

## INTISARI

Interior mobil merupakan salah satu aplikasi penggunaan bahan komposit *E-glass*/Polivinil Klorida (PVC) di bidang otomotif. Namun, bahan komposit *E-glass*/PVC mempunyai efek negatif terhadap kesehatan manusia dan lingkungan yaitu limbahnya tidak dapat terurai secara alami (*nonbiodegradable*). Oleh karena itu, pada penelitian ini dibuat material komposit hibrida dengan memadukan serat *E-glass* dan serat kenaf sebagai bahan penguat komposit. Dalam hal ini serat kenaf memiliki beberapa sifat unggul diantaranya dapat diperbaharui (*renewable*), ringan, murah, ramah lingkungan, tidak beracun, *non-abrasif*, sifat mekanik tinggi, dan ketersediaannya berlimpah di Indonesia.

Material komposit PVC/kenaf/*E-glass* difabrikasi menggunakan *hot compressing molding* pada suhu 160°C dan tekanan 130 kg/cm<sup>2</sup> selama 10 menit. Sebelum fabrikasi, serat kenaf dialkalisasi menggunakan larutan NaOH dengan konsentrasi 6% selama 4 jam. Selain itu, untuk tujuan yang sama maka serat *E-glass* diberi perlakuan panas pada suhu 400°C selama 20 menit. Pada penelitian ini dibuat variasi matriks/*filler* yaitu 80/20. Variasi perbandingan serat kenaf/*E-glass* adalah 20/0, 15/5, 10/10, 5/15, 0/20 % berat. Komposit diuji sifat mekanisnya menggunakan uji *bending* dan sifat fisis daya serap air. Spesimen uji bending dibuat menurut standar ASTM D790 dan uji daya serap air serta *thickness swelling* dengan standar ASTM D570. Perubahan nilai sifat mekanik dikarakterisasi dari struktur patahan menggunakan *scanning electron microscope* (SEM) dan mikroskop optik.

Komposit dengan variasi PVC/kenaf/*E-glass* 80/5/15 memiliki hasil kekuatan bending dan modulus elastisitas tertinggi sebesar 100,1 MPa dan 2,67 GPa. Variasi PVC/kenaf/*E-glass* 80/10/10 memiliki hasil regangan bending tertinggi sebesar 5,43 %. Pengujian daya serap air dan *thickness swelling* variasi PVC/kenaf/*E-glass* 80/5/15 mendapatkan hasil terendah dengan perubahan berat dan tebal sebesar 4,84 % dan 2,64 %. Karakterisasi menggunakan foto makro dan SEM memperlihatkan ikatan kuat antara matriks dengan *filler* tetapi masih terdapat void.

**Kata Kunci:** serat kenaf, serat *E-glass*, Polyvinyl Chloride, komposit hibrida, sifat mekanis, uji bending, SEM

## ABSTRACT

Car interiors are examples of E-glass/polyvinyl chloride (PVC) composites material application . Nevertheless, the E-glass/PVC composites waste are non-biodegradable materials which may caused negative impact on human and environment. Therefore, this study is aimed to produce a hybrid composite material by combining the E-glass fiber and kenaf fiber as reinforcement. Kenaf fiber was selected because of its superior characteristics, which are renewable, lightweight, cheap, eco-friendly, non-toxic, non-abrasive, high mechanical properties, and its abundant availability, especially in Indonesia.

The composite materials of kenaf/E-glass/PVC composite was fabricated by means of hot compression molding at 160°C and at 130 kg/cm<sup>2</sup> for 10 minutes. The alkalization of kenaf fiber with NaOH solution were performed before the fabrication process. The E-glass fiber was heat-treated at 400°C for 20 minutes. In this study, the matrix to filler ratio of 80/20 was used. The variations of kenaf fiber/E-glass ratios were 20/0, 15/5, 10/10, 0/20 wt %. The mechanical testing was bending test, and physical test was water absorption test. The bending test was done according to the ASTM D790 standard, while the water absorption test and thickness swelling were done according to the ASTM D570 standard. The mechanical property changes were characterized from the fracture structures using a scanning electron microscope (SEM) and optical microscopy.

The kenaf/E-glass/PVC composite at 80/5/15 ratio showed the highest bending strength and modulus of elasticity, 100.1 MPa and 2.67 GPa. The kenaf/E-glass/PVC composite at 80/10/10 ratio showed the highest bending strain at 5.43 %. The kenaf/E-glass/PVC composite at 80/5/15 ratio showed the lowest water absorption and thickness swelling with the weight and thickness changes of 4.84 % and 2.64 %, respectively. The macrograph and SEM photos showed a strong bond between the matrix and filler, but there were still the voids.

**Keywords:** kenaf fiber, E-glass fiber, Polyvinyl Chloride, hybrid composite, mechanical properties, bending test, SEM.