

Physicochemical and thermal properties of lignocellulosic fiber from sugar palm fibers: effect of treatment

ABSTRACT

Sugar palm fiber (SPF) is one of the prospective fibers used to reinforce polymer composites. The aim of this study is to evaluate the physicochemical, thermal, and morphological properties of SPF after alkali and sea water treatments. The chemical constituents group and thermal stability of the SPF were determined using scanning electronic microscopy (SEM) along with energy dispersive X-ray spectroscopy and thermogravimetric analysis (TGA). Fourier transform infrared spectroscopy was carried out to detect the presence of functional groups in untreated and treated SPF. The SEM images after both treatments showed that the external surface of the fiber became clean as a result. However, the sea water treatment affected the fiber properties physically, while the alkali treatment affected it both physically and chemically by dissolving the hemicellulose in the fiber. The TGA results showed that untreated fiber is significantly more stable than treated fiber. In conclusion, the results show that the fiber surface treatment significantly affected the characterization of the fiber.

Keyword: Sugar palm fiber; Alkali treatment; Sea water treatment; EDX; FTIR; TGA