Effect of blend composition on characteristics and performance of Jatropha bio-epoxy/epoxy matrix in composites with carbon fiber reinforcement

ABSTRACT

Characteristics and performances of a blended jatropha bio-epoxy/epoxy as a matrix in carbon fiber reinforcement was studied. The amount of bio-epoxy was arranged from 0 wt%, 25 wt%, 30 wt%, 40 wt%, and 50 wt% of the total matrix. Several analyses were performed to characterize and observe their performance. Fourier transform infrared spectroscopy, thermal analysis, physical characteristics, flammability, and soil burial were conducted, as well as mechanical tests. The results showed that introducing bio-epoxy in the matrix changed characteristics and increased or decreased their performance. Blending more than 25 wt% of bio-epoxy led to improved thermal stability between 280 °C to 350 °C and better biodegradability. However, tensile and flexural strength as well as modulus of elasticity decreased once the proportion of bio-epoxy was greater than 25 wt%. The paper proposed an optimal amount of jatropha bio-epoxy so that an alternative biocomposite application could be introduced to minimize carbon footprint in the environment.

Keyword: Bio-epoxy; Jatropha oil, Biocomposite; Fiber carbon; Thermal properties; Mechanical properties