



Overview of new probiotic formulations' effects on human nutrition and different disease conditions

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Abstract

Probiotics are playing a key role to boost the natural immunity. An emerging research found that probiotics minimizing the side effects of drugs and good prognosis in minimizing symptoms of various diseases Like (GIT, Psychiatry, Cancer, Respiratory). The mindset of today's health-conscious population looking for superorganism known as the human microbiome is composed of a rich and dynamic collection of bacteria to benefit of mankind. The concept of "functional meals" emphasises that, in addition to being essential for survival, food also lowers risk factors for a variety of diseases, helps prevent sickness, and can enhance several vital physiological processes. Hence the good bacteria boost physiological function which are procuring as natural sources of probiotics.

Keywords: Probiotics, good bacteria, dietary supplements, health benefits, yogurt

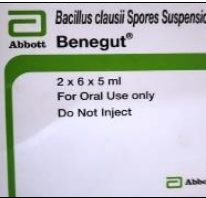






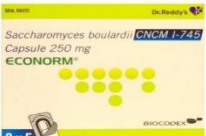

Introduction





The word "Probiotic" is Greek in origin and means "For Life". It was initially used to describe chemicals generated by one bacterium that encourage the growth of another in 1965 by Lilley and Stillwell [2]. The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) currently define probiotics as "live microorganisms which when administered in adequate amounts confer a health benefit to the host" [3]. Choosing Probiotics are known by their genus, species and strain (for example, *Lactobacillus acidophilus* ABC). Products should display each strain's designation. Amounts matter. Be sure the product contains at

least the level of probiotics that was used in the study. Higher counts are not necessarily better. More important than supplement vs food is getting an effective probiotic strain at an effective dose. Some yogurts, fermented milks and some other foods may contain probiotics. Traditional yogurts contain live bacteria that can help digestion of lactose. Probiotics are made of good live bacteria that naturally live in our body. constantly our body have both good and bad bacteria. Whenever our body gets infected more bad bacteria knocking our system, it loses our body balance. Good bacteria helps eliminate extra bad bacteria, returning the balance. Probiotic-supplements are a way to add good bacteria to our body.

Table 1: Types of microorganisms [4]

Probiotics	Examples	Mechanism	Beneficial health effects
Lactobacillus sp	<i>L acidophilus</i> <i>Ldelbrueckii subsp bulgaricus</i> <i>L casei</i> <i>L cellobiosis</i> <i>L fermentum</i> <i>L curvatus</i> <i>L reteri</i> <i>L plantarum</i> <i>L brevis</i> <i>L lactis</i>	Improve the synthesis of mucin by upregulating MUC2	Enhanced mucosal mucin production immune response, and disease prevention clinging to human intestine cells and maintaining the balance of intestinal microflora intensification of lactose digestion and reduction of Diarrhoea.
Bifidobacterium sp	<i>B bifidum</i> <i>B adolescentis</i> <i>B thermophilum</i> <i>B animalis</i> <i>B infantis</i> <i>B longum</i>	Generation of cytokines preventing inflammation.	Used to remedy viral diarrhoea, balance the flora in the gut, and treat Rotavirus Diarrhoea

