



PREPARATION AND CHARACTERIZATION OF MALEINATED OIL BASED BANANA FIBER INCORPORATED GREEN COMPOSITE

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Abstract

During the past few decades consumerist society has identified consequences of petrochemical products and hence the interest of scientists has been drawn towards the renewable, bio-derived products. In this effort a green composite was developed using banana fibers. The crosslinked polymer matrix was developed by using maleated castor oil (MACO) and linseed oil (LO) by free radical polymerization. The polymer matrix was reinforced with NaOH treated banana fibers (BF) which was extracted by water retting method. The effect of varying fiber load and resin composition was analyzed to obtain the optimum strength and thermal stability of the composite within a range of temperature, by performing dual-cantilever flexural test using Q800 Dynamic Mechanical Analyzer (DMA). The water absorptivity and chemical resistivity of the composite was also explored by allowing the composite to be drenched in water, saline water, an acid and a base for 24 hours. The swelling of the composites in acid and saline water showed a similar behavior while the samples were not resistant to alkaline solution. With the increase of the fiber content the swelling of the composites increased. Optimum properties were shown by the composite with 50% (w/w) fiber load and the composite was 2780 g m⁻². The optimized composite can be used in household utilities as in packaging, impact bearing within a wide range of temperature. The composite can be further optimized to be used in industrial scale applications.

Keywords: Green Composites, Renewable Resources, Castor Oil, Linseed Oil, Banana Bast Fibers