

Mechanical Properties of Ramie Fibers Reinforced Biobased Material Alternative as Natural Matrix Biocomposite

Mujiyono^{1*}, Jamasri², B.R. Heru Santoso² and J.P. Gentur Sutapa³

¹*Student of Ph.D Program on Engineering Faculty, Gadjah Mada University, Indonesia*

and ¹*Lecturer of Engineering Faculty, Yogyakarta State University, Indonesia*

²*Faculty of Engineering, Gadjah Mada University, Yogyakarta, Indonesia*

³*Faculty of Forestry, Gadjah Mada University, Yogyakarta, Indonesia*

Sleman 55281, Yogyakarta, Indonesia.

**Corresponding Author E-mail: mujiyonouny@yahoo.com*

Abstract

The aim of this research was to study the mechanical properties of the biocomposite from secretion of lac insect as natural matrix and ramie fiber as reinforcement.

Secretion of lac insect was used as matrix lac (matlac). By hand layout method, matlac matrix was painted to the plain weaver of ramie fibers. After three layers of the fibers were wetted, the mould was heated at 180°C for 15 minutes and then pressed at 40 MPa. The mould was disassembled after 8 hours to obtain the 0/90/0 ramie fibers reinforced matlac matrix biocomposite. Mechanical properties of the biocomposite were evaluated by tensile, flexure and impact test according to ASTM D638-90, D790-02 and D5942-96, respectively. The wettability and IFSS of fiber-matrix were measured by light microscope and Image Proplus Analyzer.

The results showed that the secretion of lac insect is feasible to be used as matrix. The tensile, flexure and impact strength of the 60% plain weave ramie fibers reinforced matlac matrix biocomposite were 87 MPa, 86 MPa and 44,6 kJ/m², respectively. The matlac matrix is well compatible with ramie, indicated by contact angle of about 30°. The biocomposite potents to be a novel material from renewable resources.

Keywords: Secretion of lac insect, ramie fiber, biocomposite, matlac matrix.