

Effect of fiber loading on mechanical and morphological properties of cocoa pod husk fibres reinforced thermoplastic polyurethane composites

ABSTRACT

In this study, cocoa (*Theobroma cacao*) pod husk (CPH) fiber reinforced thermoplastic polyurethane (TPU) was prepared by melt compounding method using Haake Polydrive R600 internal mixer. The composites were prepared with different fiber loading: 20%, 30% and 40% (by weight), with the optimum processing parameters: 190 °C, 11 min, and 40 rpm for temperature, time and speed, respectively. Five samples were cut from the composite sheet. Mean value was taken for each composite according to ASTM standards. Effect of fiber loading on mechanical (i.e. tensile, flexural properties and impact strength) and morphological properties was studied. TPU/CPH composites showed increase in tensile strength and modulus with increase in fiber loading, while tensile strain was decreasing with increase in fiber loading. The composite also showed increase in flexural strength and modulus with increase in fiber content. Impact strength was deteriorated with increase in fiber loading. Morphology observations using Scanning Electron Microscope (SEM) showed fiber/matrix good adhesion.

Keyword: Thermoplastic polyurethane; Fiber loading on mechanical; Cocoa pod husk fibers; Morphological