

<https://doi.org/10.46344/JBINO.2022.v11i02.18>

NOTE ON USE OF PROBIOTICS AND PREBIOTICS IN GASTROINTESTINAL DISORDERS: PARAMETERS NEED TO BE ADDRESSED

Indira M¹, Abraham Peele K¹, Krupanidhi S¹, John Babu D¹, Venkateswarulu T.C^{1*},

^{1,*}Department of Biotechnology, Vignan's Foundation for Science, Technology and Research, Vadlamudi-522213, Andhra Pradesh, India

ABSTRACT

Probiotics restores the normal bacterial flora in the gastrointestinal (GI) tract and maintains the homeostasis of the GI tract. The beneficial bacteria regulate intestinal cells by various mechanisms. Currently, randomized controlled trails were conducted to investigate their efficacy against gastrointestinal disorders. Several studies were performed to evaluate the efficacy of probiotic strain either in single form or in combination of two or more strains in *Clostridium difficile* associated diarrhoea, antibiotic associated diarrhoea, ulcerative colitis and irritable bowel syndrome. Although probiotics are generally recognised as safe but there is a need to evaluate the optimal dose, efficacy, safety, duration, physiological and immunological effects.

Keywords: Antibiotic associated diarrhoea, *Clostridium difficile* associated diarrhoea, Hepatic encephalopathy, Microbiome, Probiotics, Prebiotics, Ulcerative colitis.

INTRODUCTION

We read with a great interest the study by Kho & Lal [1] that emphasized the role of gut microbiome as a potential controller of the diseases caused by pathogens and maintenance of the overall wellbeing of the human beings. The microbiome that plays a role in the homeostasis are the probiotic organisms. Probiotics are the beneficial microbial flora present naturally in the human gut. Several of the studies related to probiotic microorganisms and their role in the human gastrointestinal diseases have been studied. Wilkins and Sequoia [2] enumerated the well-studied species for human gastrointestinal diseases are *Lactobacillus acidophilus*, *Lactobacillus bulgaricus*, *Saccharomyces cerevisiae*, *Saccharomyces boulardii*, *Bifidobacterium bifidum* and *Bifidobacterium longum*. According to Kerri et al [3] Probiotics are safe to use from infant age to old age patients, but it is not advisable to use in immunologically vulnerable patients. In gut environment the probiotics maintain the immunological equilibrium with the immune cells. In clinical indications, the probiotics are effective, dose specific, disease specific and duration of the treatment are important. Several of the gastrointestinal diseases are treated with probiotics and prebiotics. Davani-Davari et al [4] also observed the role of prebiotics in the gut microbiome and the prebiotics are the nutrients that promote the growth of beneficial bacteria in the gastrointestinal tract. In addition to this, Wilkins and Sequoia [2] mentioned that the prebiotics

are non-living carbohydrates that helps as nutrients for the growth and activity of the bacteria in the gastrointestinal tract. Further, in children's, the probiotics reduce the risk of clostridium difficile associated diarrhoea and antibiotic associated diarrhoea. Probiotics use in other clinical indications are hepatic encephalopathy, non-alcoholic steatohepatitis, non-alcoholic fatty liver disease and ulcerative colitis. In case of adults the probiotics reduce the risk of ulcerative colitis, abdominal pain and irritable bowel syndrome. Whereas in infants, the probiotics reduce the risk of necrotising enterocolitis due to enterobacterial pathogens. Indira et al [5] highlighted the various mechanisms related to the activity of probiotics in the gut environment are: enhances the immune response in the intestine by interacting with immune cells. They produce short chain fatty acids, amino acids, enzymes, vitamins, bacteriocins and oligosaccharides. These products modulate the immune response and provides protection against the gastrointestinal pathogens. They suppress the growth of pathogenic bacteria by producing inhibitory substances such as bacteriocins. Not only the control of pathogenic bacteria, they adhere and colonize the intestinal cells and protects the body from harmful microorganisms. Thursby & Juge [6] noted that the probiotics are available for therapeutic purpose which are provided by either in the form of food or in the form of dietary supplements. They are recognised as GRAS

(Generally recognized as safe) and they are not considered as drugs. In recent years, there is an increasing interest and recognition was developed for the role of microbial gut flora in the gastrointestinal health.

Conclusion

The concept highlighted importance of gut microbiomes that plays a role in gastrointestinal diseases and health. Several studies have been performed and reported the use of probiotics but there are some pitfalls need to be addresses. Further there is a need to study the knowledge gaps exist in the area of research, clinical trials, specific dosage, efficacy, precision medicine need to be addressed in near future.

List of Abbreviations

GRAS: Generally recognized as safe; GI: gastrointestinal

Acknowledgments

Authors thankful to, Vignan's Foundation for Science, Technology and Research, Vadlamudi-522213, Andhra Pradesh, India

Conflict of Interest None

References

1. Kho ZY, Lal SK (2018) The human gut microbiome—a potential controller of wellness and disease. *Frontiers in microbiology* 9: 1835. <https://doi.org/10.3389/fmicb.2018.01835>
2. Wilkins T, Sequoia J (2017) Probiotics for gastrointestinal conditions: a summary of the evidence. *American family physician* 96: 170-178. <https://pubmed.ncbi.nlm.nih.gov/28762696/>
3. Kerry RG, Patra JK, Gouda S, Park Y, Shin HS, Das G (2018) Benefaction of probiotics for human health: A review. *Journal of food and drug analysis* 26: 927-939. <https://doi.org/10.1016/j.jfda.2018.01.002>
4. Davani-Davari D, Negahdaripour M, Karimzadeh I, Seifan M, Mohkam M, Masoumi SJ, Ghasemi Y (2019) Prebiotics: definition, types, sources, mechanisms, and clinical applications. *Foods* 8: 92. <https://doi.org/10.3390/foods8030092>
5. Indira M, Venkateswarulu TC, Peele KA, Bobby MN, Krupanidhi S (2019) Bioactive molecules of probiotic bacteria and their mechanism of action: a review. *3 Biotech* 9: 1-11. <https://doi.org/10.1007/s13205-019-1841-2>
6. Thursby E, Juge N (2017) Introduction to the human gut microbiota. *Biochemical Journal* 474: 1823-1836. <https://doi.org/10.1042/BCJ20160510>