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REVIEWER'S REPORT

Manuscript No.: IJAR-57790

Title: Under the 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's ID: JPR- 212

Detailed Reviewer's Report

Summary

This manuscript provides a timely and well-structured review of next-generational fermentation strategies, emphasizing the role of probiotic microbiota in producing bioactive compounds and promoting gut health. The authors successfully integrate traditional fermentation concepts with emerging biotechnologies such as precision fermentation, omics, and next-generation probiotics.

Strengths

- **Comprehensive scope:** Covers probiotics, postbiotics, SCFAs, bioactive peptides, and precision fermentation.
- **High technical quality:** Well-supported by recent (2022–2025) and authoritative references, including ISAPP consensus statements.
- **Clear organization:** Logical flow from foundational concepts to advanced strategies and applications.
- **Clinical and industrial relevance:** Includes practical recommendations for research, industry, and regulatory bodies.
- **Illustrative figure:** Figure 1 effectively summarizes mechanistic pathways linking fermented metabolites to gut health.

Weaknesses & Suggested Revisions (Minor)

1. **Abstract refinement:**
 - The abstract is slightly dense. Consider breaking the first sentence into two for readability.
 - *Suggested revision:* "Fermentation has evolved from a traditional preservation method into a modern biotechnology platform. This review examines next-generational fermentation strategies that utilize probiotic microbiota for bioactive metabolite production and gut health promotion."
2. **Figure citation:**
 - Figure 1 is mentioned but not provided in the manuscript text. Ensure the figure is included in the final version with a clear caption and citation in the body (e.g., after line 226).
3. **Repetition reduction:**
 - The phrase "Leeuwendaal et al., 2022" is cited excessively (lines 25, 33, 38, 55, 66, etc.). Replace some citations with more recent or complementary references (e.g., Mukherjee et al., 2024; Valentino et al., 2024).
4. **Minor grammatical issues:**

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- Line 38: "Studies also shows that interest" → change to "Studies also show that interest".
 - Line 116: "organisms are described as promising because they are linked" → can be shortened to "organisms are promising due to their link".
5. **Recommendations section:**
- Already strong. However, add a specific suggestion for **harmonizing regulatory frameworks** for postbiotics across regions (e.g., EU vs. FDA vs. ASEAN).
6. **Reference formatting:**
- Some references are incomplete (e.g., Salminen et al., 2021, has no page numbers). Ensure all references follow the journal's style consistently.

Conclusion

This is a high-quality, timely, and significant review that will be of great value to researchers in food microbiology, gut health, and functional food development. With minor revisions (especially reducing citation redundancy and formatting consistency), the manuscript is suitable for acceptance.

Recommendation: Accept after minor revision