

# Pengaruh isolat inhibitor beta glukosidase terhadap aktivitas enzim selulase untuk preparasi selulosa mikrokristal dari eceng gondok (*Eichhornia crassipes*) = Beta glucosidase inhibitor effect towards cellulase enzyme for microcrystalline cellulose preparation from water hyacinth (*Eichhornia crassipes*)

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## Abstrak

Selulosa mikrokristal adalah eksipien yang diminati untuk pembuatan tablet dengan metode kempa langsung yang merupakan metode paling ekonomis. Eceng gondok dapat dimanfaatkan untuk menghasilkan selulosa mikrokristal karena mengandung selulosa yang cukup tinggi untuk dihidrolisis secara enzimatis. Tujuan penelitian ini adalah untuk meningkatkan rendemen hasil hidrolisis dengan menambahkan inhibitor enzim b-glukosidase, sebagai salah satu enzim yang terkandung pada enzim selulase dari tanah pada hutan bakau dilanjutkan dengan karakterisasi serbuk yang dihasilkan. Penelitian diawali dengan mengisolasi mikroorganisme potensial sebagai inhibitor dan peremajaan isolat kapang dari penelitian sebelumnya, kemudian dilakukan evaluasi kerja, isolasi a-selulosa dari serbuk eceng gondok, optimasi kondisi hidrolisis, proses hidrolisis secara enzimatis, identifikasi, dan karakterisasi. Identifikasi dilakukan menggunakan FTIR serta karakterisasi dengan pemeriksaan organoleptis, analisis kualitatif, uji pati, derajat keasaman, Scanning Electron Microscopy SEM analisis distribusi dan ukuran partikel, X-ray Diffraction XRD, kadar abu, kadar air, uji susut pengeringan, uji kerapatan partikel, uji laju alir, dan uji sudut istirahat dibandingkan dengan Avicel PH 101. Dari hasil penelitian didapatkan bahwa rendemen hasil hidrolisis enzimatis selulosa mikrokristal dengan penambahan inhibitor b-glukosidase lebih tinggi dibandingkan tanpa penambahan inhibitor. Kondisi hidrolisis dilakukan pada suhu 30 C, selama 2 jam, dan serbuk dilarutkan dalam dapar asetat pH 7 dengan penambahan enzim dan inhibitor masing-masing 2,5 mL. Hasil identifikasi menunjukkan bahwa selulosa mikrokristal dari eceng gondok yang dihasilkan memiliki kemiripan dengan pembanding. Analisis dengan SEM menunjukkan adanya kesamaan morfologi; analisis dengan XRD menunjukkan derajat kristalinitas 67,47; Serbuk yang dihasilkan sangat halus; analisis kualitatif, uji pati, derajat keasaman, uji susut pengeringan memenuhi persyaratan; kadar abu, kadar air, uji kerapatan partikel, uji laju alir, dan uji sudut istirahat tidak memenuhi syarat.

*Microcrystalline cellulose MCC was a highly desirable excipient which being used for making tablets with direct compression method in Pharmaceutical manufacture. One of the methods to make microcrystalline cellulose by hydrolize enzymes from cellulose. Water hyacinth was one of the plants with cellulose contents of approximately 60, allows of hydrolysis process. The purpose of this study was to improve the yield of enzymes with addition of b glucosidase inhibitor, as one of the enzymes contained in cellulase enzymes from soils in mangroves with the characterization of the resulting powders. Efforts were made to achieve this by adding b glucosidase enzyme inhibitors, as one of the enzymes contained in cellulase enzymes from soils in mangrove forests. The study began with isolation of potential organisms and rejuvenation of isolates from previous studies, followed by extraction of b glucosidase, isolation from water hyacinth, optimization of hydrolysis conditions, enzymatic hydrolysis process, identification using FTIR,*

also characterization by organoleptic examination, qualitative analysis, starch test, pH test, Scanning Electron Microscopy SEM analysis of particle size and distribution, X ray Diffraction XRD , moisture content, drying shrinkage test, particle density test, flow rate test, and angle of repose test compared to Avicel PH 101. From the results obtained microcrystalline cellulose enzyme hydrolysis result with addition of b glucosidase inhibitor higher than without inhibitor. The hydrolysis conditions were carried out at 30 C, for 2 hours, and the powder was dissolved in pH 7 acetate buffer by adding enzymes and inhibitors of 2.5 mL each. The results showed that the microcrystalline cellulose of the resulting hyacinth had similarities to the comparison. Analysis with SEM showed a morphological similarity analysis with XRD showed degree of crystallinity 67,47 Powder was very fine qualitative analysis, starch test, pH test, drying shrinkage test, met the requirements ash content, moisture content, particle density test, flow rate test, and angle of repose test were not eligible.</i>