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REVIEWER'S REPORT

Manuscript No.: IJAR-52878 Date: 17/07/2025

Title: Continuous improvements in the product portfolio of Liposomal Iron by WBCIL to offer enhanced Nutraceutical Efficacy and Public Health Safety

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. S. K. Nath Date: 18/07/2025

Reviewer's Comment for Publication:
The research convincingly demonstrates that WBCIL's liposomal iron formulation exhibits high encapsulation efficiency, excellent stability, and nanoscale uniformity, making it a promising candidate for advanced nutraceutical applications. By employing sophisticated characterization techniques, the study provides robust evidence of the formulation's physicochemical integrity and potential for improved bioavailability. However, further biological validation through in-vivo studies is essential to fully establish its efficacy and safety profile.

Reviewer's Comment / Report

Strengths of the Paper:

1. **Comprehensive Characterization:** The use of multiple advanced techniques (DLS, FTIR, SEM, EDAX, DSC, TGA) provides a thorough understanding of the formulation's physicochemical and structural properties.
2. **Focus on Stability and Encapsulation Efficiency:** Demonstrates high iron encapsulation (~89%), essential for bioavailability, along with stability under thermal and storage stress, addressing common issues in liposomal formulations.
3. **Methodological Rrigor:** The study adheres to validated, standardized analytical methods, ensuring the reliability of results and reproducibility.
4. **Innovation and Application:** Emphasizes technological advancements in formulation, such as high-pressure homogenization and use of non-GMO phospholipids, aligning with international quality standards and real-world applications.
5. **Future Directions:** Notes ongoing in-vitro biocompatibility and absorption studies, indicating a pathway toward clinical validation.

Weaknesses and Limitations:

1. **Limited In-vivo Data:** The study primarily presents physicochemical and stability data. Biological performance such as absorption, bioavailability, and safety in animal or human models is not included, which is critical for clinical validation.
2. **Lack of Detailed Mechanistic Insights:** While interactions between iron and lipids are confirmed via FTIR, deeper mechanistic insights into how encapsulation enhances bioavailability or reduces side effects are not provided.
3. **Absence of Comparative Data:** The study mentions improvements over traditional formulations but lacks direct comparative data or bioequivalence studies with existing iron supplements.
4. **Clarity and Organization:** Some sections, especially methodology and discussion, could benefit from clearer articulation and more concise presentation to improve readability for a broader audience.