

Development and properties of sugar palm fiber reinforced polymer composites

ABSTRACT

Natural fibers have recently become attractive as an alternative reinforcement for fiber reinforced polymer composites. They are gaining more attention due to their low cost, easy availability, less health hazards, fairly good mechanical properties, high specific strength, nonabrasive, ecofriendly and bio-degradability characteristics. Polymers from renewable resources have attracted tremendous amount of attention to researchers and engineers over two decades. The increasing appreciation for biopolymers is mainly due to environmental concerns, and the rapid petroleum resources depletion. Sugar palm fiber (SPF) reinforcement of a novel biodegradable sugar palm starch (SPS) has been studied in this chapter. The result shows that the mechanical properties of plasticized SPS improved with the incorporation of fibers. Fiber loading also increased the thermal stability of the biocomposite. Water uptake and moisture content of SPF/SPS biocomposites decreased with the incorporation of fibers, which is due to better interfacial bonding between the matrix and fibers as well as the hindrance to absorption caused by the fibers. It can be seen that tensile strength and impact strength of biocomposites increase with increasing fiber content. This enhancement indicates the effectiveness of the SPF act as reinforcement. SPF reinforcement of epoxy and high impact polystyrene (HIPS) have also been looked into. Overall, SPF treatments enhanced the mechanical properties of both polymers (epoxy and high impact polystyrene). Thus, indicating that SPF has a promising potential to be used as reinforcement in polymer composites.