

Kajian Adsorpsi Tanah Terhadap Tembaga (Cu) dari Limbah Cair Industri Kerajinan Perak di Kotagede, Daerah Istimewa Yogyakarta

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INTISARI

Limbah cair yang dihasilkan oleh industri kerajinan perak bersifat asam dan mengandung kadar Cu^{2+} yang tinggi. Berdasarkan Keputusan Gubernur Kepala D.I. Yogyakarta nomor : 281/KPTS/1998 tentang baku mutu limbah cair kegiatan industri di Propinsi D.I. Yogyakarta untuk logam Cu sebesar 2 ppm. Salah satu metode yang dapat dipakai untuk menurunkan kadar logam berat dalam limbah cair adalah metode adsorpsi. Tujuan penelitian ini adalah 1) mengetahui kemampuan adsorpsi Cu tanah Grumusol, Aluvial, dan Latosol dalam limbah cair industri kerajinan perak, dan 2) mengetahui perbedaan kadar Cu dalam limbah cair industri kerajinan perak, efisiensi penjerapan, dan jumlah adsorpsi tanah sebelum dan sesudah perlakuan dengan metode adsorpsi menggunakan tanah Grumusol, Aluvial, dan Latosol. Penelitian dilakukan di UPN "Veteran" Yogyakarta. Penelitian dilakukan pada Agustus 2015 sampai April 2016. Metodologi penelitian menggunakan Rancangan Acak Lengkap 1 faktor. Terdapat 6 perlakuan, yaitu P1 : Grumusol + 1 liter limbah, P2 : Grumusol + ½ liter limbah, P3 : Aluvial + 1 liter limbah, P4 : Aluvial + ½ liter limbah, P5 : Latosol + 1 liter limbah, dan P6 : Latosol + ½ liter limbah. Perlakuan dilakukan 3 kali ulangan dan 5 kali penjenuhan. Parameter yang diamati adalah jumlah adsorpsi, efisiensi penjerapan, kapasitas pertukaran kation, C-organik, tekstur tanah, pH tanah, kandungan Cu dalam tanah, dan kandungan Cu dalam limbah cair. Analisis data dengan analisis keragaman taraf 5%, dan dilanjutkan dengan Uji *Duncan's Multiple Range Test* taraf 5%. Hasil yang didapat, ketiga jenis tanah dapat menjerap logam tembaga dalam limbah cair menjadi dibawah baku mutu sebesar 2 ppm pada penjenuhan pertama. Jenis tanah yang direkomendasikan untuk aplikasi terbaik adalah perlakuan P1 yaitu tanah Grumusol dengan perlakuan 1 liter limbah cair. Maksimal penjenuhan sebanyak 4 kali, filtrat yang dihasilkan dibawah ambang batas sebesar 2 ppm.

Kata Kunci : Adsorpsi Tanah, Tembaga (Cu), Limbah Cair Industri Kerajinan Perak

Soil Adsorption Studies on Copper (Cu) of Water Waste from Silver Craft Industry in Districts of Kotagede, Special Region of Yogyakarta

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ABSTRACT

Wastewater produced by the silver industry is acidic and contains high levels of Cu^{2+} . Based on the Decree of the Governor D.I. Yogyakarta number: 281 / KPTS / 1998 on effluent standards for industrial activities in the province of D.I. Yogyakarta to Cu at 2 ppm. One method that can be used to reduce levels of heavy metals in the wastewater is adsorption method. The purpose of this research is 1) determine adsorption capacity for Cu soil Grumusol, Alluvial and Latosol in the wastewater of the silver industry, and 2) know the difference Cu content in the wastewater of the silver industry, the efficiency of adsorption, and the amount of adsorption of land before and after treatment with Grumusol adsorption method using soil, alluvial, and Latosol. The study was conducted in UPN "Veteran" Yogyakarta. The study was conducted in August 2015 to April 2016. The research methodology uses one factor completely randomized design. There are 6 treatment, P1: Grumusol + 1 liter of waste, P2: Grumusol + ½ liters of waste, P3: Alluvial + 1 liter of waste, P4: Alluvial + ½ liters of waste, P5: Latosol + 1 liter of waste, and P6: Latosol + ½ liters of waste. The treatment was done three replications and 5 times saturation. The parameters measured were the number of adsorption, the adsorption efficiency, cation exchange capacity, organic C, soil texture, pH, Cu content in the soil, and the Cu content in the wastewater. Data were analyzed using analysis of variance level of 5%, followed by Duncan's Multiple Range Test level of 5%. The results obtained, the third type of soil can adsorb copper metals in wastewater to below the quality standard of 2 ppm in the first saturation. The soil type is recommended for best application is the treatment of earth Grumusol P1 with 1 liter of wastewater treatment. Maximum saturation as much as four times, the resulting filtrate below the threshold of 2 ppm.

Keywords: Adsorption Soil, Copper (Cu), Silver Craft Industry Liquid Waste