

Mechanical properties of unsaturated polyester/epoxidized palm oil/Kenaf fibre composite at different styrene content

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ABSTRACT

Polyester resin (UPE) is petroleum-based polymer that most generally utilized as matrix system in fibre-reinforced plastic (FRP) products due to its high properties per price ratio. Currently, researchers are interested in partial blends of UPE resin with vegetable oil reinforced with natural fibre to produce renewable and sustainable composite products. However, the mechanical properties of this new blending bio-composite are highly related to the curing and crosslinking process of the UPE resin; which contributed by the styrene concentration as the crosslinking agent. Thus, this research aims to investigate the effect of styrene contents on the mechanical and thermal properties of unsaturated polyester (UPE)/epoxidized palm oil (EPO)/kenaf composites. The kenaf fibres were initially treated with an alkaline solution, and the composites were prepared by the direct mixing method and fabricated by hand lay-up technique. In this research, the amount of EPO and styrene varied at 0, 10, 20, 30 wt% and 25, 35, and 45 %, respectively. The characterization of found that increasing styrene content in UPE/EPO/kenaf composites improved the crosslinking and chemical interactions in the composites. In addition, increasing styrene content also improved the tensile modulus, tensile strength, Izod impact strength and elongation at break of the UPE/EPO/kenaf composites.

KEYWORDS

Biocomposite; Epoxidized palm oil; Kenaf fiber; Styrene; Unsaturated polyester

ACKNOWLEDGEMENTS

This work is funded by Fundamental Research Grant Scheme (FRGS) No. FRGS/1/2019/STG07/UMP/02/2 (University Reference RDU1901105) and Fundamental Research Grant UMP (RDU1903136).