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Probiotics and Prebiotics in Promoting Gut Health and Immunity

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Abstract

Probiotics and prebiotics play a crucial role in maintaining gut health and supporting immune function. Probiotics are beneficial microorganisms, while prebiotics are non-digestible food components that promote the growth of these microorganisms. Together, they contribute to a balanced gut microbiota and improved overall health. This article discusses the importance of probiotics and prebiotics in modern nutrition and food science. This article discusses the role of food biotechnology in modern food science and its contribution to sustainable food production. Improper post-harvest practices can lead to significant food losses, reduced nutritional value, and economic challenges. The application of appropriate post-harvest technologies enhances food safety, extends shelf life, and ensures year-round availability of food products. This article discusses the role of post-harvest technology in improving food quality and reducing post-harvest losses.

***Keywords:** Probiotics, Prebiotics, Gut microbiota, Immune health, Functional foods*

Introduction

Probiotics are live microorganisms that confer health benefits to the host when consumed in adequate amounts, while prebiotics are dietary components that selectively stimulate the growth and activity of beneficial gut bacteria [1]. Together, they form a synergistic system that supports digestive health and metabolic balance.A healthy gut microbiota is essential for nutrient absorption, immune function, and protection against pathogenic microorganisms [1]. Additives can be derived from natural or synthetic sources, depending on their intended application and regulatory approval. Preservatives are among the most widely used food additives, as they inhibit microbial growth and delay spoilage in perishable foods [2]. Chemical indicators such as lipid oxidation and enzymatic activity also play a significant role in determining shelf stability, particularly in fat-rich and processed foods [3]. Sensory evaluation complements analytical methods by assessing consumer acceptability in terms of taste, odor, color, and texture [4]. Shelf-life studies are also important for regulatory compliance, as food manufacturers must provide accurate expiration dates and storage instructions based on scientific evidence [5]. Together, these approaches ensure that shelf-life evaluation supports food safety, quality control, and consumer trust.

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Conclusion

Probiotics and prebiotics are essential for maintaining gut health and supporting immune function. Their integration into food systems contributes to improved public health outcomes. Continued research will further clarify their mechanisms of action and expand their applications in functional and therapeutic nutrition. Their successful application requires careful formulation, scientific validation, and regulatory compliance. Ongoing research will further expand the use of natural preservatives in sustainable and health-oriented food production. Food additives play a significant role in improving food quality, safety, and shelf life in modern food systems. When used responsibly and regulated effectively, they contribute to product stability and consumer satisfaction. Ongoing research and regulatory oversight are essential to ensure the safe and beneficial use of food additives in the global food industry.

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