ABSTRAK

Henny Agustin. NIM 4221210003 (2022). Optimasi Adsorpsi Methylene Blue Menggunakan Karbon Aktif Tongkol Jagung (*Zea Mays L.*) Teraktivasi Kalium Hidroksida (KOH) Dengan Modifikasi *Surfaktan Sodium Lauryl Sulfate* (SLS).

Abstrak

Methylene blue (MB) merupakan zat warna kationik yang banyak digunakan di berbagai industri dan berpotensi mencemari perairan apabila dibuang tanpa pengolahan. Penelitian ini bertujuan mengetahui komposisi dan formulasi karbon aktif tongkol jagung teraktivasi kalium hidroksida (KOH) dengan modifikasi *Sodium Lauryl Sulfate* (SLS), mengkarakterisasi karbon aktif menggunakan FTIR dan BET, serta mengevaluasi kinerja adsorpsinya terhadap *methylene blue* (MB). Karbon aktif disiapkan melalui karbonisasi pada 400°C selama 15 menit, diaktivasi menggunakan KOH 4 N (rasio 1:10), kemudian dimodifikasi dengan SLS 0,0080 M. Karakterisasi dilakukan menggunakan FTIR dan BET, sedangkan uji adsorpsi meliputi optimasi massa karbon aktif, konsentrasi awal *methylene blue* (MB), dan waktu kontak menggunakan spektrofotometri UV–Vis. Hasil FTIR menunjukkan pergeseran gugus O–H, C–H, C≡C, dan C=C serta munculnya gugus sulfat (S=O dan S–O), yang mengonfirmasi keberhasilan modifikasi SLS. Analisis BET menunjukkan penurunan luas permukaan dari 0,153667 m^2/g menjadi 0 m^2/g akibat *pore blocking*, namun tidak menurunkan kinerja adsorpsi. Karbon aktif (KA) mencapai efisiensi adsorpsi optimum 99,20% pada massa 0,20 g, konsentrasi 200 ppm, dan waktu kontak 30 menit, sedangkan karbon aktif termodifikasi SLS (KA-SLS) mencapai efisiensi 99,22% pada massa 0,10 g, konsentrasi 150 ppm, dan waktu kontak 60 menit dengan kapasitas adsorpsi lebih tinggi. Modifikasi SLS terbukti meningkatkan efisiensi penggunaan adsorben dan kapasitas adsorpsi terhadap *methylene blue* (MB).

Kata Kunci: Karbon aktif tongkol jagung, Kalium Hidroksida, Sodium Lauryl Sulfate, Methylene Blue, adsorpsi.

ABSTRACT

Henny Agustin. NIM 4221210003 (2022). Optimization of Methylene Blue Adsorption Using Activated Carbon of Corn Cobs (*Zea Mays L.)* Activated Potassium Hydroxide (KOH) With Modified Surfactant *Sodium Lauryl Sulfate* (SLS).

Methylene blue (MB) is a cationic dye widely used in various industries and has the potential to pollute waters if disposed of without treatment. This study aims to determine the composition and formulation of activated corncob carbon activated with potassium hydroxide (KOH) with *Sodium Lauryl Sulfate* (SLS) modification, characterize the activated carbon using FTIR and BET, and evaluate its adsorption performance against *methylene blue* (MB). Activated carbon was prepared by carbonization at 400°C for 15 minutes, activated using 4 N KOH (ratio 1:10), then modified with 0.0080 M SLS. Characterization was carried out using FTIR and BET, while the adsorption test included optimization of activated carbon mass, initial concentration of *methylene blue* (MB), and contact time using UV–Vis spectrophotometry. FTIR results showed shifts in O–H, C–H, C≡C, and C=C groups as well as the appearance of sulfate groups (S=O and S–O), which confirmed the success of SLS modification. BET analysis showed a decrease in surface area from 0.153667 m^2/g to 0 m^2/g due to pore blocking, but did not reduce the adsorption performance. Activated carbon (KA) achieved an optimum adsorption efficiency of 99.20% at a mass of 0.20 g, a concentration of 200 ppm, and a contact time of 30 minutes, while SLS-modified activated carbon (KA-SLS) achieved an efficiency of 99.22% at a mass of 0.10 g, a concentration of 150 ppm, and a contact time of 60 minutes with a higher adsorption capacity. SLS modification was proven to increase the efficiency of adsorbent use and adsorption capacity towards *methylene blue* (MB).

Keywords: Corncob activated carbon, Potassium Hydroxide, Sodium Lauryl Sulfate, Methylene Blue, adsorption.