Product formulations	Manufacture	Treatment	Pictures	Sources
Benegut (Suspension)	Abbott	Diarrhea is associated with a rise in bowel motions, mainly loose, watery stool movements.		Bacillus Clausii (NA)
Bifilac (Sachet, Syrup)	Tablets India Ltd	Effective for relieving diarrhoea induced on by antibiotics (AAD)		Streptococcus Faecalis (300M) Clostridium Butyricum (2.0M) Bacillus Mesentericus (1.0M) Lactobacillus Sporogenes (50.0M)
Bifilac GG (Capsules)	Tablets India Ltd	It contains lactobacillus which are healthy gut bacteria and can help with managing diarrhoea		Lactobacillus rhamnosus
Combiflora (Capsules, Sachets, Oral Drops, Syrup)	Medopharm	It aids in gastrointestinal ailment tolerance improvement, various anti-inflammatory properties effective in relieve from dysentery and helps to prevent constipation. It stimulates the expansion of beneficial bacteria.		Bacillus subtilis 2 billions spores
Cyfolac (suspensions, capsule)	Karnataka Antib & Pharm Ltd	Lactic acid bacillus Prevents the invasion of intestinal lumen by pathogenic bacteria. Folic acid: Promotes in the body's generation of healthy new cells such intestinal epithelial cells as well as RBCs. Vitamin B12: Essential for normal functioning of the nervous system and plays a key role in the generation of red blood cells.		Lactic acid bacillus, (Folic acid, vitamin B12)
Darolac-IBS (Sachet, Tables, capsules)	Aristo Pharmaceuticals Pvt Ltd	The probiotics subclass, which includes darolac ibs capsules, are mostly used to treat diarrhoea. Irritable bowel syndrome, lactose intolerance, Crohn's Disease (Inflammatory Bowel Disease), and intestinal bacterial overgrowth are among conditions that Darolac IBS Capsule 10's Successfully Cure.		Lactobacillus Lp299v
Ecogro (Syrup, suspension)	Akum Drugs & Pharma	Ecogro can be used to correct the bacterial flora imbalance that antibiotics have caused in the digestive and respiratory systems.		Bacillus Clausii (2) billions spores
Econorm (Capsules)	Dr. Reddy's Laboratories Ltd	This medication is a probiotic, and it works besides re-establishing the balance of gut flora in the intestine, which can be upset by antibiotics or intestinal infections.		Saccharomyces boulardii
Entero Plus (Sachet)	Glaxo India Ltd	It is beneficial in cases of bacterial vaginosis, diarrhoea (acute, antibiotic-associated, and persistent), and irritable bowel syndrome. (IBS).		Lactobacillus rhamnosus

Entromax (Suspension)	Mankind Pharma	It is helpful in the production of vitamins and also in the treatment of avitaminosis.		Bacillus clausii
Gutpro (Syrup)	JB Chemicals and Pharmaceuticals Ltd	Modulates local immunity and improves the immune system's ability to inhibit harmful bacteria in the gut.		Bacillus subtilis
Pre Pro Kid L (sachet)	Fourrts India Laboratories	Any disruption to this community of microorganisms is referred to as dysbiosis, and it can result in a variety of disease conditions such as diarrhoea. Antibiotics also cause diarrhoea by disrupting a healthy community of microorganisms		Lactobacillus Acidophilus, <i>Lactobacillus rhamnosus</i> , Bifidobacterium Longum, Bifidobacterium Infantis, Saccharomyces Boulardii, (Elementa Zinc, Fructo Oligo Saccharides)
Reflora Z (Sachets)	Sundyota Numandis	It useful to prevent Irritable bowel movements		saccharomyces boulardi lactic acid bacillus

