

Synbiotic: A Gut Microbe

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ABSTRACT

Synbiotics are the combination of prebiotic and probiotic which helps to maintain health and contracting diseases. Synbiotics will have living microorganisms, which helps to boost the gut bacteria. It has many health benefits like maintenance of gut health by improving gut bacteria and it will reduce intestinal problems such as gastrointestinal flora, diarrhea, and constipation. It enhances the overall efficacy against gastrointestinal (GI) pathogens. Other than GI system, synbiotics are aids in the treatment of nongastrointestinal diseases such as prevention of osteoporosis, regulation of immune system, and curing brain dysfunction, with the help of its antimicrobial, anticarcinogenic, antidiarrheal, and antiallergenic effects.

Keywords: Gut microorganism, Prebiotics, Probiotics, Synbiotics.

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INTRODUCTION

The basic role of nutrition is to provide necessary nutrients for cell and organism's growth and development. Other aspects of nutrition are also important, such as maintaining health and preventing sickness.¹ Synbiotics are "a mixture of live microorganisms and substrates digested exclusively by host microbes that provide a health advantage to the host".² Synbiotics are a combination of prebiotics and probiotics products that help living microorganisms and dietary supplements survive and thrive in the gut. When both probiotics and prebiotics work together in the biological system, synergistic effects are more actively promoted. The synbiotic relationship between prebiotics and probiotics, which significantly enhances human health, is well recognized.³

MECHANISM OF SYNBIOTICS

Given the fact that a probiotic is beneficial from both the small and large intestines, while a prebiotic's effect is mainly noticed in the large intestine, the two might have a synergistic effect when used simultaneously.

Synbiotic action can take place in two action and in two ways:

- Through improved probiotic microbe stability.
- Through the supply of specific health effects.¹

When probiotics are paired with prebiotics, metabolism in the intestine is modulated, resulting in the conservation of gastrointestinal bio-structure, the production of beneficial microbiota, and the suppression of potential pathogens in the intestinal system.

Synbiotics are absolutely highly advantageous when it comes to maximizing colon health.^{4,5} Synbiotics cause undesirable metabolites to be minimized, along with nitrosamines and carcinogenic compounds to be attenuated. It makes a massive increase of ketones, methyl acetates, carbon disulfides, and short-chain fatty acids, all of these may be helpful for the host's health.⁶ Synbiotics have been proved to be effective in the treatment of the brain diseases caused by impaired hepatic function, the prevention of osteoporosis, the dropping of blood fat and sugar levels, and the regulation of immune system.⁷

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CHARACTERIZATION OF SYNBIOTICS

A synbiotic should be investigated systematically to ensure the safety and reliability of performance. Carbohydrates that are left over from the manufacturing process make up prebiotics, which are digested and absorbed by the body in the gastrointestinal tract during oral consumption. Microbes are utilized selectively and have a positive impact on the health of the target host.⁵

RATIONALE OF SYNBIOTICS

Prebiotics are utilized generally as a selective medium for the production, fermentation, and passage of probiotic strains through the colon. Probiotic bacteria are shown to grow better tolerant of environmental conditions in the intestine of a specific creature, such as oxygenation, pH, and temperature.⁸ It might prevent cancer from beginning or proliferating in the early stages, as well as treat existing malignancies.⁹

THERAPEUTIC ACTIONS OF SYNBIOTICS

Synbiotic features such as antimicrobial, anticarcinogenic, antidiarrheal, and antiallergenic properties aid in the reduction of nongastrointestinal problems such as osteoporosis prevention, cholesterol and blood sugar reducing, and immune system regulation, which are all desirable synbiotic properties for therapeutic success.¹⁰

APPLICATIONS OF SYNBIOTICS

Synbiotics development is due to their preventive role in the host against nonindigenous microbe colonization of the digestive tract. Synbiotics have a number of health benefits. These are some of the applications:

Antimutagenic Effect

Probiotics may have known to have antimutagenic characteristics. *Lactobacilli* strains in milk could minimize mutagenicity by binding to harmful substances and carcinogens in the gastric fluids.¹¹

Lowering Serum Cholesterol

Probiotic strains may help to lower cholesterol levels in the blood. The bile acids released into the small intestine may be degraded by bacteria in the gut. By reducing bile salts from being reabsorbed, this reduces liver cholesterol.

