

**THE EFFECT OF ALKALI TREATMENT ON TENSILE PROPERTIES AND
WATER ABSORPTION OF COIR / POLYPROPYLENE BIOMATERIAL**

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ABSTRACT

Nowadays, natural fiber has play important role as reinforcements for polymer based-composites. The fiber reinforced polymer have been applied in variety of application due to high tensile strength and modulus. In this work, coir fiber were treated with sodium hydroxide solution (3 wt% and 5 wt%) for various times (2, 4 and 6 hours) at room temperature. Then, 10 and 30 wt% of treated fiber with size 160-250 μm were mix with polypropylene to prepare the biocomposite. The influence of alkali treatment time on morphology analysed using scanning electron microscopy (SEM). Thermogravimetric analysis (TGA) used to evaluate thermal stability of treated fiber by observing the weight loss at different temperature to indicate degradation of components. Tensile strength and water absorption of treated coir/ PP biocomposite were studied in this research. The alkali treatment was improved the properties of coir based on chemical composition, morphology and thermal stability. Fiber that treated with alkali treatment was resulted rougher surface due to most of the lignin and pectin was removed. It was determined that 5 wt % NaOH with 6 hour treatment time treated coir fiber reinforced PP composites with 30 wt% fiber loading performed the highest mechanical properties. The tensile strength and tensile modulus measured were 28.74 MPa and 1338.08 MPa respectively. The chemical treatment had reduced the water absorption of biocomposite due to removal hemicellulose component.

ABSTRAK

Pada masa kini, serat semula jadi memainkan peranan penting sebagai bala bantuan untuk polimer didasarkan-composites. The bertetulang gentian polimer telah digunakan dalam pelbagai aplikasi kerana modulus dan kekuatan tegangan yang tinggi dan. Dalam karya ini, serat sabut telah dirawat dengan larutan natrium hidroksida (3% berat dan 5% berat) untuk pelbagai kali (2. 4 dan 6 jam) pada suhu bilik. Kemudian, 10 dan 30% berat gentian dirawat dengan saiz 160-250 mikron adalah bercampur dengan polypropylene untuk menyediakan biokomposit itu. Pengaruh masa rawatan alkali morfologi dianalisis dengan menggunakan mikroskop elektron pengimbas (SEM). analisis Termogravimetri (TGA) yang digunakan untuk menilai kestabilan haba serat dirawat dengan memerhatikan penurunan berat badan pada suhu yang berbeza untuk menunjukkan degradasi komponen. kekuatan tegangan dan penyerapan air dirawat biokomposit sabut / PP dikaji dalam kajian ini. Rawatan alkali telah bertambah baik sifat-sifat sabut berdasarkan komposisi kimia, morfologi dan kestabilan terma. Serat yang dirawat dengan rawatan alkali telah menyebabkan permukaan lebih kasar kerana kebanyakan daripada lignin dan pektin telah dibuang. Ia telah ditentukan bahawa 5wt% NaOH dengan 6 jam masa rawatan gentian sabut dirawat diperkuuh komposit PP dengan 30% berat gentian loading dilakukan sifat-sifat mekanik tertinggi. Kekuatan tegangan dan modulus tegangan diukur masing-masing 28.74 MPa dan 1333.08 MPa. Rawatan kimia telah mengurangkan penyerapan air biokomposit dengan penyingkiran komponen hemiselulosa.