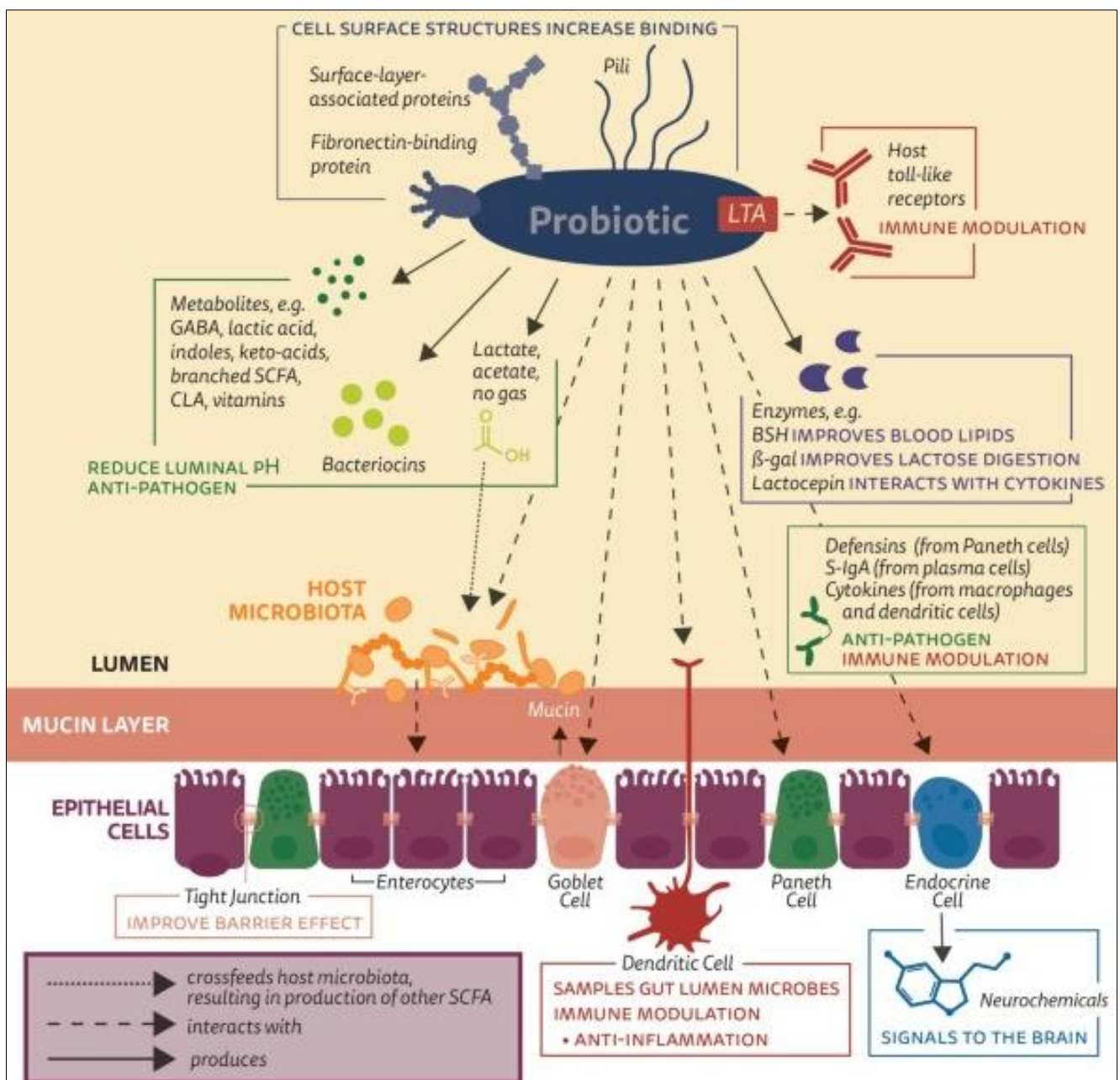


Fig 1: Some important Indian products with their formulations [5]

Mechanism of traditional probiotics

Table 2: Impact of probiotics various Diseases conditions


Diseases condition	Efficacy of probiotics in diseases condition
Netrotizing Enterocolitis (NEC)	The digestive disease necrotizing enterocolitis (NEC) primarily affects premature babies. Intestinal tissue becomes inflamed and dies as a result of the condition. A distension may form in your baby's intestine. Bacteria can enter the abdomen or bloodstream through the hole ^[6] . After the new framework was implemented, a quality improvement programme in which a neonatal paediatric intensive care unit administered the probiotic <i>L. reuteri</i> to every premature infant admitted reported remarkable and sustained improvements in their babies' outcome measures, including a 6-fold lower risk of NEC ^[7]
Acute Infectious Diarrhea	<i>Bifidobacilli</i> were always present in the probiotic, and they were frequently combined with other probiotics (s). The results confirmed the efficacy of probiotic prophylaxis, which had a significant impact in children with Acute Infectious Diarrhea ^[8]
Upper Respiratory Infections	All probiotics activate the immune system, and probiotics increase the number of immunoglobulin A (IgA)-secreting cells in the respiratory and gastrointestinal mucosae which protect from the upper respiratory infection ^[9]
Irritable Bowel Syndrome (IBS) Abdominal	Probiotics can only help with individual IBS symptoms like bloating and abdominal pain sores, not overall IBS symptoms. Improves colon contractility, and <i>L. rhamnosus</i> causes a contractility disorder induced by acetilcolin ^[10]
Antibiotic-associated diarrhea (AAD)	Amoxicillin, azithromycin, and amoxicillin/clavulanate cause the ADD. Probiotics should be consumed as soon as possible during antibiotic therapy to help prevent AAD in adults. Among all probiotics species, <i>Lactobacillus</i> showed the most protective trend. (RR, 0.67; 95% CI, 0.50-0.91) ^[11]
Infantile Colic	<i>B. Oral treatment longum</i> CECT7894 (KABP042) and <i>P. pentosaceus</i> CECT8330 (KABP041) was successful in reducing weeping time due to infantile colic and getting better faecal stability and predictability.
HIV	The use of probiotics in the treatment and delay of HIV progression appears to be feasible and effective. The restoration of intestinal bacteria to a more healthful ecology may have several important clinical benefits, particularly when combined with improved nutrition and access to micronutrient supplementation, resulting in better health among HIV-infection ^[13]
Cancer	Probiotic bacteria are used as comprehensive drug-delivery vectors for non-invasive cancer treatment in humans. Taken together, a growing body of research has highlighted the role of probiotic balance in the maintenance of well-understood homeostasis, suggesting that cancer therapy will indeed be successful ^[14]
Cardiovascular disease	The gut microbiota signature in chronic heart failure is dominated by considerable compositional shifts with reduced microbial richness and biodiversity loss of microbes capable of producing butyrate. Butyrate Local anti-inflammatory effects in the gut mucosa, as well as peripheral stimulation of regulatory T cells. Notably, we discovered an inverse relationship between <i>Lachnospiraceae</i> and sCD25, which was even more pronounced in patients with severe illness ^[15]
UTI	Probiotic <i>Lactobacillus rhamnosus</i> GR-1 and <i>Lactobacillus reuteri</i> RC-14 May Significantly Minimize TNF-Alpha, IL-6, IL-8, IL-10, and IL-12 (p70) Expression in the Neurogenic Bladder of a Spinal Cord Injured Patient with Urinary Tract Infections ^[17]





