

ABSTRAK

PENGARUH KOMBINASI METODE PENYESUAIAN pH, ELEKTROKOAGULASI, OZONISASI DAN ADSORPSI PADA PENURUNAN KADAR LOGAM BERAT LIMBAH LABORATORIUM KIMIA UIN SUNAN GUNUNG DJATI BANDUNG

Limbah laboratorium mengandung senyawa organik dan anorganik, limbah tersebut merupakan sisa bahan kimia yang digunakan dalam praktikum. Apabila limbah tersebut tidak diolah dengan baik akan berpotensi mencemari lingkungan. Salah satu upaya mengurangi pencemaran limbah cair yaitu dengan mengkombinasikan metode pengolahan limbah dengan penyesuaian pH, elektrokoagulasi, ozonisasi dan adsorpsi dalam pengolahan limbah cair. Penelitian ini bertujuan untuk menganalisis pengaruh kombinasi penyesuaian pH, elektrokoagulasi, ozonisasi dan adsorpsi dalam pengolahan limbah cair laboratorium kimia terhadap kadar pH, kadar logam Cu, logam Fe dan logam Pb. Pada tahap awal dilakukan penyesuaian pH menggunakan NaOH. Kemudian proses elektrokoagulasi menggunakan plat elektroda Aluminium (Al) berukuran 40×28 cm sebagai katoda dan anoda dengan jarak antar elektroda 4 cm, tegangan 3,87 volt DC, arus 14,44 A dengan waktu kontak 40 menit. Selanjutnya dilakukan proses ozonisasi dengan waktu kontak 40 menit. Lalu dilakukan proses adsorpsi menggunakan zeolit dengan variasi waktu 120 menit, 150 menit, dan 180 menit. Hasil penelitian menggunakan kombinasi penyesuaian pH, elektrokoagulasi, ozonisasi dan Adsorpsi 120 menit, 150 menit dan 180 menit didapatkan kadar Cu sebesar 29,93%, kadar Pb 49,10% dan kadar Fe sebesar 40,03%.

Kata kunci: adsorpsi; elektrokoagulasi; limbah laboratorium; logam; ozonisasi.

ABSTRACT

THE EFFECT COMBINATION OF pH ADJUSTMENT, ELECTROCOAGULATION, OZONATION, AND ADSORPTION METHODS ON REDUCING HEAVY METAL LEVELS IN CHEMICAL LABORATORY WASTE AT UIN SUNAN GUNUNG DJATI BANDUNG

Laboratory waste contains organic and inorganic compounds. This waste is the residue of chemicals used in practical work. If not properly treated, it can potentially pollute the environment. One of the efforts to reduce the pollution of liquid waste is by combining waste treatment methods with pH adjustment, electrocoagulation, ozonation, and adsorption in the treatment of liquid waste. This study aims to analyze the effect of the combination of pH adjustment, electrocoagulation, ozonation, and adsorption in the treatment of chemical laboratory liquid waste on pH levels, Cu metal levels, Fe metal levels, and Pb metal levels. In the initial stage, pH adjustment was performed using NaOH. Then, the electrocoagulation process was carried out using Aluminum (Al) electrode plates measuring 40×28 cm as the cathode and anode, with an electrode spacing of 4 cm, a voltage of 3.87 volts DC, a current of 14.44 A, and a contact time of 40 minutes. Subsequently, the ozonation process was carried out with a contact time of 40 minutes. Then, the adsorption process was performed using zeolite with variations in contact time of 120 minutes, 150 minutes, and 180 minutes. The results of the study using the combination of pH adjustment, electrocoagulation, ozonation, and adsorption for 120 minutes, 150 minutes, and 180 minutes showed Cu levels of 29.93%, Pb levels of 49.10%, and Fe levels of 40.03%.

Keywords: laboratory waste, electrocoagulation, ozonation, adsorption, met