

**Adsorpsi Zat Warna *Remazol Brilliant Blue* Menggunakan Arang Aktif dari
Cangkang Buah Ketapang (*Terminalia catappa L.*)**

Oleh

Komang Sri Widiastuti NIM 2113081023

Program Studi Kimia

ABSTRAK

Penelitian ini bertujuan untuk menganalisis karakteristik, menentukan efisiensi adsorpsi dan menganalisis pola isoterm, termodinamika, serta kinetika adsorpsi zat warna *Remazol Brilliant Blue* menggunakan arang aktif dari cangkang buah ketapang. Arang diperoleh melalui proses karbonisasi dengan suhu 500°C lalu diaktivasi dengan H₂SO₄. Arang dikarakterisasi meliputi analisis proksimat (kadar air, kadar abu, *volatile matter*, *total fixed carbon*), morfologi permukaan menggunakan SEM (Scanning Electron Microscope) JEOL JSM IT300 EDX Oxford Xmax 20. Selanjutnya dianalisis efisiensi adsorben (variasi uji waktu kontak optimum, pH optimum, konsentrasi optimum) dan pola isoterm, kinetika, termodinamika adsorpsinya terhadap penyerapan zat warna *Remazol Brilliant Blue*. Karakteristik arang cangkang buah ketapang yang meliputi kadar air, kadar abu, *volatile matter* dan *total fixed carbon* pada arang yang tidak diaktivasi yaitu 27,4%; 11,73%; 54,42%; dan 6,81%, sedangkan arang yang diaktivasi H₂SO₄ yaitu 5,3%; 5,63; 59,37; dan 30,03%. Studi morfologi permukaan menunjukkan bahwa secara kualitatif karbon yang diaktivasi menggunakan H₂SO₄ memiliki rongga lebih besar. Arang yang sudah diaktivasi H₂SO₄ lebih efektif menyerap zat warna dengan nilai efisiensi 99,71% pada kondisi pH 6, dalam waktu kontak 120 menit dan konsentrasi zat warna 70 mg/L. Pola isoterm adsorpsi zat warna *Remazol Brilliant Blue* mengikuti model pola Freundlich, sedangkan termodinamika didapat nilai ΔG^0 dan ΔS^0 bernilai positif, serta ΔH^0 negatif. Kinetika adsorpsi mengikuti model *pseudo second order*.

Kata Kunci: Arang Aktif, Cangkang Buah Ketapang, *Remazol Brilliant Blue*

***Adsorption of Remazol Brilliant Blue Dyes Using Activated Charcoal from
Ketapang Fruit Shells (*Terminalia catappa* L.)***

by

Komang Sri Widiastuti NIM 2113081023

Program Studi Kimia

ABSTRACT

This study aims to determine the characteristics, the adsorption efficiency, the model, thermodynamics, and kinetics parameters of Remazol Brilliant Blue dye adsorption process using activated charcoal from ketapang fruit shells. Charcoal is made by carbonization process at 500°C and then activated with H₂SO₄. Charcoal was characterized by conducting proximate analysis (water content, ash levels, volatile matter and total fixed carbon), surface morphology study use SEM (Scanning Electron Microscope) JEOL JSM IT300 EDX Oxford Xmax 20. Further analyzing their efficiency (contact time, pH, concentration) and adsorption model, thermodynamic study and kinetics in the adsorption process of Remazol Brilliant Blue dyes. The results of ketapang fruit shell charcoal includes water content, ash levels, volatile matter and total fixed carbon without activation, were 27.4%; 11.73%; 54.42%; and 6.81% respectively, while H₂SO₄ activated is 5.3%; 5.63; 59.37; and 30.03% respectively. Surface morphology study shows that the activated charcoal using H₂SO₄ has a larger cavity. Activated charcoal that is more effective in absorbing Remazol Brilliant Blue dye is activated charcoal that has been activated by H₂SO₄ with an efficiency value of 99.71% at pH 6, in contact time of 120 minutes and dye concentration of 70 mg/L. Adsorption of Remazol Brilliant Blue using carbon from coconut charcoal follows the Freundlich adsorption isotherm model, while thermodynamics study results obtained positive values of ΔG° and ΔS° , and negative values ΔH° . Adsorption kinetics follow the pseudo second order model.

Key word: Activated Charcoal, Ketapang Fruit Shells, Remazol Brilliant Blue