

ABSTRACT

Uyun Al Khikmah Novia Wardani, 2023, Reducing COD and TSS Levels in Batik Liquid Waste with the Combination of Adsorption and Phytoremediation Methods, Thesis, Study Program : Environmental Engineering, Faculty of Engineering, PGRI Adi Buana University Surabaya, Advisor : (Dra. Indah Nurhayati, S.T., M.T.).

Batik liquid waste contains chemicals that are detrimental to the environment including heavy metals, pesticides, and other radioactive materials. This waste must be treated before being discharged into the environment. If it is directly discharged into the environment, it will reduce the quality of the environment and damage the habitat that lives around the river. The aim of the study was to determine the difference in residence time for the reduction of COD and TSS in batik wastewater treated using a combination of adsorption and phytoremediation. The research variables are the residence time of 2 days, 4 days, and 6 days. The adsorbents used were zeolite and activated carbon with a height of 10 cm each. Before use the adsorbent is washed and dried to remove adhering dirt. Water hyacinth plants were acclimatized for 7 days, 2 days using mineral water and 5 days using additional batik textile wastewater 200 ml/day. Analysis of COD with SNI 6989.72:2009 and TSS with SNI 6989.3:2019, the results of this study are that the adsorption process can reduce COD 76.35% and TSS 99.48%. The combination of adsorption and phytoremediation can reduce the highest COD by 88.07% on the 4th day and the highest TSS reduction of 99.80% occurs on the 4th day. The TSS concentration at the end of the study was 8 mg/L and met the quality standards. The COD concentration at the end of the study was 326.7 mg/L and did not meet the quality standards according to the Regulation of the Governor of the Special Region of Yogyakarta No. 7 of 2016.

Key words : Batik industrial liquid waste, COD and TSS, Adsorption, Phytoremediation

ABSTRAK

Uyun Al Khikmah Novia Wardani, 2023, Penurunan Kadar COD dan TSS pada Limbah Cair Batik dengan Metode Kombinasi Adsorpsi dan Fitoremediasi, Skripsi, Program Studi : Teknik Lingkungan, Fakultas Teknik, Universitas PGRI Adi Buana Surabaya, Dosen Pembimbing : (Dra. Indah Nurhayati, S.T., M.T.).

Limbah cair batik mengandung zat kimia yang merugikan bagi lingkungan diantaranya logam berat, pestisida, dan bahan-bahan radioaktif lainnya. Limbah ini harus diolah dahulu sebelum dibuang ke lingkungan. Jika langsung dibuang ke lingkungan akan menurunkan kualitas lingkungan dan merusak habitat yang hidup sekitar aliran sungai. Tujuan penelitian untuk mengetahui perbedaan waktu tinggal terhadap penurunan COD dan TSS pada limbah cair batik yang diolah menggunakan kombinasi adsorpsi dan fitoremediasi. Variabel penelitian yaitu waktu tinggal 2 hari, 4 hari, dan 6 hari. Adsorben yang digunakan adalah zeolit dan karbon aktif dengan ketinggian masing-masing 10 cm. Adsorben dicuci dan dikeringkan untuk menghilangkan kotoran yang menempel sebelum digunakan. Tanaman eceng gondok diaklimatisasi selama 7 hari, 2 hari menggunakan air mineral dan 5 hari menggunakan tambahan limbah cair tekstil batik 200ml/hari. Analisis COD dengan SNI 6989.72:2009 dan TSS dengan SNI 6989.3:2019. Hasil penelitian ini adalah proses adsorpsi dapat menurunkan COD 76,35% dan TSS 99,48%. Metode kombinasi adsorpsi dan fitoremediasi dapat menurunkan COD tertinggi sebesar 88,07% pada hari ke-4 dan penurunan TSS tertinggi 99,80% pada hari ke-4. Konsentrasi TSS pada akhir penelitian 8 mg/L dan sudah memenuhi standar baku mutu yang ditetapkan. Konsentrasi COD pada akhir penelitian 326,7 mg/L dan belum memenuhi standar baku mutu menurut Peraturan Gubernur Daerah Istimewa Yogyakarta No 7 Tahun 2016.

Kata kunci : Limbah Cair Industri Batik, COD, TSS, Adsorpsi dan fitoremediasi