

## **The effect of sea water treatment on the impact and flexural strength of sugar palm fibre reinforced epoxy composites**

### **ABSTRACT**

Human safety and health and 'green' environmental sustainability are major concerns to the world community. To material scientists and engineers, these concerns meant that they have to devise new ways of treating or producing materials. Over the last decade, natural fibres had been treated chemically to enhance fibre-matrix interfacial adhesion and this trend continues until today. The goal of this study is to find a suitable replacement for chemical treatment of natural fibres. The use of biological base treatment agent in the form of sea water to enhance fibre-matrix interfacial adhesion in sugar palm fibre reinforced epoxy composites was studied. Sugar palm fibre was soaked in the sea water for the duration of 30 days. Impact and flexural tests were carried out in order to examine the effectiveness of this treatment in accordance to the ASTM D256 and ASTM D790 respectively. Scanning electron microscope (SEM) was used to analyse the surface fibres and fractured composites. It was experimentally proven that the sea water treated composites of 20% and 30% fibre content had higher impact value at 18.46 MPa and 14.16 MPa with 5.06% and 4.27% of improvements respectively, when compared to untreated composites. Similar result was reported for flexural strength of 30% fibre content which had higher impact value at 53.87 MPa with 7.35% of improvements. For the composite of 20% fibre content, reverse trend result was obtained at 54.22 MPa with decrease 8.12% compared to untreated composites. In conclusion, sea water treatment significantly improved surface characteristics of fibres by removal of the outer layer of hemicellulose and pectin and led to improve fibre-matrix interface. This caused a direct result of higher impact and flexural strength compared to untreated composites.

**Keyword:** Sugar palm fibre; Natural fibre composites; Sea water treatment.