

Insect secretion on Albazia tree as biobased material alternative for matrix composite

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ABSTRACT

Investigation and characterization of insect secretion on Albazia tree (hereinafter used the term ISA) showed that the material contained of complex molecules with the main constituent is aleuretic acid and the insect is lac. So ISA is secretion of lac insect on Albazia tree. This paper will report the biobased ISA as a feasible matrix for composite. Some requirements of the ISA matrix to protect the fibers, keeping the fibers in place and can distribute the load to the fibers, the first step was the matrix phase changed from solid to liquid with an ethanol as a solvent so the matrix distributed to cover the fibers perfectly. Secondly, the matrix phase then change into solid by evaporation process to remove ethanol solvent without any scattered to the fibers. This matrix is now called as matrix lac (or matlac). Characterization of chemical structure of the matlac investigated before and after mixed with ethanol using FTIR method. Evaporation process of ethanol was also examined and conducted by heating the sample respectively 40, 50, 70, 90, 110, 150 and 180 oC for 2-210 minutes to determine the weight loss and changes liquid to solid phase. TGA also used to determine performance of the matrix at high temperatures. Evaluation of fiber-matrix bonding strength was done by wettability testing. The results showed that the ISA can be used as a matrix composite by blending ethanol as a main solvent followed by melting and heating process at temperatures above 100oC. Chemical structure of the ISA before and after the mixing of ethanol did not change that ethanol has a function as a "transporter" to bring ISA reaches the matrix requirements. Bonding strength between the fiber and the matlac showed contact angle of about 30o and indicated good wettability. Average of the tensile strength of the matlac was 7 MPa which has opportunity and feasibility to be developed further as matrix composite. Method proposes succeeded making composite from matlac matrix.

Keywords : Insect secretion on Albazia tree (ISA), biobased material, aleuretic acid, matlac, biocomposite.