

Physical, mechanical, and morphological properties of woven kenaf/polymer composites produced using a vacuum infusion technique

ABSTRACT

Nowadays, due to renewable issues, environmental concerns, and the financial problems of synthetic fibres, the development of high-performance engineering products made from natural resources is increasing all over the world. Lately, kenaf fibre has been used among many different types of natural resources in various shapes. Unidirectional long fibres or randomly oriented short fibre shapes are the most common type of kenaf fibres that have been investigated in previous works. This work characterises and evaluates the physical, mechanical, and morphological properties of plain woven kenaf fabric and its composites with three types of thermoset resin at $0^\circ/90^\circ$ and $45^\circ/-45^\circ$ orientation, in order to assess their suitability as lignocellulosic reinforced polymer composites. A vacuum infusion manufacturing technique was used to prepare the specimens with fibre weight content of $35\% \pm 2\%$. Eight specimens were prepared for each test, and five replications were adopted. A total of 78 samples were tested in this study. The results show that the composites with $0^\circ/90^\circ$ had the highest tensile, flexural strengths, and modulus. The morphological properties of composite samples were analysed through scanning electron microscopy (SEM) images and these clearly demonstrated the better interfacial adhesion between the woven kenaf and the epoxy matrix.