

INTISARI

Komposit berbahan serat alam seperti nanas, kenaf, dan sisal yang terus diteliti dan dikembangkan menjadi bahan alternatif pengganti serat sintetis, karena diketahui serat alam mudah didaur ulang sehingga dapat mengurangi dampak negatif terhadap lingkungan. Tujuan dari penelitian ini yaitu membuat bahan komposit polipropilen dengan *filler* serat alam (nanas, kenaf, dan sisal)/*E-Glass*/PP untuk mengetahui pengaruh jenis serat alam terhadap nilai ketangguhan impact dan daya serap air.

Komposit hibrid serat alam/*E-glass*/PP dengan perbandingan *filler* dan matriks polipropilena 30:70 (fraksi volume) difabrikasi dengan *hand lay up* dan metode *hot press*. *Filler* yang terdiri dari serat alam dan serat *E-Glass* (panjang 6 mm) yang telah di *treatment* divariasi dengan perbandingan serat nanas/*E-Glass* (2:1), serat kenaf/*E-Glass* (2:1), dan serat sisal/*E-Glass* (2:1). Pengujian ketangguhan impact (ASTM D 5942), pengujian daya serap air (ASTM D 570) dilakukan pada semua spesimen komposit. Selain itu, karakterisasi struktur patahan hasil uji impact dan struktur mikro dari sisi penampang lintang masing-masing dilakukan dengan mikroskop optik dan *scanning electron microscope* (SEM).

Hasil penelitian menunjukkan bahwa nilai ketangguhan impact tertinggi terdapat pada komposit hibrid dengan nanas/*E-Glass*/PP dengan nilai ketangguhan impact $0,0193 \text{ J/mm}^2$, hal ini dikarenakan serat nanas terdispersi merata didalam matriks PP dibandingkan sisal dan kenaf. Sedangkan hasil persentase daya serap air terendah terdapat pada komposit hibrid dengan variasi perbandingan sisal/*E-Glass*/PP sebesar 7,33 % selama 24 jam. Selain itu, hasil karakterisasi struktur mikro menunjukkan ikatan antara *filler* dan matriks saling mengikat dengan baik.

Kata kunci : Komposit, serat nanas, serat kenaf, serat sisal, serat *E-Glass*, polipropilena, *hand lay up*.

Abstract

Composite natural fibers pineapple, kenaf, and sisal has researched and developed into a replacement alternative synthetic fiber, because known natural fibers recycled so easy to reduce the negative impact on the environment. The purpose of this study of making a composite filler polypropylene with natural fibers (pineapple, kenaf, and sisal)/E-Glass/PP to know the influence of natural fibers on the impact toughness and water absorption.

Composite hybrid a natural fiber/ E-Glass/PP with the ratio of to filler and a matrix polypropylene 30: 70 (volume fraction) fabricated with the hand lay up and methods of the hot press . The filler consisting of a natural fiber and for the fibers of e-glass (6 mm long) which have been treated with pineapple/E-Glass fiber (2: 1), kenaf/E-Glass fiber (2: 1), and sisal/E -Glass fiber (2: 1). Impact toughness test (ASTM D 5942), water absorption test (ASTM D 570) was carried out on all composite specimens. In addition, the structural characterization of the results and microstructure of each was carried out by optical microscopy and scanning electron microscope (SEM).

The results showed that the highest impact toughness value was found in hybrid composites with pineapple / E-Glass / PP with impact toughness value 0.0193 J / mm², this was because pineapple fibers were dispersed evenly in the PP matrix compared to sisal and kenaf. While the lowest percentage of water absorption was found in hybrid composites with a variation of sisal / E-Glass / PP ratio of 7.33% for 24 hours. In addition, the results of microstructure characterization show that the bond between filler and matrix is mutually binding.

Keywords: *Composite, pineapple fiber, kenaf fiber, sisal fiber, E-Glass fiber, polypropylene, hand lay up.*