

Influence of treatments on the mechanical and thermal properties of sugar palm fibre reinforced phenolic composites

ABSTRACT

Sugar palm fibre (SPF) was used to prepare composites with phenolic resin. The SPF underwent treatment with either sea water for 30 d or a 0.5% alkaline solution for 4 h. The composites contained 30% (vol.) SPF in a powdered form, and the composite samples were fabricated by a hot press machine. The effects of the fibre treatments on the mechanical (flexural, impact, and compressive), thermal, and morphological properties of the composites were analyzed. The SPF treatments considerably improved the mechanical properties of the composites compared with the untreated composite. The alkaline treatment resulted in the most improved flexural and impact strength of the composites. In contrast, the sea water treatment had the best results for improving the compressive strength. Morphological analyses indicated that the surface treatments improved the fibre-matrix bonding. The thermal degradation analysis showed that both the sea water and alkaline treatments of the SPF slightly affected the thermal stability of the composites. Consequently, SPF can be effectively used as an alternative natural fibre for reinforcing bio-composites.

Keyword: Sugar palm fibre; Mechanical properties; Thermal properties; Treatments; Phenolic composites