

Manuscript No.: IJAR-57790

Title: NEXT-GENERATIONAL FERMENTATION STRATEGIES: HARNESSING PROBIOTIC MICROBIOTA FOR BIOACTIVE COMPOUND PRODUCTION AND GUT HEALTH PROMOTION.

Recommendation:

- Accept as it is
- Accept after minor revision.....**
- Accept after major revision
- Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality		✓		
Clarity	✓			
Significance	✓			

Reviewer Name: Dr.Mithilesh kumar shukla

Reviewer's Comment for Publication:

This paper reviews next-generation fermentation strategies that leverage probiotic microbiota to produce bioactive compounds and promote gut health. It highlights advances in precision fermentation, synthetic biology, and multi-omics technologies, which enable targeted production of functional ingredients like short-chain fatty acids, bioactive peptides, and postbiotics. The review emphasizes the health benefits of fermented foods through gut microbiota modulation, immune regulation, and intestinal barrier support. It also discusses industrial applications and challenges such as strain specificity, safety validation, and regulatory issues. Overall, the paper underscores fermentation's evolving role as a biotechnology platform for developing personalized, health-promoting functional foods. Functional foods contain ingredients that may improve health, reduce disease risk, or promote optimal body function. These foods often include added vitamins, minerals, probiotics, prebiotics, bioactive peptides, or other beneficial compounds naturally produced or enhanced through processes like fermentation. Examples include yogurt with probiotics, fortified cereals, and foods rich in antioxidants.

Recommendation: Accept after minor revision,

Detailed Reviewer's Report

STRENGTHS:

- 1- The paper covers examines next-generational fermentation strategies that utilize probiotic microbiota for bioactive metabolite production and gut health promotion.
- 2- A wide range of topics related to fermentation, from traditional methods to modern precision fermentation technologies.
- 3- It highlights emerging techniques such as synthetic biology, multi-omics,
- 4- Its Emphasizes the role of pro biotic, post biotic, bioactive peptides, and short-chain fatty acids in promoting gut health.
- 5- The paper details how fermented metabolites interact with the gut environment and contribute to health.
- 6- It Discusses how next-generation fermentation can enhance food quality, safety, flavor,

WEAKNESSES:

- 1- The paper is primarily a review but does not present new experimental data.
- 2- It is using Complex Terminology and advanced scientific terms like -multi-omics, synthetic biology.
- 3- Narrow Focus on Gut Health.

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