

PENGARUH PRETREATMENT STEAM EXPLOSION DAN PENAMBAHAN ASAM ASETAT TERHADAP KARAKTERISTIK AMPAS TEBU

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INTISARI

Penelitian ini adalah untuk mengetahui pengaruh variasi suhu *pretreatment steam explosion* dan penambahan asam asetat terhadap gula reduksi dan gula total ampas tebu. Serta mengetahui pengaruh proses *pretreatment steam explosion* dan penambahan asam asetat terhadap gugus fungsi dalam spektra FTIR ampas tebu dan mengetahui perubahan karakteristik morfologi ampas tebu melalui scanning electron microscopy (SEM). Penelitian ini menggunakan rancangan acak lengkap dengan ulangan analisa sebanyak tiga kali. untuk mengetahui pengaruh variasi suhu pretreatment steam explosion dan penambahan asam asetat terhadap gula total dan gula reduksi. Hasil penelitian menunjukkan Gula total tertinggi sebesar 8.1426 mg/ml pada suhu steam explosion 170⁰C dan penambahan asam asetat. Gula pereduksi tertinggi ditunjukkan pada perlakuan penambahan asam asetat dan steam explosion dengan suhu 170⁰C yaitu sebesar 11.5610 mg/ml. pada FT-IR terjadi peningkatan deformasi C-H alifatik, C-H deformasi dalam lignin dan karbohidrat pada ampas tebu steam explosion dan penambahan asam. Pretreatment steam explosion dan penambahan asam asetat terbukti efektif untuk proses hidrolisis karbohidrat menjadi monomernya. hasil analisa SEM pretreatment steam explosion 170⁰C dengan penambahan asam asetat sebagai perlakuan terbaik. Pretreatment steam explosion dan penambahan asam asetat meningkatkan kadar gula total dan gula reduksi ampas tebu. Pretreatment steam explosion suhu 170⁰C dengan penambahan asam asetat menghasilkan gula total dan gula reduksi tertinggi yaitu masing – masing 8.1426 mg/ml dan 11.5610 mg/ml. Spektra FTIR pada pretreatment steam explosion 170⁰C dengan penambahan asam asetat menunjukkan deformasi C-H pada selulosa dan hemiselulosa pada bilangan gelombang 1381.03 cm⁻¹ sebagai indikasi terjadinya hidrolisis selulosa dan hemiselulosa. Hasil analisa SEM menunjukkan terjadi perubahan morfologi serat ampas tebu yang semula kompak dan kokoh menjadi tidak beraturan dan berpori dengan adanya pretreatment steam explosion 170⁰C dengan penambahan asam asetat.

Kata kunci : Ampas tebu, *Steam explosion*, Gula total, Gula reduksi

EFFECT OF PRETREATMENT STEAM EXPLOSION AND ACETATE ACID ADDITION ON THE CHARACTERISTICS OF SUGARCANE BAGASSE

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ABSTRACT

This study aims to determine variations in vapor explosive pretreatment and acetic acid against reducing sugar and sugar cane bagasse. Read more about the steam explosion pretreatment process and replace acetic acid against functional groups in bagasse FTIR spectra and study the changes in morphological characteristics of bagasse through scanning electron microscopy (SEM). This research uses a complete design with repeated tests three times. to find out variations in vapor explosion pretreatment and request acetic acid for total sugar and sugar reduction. The results showed the highest total sugar of 8.1426 mg / ml at 170°C steam temperature and using acetic acid. The maximum reducing sugar approved in the administration of acetic acid and steam explosion at a temperature of 170°C is equal to 11.5610 mg / ml. on FT-IR there was an increase in aliphatic C-H deformation, C-H deformation in lignin and consumption in steam blast bagasse and added acid. The pretreatment explosion and adding acetic acid proved to be effective for the backup hydrolysis process to become the monomer. the results of SEM explosive 170°C pretreatment analysis with the approval of acetic acid as the best aid. The pretreatment explosion and increase acetic acid increase the total sugar content and sugarcane bagasse reduction sugar. The pretreatment vapor explosion temperature of 170°C with acetic acid content produced total sugar and reducing sugars of 8.146 mg / ml and 11.5610 mg / ml, respectively. FTIR spectra at 170°C steam explosion pretreatment using acetic acid showed C-H deformation on cellulose and hemicellulose at wave number 1381.03 cm⁻¹ as a result of hydrolysis of cellulose and hemicellulose. The results of SEM analysis showed that the morphological changes of bagasse fiber which were originally compact and sturdy became irregular and porous with the presence of 170°C steam explosion pretreatment using acetic acid.

Keywords: Sugarcane bagasse, Steam explosion, Total sugar, Reducing sugar