

Effect of Coir Fiber Content and Compatibilizer on the Properties of Unidirectional Coir Fiber/Polypropylene Composites

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Abstract: The main objective of this research was to study the effect of fiber content variation and stearic acid (SA) treatment on the fundamental properties of unidirectional coir fiber (CF) reinforced polypropylene (PP) composites. Several percentages of filler contents were used (10-40 wt %) in order to gain insights into the effect of filler content on the properties of the composites. Coir/PP composites were fabricated by compression molding, and the properties of composites were studied by physico-mechanical and thermal properties. The results from mechanical properties such as tensile strength (TS), tensile modulus (TM) and impact strength (IS) of the CF/PP composites were found to be increased with increasing fiber content, reached an optimum and thereafter decreased with further increase in fiber content. Treatment of the coir with SA as the coupling agent enhanced the mechanical properties, crystallization temperature and crystallinity of virgin PP and water desorption of the resulting composites, resulting from the improved adhesion between the CF and PP matrix. Scanning electron micrographs (SEM) of the tensile fractured samples showed improved adhesion between fiber and matrix upon treatment with SA. Interfacial shear strength (IFSS) of the composites was measured by single fiber fragmentation test (SFFT).

Keywords: Polymer composites, PP, Coupling agent, coir fiber, Mechanical properties, Water absorption