

Experimental Investigation of Static and Dynamic Behavior of Natural and Artificial Composite for Automobile and Aerospace Application.

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Abstract: *The aim of this study is to provide a comprehensive overview of the fabrication, design, and characteristics of sustainable composites based on natural, artificial, and hybrid fibers, particularly with coconut, banana, and jute fibers. It emphasizes these materials as resources that are very friendly to the environment for application in the automotive and aerospace sectors. This discusses the influences of mixing together natural fibers of banana and jute with synthetic fibers in hybrid composites with an objective to increase the shelf life and the performance of the epoxy-based composites. Key techniques in the manufacture of fiber composites include fiber choice, surface modifications, and composition of the epoxy matrix; processing techniques like compression molding, vacuum infusion, and traditional lay-up all became important contributors. Mechanical tests return tensile strengths from 12 MPa (abaca) to 1627 MPa (fruit-based composites), and densities from 295 kg/m³ for kenaf up to 1560 kg/m³ for pineapple, so these are versatile materials. The study underlines that mechanical performance, tensile strength, thermal conductivity, and impact resistance are highly influenced by fiber-matrix interaction, fiber orientation, and interfacial adhesion. Hybrid composites show immense potential for use in structural and non-structural applications in automotive and aerospace industries, especially in load-bearing and interior components. The research concludes that the integration of coconut, banana, and jute fibers in epoxy-based composites offers a promising solution to reduce environmental impact while maintaining durability and performance, supporting sustainable advancements in high-performance sectors*

Keywords: Natural Fiber Composites, Hybrid Fiber Composites, Coconut, Banana, Jute Fibers Sustainable Materials, Automotive Applications and Aerospace Applications