Mechanical properties of sugar palm yarn/woven glass fiber reinforced unsaturated polyester composites: effect of fiber loadings and alkaline treatment

ABSTRACT

In this paper, hybrid sugar palm yarn and glass fiber reinforced unsaturated polyester composites were investigated in relation to the effects of fiber loadings and alkaline treatment on the composite mechanical properties, such as tensile, flexural, impact and compression strength. The composites were fabricated at a weight ratio of matrix to reinforcement of 70 : 30 and 60 : 40, respectively, while the ratio of sugar palm yarn fiber to glass fiber was selected at 70 : 30, 60 : 40 and 50 : 50, respectively. The results revealed that the mechanical properties of the hybrid composites were increased with an increase of glass fiber loading for both 30 wt % and 40 wt % reinforcement content. The alkaline treatment of the sugar palm fibers have advantageous effect on the hybrid composite performance. The overall results indicated that the developed hybrid composites can be used as an alternative material for glass fiber reinforced polymer composites for various structural applications.

Keyword: Glass fiber; Hybrid composites; Mechanical properties; Sugar palm fiber; Yarn fiber; Unsaturated polyester resin