

Deformation and energy absorption characteristics of biomass foam composites

Abstract

Deformation and energy absorption characteristic of biomass foam composites are important in crashworthiness efficiency. The type of foam that had been used in this research is polyurethane (PU) foam with plant-based filler which are turmeric powder (*Curcuma Longa*), charcoal powder, henna powder (*Lawsonia inermis*) and lemon grass powder (*Cymbopogon*) that give natural color to the composites. The percentages of filler was specified to 10% by weight. PU foam was prepared by reaction of natural oil polyol and isocyanate with a ratio of 1 to 1.1 by weight. The mixture was stirred with 1500 rpm and was poured into the mould when mixture starting to expand. Band saw was used to cut the sample with desired dimension. The characterization of filler was done using Fourier Transform Infrared Spectroscopy (FTIR). Compression was tested using Ultimate Testing Machine (UTM) and scale to weigh the sample. Composites with henna filler have ductile like behavior that proved in stress-strain curved that show the rough line in the graph. Other composites have rigid like behavior which have a smooth line in a stress - strain curve.

Keywords; Charcoal, Henna, Lemon Grass, Polyurethane, Turmeric