

## **Comparative study on chemical composition, physical, tensile and thermal properties of sugar palm fiber (*arenga pinnata*) obtained from different geographical locations**

### **ABSTRACT**

Physical, mechanical, chemical, and thermal properties of sugar palm (*Arenga pinnata*) fiber were investigated for specimens obtained from three different locations: Kuala Jempol (Peninsular Malaysia), Tawau (West Malaysia), and Tasik Malaya (Indonesia). The morphology of the fiber were observed through scanning electron microscopy (SEM), the thermal properties by thermogravimetric analysis (TGA), tensile properties according to ASTM D3379, and chemical analysis by using neutral detergent fiber (NDF) and acid detergent fiber (ADF). This study confirmed that in sugar palm fiber, the highest chemical content of cellulose resulted in the highest strength and thermal stability of the fiber. Fiber originating from Kuala Jempol had the highest cellulose content of 44.53%, followed by Indonesia (44.47%) and Tawau (43.75%). Kuala Jempol fiber (233.28 MPa) also had the highest tensile strength, followed by Indonesia (211.03 MPa) and Tawau (201.30 MPa), which was affected by the cellulose content in the fiber. Thus, fiber originating from Kuala Jempol had better quality than the others as a reinforcement material in manufacturing of polymer composites.

**Keyword:** Sugar palm fiber; Physical properties; Mechanical properties; Chemical properties; Thermal properties