

Mechanical Analysis of Pineapple Leaf Fiber Reinforced Polymer Composites

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Abstract : In the field of material engineering, composites are in great concern for their nonbiodegradability and their cost. In order to reduce its cost and weight, plant derived fibers witnessed miraculous triumph. Plant fibers can be of different types like seed fibers, blast fibers, leaf fibers, etc. Composites can be reinforced with exclusively one type of natural fiber or also can be combined with two or more different types of natural or synthetic fibers to boost up their specific properties. Among all natural fibers, wheat straw, bagasse, kenaf, pineapple leaf, banana, coir, ramie, flax, etc. pineapple leaf fibers have very good mechanical properties. Being hydrophilic in nature, pineapple leaf fibers have very less affinity towards all types of polymer matrixes like HDPE, LDPE, PET, epoxy, etc. Surface treatments like alkaline treatment in different concentrations were conducted to improve its adhesion and compatibility towards hydrophobic polymer matrix i.e. epoxy resin. Pineapple leaf fiber epoxy composites have been prepared using hand layup method. Effect of fiber loading and surface treatments have been studied for different mechanical properties i.e. tensile strength, flexural strength and impact properties of pineapple leaf fiber composites. Analysis of fiber morphology has also been studied using FTIR, XRD. Scanning electron microscopy has also been used to study and compare the morphology of untreated and treated fibers. Also, the fracture surface has been reviewed comparing the reported literature of other eminent researchers of this field.

Keywords : composite, mechanical, natural fiber, pineapple leaf fiber

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