

## **ADSORPSI ION Cd(II) PADA ABU VULKANIK GUNUNG KELUD TERIMOBILISASI DITIZON**

Inarotul Wardah Pratiwi  
18/427625/PA/18585

### **INTISARI**

Telah dipelajari imobilisasi ditizon pada abu vulkanik Gunung Kelud dan kajian adsorpsinya terhadap ion Cd(II). Penelitian ini dilakukan untuk memodifikasi abu vulkanik Gunung Kelud dengan imobilisasi ditizon, mengkaji faktor-faktor yang mempengaruhi adsorpsi, dan mempelajari kinetika serta isoterm adsorpsinya.

Modifikasi abu vulkanik Gunung Kelud diawali dengan aktivasi abu vulkanik menggunakan NaOH 4M. Ditizon diimobilisasikan pada abu vulkanik teraktivasi dalam pelarut NaOH. Abu vulkanik terimobilisasi ditizon dikarakterisasi menggunakan XRF, XRD dan FTIR. Abu vulkanik terimobilisasi ditizon diaplikasikan untuk mengadsorp ion Cd(II) dengan memvariasikan pH, massa adsorben, waktu kontak, dan konsentrasi awal adsorbat.

Berdasarkan karakterisasi XRF, XRD, dan FTIR ditunjukkan bahwa ditizon telah berhasil diimobilisasikan pada abu vulkanik. Hasil adsorpsi menunjukkan bahwa kondisi optimum adsorpsi untuk abu vulkanik terimobilisasi ditizon diperoleh pada pH 5, massa adsorben 100 mg, waktu kontak 60 menit, dan konsentrasi optimum 75 ppm sedangkan untuk abu vulkanik teraktivasi diperoleh kondisi optimum pada pH 6, massa adsorben 600 mg, waktu kontak 90 menit, dan konsentrasi optimum 75 ppm. Adsorpsi ion Cd(II) pada abu vulkanik terimobilisasi ditizon dan teraktivasi mengikuti model kinetika orde kesatu semu dengan harga konstanta laju adsorpsi masing-masing sebesar 0,0195 dan 0,0407 menit<sup>-1</sup>. Isoterm adsorpsi ion Cd(II) abu vulkanik terimobilisasi ditizon mengikuti model isoterm adsorpsi Langmuir, sedangkan untuk abu vulkanik teraktivasi mengikuti model isoterm adsorpsi Freundlich. Kapasitas adsorpsi abu vulkanik terimobilisasi ditizon sebesar  $7,50 \times 10^{-5}$  mol/g sedangkan abu vulkanik teraktivasi sebesar  $5,19 \times 10^{-6}$  mol/g

Kata kunci: abu vulkanik, adsorpsi, ditizon, ion Cd(II), kinetika dan isoterm

## **ADSORPTION OF Cd(II) ION ON DITHIZONE-IMMOBILIZED MOUNT KELUD VOLCANIC ASH**

Inarotul Wardah Pratiwi  
18/427625/PA/18585

### **ABSTRACT**

The immobilization of dithizone on Mount Kelud volcanic ash as an adsorbent of Cd(II) ions was studied. The aims of this research are to modify the volcanic ash of Mount Kelud by immobilizing dithizone, examination of influencing factors of adsorption, and study its adsorption kinetics and isotherms.

Modification of Mount Kelud volcanic ash started with activation of volcanic ash using 4M NaOH. Dithizone was immobilized on activated ash in NaOH solvent. Dithizone immobilized volcanic ash was characterized by using XRF, XRD and FTIR. Dithizone immobilized volcanic ash was applied to adsorb Cd(II) ions by varying the pH, adsorbent mass, contact time, and initial concentration of the adsorbate.

Based on the characterization of XRF, XRD, and FTIR, it was shown that dithizone has been successfully immobilized in volcanic ash. The adsorption results showed that the optimum adsorption conditions for dithizone immobilized volcanic ash were obtained at pH 5, adsorbent mass 100 mg, contact time 75 minutes, and optimum concentration 75 ppm while for activated volcanic ash obtained pH 6, adsorbent mass 600 mg, contact time 75 minutes, and the optimum concentration of 75 ppm. Adsorption of Cd(II) ions on Dithizone immobilized and activated volcanic ash determined using adsorption kinetics of pseudo first order with adsorption rate constants of 0.0407 and 0.0195 min<sup>-1</sup>, respectively. Adsorption of Cd(II) ions isotherm of dithizone immobilized volcanic ash followed Langmuir isotherm model, while activated volcanic ash followed Freundlich isotherm model. The adsorption capacity of dithizone immobilized volcanic ash is  $7.50 \times 10^{-5}$  mol/g while activated volcanic ash is  $5.19 \times 10^{-6}$  mol/g.

**Keywords:** adsorption, Cd(II) ions, dithizone, kinetic and isotherm, volcanic ash