

Effect of benzoyl treatment on the performance of sugar palm/kenaf fiber-reinforced polypropylene hybrid composites

ABSTRACT

The main purpose of this work is to investigate the effect of benzoyl treatment on the performance of sugar palm/kenaf fiber-reinforced polypropylene hybrid composites. Water absorption tests were carried out to confirm the effect of benzoylation treatment toward fabricating a more hydrophobic behavior of the hybrid composites. Both treated and untreated composites that have 10 wt.% of fiber loading with three different fiber ratios between sugar palm and kenaf (7:3, 5:5, 3:7) were analyzed. Physical and mechanical properties such as tensile, flexural, and impact strength were determined from this study. Morphological properties were obtained using scanning electron microscopy (SEM). It was found that the tensile strength of sugar palm/kenaf-reinforced polypropylene hybrid composites was improved with the treatment of benzoyl with a value of 19.41 MPa. In addition, hybrid composite with treated sugar palm and kenaf fiber T-SP3K7 recorded the highest impact and flexural strength of 19.4 MPa and 18.4 MPa, respectively. In addition, SEM demonstrated that surface treatment enhanced the mechanical properties of the hybrid composites. Overall, it can be suggested that benzoyl-treated composites with a higher volume of kenaf fiber than sugar palm fiber will improve the mechanical characteristics of the hybrid composites.

Keyword: Biocomposites; Mechanical properties; Physical properties; Polypropylene; Sugar palm fibers