

ABSTRAK

EFEKTIVITAS KARBON AKTIF DARI TONGKOL JAGUNG (*Zea mays* L) DALAM MENURUNKAN KONSENTRASI METILEN BIRU PADA AIR LIMBAH INDUSTRI TEKSTIL

Annisa Kurnia Pebriani, 2026, 35 Halaman, 6 Tabel, 9 Gambar, 4 Lampiran

Penelitian ini bertujuan mengidentifikasi karakteristik karbon aktif tongkol jagung, menentukan kondisi optimum adsorpsi metilen biru berdasarkan variasi massa adsorben dan waktu kontak, serta model isotermnya. Karbon aktif dibuat melalui karbonisasi (500°C, 2 jam) dan aktivasi NaOH 1 N, lalu diuji pada 50 mL limbah tekstil dengan variasi massa (2 gr dan 4 gr) serta waktu kontak (60–180 menit). Hasil karakteristik menunjukkan kadar air 8,82%, kadar abu 7,5%, dan daya serap iodin 1193,14 mg/g, yang seluruhnya memenuhi SNI 06-3730-1995. Kondisi optimum adsorpsi dicapai pada massa adsorben 2 gram dan waktu kontak 150 menit dengan efisiensi penyerapan tertinggi sebesar 98,62%. Proses adsorpsi secara konsisten mengikuti model isoterm Langmuir ($R^2 = 1$), yang menunjukkan bahwa mekanisme penyerapan berlangsung secara homogen dan membentuk lapisan tunggal (*monolayer*) di permukaan adsorben.

Kata kunci: Karbon aktif, tongkol jagung, adsorpsi, metilen biru, isoterm Langmuir.

ABSTRACT

EFFECTIVENESS OF ACTIVATED CARBON FROM CORN COB (*Zea mays* L) FOR REDUCING METHYLENE BLUE CONCENTRATION IN TEXTILE INDUSTRY WASTEWATER

Annisa Kurnia Pebriani, 2026, 35 Pages, 6 Tables, 9 Figures, 4 Attachments

This study aims to characterize corncob-based activated carbon, determine the optimum conditions for methylene blue adsorption based on adsorbent mass and contact time variations, and identify the most suitable adsorption isotherm model. The activated carbon was prepared through carbonization (500°C, 2 hours) and NaOH 1 N chemical activation, then applied to 50 mL of textile wastewater with varied adsorbent masses (2 g and 4 g) and contact times (60–180 minutes). Characterization results showed a moisture content of 8,82%, ash content of 7,5%, and iodine absorption of 1193,14 mg/g, all meeting the SNI 06-3730-1995 standards. The optimum adsorption condition was achieved using 2 grams of adsorbent and a 150-minute contact time, yielding the highest removal efficiency of 98,62%. The adsorption process consistently followed the Langmuir isotherm model ($R^2 = 1$), indicating a homogeneous and monolayer adsorption mechanism on the adsorbent surface.

Keywords: *Activated carbon, corn cob, adsorption, methylene blue, Langmuir isotherm.*