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Peer Review

Review of: "Investigation of Mechanical Properties of Sisal Fiber and Sugar Palm Fiber Reinforced Hybrid Composites"

Elayaraja R¹

1. Mechanical Engineering, Vellore Institute of Technology, India

The paper is well-structured and presents a clear experimental investigation into the mechanical properties and water absorption of sisal and sugar palm fiber-reinforced epoxy composites. The use of hybrid fibers in varying ratios is a key aspect. However, there are areas where more technical detail and grammatical precision could enhance the paper's quality.

- 1. The abstract mentions "better tensile properties with a stress value of 6.67N/mm2" for the 20% sisal and 10% sugar palm composite. However, the results section (Figure 8) shows a tensile strength of 65 N/mm². Could you clarify this discrepancy? Is "tensile properties" referring to a specific aspect beyond just tensile strength in this context?
- 2. The abstract states an "Izod impact value of 42.461J/m" for the same composite (20% sisal, 10% sugar palm). Table 1 shows this value for Sample-3 (15% sisal, 15% sugar palm). Please clarify which composite exhibited this value.
- 3. The abstract mentions a "better flexural stress value of 67.29N/mm2" for the 10% sisal and 20% sugar palm composite. Figure 9 shows this value for Sample-3 (15% sisal, 15% sugar palm). Please clarify this inconsistency.
- 4. The abstract mentions the water absorption test was carried out for four days with a 96-hour analysis. This is redundant. Could it be rephrased for clarity?
- 5. When discussing the advantages of composites for sports goods, could you provide specific examples of these goods beyond "helmet shells"?
- 6. The introduction mentions "cost-effective machining of metal alloys" as a reason for the high demand for natural fiber composites. Could you elaborate on why natural fiber composites offer a cost advantage over machining metal alloys in specific applications?

- 7. You state that "hybrid fibre-reinforced composite is designed to improve thermal and mechanical properties" compared to composites reinforced with carbon fibers. While this can be true in specific cases, it's a broad generalization. Could you be more specific about the types of improvements and the context where this holds? Carbon fiber composites generally have superior mechanical properties.
- 8. When discussing the environmental benefits of natural fibers, could you briefly mention any potential environmental drawbacks associated with their processing or use in composites?
- 9. In section 2.3, you mention maintaining a "total fiber loading of 30wt%". Was the epoxy resin the remaining 70wt% in all samples? This is implied but could be explicitly stated.
- 10. You mention "random orientation" of the fibers. Could you provide more detail about how this random orientation was achieved during the compression molding process? Was there any attempt to control the distribution or alignment?
- 11. The curing temperature of 120 degrees Celsius for the epoxy is mentioned. What type of epoxy resin was used, and what was the recommended curing cycle by the manufacturer?
- 12. You mention making two plates with fiber lengths of 20mm and 30mm. Were these used for preliminary studies, or are they related to the three hybrid composite samples discussed later? This is unclear.
- 13. In section 3, you mention cutting specimens according to ASTM standards as mentioned in Figure 7. However, Figure 7 is a general label for the ASTM standards. Could you specify the exact ASTM standard number used for each test (tensile, flexural, impact, and water absorption) within the text of each subsection?
- 14. For the tensile test (section 3.1), you mention "five specimens of treated fiber-reinforced composites were tested". Does this mean five specimens for *each* of the three hybrid composite ratios?
- 15. In the flexural test (section 3.2), the specimen size is given. What was the support span used in the three-point bending test?
- 16. For the impact test (section 3.3), you mention "untreated and 5% alkali-treated sugar palm sprout fiber reinforced composite specimens were tested". This seems to contradict the earlier statement that only treated fibers were used for the hybrid composites. Please clarify. Also, the specimen size mentioned here (50×13×5mm³) is different from the general specimen preparation size mentioned earlier.

- 17. In the water absorption test (section 3.4), the initial heating of the composite at 50 degrees Celsius for 24 hours is mentioned. What was the purpose of this pre-drying step?
- 18. The dimensions of the water absorption test specimens are given as 152×152×5mm. These are quite large compared to the mechanical testing specimens. Was there a specific reason for using such large samples for water absorption?
- 19. In section 4.1 (Tensile Strength), the units in the text are N/mm², which is equivalent to MPa. Please maintain consistency in units throughout the results section.
- 20. In the discussion of water absorption, you attribute the lower water absorption of Sample-2 to "less amount of sugar palm fibers and their stability during the heating process." Could you elaborate on why sugar palm fibers might contribute more to water absorption compared to sisal fibers and what "stability during the heating process" refers to in this context?
- 21. The conclusion states that "Sample 3 exhibited better tensile properties," but the value mentioned in the abstract (6.67 N/mm²) contradicts the value in the results section (76 N/mm²). Please resolve this discrepancy.
- 22. The conclusion mentions Sample-3 having a fiber combination of "sisal with 20% and sugar palm fibre with 10%," which contradicts the sample composition defined in section 2.3 (Sample 3: 15% Sisal, 15% Sugar palm). This is a critical error that needs correction.
- 23. The conclusion states that "by increasing the sisal fibre percentage, the specimens showed better mechanical properties." This is a generalization based on comparing Sample-2 (20% sisal) with Sample-1 (10% sisal). However, Sample-3 (15% sisal) often showed the best results. The conclusion should be more nuanced and reflect the optimal hybrid ratio observed.

Declarations

Potential competing interests: No potential competing interests to declare.