

Influence of fiber content on properties of oil palm mesocarp fiber/poly(butylene succinate) biocomposites

ABSTRACT

Biodegradable and environmentally friendly biocomposites produced by a combination of biodegradable thermoplastics and natural fiber have gained increasing interest in recent years. In this work, eco-friendly biocomposites made from poly(butylene succinate) (PBS) and different weight percentages (10, 30, 50, and 70 wt%) of oil palm mesocarp fiber (OPMF) were fabricated via a melt blending process followed by hot-press molding. The biocomposites showed an improvement in storage and loss moduli with increasing fiber content, as indicated by dynamic mechanical analysis. Also, the water uptake and thickness swelling of the biocomposites increased with fiber content. The presence of fiber improved the biodegradability of the PBS, as evidenced from soil decomposition and scanning electron microscopy studies. Conversely, the presence of fiber lowered the melting and crystallization temperature as well as the thermal stability of neat PBS. The biocomposites from PBS and OPMF could be promising biocomposite materials because of their improved mechanical properties and biodegradability compared to neat PBS.

Keyword: Biodegradability; Dynamic mechanical analysis; Oil palm mesocarp fiber; Poly(butylene succinate); Thermal; Dimensional stability