

An investigation of the morphological and tensile properties of vacuum resin impregnated sugar palm fibers with various thermosetting resins

ABSTRACT

Sugar palm (*Arenga pinnata*) is a type of natural fiber that belongs to the Palmae family. It is versatile, readily available, and virtually the entire tree can be formed into many different products. This paper discusses the effect of vacuum resin impregnation on a single sugar palm fiber (SPF) using various thermosetting resins such as epoxy, vinyl ester (VE), and polyester (PE). The fibers were vacuum impregnated at a constant pressure of 600 mmHg for 5 min. The excessive resins were wiped off, and the impregnated fibers were cured in an oven for approximately 30 min at a temperature of 140 °C. Following this, the tensile properties of the single SPF impregnated with epoxy, VE, and PE were determined. The results indicated that impregnation of SPF with epoxy resin increased the tensile strength and modulus of SPF 50% and 59%, respectively. Scanning electron microscope images also illustrated that the epoxy resin offered better impregnation on the SPF compared to the other thermosetting resins. A suitable application for the impregnated SPF is as a roofing material.

Keyword: Sugar palm fiber; Single fiber; Thermosetting resin; Vacuum resin impregnation; Impregnation modification