et al., 2019).

Additionally, Probiotics have been reported for their positive effects on Alzheimer's disease (Kesika et al., 2021a), autism spectrum disorders (Sivamaruthi et al., 2000a), mental health benefits (Sivamaruthi et al., 2018), cancer management (Sivamaruthi et al., 2000), and infectious diseases (Kesika et al., 2021) (Figure 2). Generally, probiotic intervention confers positive health effects on the host via the modulation of gut microbiota. The efficiency of probiotic interventions depends on the strain, dosage, duration, aided supplements, lifestyle, and psychological conditions of the host.

Conclusions

Probiotics could be used as food supplements or an adjuvant to treat and/or manage several health issues. The health benefits of probiotic consumption depend on several factors, especially relying on the probiotic strain, dosage, and duration. Further studies are necessary to confirm the proposed health benefits of probiotics.

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