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REVIEWER'S REPORT

Manuscript No.: IJAR-51396 Date: 4/5/2025

Title: Removal of Methylene Blue by Activated Carbon beads and Agricultural waste: A Review

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: Ahmed M. Saqr **Date:** 4/5/2025

Reviewer's Comment for Publication.

(*To be published with the manuscript in the journal*)

The reviewer is requested to provide a brief comment (3-4 lines) highlighting the significance, strengths, or key insights of the manuscript. This comment will be Displayed in the journal publication alongside with the reviewers name.

This review manuscript offers a comprehensive overview of low-cost adsorbents, particularly activated carbon beads and agricultural wastes, for the removal of Methylene Blue from wastewater. Its strength lies in synthesizing recent advancements, adsorption mechanisms, and performance comparisons, providing valuable insights for researchers exploring sustainable wastewater treatment solutions.

Detailed Reviewer's Report

Thank you for the opportunity to review the manuscript entitled "Removal of Methylene Blue by Activated Carbon Beads and Agricultural Waste: A Review" submitted to the International Journal of Advanced Research (IJAR). The topic is relevant and timely, addressing environmental remediation through low-cost adsorption technologies. The manuscript presents a broad overview of biosorbents, with a particular emphasis on activated carbon beads and agricultural waste-derived materials for Methylene Blue removal from wastewater.

While the manuscript is informative and contains a wealth of references and data, it suffers from several structural, methodological, and interpretive

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issues. These issues must be addressed to enhance the manuscript's scientific rigor, coherence, and utility for readers. I therefore recommend major revision before the paper can be considered for publication.

Major Comments

1. Abstract

Can the authors clarify if this is a systematic review or narrative review? What criteria were used for article selection?

Please include more specific quantitative comparisons or limitations of each adsorbent type in the abstract for clarity.

2. Introduction

While the introduction outlines the problem well, it lacks a clear research gap. Can the authors identify specific limitations in previous reviews that this paper addresses?

Could the authors integrate more recent statistics (post-2021) regarding MB discharge and its environmental impact?

3. Methodology of Review Process

The methodology section is absent. What databases were searched, what were the inclusion/exclusion criteria, and what time frame was covered?

How were data from other studies validated or compared (e.g., normalization of adsorption capacities)?

4. Figures and Data Presentation

Figures 2, 3, and 4 lack clarity and proper formatting. Can these be redrawn with higher resolution and consistent labeling (source, axis titles)?

Could the authors include a summary table comparing the adsorption capacities and cost-effectiveness across various agricultural wastes and activated carbons?

5. Activated Carbon Beads (Section 3)

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The section is descriptive but lacks critical analysis. Can the authors provide a comparative advantage of alginate beads over other bead forms (e.g., chitosan)?

Please discuss limitations such as desorption capacity, reuse cycles, or degradation under real wastewater conditions.

6. Agricultural Waste Adsorbents (Section 5)
Many references are cited without a critical summary. Can the authors synthesize findings into meta-analysis-style insights (e.g., average removal rates, preferred pH)?

Could the variability in agricultural waste composition due to regional factors be better addressed?

7. Results and Discussion (Sections 4–6)
The results section is somewhat fragmented. Can the authors consolidate kinetic models and isotherm results into a single coherent table?

Are there statistical methods (e.g., R^2 values) used to validate model fitting that could be reported or discussed?

8. Handling of Spent Adsorbents (Section 8)
The discussion is informative but lacks quantitative assessments of the regeneration efficiency. Can the authors add comparative regeneration costs or efficiencies?

Could more emphasis be placed on the environmental risks of improper adsorbent disposal?

9. Conclusion
The conclusion reiterates general points but lacks forward-looking recommendations. What are the key future research directions, especially concerning industrial scalability?

Could the authors briefly discuss policy or regulatory implications of scaling up these adsorption technologies?

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Minor Comments

1. Abstract
Lines 23–24: Consider rephrasing "filling research gaps" to specify what those gaps are.

2. Introduction
Line 29: "Methylene Blue (MB) is a synthetic dye…" Consider including its CAS number or chemical structure reference.

3. Section 2 (Activated Carbon)
Line 2.2: Specify the activation temperature range more consistently (some places say 400–900°C, others differ).

4. Section 3.5 (Factors Affecting Adsorption)
The explanation on pH effects is repetitive. Please revise for conciseness.

5. Figures
Ensure all figures are numbered sequentially and cited in the text. "Figure 2" appears twice (line 2 and line 2 again under a different context).

6. References
Several citations are not properly formatted (e.g., [1,2], [17]) and should follow journal style.

Add missing DOIs where applicable.

7. English Language and Grammar
The manuscript contains occasional grammatical issues. For example: "The garbage is thoroughly cleansed…" (Section 5.4) – please replace with "The waste is thoroughly cleaned…"

8. Consistency
Units such as mg/g, °C, and % should follow a consistent style throughout the manuscript (e.g., "230 mg/g" vs. "230mg/g").