Reusing Banana Plant Pseudostems for the Production of Thermoacoustic Panels in Civil Construction

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This research investigates the reuse of banana pseudostems for the production of thermoacoustic panels for application in civil construction. The initial idea was inspired by research conducted by Victor Fabiano Ledur (1994), which analyzed banana fibers for use in automotive components. In this project, the same agricultural waste was redirected to the construction sector, aiming to produce thermoacoustic panels and evaluate their technical feasibility in comparison with materials currently used in the market. Composite panels were manufactured by crushing banana pseudostems and shaping them into molds to produce sustainable panels. The panels were subjected to density, fire reaction, bending strength, thermal and acoustic insulation, specific heat, water absorption, and thickness swelling tests. The results indicated low material density, which favors acoustic performance. The panels exhibited self-extinguishing behavior in the fire reaction test. The bending strength obtained was 0.06 MPa, and the specific heat was 4.2 kJ/kg·K. Thermographic analysis showed thermal insulation of approximately 7 °C for panels bonded with PVA adhesive and 3.5 °C for panels bonded with dextrin. Acoustic tests demonstrated sound absorption of 13.4 dB for 15 mm thick panels and 20.5 dB for 20 mm thick panels. These results indicate that banana pseudostems have significant potential for use in sustainable thermoacoustic panels, providing a renewable alternative for the construction industry.

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