

Effect of treatments on the physical and morphological properties of SPF/phenolic composites

ABSTRACT

This study aims at evaluating the physical properties and effects of fiber treatments of natural fiber reinforced polymer composite's friction applications. Sugar palm fibers (SPFs) were used as fillers ($\leq 150 \mu\text{m}$) with phenolic resin to fabricate the composites by the hot press technique. The loading of SPFs varied from 0 to 40 vol.% with an interval of 10 vol.% in phenolic composites. The fibers were treated with sea water for 30 days, and with 0.5 M of alkaline solution for 4 hrs. Rockwell hardness, density, voids content, water/oil absorption, and moisture content were studied. Scanning electron microscopy (SEM) was used to investigate the morphology and interfacial bonding of the fiber-matrix in composites. With an increase in the SPF loading in the composites, the results indicated a decline in Rockwell hardness, an increase in water/oil absorption, and density. It was also observed that higher the density of the composites, lower was the voids content. In terms of physical properties, sea water treatment showed better improvement than alkaline treatment. The outcome of this research indicated that SPFs can be effectively used in reinforcing polymer composites, such as friction composites.

Keyword: Alkaline treatment; Phenolic resin; Physical properties; Sea water treatments; SEM; Sugar palm fibre