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## REVIEWER'S REPORT

Manuscript No.: **IJAR-53341** Date: 16-08-2025

**Title: STUDY OF THE THERMOMECHANICAL PERFORMANCES OF BIO-SOURCED MATERIALS: INFLUENCE OF THE PROPORTION OF SUGAR CANE FIBER AND THE CEMENT CONTENT**

**Recommendation:**
**Accept as it is .....YES.....**
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: Mir Bilal

**Reviewer's Comment for Publication.**

### Content Review:

The manuscript examines the thermomechanical performances of bio-sourced adobes reinforced with sugarcane fibers and stabilized with cement. It is situated within the broader context of global warming, the scarcity of natural resources, and the urgent need for sustainable construction materials. The study highlights the relevance of green construction materials in reducing the carbon footprint of the building sector, particularly in regions where both resource efficiency and thermal comfort are pressing issues.

The abstract provides a concise overview of the research, clearly stating the experimental setup, fiber and cement proportions, and the thermal and mechanical properties measured. The results are explicitly presented with numerical values, showing the optimization of thermal conductivity, effusivity, and strength when using 2.5% sugarcane fiber and 10% cement. This

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quantitative precision enhances the clarity of the research outcomes and emphasizes the material's suitability for lightweight, eco-friendly construction applications.

The introduction situates the study within the global environmental context, emphasizing the carbon emissions linked to conventional construction materials. It highlights the potential of plant fiber–reinforced clay as a sustainable alternative and provides a comprehensive review of previous works. The literature cited includes examples of plant fibers such as kenaf, fonio straw, corn cob, barley straw, and hemp shiv, each contributing to improvements in either mechanical strength or thermal insulation in adobe or compressed earth blocks. These comparisons establish a strong foundation for the relevance of sugarcane fiber as an alternative.

The manuscript is well-anchored in both environmental and technical dimensions. On one hand, it stresses the urgent need for sustainable material solutions in response to climate change and resource depletion. On the other hand, it details the experimental methodology and findings with clarity, focusing on the balance between thermal regulation and mechanical strength. The study effectively demonstrates how fiber content and cement stabilization interact to enhance material performance, confirming the feasibility of sugarcane fiber as a viable bio-sourced reinforcement.

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Overall Assessment:

The paper provides a coherent and scientifically grounded exploration of bio-sourced adobes reinforced with sugarcane fibers. It combines environmental justification, literature-based context, and quantitative experimental results to highlight the potential of such materials in sustainable construction. By presenting both thermophysical and mechanical performance outcomes, the manuscript underscores the dual benefits of thermal comfort and structural integrity, contributing meaningfully to the advancement of green building technologies.

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