

## ADSORPSI Zn(II) OLEH HIDROKSIAPATIT DARI LIMBAH CANGKANG TELUR BEBEK

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### INTISARI

Telah dilakukan penelitian untuk mengkaji adsorpsi ion Zn(II) oleh hidroksiapatit dari limbah cangkang telur bebek. Adsorben hidroksiapatit disintesis melalui metode presipitasi dengan cangkang telur bebek sebagai prekursor kalsium. Adsorben dikarakterisasi dengan spektrofotometer *Fourier Transform Infrared Spectroscopy* (FTIR), *X-ray Diffraction* (XRD) dan *Scanning Electron Microscope-Energy Dispersive Spectrometer* (SEM-EDX). Hidroksiapatit diinteraksikan dengan Zn(II) dengan variasi pH. Kajian isoterm adsorpsi dilakukan dengan menginteraksikan hidroksiapatit pada pH optimum dengan variasi konsentrasi. Model kinetika adsorpsi ditentukan dengan menginteraksikan hidroksiapatit dengan Zn(II) pada pH optimum dengan variasi waktu.

Hasil yang diperoleh menunjukkan bahwa logam Zn(II) dapat berinteraksi dengan hidroksiapatit secara optimum pada pH 6. Adsorpsi logam Zn(II) dengan hidroksiapatit mengikuti model isoterm Langmuir dengan kapasitas adsorpsi maksimum ( $q_{maks}$ )  $3,66 \times 10^{-4}$  mol g<sup>-1</sup> dan perubahan energi bebas Gibbs ( $\Delta G^\circ$ ) yaitu  $-24,86$  kJ mol<sup>-1</sup>. Kinetika adsorpsi Zn(II) pada hidroksiapatit mengikuti model kinetika Ho dengan konstanta laju adsorpsi ( $k$ ) 885,5 mg g<sup>-1</sup> menit<sup>-1</sup>.

Kata Kunci: hidroksiapatit, Zn(II), isoterm adsorpsi, kinetika adsorpsi

## ADSORPTION STUDY OF Zn(II) BY HYDROXYAPATITE FROM DUCK EGGSHELL WASTE

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### ABSTRACT

The adsorption properties of Zn(II) ions by hydroxyapatite from duck eggshell waste was investigated. Adsorbent was synthesized by precipitation method with duck eggshell as a calcium precursor. Adsorbent produced then characterized by *Fourier Transform Infrared Spectroscopy* (FTIR), *X-ray Diffraction* (XRD) and *Scanning Electron Microscope-Energy Dispersive Spectrometer* (SEM-EDX). Hydroxyapatite was interacted with Zn(II) at various pH. Isotherm of adsorption was determined by interacting hydroxyapatite and Zn(II) at the optimum of pH with various of concentration. Model of kinetics adsorption was determined by interacting hydroxyapatite and Zn(II) at the optimum of pH with various of times.

The result showed that the adsorption of Zn(II) metal ion on hydroxyapatite was optimum at pH 6. Adsorption of Zn(II) metal on hydroxyapatite tended to follow the Langmuir isotherm model with maximum adsorption capacity ( $q_{maks}$ ) was  $3.66 \times 10^{-4} \text{ mol g}^{-1}$  and change in Gibbs free energy ( $\Delta G^\circ$ ) was  $-24.86 \text{ kJ mol}^{-1}$ . The adsorption kinetic of Zn(II) on hydroxyapatite tended to follow the Ho kinetic model with the adsorption rate constant (k) was  $885.5 \text{ mg g}^{-1} \text{ min}^{-1}$ .

Keywords: hidroxyapatite, Zn(II), isotherm adsorption, kinetic adsorption