INTISARI

Perkembangan industri yang semakin berkembang pesat menuntut untuk ditemukannya material alternatif yang ramah lingkungan sekaligus ekonomis. Salah satu diantaranya adalah dengan mengoptimalkan serat alam sebagai penguat material komposit. Pegunaan material komposit yang ramah lingkungandan bisa didaur ulang, merupakan tuntutan teknologi saat ini. Pandang laut ini memiliki potensi untuk dijadikan sebagai bahan baku material. Penelitian ini bertujuan untuk mengetahui pengaruh perbandingan sifat tarik dan impak terhadap tebal lapisan serat pandan berduri sebagai bahan pengauat material komposit, maka muncul gagasan untuk mangolah pandan berduri sebagai salah satu upaya mengurangi penggunaan serat kaca

Penelitian ini mengkaji tentang pengaruh tebal lapisan pandan berduri dengan penyusunan serat secara kontinyu dan acak bermatrik *unsaturated polyester* terhadap sifat tarik dan impak. Bahan baku daun pandan berduri direbus pada suhu konstan dengan suhu 80 ^{o}C selama 3jam. Kemudian serat direndam alkali (NaOH) dengan konsentrasi 2.5% selama 2 jam, selanjutnya serat direndam air selam 3 hari dengan pergantian air setiap 6 jam. Serat dibilas dengan air bersih dan dikeringkan kemudian serat dicetakmenggunkan cetakan kaca,dengan beban statis.Susunan serat yang digunakan yaitu secara kontinyu dan acak dengan varasi yang berbeda –beda dan bahan *unsaturated polyester* sebagai pengikatnya, dengan ketebalan yang seragam

Hasil pengujian tarik dan impak yang dilakukan menujukan hasil yang berbeda tergantung susunan serat yang digunakan. Semhakin banyak serat dengan arah kontinyu maka semakin besar nilai yang didapatkan sedangkan penyusunan serat yang banyak menggunakan serat secara acak akan maka nilai yang didpat rendah.Pengujian ketangguhan impak rata-rata tertinggi pada variasi 1 dengan nilai 0.233 J/mm^2 dan nilai terendah pada variasi 5 dengan nilai kekuatan impak sebesar 0.047 J/mm^2. Dan uji kuat tarik nilai tertinggi pada variasi 1 dengan nilai 44.517 dan nilai terendah pada variasi 5 dengan nilai 18.653. Pada pengujiantarik dan impak semakin banyak lapisan serat dengan arah kontinyu maka semakin besar nilai yang didapatkan, sedangkan susunan serat acak mendapatkan nilai rendah dapat dilihat dari hasil yang didapat pengujian sifat impak dan tarikvariasi 1 memiliki nilai *optimum* dengan variasi serat seluruhnya lurus/kontinyu dan yang terendah pada variasi 5 dengan variasi serat acak.

Kata kunci : Serat Pandan Berduri, *Polyester,* Perbandingan tebal, Sifat tarik, Sifat impak.

ABSTRACT

The rapid growing of industrial development demands the discovery of alternative materials that are environmentally friendly, economical, and recyclable. One of them is by optimizing natural fibers of spiky pandanous fibers as a composite material. This spiky pandanous has the potential to be used as raw material. This study aims to find out the comparison of tensile and impact characteristics to the layer thickness of spiky pandanous fibers as a material of composite material amplifier. Thus, the idea to process spiky pandanous as one effort to reduce the use of glass fiber came up.

This study examines the effects of layer thickness of spiky pandanous with continuous fiber formation and random unsaturated polyester matrix on tensile and impact characteristics. The raw materials of spiky pandanous leaves were boiled at constant temperature of 80 ^{o}C for 3 hours. Then, the fibers were soaked in alkali (NaOH) with a concentration of 2.5% for 2 hours. Subsequently, the fibers were soaked in water for 3 days with a water change in every 6 hours. The fibers were rinsed with clean water and dried and then the fibers were printed using a glass mold, with a static load. The fiber formation used was continuous and random with different variations of unsaturated polyester material as the binder.

The results of the tensile and impact tests performed by the researcher showed different results depending on the layers of fibers used. In the impact test, the highest toughness value in variation 1 was 0.233 J/mm^2 and the lowest value in variation 5 was 0.047 J/mm^2, and the highest absorbed energy value in variation 1 was 630 J, the lowest value in variation 3 was 0.077 J. In tensile testing, the highest value of tensile strength on variation 1 was 44.517 MPa and the lowest value in variation 5 was 18.653 MPa. The highest strain value on variation 1 was 0.0187 mm/mm and the lowest strain value of variation 5 was 0.0094 mm/mm. In the elastic modulus, the highest value of variation5 was 443.36 MPa and the lowest value of variation 1 was 431.94 MPa. From the test results, it can be concluded that the highest impact toughness test of variation 1 has an overall continues formation, while the lowestimpact is in variation 5 with a complete random formation. The highest absorbed energy of variation 1 has its overall continuous fiber formation, while the lowest was in variation 3 with the fiber formations of continuous, random, continuous, and random. In the tensile test, the highest tensile strength and strain value of variation 1showing that the fiber formation is all continuous, while the lowest value was in variation 5 since all fibers are arranged randomly. At the highest elasticity modulus value of variation 5, the fiber formation is entirely random, and the lowest value is in variation 1 with all continuous fiber formation.

Keywords: Spiky pandanous fiber, Polyester, layer thickness, fiber formation, tensile characteristics, impact characteristics