

REVIEWER'S REPORT

Manuscript No.: IJAR-56215**Title: AMELIORATIVE ROLE OF BIOCHAR AND NANODAP IN MITIGATING SEWAGE SLUDGE INDUCED CADMIUM STRESS IN PRAECITRULLUS FISTULOSUS,****Recommendation:****Accept after minor revision**

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

Reviewer Name: Dr Abdul Haseeb Mir

Detailed Reviewer's Report

The article titled "AMELIORATIVE ROLE OF BIOCHAR AND NANODAP IN MITIGATING SEWAGE SLUDGE INDUCED CADMIUM STRESS IN PRAECITRULLUS FISTULOSUS" provides a comprehensive and technically sound study on sustainable remediation strategies for heavy metal-contaminated soils. By evaluating the combined effects of rice husk biochar (RHB) and Nano-diammonium phosphate (Nano-DAP), the author addresses a critical challenge in modern agriculture: the safe utilization of nutrient-rich sewage sludge that is often compromised by toxic cadmium levels.

The study's methodology is robust, utilizing a pot experiment with eight distinct treatment groups to isolate the effects of cadmium stress and the corresponding recovery provided by the amendments. The results are particularly compelling, showing that while cadmium stress significantly reduces plant height by 36% and fruit weight by 45%, the integrated application of biochar and nano-fertilizer can improve these growth parameters by approximately 45% while simultaneously reducing cadmium accumulation in shoots by half. This research successfully demonstrates that biochar's ability to immobilize metals through surface complexation and Nano-DAP's role in alleviating nutrient deficiencies create a powerful synergy for crop security.

To ensure the manuscript meets the highest standards for international publication, the following minor revisions are recommended:

While the article mentions that Nano-DAP is an effective alternative to conventional fertilizers, it should provide more specific characterization data for the nanoparticles used in the study. Including the specific

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particle size (e.g., confirming they are below 100 nm) and the zeta potential would add necessary scientific rigor to the nanotechnology aspect of the paper.

The abstract mentions that "acidified biochar" can effectively resolve cadmium issues by creating additional adsorption sites. However, the materials and methods section primarily lists "Rice husk biochar" without detailing the specific acidification protocol (e.g., the type of acid and concentration used). The author should clarify whether the biochar used in the experiment was acidified or if the abstract is referring to the general potential of the material.

The study reports highly significant effects via two-way ANOVA ($p < 0.0001$). To make these findings more accessible, the author should include graphical representations (bar charts with error bars) for the primary growth parameters, such as leaf area and fruit weight, across all eight treatment groups. This would visually reinforce the "partial recovery" versus "combined treatment success" discussed in the text.

The article focuses on a single crop cycle of *Praecitrullus fistulosus*. A brief discussion on the long-term stability of the immobilized cadmium would be beneficial. Specifically, the author should address whether the cadmium bound to the biochar remains stable over multiple seasons or if changes in soil pH could potentially re-mobilize the metal.

There are several instances of minor typographical errors in the citations, such as "Carabassa et al." and "DelīBacaket al." where spaces are missing. Additionally, the author should ensure that the reference to "Sheikh, L., et al. (2025)" is correctly dated, as this appears to be a future-dated citation or a typo that could affect the credibility of the literature review.

Recommendation for the Editor

Overall, this article is a significant and timely contribution to the fields of environmental science and agricultural technology. It provides practical, sustainable solutions for managing contaminated soils and ensuring food safety.

I recommend this article for publication with minor revision.