Title: Preparation and characterization of snake plant fiber reinforced composite: A sustainable utilization of biowaste

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Abstract: Natural fibers are one of the most attractive materials in biocomposites due to their potential for sustainability. This study aims to prepare sustainable composite materials using fibers from *Sansevieria trifasciata* (snake plant) and to investigate their mechanical, morphological, and water absorption properties. The composite was prepared with epoxy resin through a manual hand lay-up process, maintaining standard parameters with changeable reinforcement (10%, 20%, and 30%). The mechanical properties (tensile, impact, and flexural strength), Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), and water absorbency of the composites were evaluated. The result showed that the tensile strength, flexural strength, and impact resistance of the composites are 6.99 MPa, 10.77 MPa, and 14 J, respectively, for 30% fiber components, which are significantly higher than other composite materials. The SEM analysis showed a strong interfacial bond between the snake plant fiber and the epoxy resin. The FTIR analysis revealed a reduction in hemicellulose and lignin and an improvement in the interfacial adhesion between snake plant fiber and epoxy resin. The composites also demonstrated time-dependent increases in water absorption, with the sample containing 30% fiber components showing the best absorbency performance at 0.88%.

Key words: Sansevieria trifasciata fiber, Epoxy resin composite, Mechanical properties, SEM analysis, FTIR analysis, Water absorption

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