If the gut has been more colonized with *Lactobacillus acidophilus*, serum cholesterol levels should definitely be lower since there would be more prevention of bile salt re-absorption, less cholesterol in the liver, and hence less cholesterol in the serum.¹²

Antihypertensive Action

Hypertensive patients may benefit from fermented dairy foods, such as fermented milk as well as other food that may help lower blood pressure.¹³

Immune System

Immunoglobulin A is an immunological antibody that prevents harmful microbes from binding to the gut wall and penetrating it. Yogurt and probiotics such as *Lactobacillus casein* can boost sIgA levels by promoting the production of additional IgA-producing plasma cells.¹⁴

Antioxidant Effects

Free radicals are produced in normal human metabolism when oxygen is consumed. If free radicals are not neutralized quickly enough, these may cause damage to cells through oxidation of enzymes, proteins, and lipids.¹⁵

CONCLUSION

Synbiotics are living microorganisms that help to improve the function of our gut bacteria and are found in fermentable foods. Synbiotics improve the health, metabolism, and immune system of the host on a systemic level. Synbiotics should utilize probiotics and prebiotics, which should be a prerequisite for synbiotic selection, in order to maintain a strong synergy between the both and maximize the therapeutic effects in your GUT. This must provide

numerous health benefits to consumers, including both GI and non-GI conditions.

REFERENCES

1. Markowiak P, Śliżewska K. Effects of probiotics, prebiotics, and synbiotics on human health. *Nutrients* 2017;9(9):1021–1051. DOI: 10.3390/nu9091021.
2. Ale EC, Binetti AG. Role of probiotics, prebiotics, and synbiotics in the elderly: insights into their applications. *Front Microbiol* 2021;12:19. DOI: 10.3389/fmicb.2021.631254.
3. Maftai NM. Probiotic, prebiotic and synbiotic products in human health. In: *Frontiers and new trends in the science of fermented food and beverages*. IntechOpen; 2019. DOI: 10.5772/intechopen.81553.
4. Gupta C, Prakash D, Rostagno MH, Callaway TR. Synbiotics: promoting gastrointestinal health. In: *Phytochemicals of nutraceutical importance*. 2014. p. 61–78.
5. Swanson KS, Gibson GR, Hutkins R, Reimer RA, Reid G, Verbeke K, et al. The International Scientific Association for Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of synbiotics. *Nat Rev Gastroenterol Hepatol* 2020;17(11):687–701. DOI: 10.1038/s41575-020-0344-2.
6. Manigandan T, Mangaiyarkarasi SP, Hemalatha R, Hemalatha VT, Murali NP. Probiotics, prebiotics and synbiotics—a review. *Biomed Pharmacol J* 2012;5(2):295.
7. Pandey KR, Naik SR, Vakil BV. Probiotics, prebiotics and synbiotics—a review. *J Food Sci Technol* 2015;52(12):7577–7587. DOI: 10.1007/s13197-015-1921-1.
8. Jog P. The world of synbiotics: a review of literature and clinical evidence in diarrhoea from the lens of a paediatrician. *International Journal of Contemporary Pediatrics* 2019;6(1). DOI: 10.18203/2349-3291.ijcp20185219.
9. Chorawala MR, Oza PM, Shah GB. Probiotics, prebiotics and synbiotics: a health benefit supplement. *Res J Pharm Biol Chem Sci* 2011;2(3):1101–1111. ISSN: 0975-8585.
10. Reddy RS, Swapna LA, Ramesh T, Singh TR, Vijayalaxmi N, Lavanya R. Bacteria in oral health—probiotics and prebiotics a review. *Int J Biol Med Res* 2011;2(4):1226–1233. ISSN: 0976-6685.
11. Hosono A, Kitazawa H, Yamaguchi T. Antimutagenic and antitumour activities of lactic acid bacteria. In: *Probiotics*, vol. 2. Dordrecht: Springer; 1997. p. 89–132. DOI: 10.1007/978-94-011-5860-2_5.
12. Pereira DI, Gibson GR. Effects of consumption of probiotics and prebiotics on serum lipid levels in humans. *Crit Rev Biochem Mol Biol* 2002;37(4):259–281. DOI: 10.1080/10409230290771519.
13. Liong MT. Probiotics: a critical review of their potential role as antihypertensives, immune modulators, hypocholesterolemic, and perimenopausal treatments. *Nutr Rev* 2007;65(7):316–328. DOI: 10.1111/j.1753-4887.2007.tb00309.x.
14. Schley PD, Field CJ. The immune-enhancing effects of dietary fibres and prebiotics. *Br J Nutr* 2002;87(S2):S221–S230. DOI: 10.1079/BJNBJN/2002541.
15. Songisepp E, Kullisaar T, Hütt P, Elias P, Brilene T, Zilmer M, et al. A new probiotic cheese with antioxidative and antimicrobial activity. *J Dairy Sci* 2004;87(7):2017–2023. DOI: 10.3168/jds.S0022-0302(04)70019-3.