Role of probiotics in pregnancy

An investigation is underway. A 256 pregnant women were given *Bifidobacterium lactis* Bb12 and *Lactobacillus rhamnosus* GG D: 1010 colony-forming unit (CFU)/d each: pregnancy first trimester (to mothers) to exclusive breast-feeding termination. Probiotic

safety and efficacy in mothers and infants Probiotics supplementation reduced the frequency of gestational diabetes mellitus while maintaining normal pregnancy duration and no adverse events in mothers or children ^[17].

Table 3: Advantages of probiotic in breast feeding

Yogurt	Yogurt is a widely known fermented milk products produced by lactic acid bacteria including such <i>S. thermophilus</i> and <i>Lactobacillus delbrueckii</i> , subsp. <i>bulgaricus</i> . These bacteria produce lactic acid during yoghurt production, reducing the pH and causing milk protein to coagulate ^[19]	
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Kefir	Lactobacillus, Lactococcus, Leuconostoc, and Streptococcus are the most common lactic acid bacteria (LAB) found in kefir, as are acetic acid bacteria from the genus Acetobacter ^[20]	
Butter milk	Streptococcus Lactis, S. Cremoris, Leuconostoc Citrovorum and L. Dextranicum are among the bacteria added. the assorted types of bacteria can be used singly or in combination to achieve the desired flavour by converting lactose to lactic acid ^[21]	
Chongkukjang	Chongkukjang is a fermented product made by fermenting boiled soybean seeds in rice straw with Bacillus subtilis for a short period of time. It's a classic Korean dish ^[22]	
Kimchi	A wide range of bacteria are involved in the fermentation of kimchi, but LAB are the predominant species. Kimchi is anti-inflammatory, antimicrobial activity, free radical scavenging, anticancer, antihyperlipidemic, probiotic, plasma lipid, and antiaging ^[22]	

Probiotic bacteria are an important component that contributes to children's proper development. Many studies have found that probiotic bacteria in breast milk, such as Lactobacillus bacteria, help to form the infant's intestinal micro biome. It is critical to understand the factors that may influence the microbiological profile of both breast milk and the child's digestive tract, as well as their mutual correlations. Even though probiotic bacteria in the diet has multiple benefits, it is essential to ensure that children's food is of the highest quality possible, including breast milk as the first recommended food for new-born babies^[18].

Conclusion

Probiotics have been shown to be beneficial in preventing and treating a wide range of conditions, particularly those that affect the gastrointestinal tract. Not only GI, probiotics improve functioning of various systems of human body such as immunoglobulins (IgA) of immune system Great impact on the HIV patients indirectly to build the immune system, low the risk of cardiovascular diseases by stabilizing the cholesterol levels, reduced the thread of cancer, positive benefits of probiotics and their outcomes increases by upcoming research to know better therapeutic action, efficacy, nutritional status of mankind.

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