ADVANCES IN MATERIALS ENGINEERING

Volume 2

Edited By:
Md Abdul Maleque
Iskandar Idris Yaacob
Zahurin Halim

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Chapter 018

Investigation on the Effect of Ultra Violet on Cotton Albumen Composite

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Keywords: Natural fiber, Composite , Ultra violet, Cotton, Albumen, Biodegradable.

Abstract. This chapter studied the effect of ultra violet on cotton albumen composite (CAC). The cotton albumen composites were fabricated by hands lay-up technique with 10 w/w % of fiber content and cured for 14 days at room temperature. The samples were then exposed to ultra violet radiation from 5 days up to 40 days. The increasing of impact strength was observed after 5 days up to 10 days ultra violet exposure followed by decrement of impact strength after 15 days up to 40 days. Nevertheless, FTIR spectroscopy showed no difference in FTIR spectra of cotton albumen composite after ultra violet radiation exposure signifying the resistance to chemical reaction in molecular network up to 40 days.

Introduction

Ecological concerns in issues of sustainability, recyclability, and environmental safety in 1990s resulted in renewed interest in natural fiber composites. Two principal drivers have contributed to this surge in interest in natural fiber composites which are environment and cost. In fact, increasing of the understanding on correlations between structures and properties of new materials such as biodegradable composites seems to be greater driving force to the researches and applications of the new composites.

Cotton used in this research is one of the most recognized lignocellulosic fibers used in several applications varying from common fabrics to composites. It is reported that a cotton stalk fibers/gypsum composite was proposed as building material due to its low density, good thermal and acoustic insulation, and a high strength to weight ratio. Similarly the several researchers have reported the performance, physical, mechanical and thermal properties etc. of cotton fibers reinforced polymer matrix composite. For example, an addition of 27.5 % of cotton in unsaturated polyester resin increased the impact strength from 61 to 971 Nm/s^2 per unit width, flexural strength from 101.8 to 142 MPa, modulus of elasticity at bending from 2.4 to 4.2 GPa [1].

Albumen used as the matrix in this research is the white egg. It consists mainly of about 10% proteins dissolved in water. In ancient ages, egg, yolk and white egg were reported to be used as binder in mud clay bricks, wall plaster and even Egyptian tomb coating by Egyptian, Roman, Indian, Chinese and others ancient people. Some of those ancient buildings and products are still not ruin showed their strength and toughness properties. As we know, ancient people directly utilized all the natural resources around them.

There are few current research works using albumen as the matrix in composite. The usage of albumen as the non food product has been started at early 18th's. It was reported that