

Water absorption, thickness swelling and thermal properties of roselle/sugar palm fibre reinforced thermoplastic polyurethane hybrid composites

ABSTRACT

The aim of this work is to investigate the effect of sugar palm fibre (SPF) loading on the water absorption, thickness of swelling and thermal properties of roselle (RF)/SPF/thermoplastic polyurethane (TPU) hybrid composites using thermogravimetric analysis (TGA). The hybridised versions of RF/SPF were prepared at different weight ratios through melt mixing and hot compression at 170 °C. Water absorption and thickness of swelling properties were investigated using the water immersion time test. The thermal properties of the hybrid composites were also analysed. The water absorption and thickness of swelling results revealed that an increase in SPF content led to a decrease in water uptake and thickness of swelling of the RF/SPF hybrid composites. The lowest water absorption (7.35%) and thickness of swelling (7.15%) data were obtained from the RST-3 hybrid composite. The TGA also showed that hybrid composites with increased SPF content recorded improved thermal stability.

Keyword: Roselle fibre; Sugar palm fibre; Hybrid composites; Thermoplastic polyurethane