

Experimental investigation on performance of short pineapple leaf fiber reinforced tapioca biopolymer composites

ABSTRACT

The performance of short pineapple leaf fiber (PALF) reinforced tapioca biopolymer (TBP) composites were investigated, specifically the effect of fiber length and fiber composition on mechanical properties (tensile properties, flexural strength, and impact strength). Composite samples with different fiber lengths (< 0.50 mm, 0.51 mm to 1.00 mm, and 1.01 mm to 2.00 mm) and different fiber compositions (10%, 20%, 30%, and 40%) were prepared through crushing, sieving, internal mixing, compression molding, and machining processes. The combination of PALF and TBP enhanced the mechanical properties of composites with 30% as the optimum fiber content. However, the influence of different fiber lengths up to 2.00 mm provided no significant effect on producing maximum tensile properties. Good interfacial adhesion between PALF and TBP was evident from scanning electron microscopy analysis. Therefore, the combination of PALF and TBP has great potential as a renewable and biodegradable polymer. Moreover, PALF-TBP composites are expected to become alternatives to petroleum-based polymers.

Keyword: Bio-composites; Natural fiber composites; Pineapple leaf fiber; Starch-based polymer; Tapioca biopolymer