



Next-Generation Probiotics From Traditional Fermented Foods: Potential Role In Managing Metabolic And Immune Disorders – A Review

Himadri Sharma

Assistant Professor, Jagannath University, Department of Allied Health Sciences

Abstract

Traditional fermented foods have been consumed for centuries and are recognized as natural reservoirs of beneficial microorganisms. In recent years, research attention has shifted from conventional probiotics to next-generation probiotics, which include newly identified and functionally characterized microbial strains with targeted health benefits. This review explores the potential of traditional fermented foods such as dahi, kanji, idli, and ugba as sources of next-generation probiotics and evaluates their role in managing metabolic and immune-related disorders. A structured literature search was conducted using databases including PubMed, Google Scholar, and ScienceDirect, focusing on studies published between 2018 and 2025. Evidence from in vitro, animal, and human studies indicates that several indigenous microbial strains exhibit anti-inflammatory properties, modulation of gut microbiota, and improvement in metabolic parameters such as glucose tolerance and lipid metabolism. Compared to conventional probiotics, next-generation probiotics demonstrate strain-specific functionality and enhanced therapeutic potential. However, challenges related to safety assessment, regulatory approval, and clinical validation remain significant. This review highlights current advancements, identifies research gaps, and emphasizes the need for well-designed clinical trials to translate traditional food-derived probiotics into precision health applications.

Keywords

Next-generation probiotics, Fermented foods, Gut microbiome, Metabolic disorders, Precision nutrition

1. Introduction

Probiotics are live microorganisms that confer health benefits to the host when administered in adequate amounts. Conventional probiotics are largely limited to a small number of well-characterized species such as *Lactobacillus* and *Bifidobacterium*. Although these probiotics have demonstrated benefits in gut health, their clinical efficacy in complex metabolic and immune disorders remains inconsistent. This limitation has led to growing interest in next-generation probiotics, which include newly identified microbial strains with specific functional properties. Traditional fermented foods represent a rich and

underexplored source of microbial diversity and provide an important foundation for the discovery of novel probiotic candidates.

2. Methodology

This review followed a structured literature search strategy. Peer-reviewed articles were retrieved from PubMed, Google Scholar, and ScienceDirect using relevant keywords. Studies published in English between 2018 and 2025 were included. Articles focusing on microbial isolation, functional characterization, and clinical applications were selected, while non-scientific reports and duplicate publications were excluded.

3. Traditional Fermented Foods as Sources of Next-Generation Probiotics

Traditional fermented foods such as dahi, kanji, idli, dosa, and ugba harbor diverse microbial populations that contribute to their nutritional and functional properties. These foods have a long history of safe consumption and serve as valuable sources of lactic acid bacteria and other beneficial microorganisms. Recent studies have identified novel strains from these foods with probiotic potential, including antimicrobial activity, acid and bile tolerance, and immune modulation.

4. Characteristics of Next-Generation Probiotics

Next-generation probiotics are distinguished by their strain-level specificity and targeted functional effects. These microorganisms often produce bioactive metabolites and interact closely with host immune pathways. Species such as *Akkermansia muciniphila* and *Faecalibacterium prausnitzii* have been associated with improved metabolic health and reduced inflammation, highlighting their potential role in precision nutrition.

5. Therapeutic Applications in Metabolic and Immune Disorders

Evidence from experimental and clinical studies suggests that next-generation probiotics may contribute to the management of metabolic disorders including obesity, type 2 diabetes mellitus, and cardiovascular diseases. These probiotics influence host metabolism by improving insulin sensitivity, regulating lipid metabolism, and reducing chronic inflammation. Their immune-modulatory properties also support gut barrier integrity and overall immune homeostasis.

6. Challenges and Regulatory Considerations

Despite promising findings, several challenges remain in translating next-generation probiotics into clinical applications. Safety assessment of novel strains, standardization of dosage, and regulatory approval processes require careful consideration. Clear guidelines and robust clinical evidence are essential to ensure safe and effective use.

7. Future Scope

Future research should emphasize advanced genomic and metabolomic characterization of probiotic strains derived from traditional fermented foods. Large-scale human clinical trials and personalized nutrition strategies may further enhance the therapeutic potential of next-generation probiotics.

8. Conclusion

Traditional fermented foods represent a promising and sustainable source of next-generation probiotics with potential benefits for metabolic and immune health. While current evidence supports their

therapeutic promise, systematic clinical validation and regulatory clarity are required to translate research findings into practical health interventions.

References

1. Hill C et al. Expert consensus on the scope and appropriate use of the term probiotic. Nat Rev Gastroenterol Hepatol.
2. Derrien M et al. Akkermansia muciniphila and metabolic health. Gut.
3. Marco ML et al. Health benefits of fermented foods. Nat Rev Gastroenterol Hepatol.
4. Sanders ME et al. Next-generation probiotics. Gut Microbes.
5. FAO/WHO. Probiotics in food.

