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An Overview on Polyester Hybrid Composites

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Description

In the current study, natural resources such as olive root fibers and coir pitch filler were combined with polyester waste fibers to create hybrid composites. Such composite panels can be used as a possible replacement for fiber glass room separators and sunshade panels in structures. By combining polyester waste fibers and olive root fibers in various ratios, hybrid composites were created. At three distinct filler levels (0 percent, 5 percent, and 10 percent) of the total matrix weight, coir pith micro-particles with an average size of 312 d.nm were utilized as reinforcement in the polyester matrix. Characteristics of the material's physical characteristics, including tensile strength, flexural strength, and impact resistance, as well as its thermal and environmental characteristics, including water absorption and density loss due to weathering, were determined. A sampling of commercially available fiber glass sunshades was also looked at for comparison's sake. In order to achieve the best ratio of all the components in the composite, mixture design analysis was performed. Regression model-based experimental findings graphically compared revealed a strong degree of correlation.

A composite's optimal formulation was found to contain polyester waste fibers, olive root fibers, and coir pith micro-fillers, respectively, with the goals of maximization of tensile strength, flexural strength, impact strength, and minimization of water absorption, density loss, and coefficient of linear thermal expansion. All things considered, it can be said that the created hybrid composites from waste fiber materials can be employed as a potential alternative and a value-added application in structures and construction. A focus on low-cost, lightweight materials has led to a resurgence in interest in the development of sustainable materials that can replace non-biodegradable and ecologically unfriendly elements in reinforced composites due to environmental and energy conservation considerations. The composite was created by hand-laying up different hybrid fiber weight fractions (5 to 25 wt%) while keeping the fiber blend ratio constant at 50/50. Additionally, composites were created using a constant fiber weight fraction of 20% and a range of 0% to 100% for the fiber mix ratio. Following ASTM and ISO standards, fabricated composites were then evaluated for their flexural, tensile, compressive, and impact strengths. Two or more physically different and mechanically separable components that exist in two or more phases make up hybrid composite materials. Typically, this seeks to maximize the benefits of many fibers while keeping their desirable individual qualities in the finished product [1,2].

Because of their inexpensive cost of production and reasonable mechanical qualities, synthetic fibers like carbon, glass, and aramid have dominated the composite manufacturing industry from the dawn of time. However, due to growing environmental concerns, more research is being done on the prospect of using natural fibers instead of synthetic ones when creating polymer composites. In compared to their traditional synthetic counterparts, such as glass and carbon fibers, natural plant fibers have appealing advantages. Natural fibers have low density, high specific strength, and stiffness, yet when heated or burned at the end of their useful lives, they emit significantly fewer hazardous gases. They are also inexpensive, non-abrasive for processing instruments, renewable and biodegradable reinforcing agents, and their production feedstock is typically accessible. Numerous researchers have looked at how natural fibers including sisal, jute, hemp, coir, and cattail can be hybridized with polymer matrices to enhance the mechanical properties of the resulting polymer composites. According to a different experiment, the mechanical performance of a hybrid composite reinforced with banana and sisal fibers in epoxy-based composites led to an improvement in the composite's mechanical properties. To the best of our knowledge, there hasn't been any research on the hybridized sisal and cattail fibers used to make composites' mechanical properties in the open literature. As an alternative raw material for nonstructural applications, sisal-cattail fiber-reinforced polyester hybrid composite was created through a number of studies. Simple hand lay-up techniques were used to create hybrid composites reinforced with cattail-sisal fiber. Simple hand lay-up techniques were used to create hybrid composites reinforced with cattail-sisal fiber. Sisal and cattail fiber-reinforced polyester composites failed as a result of fiber pullouts (mostly sisal fibers) and fiber breakage (mainly cattail fibers and partly sisal fibers). The impact of chemically treating fibers on the properties of reinforced hybrid composites should be investigated further. While the mechanical and thermal properties were determined using dynamic mechanical analysis (DMA) and thermomechanical analysis (TMA), the chemical aspect was investigated using Fourier transform infrared spectroscopy (FTIR). The storage, loss, and damping factors were used to analyze the dynamic mechanical properties. A composite material is created by combining at least two components with distinct interfaces at their point of intersection. The reinforcement (carrier), another component, carries the same load while the matrix (transmitter), another component, transfers the weight. Lignin (the matrix) transfers the load while cellulose (the reinforcement) carries the tension in wood, a naturally occurring composite [3-5].

Conflict of Interest

None.

References

1. Mishra, S and A.K. Mohanty. "Studies on mechanical performance of biofibre/glass reinforced polyester hybrid composites." *Compos Sci Technol* 63 (2003): 1377-1385.

2. Uthayakumar, M., V. Manikandan, N. Rajini and P. Jeyaraj. "Influence of redmud on the mechanical, damping and chemical resistance properties of banana/polyester hybrid composites." *Mater Des* 64 (2014): 270-279.

3. Isa, M.T., A.S. Ahmed and I.A. Mohammed-Dabo. "Effect of fiber type and combinations on the mechanical, physical and thermal stability properties of polyester hybrid composites." *Composites Part B: Eng* 52 (2013): 217-223.

4. Nurazzi, N. Mohd, A. Khalina and Z. M. Hanafee. "Thermal properties of treated sugar palm yarn/glass fiber reinforced unsaturated polyester hybrid composites." *J Mater Res Technol* 9 (2020): 1606-1618.

5. Patnaik, Amar, Alok Satapathy, S.S. Mahapatra and R.R. Dash. "Tribo-performance of polyester hybrid composites: damage assessment and parameter optimization using Taguchi design." *Mater Des* 30 (2009): 57-67.

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