

ABSTRAK

SINTESIS NANOSULULOSA DARI DAUN MAHKOTA NANAS DENGAN METODE HIDROLISIS ASAM

Oleh

VIVIA ANA BAPTIS

Limbah organik perkebunan dan pasar lokal khususnya Daun Mahkota Nanas (DMN) menjadi salah satu penyumbang terbesar limbah organik. Sehingga, pengolahan limbah DMN diperlukan untuk mengurangi limbah organik yang menumpuk. Penelitian ini bertujuan untuk mengisolasi α -selulosa dari limbah DMN, membuat nanoselulosa dari α -selulosa melalui metode hidrolisis asam dengan H_2SO_4 variasi konsentrasi 5%, 10%, dan 15%, serta menganalisis karakteristik nanoselulosa yang dihasilkan dari limbah DMN.

Sampel DMN dilakukan isolasi α -selulosa dengan variasi HNO_3 dan *citric acid* untuk *pretreatment* hidrolisis asam, serta NaOH dan MSG untuk pemurnian α -selulosa. Nanoselulosa dibuat dengan metode hidrolisis asam menggunakan H_2SO_4 dengan variasi konsentrasi 5%, 10%, dan 15%. Analisis dilakukan menggunakan FTIR, XRD, PSA, dan FESEM.

Hasil penelitian menunjukkan bahwa variasi optimal dari isolasi α -selulosa adalah variasi HNO_3 x NaOH dengan kadar α -selulosa 93,284% dan lignin 11%. Hasil analisis spektrum FTIR nanoselulosa 5% dan 15% tidak menunjukkan banyak perubahan dari spektrum FTIR selulosa. Hasil XRD menunjukkan indeks kristalinitas tertinggi ada pada nanoselulosa 5% sebesar 84,62%. Hasil analisis PSA menunjukkan bahwa nanoselulosa variasi H_2SO_4 5% memiliki ukuran partikel sebesar 279,04 nm sebanyak 29,1%. Hasil analisis FESEM menunjukkan bahwa hasil morfologi nanoselulosa DMN berupa serat halus seperti benang.

Kata Kunci: daun mahkota nanas, nanoselulosa, hidrolisis asam

ABSTRACT

SYNTHESIS OF NANOCELLULOSE FROM PINEAPPLE CROWN LEAVES USING ACID HYDROLYSIS METHOD

By

VIVIA ANA BAPTIS

Organic waste from plantations and local markets especially Pineapple Crown Leaf (PCL), is one of the largest contributors to organic waste. Therefore, the processing of PCL waste is necessary to reduce the accumulation of organic waste. This study aims to isolate α -cellulose from PCL waste, produce nanocellulose from α -cellulose through acid hydrolysis using H_2SO_4 with concentration of 5%, 10%, and 15%, and analyze the characteristics of the nanocellulose produced from PCL waste. The prepared PCL samples underwent α -cellulose isolation using variations of HNO_3 and citric acid for hydrolysis acid pretreatment, and NaOH and MSG for α -cellulose purification. Nanocellulose was produced through acid hydrolysis using H_2SO_4 with concentration variations of 5%, 10%, and 15%. Analyses were conducted using FTIR, XRD, PSA, and FESEM. The results showed the optimal variation for α -cellulose isolation was $\text{HNO}_3 \times \text{NaOH}$, with α -cellulose content of 93.284% and lignin content of 11%. FTIR analysis showed that the FTIR spectra of 5% and 15% nanocellulose did not show significant differences from cellulose FTIR spectra. XRD results showed that the highest crystallinity index was found in 5% nanocellulose at 84.62%. PSA analysis showed that nanocellulose with 5% H_2SO_4 had a particle size of 279.04 nm with 29.1% distribution. FESEM analysis showed that the morphology of PCL nanocellulose appeared as fine, thread-like fibers.

Key words: pineapple crown leaves, nanocellulose, acid hydrolysis