ABSTRAK

PENGARUH VARIASI SUHU DAN WAKTU TERHADAP KADAR GLUKOSA CAIR DARI LIMBAH KULIT PISANG KEPOK (*MUSA PARASISIACA L.*) MELALUI PROSES HIDROLISIS

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Limbah kulit pisang kepok (*Musa paradisiaca* L.) yang dihasilkan dalam jumlah besar berpotensi dimanfaatkan sebagai bahan baku produksi glukosa cair karena mengandung selulosa tinggi sebagai komponen utama biomassa lignoselulosa. Penelitian ini bertujuan menentukan kondisi optimum delignifikasi kulit pisang kepok dalam menghasilkan selulosa sebagai bahan baku hidrolisis, menentukan kondisi optimum hidrolisis berdasarkan variasi suhu dan waktu, serta mengevaluasi efektivitas proses pemurnian menggunakan NaOH. Penelitian dilakukan melalui tiga tahap, yaitu delignifikasi menggunakan NaOH 20% dengan variasi waktu perendaman 3 jam dan 6 jam, hidrolisis asam menggunakan H_2SO_4 0,75% dengan variasi suhu 80°C dan 100°C serta variasi waktu 40, 60, 80, 100, dan 120 menit, dan pemurnian menggunakan NaOH 10% untuk menetralkan sisa asam. Pada delignifikasi, kondisi optimum delignifikasi ditetapkan pada waktu perendaman 3 jam dengan kadar selulosa tertinggi sebesar 69,67% sebagai bahan baku utama hidrolisis. Hasil uji ANOVA menunjukkan bahwa variasi waktu perendaman berpengaruh nyata terhadap kadar lignin, selulosa, dan hemiselulosa.Pada tahap hidrolisis, kondisi optimum diperoleh pada suhu 80°C selama 120 menit karena menghasilkan kadar glukosa yang paling konsisten, meskipun uji ANOVA menunjukkan bahwa kedua faktor tersebut secara statistik tidak berpengaruh nyata terhadap kadar glukosa. Kadar glukosa yang diperoleh hanya sebesar 5,6%, sehingga belum memenuhi persyaratan SNI 01-2978-1992 yang menetapkan kadar gula pereduksi minimum sebesar 30% b/b. Sementara itu, proses pemurnian menggunakan NaOH 10% terbukti efektif dalam menaikkan pH hidrolisat dari 2 menjadi 5 secara konsisten pada seluruh sampel.

Kata kunci: kulit pisang kepok, delignifikasi, hidrolisis asam, glukosa cair

ABSTRACT

THE EFFECT OF TEMPERATURE AND TIME VARIATIONS ON LIQUID GLUCOSE CONTENT FROM KEPOK BANANA PEEL WASTE (MUSA PARADISIACA L.) THROUGH THE HYDROLYSIS PROCESS

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Banana peel waste from kepok bananas (Musa paradisiaca L.), which is generated in large quantities, has potential as a raw material for liquid glucose production due to its high cellulose content as the main component of lignocellulosic biomass. This study aimed to determine the optimum delignification conditions for kepok banana peel in producing cellulose as a raw material for hydrolysis, to determine the optimum hydrolysis conditions based on variations in temperature and time, and to evaluate the effectiveness of the purification process using NaOH. The research was conducted in three stages: delignification using 20% NaOH with soaking time variations of 3 hours and 6 hours, acid hydrolysis using 0.75% H2SO4 with temperature variations of 80°C and 100°C as well as time variations of 40, 60, 80, 100, and 120 minutes, and purification using 10% NaOH to neutralize the remaining acid. In the delignification stage, the optimum delignification condition was determined to be a soaking time of 3 hours, yielding the highest cellulose content of 69.67% as the main raw material for hydrolysis. ANOVA test results showed that variations in soaking time had a significant effect on lignin, cellulose, and hemicellulose content. In the hydrolysis stage, the optimum condition was obtained at a temperature of 80°C for 120 minutes, as it produced the most consistent glucose content, although the ANOVA test showed that both factors statistically had no significant effect on glucose content. The glucose content obtained was only 5.6%, which did not yet meet the requirements of SNI 01-2978-1992, which sets a minimum reducing sugar content of 30% w/w. Meanwhile, the purification process using 10% NaOH proved effective in consistently raising the pH of the hydrolysate from 2 to 5 across all samples.

Keywords: *kepok banana peel, delignification, acid hydrolysis, liquid glucose.*