

Mechanical properties of woven banana fibre reinforced epoxy composites

ABSTRACT

In this paper, the experiments of tensile and flexural (three-point bending) tests were carried out using natural fibre with composite materials (Musaceae/epoxy). Three samples prepared from woven banana fibre composites of different geometries were used in this research. From the results obtained, it was found that the maximum value of stress in x-direction is 14.14 MN/m², meanwhile the maximum value of stress in y-direction is 3.398 MN/m². For the Young's modulus, the value of 0.976 GN/m² in x-direction and 0.863 GN/m² in y-direction were computed. As for the case of three-point bending (flexural), the maximum load applied is 36.25 N to get the deflection of woven banana fibre specimen beam of 0.5 mm. The maximum stress and Young's modulus in x-direction was recorded to be 26.181 MN/m² and 2.685 GN/m², respectively. Statistical analysis using ANOVA-one way has showed that the differences of results obtained from those three samples are not significant, which confirm a very stable mechanical behaviour of the composites under different tests. This shows the importance of this product and allows many researchers to develop an adequate system for producing a good quality of woven banana fibre composite which maybe used for household utilities.

Keyword: Woven banana; Mechanical properties; Epoxy composites; Fibre; Tensile test; Flexural test; ANOVA-one way; F-test