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EXPERIMENTAL AND VALIDATION OF THE MECHANICAL CHARACTERISTICS OF BIO BASED HYBRID COMPOSITES

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Abstract

Natural fibers are used as reinforcement in composites composed of polymers nowadays due to major environmental concerns. Jute plants have been widely used as a resource in recent years, in addition to many other kinds of natural resources. In this study, hybrid composites that were completely eco-friendly were made using ramie and jute fibers with two distinct fiber direction, 0^0 and 90^0. These composites' mechanical attributes, Including their flexural, tensile and impact strengths, have been examined. The investigation's key revelation is that composite materials with a fiber orientation of 0^0 may withstand maximum tensile strengths of 56.12 MPa, flexural strengths of 166.32 MPa, and impact strengths of 12.10 J/m^2. The condition of tensile strength, flexural strength and impact strength, the composites with the 90^0 fibre orientation had the most significant values at 72.36 MPa, 169.35 MPa, and 14.25 J/m^2, respectively. A finite element study was carried out using the NX Nastran 9.0 program to analyze the elastic tendencies of the composites and estimate their mechanical characteristics. When the data were compared, it was discovered that there was a significant connection between the experimental and expected values. The morphology of the broken surfaces of the composites was examined using SEM analysis. The results showed that the qualities were improving and comparable to composites reinforced with ramie fiber, indicating that ramie and jute fiber may be combined.

Key words: biocomposites, natural fibers, hand layup method, mechanical properties

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