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ABSTRAK

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EFEKTIVITAS METODE ADSORPSI MENGGUNAKAN VARIASI JENIS ADSORBEN DALAM MENURUNKAN KADAR KROMIUM HEKSAVALEN (Cr^{6+}) LIMBAH CAIR BATIK X (Studi Kasus Industri Batik X Kelurahan Nagarasari Kota Tasikmalaya)

Limbah cair industri batik merupakan salah satu sumber pencemar lingkungan yang mengandung logam berat berbahaya seperti kromium heksavalen (Cr^{6+}). Berdasarkan hasil uji pendahuluan kadar Cr^{6+} limbah batik X Kota Tasikmalaya berada di atas baku mutu yang telah ditetapkan untuk limbah cair industri dalam Peraturan Menteri Lingkungan Hidup Nomor 5 Tahun 2014 sebesar 1,150 mg/L. Metode yang potensial untuk menurunkan kadar Cr^{6+} adalah dengan metode adsorpsi menggunakan adsorben yang ramah lingkungan, salah satunya yaitu karbon aktif tempurung kelapa dan zeolit. Tujuan dari penelitian ini yaitu untuk menganalisis efektivitas metode adsorpsi menggunakan variasi jenis adsorben dalam menurunkan kadar kromium (Cr^{6+}) limbah cair industri batik. Metode yang digunakan dalam penelitian ini yaitu *true experimental* dengan *posttest-only control group design*. Hasil penelitian menunjukkan bahwa terdapat perbedaan variasi jenis adsorben dalam menurunkan kadar Cr^{6+} limbah cair batik, dengan rata-rata penurunan menggunakan karbon aktif tempurung kelapa sebesar 0,073 mg/L, zeolit sebesar 0,092 mg/L, dan kombinasi adsorben sebesar 0,051 mg/L. Nilai efektivitas adsorben paling tinggi yaitu pada kombinasi adsorben sebesar 95,55%. Oleh karena itu, metode adsorpsi menggunakan kombinasi adsorben karbon aktif tempurung kelapa dan zeolit dapat dijadikan sebagai alternatif pengolahan limbah cair industri batik yang efektif dan ramah lingkungan.

Kata Kunci: Adsorpsi, Limbah batik, Karbon aktif, Zeolit, Kadar Kromium

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ABSTRACT

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EFFECTIVENESS OF ADSORPTION METHOD USING VARIOUS TYPES OF ADSORBENTS IN REDUCING THE LEVELS OF CHROMIUM HEXAVALEN (Cr^{6+}) IN BATIK X LIQUID WASTE (Case Study of Batik Industry X, Nagarasari Village, Tasikmalaya City)

Batik industrial wastewater is one of the sources of environmental pollution containing hazardous heavy metals such as hexavalent chromium (Cr6+). Based on the results of preliminary tests, the Cr6+ levels of batik wastewater in Tasikmalaya City X are above the quality standards set for industrial wastewater in the Regulation of the Minister of Environment Number 5 of 2014, which is 1.150 mg/L. A potential method to reduce Cr6+ levels is the adsorption method using environmentally friendly adsorbents, one of which is coconut shell activated carbon and zeolite. The purpose of this study was to analyze the effectiveness of the adsorption method using various types of adsorbents in reducing chromium (Cr6+) levels in batik industrial wastewater. The method used in this study was a true experimental with a posttest-only control group design. The results of the study showed that there were differences in the variation of adsorbent types in reducing Cr6+ levels in batik liquid waste, with an average reduction using coconut shell activated carbon of 0.073 mg/L, zeolite of 0.092 mg/L, and a combination of adsorbents of 0.051 mg/L. The highest adsorbent effectiveness value was in the combination of adsorbents of 95.55%. Therefore, the adsorption method using coconut shell activated carbon and zeolite adsorbents can be used as an alternative for effective and environmentally friendly batik industrial liquid waste treatment.

Keyword: *Adsorption, Batik waste, Activated carbon, Zeolite, Chromium*