

## **Preparation and characterization of oil palm leaf fiber/polypropylene/Epolene® E-43 composite**

### **ABSTRACT**

Oil palm leaf fiber was used as a reinforcement material for the preparation of polypropylene composite. First, the influence of fiber loading on the mechanical and thermal characteristics of the composite was investigated. Epolene® E-43 was used as a compatibilizing agent to enhance the mechanical and thermal properties as well as the morphology of the oil palm leaf fiber/polypropylene composite. The composites were prepared with 10, 20, 30, 40, 50, and 60% ratios of fiber by melt blending technique using internal mixer machines and compressing molding. The addition of fiber led to an increase in the tensile and flexural properties of the composite in comparison to virgin polypropylene. Similarly, Epolene® E-43 was found to improve all the studied properties. Water absorption increased with increasing fiber loading; however, the addition of Epolene® E-43 reduced this property. According to Fourier transform infrared spectroscopy results, interactions between the components of the composite were physically indicated for all fiber content ratios, except 20% due to more interaction between the components. Dynamic mechanical analysis (DMA) showed that the presence of the oil palm leaf fiber enhances mobility but reduces stiffness. The morphological analysis of the composites using a field-emission scanning electron microscope showed that Epolene® E-43 reduced the size and number of voids, which is consistent with the results from the mechanical analysis.

**Keyword:** Oil palm leaf fiber; Epolene® E-43; Dynamic mechanical properties; Mechanical properties