Characterization of novel cellulosic plant fiber reinforced polymeric composite from *Ficus benjamina* L. stem for lightweight applications

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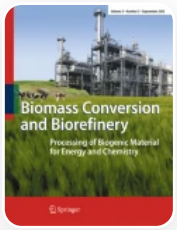

Biomass Conversion and Biorefinery

Aims and scope

Submit manuscript

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Abstract

The development of innovative reinforcement and the expansion of their potential applications will be aided by research on unique natural fibers in

polymer-based composites. In this work, new cellulosic fibers were mechanically separated from the stem of *Ficus benjamina L.* and reinforced in polyester matrix. The effect of varying fiber parameters (weight percentage and length) on the tensile, flexural, hardness, impact, water absorption, and thermal characteristics was investigated in this study. It was revealed that the composite sample with a length of 40 mm and a weight percentage of 30 wt% had the maximum mechanical properties. The impact, tensile, hardness, and flexural strength of composite found to be 9.31 kJ/m^2, 77.71 MPa, 88 HRRW, and 87.4 MPa respectively, which are comparative to many natural fibers investigated. However, increased fiber content will increase the composite water absorption which leads to failure of the composite system. As compared to the pure polyester resin, the heat stability temperatures of composites raised by 62.49%. The surface characteristics and fractured surface of the composites were examined using scanning electron microscopy and the fibers had better interfacial bonding with the polyester matrix with reduced failure mechanisms.