

ABSTRACT

IMMOBILIZATION RED ALGAE BIOMASS (*Porphyridium* sp) WITH SILICA MAGNETITE AS ADSORBENT METAL ION Pb (II), Cd (II), DAN Cu(II)

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Hybrid material of *Porphyridium* sp-silica (HAS) and *Porphyridium* sp with silica-magnet (HASM) synthesized via sol-gel process and characterized by spektrofotometer infrared (IR) and X-ray diffraction (XRD). The results showed, the immobilization of algae *Porphyridium* sp with a matrix silica and magnetic successfully performed. Adsorption process carried out by the *bacth* method and ion concentration of Cd (II), Cu (II) and Pb (II) was analyzed by atomic absorption spectrophotometer (AAS). Ion adsorption kinetics of Pb(II), Cd (II), and Cu(II) on the initial concentration of 0-300 mg L⁻¹, pH 6, and the interaction time for 60 minutes by HAS and HASM evaluated using pseudo first order and two kinetics. Ion adsorption kinetics of Pb (II), Cd (II), and Cu (II) in HAS and HASM tend to follow pseudo second order reaction kinetics with k_2 value for ion Pb (II) = 0.18 at HAS and 0.80 on HASM; Cd (II) = 1.60 at HAS and HASM; and Cu (II) = 0.80 to 0.32 for the HAS and HAS and HASM. Adsorption isotherms tend to follow the pattern of the Langmuir isotherm with adsorption capacity of the ion Pb (II), Cd (II), and Cu (II) respectively is 0.13; 0.23; and 0.38; mmol g⁻¹; whereas for HAS 0.14; 0.26; and 0.45 mmol g⁻¹ and the HASM is 0.23; 0.37; and 0.48 mmol g⁻¹. *Porphyridium* sp biomass energy adsorption to ion Pb (II), Cd (II), and Cu (II) respectively by 11.68; 8.14; and 14.46 kJ mol⁻¹ and HAS amounted to 9.43; 6.87; and 9.17 kJ mol⁻¹ as well as on HASM is 6.31; 6.83; and 8.45 kJ mol⁻¹.

Keywords: Adsorption, *Porphyridium* sp, silica-magnetic coatings, ion Pb (II) , Cd(II) and Cu (II)