

## **ABSTRACT**

### **SYNTHESIS OF ALGAE BIOMASS ADSORBENT *Tetraselmis* Sp WITH SILICA COATING FOR MAGNETITE ADSORPTION OF Pb (II) AND Cu (II)**

**By**

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In research has been performed the synthesis of silica algae hybrid (HAS) and HAS-magnetite analyzed with using an infrared spectrophotometer (IR), a scanning electron microscope (SEM) and a atomic absorption spectrophotometer (AAS). HAS and HAS-magnetite functional group identification were performed using infrared spectrophotometer (IR). Spectra data of infrared spectrophotometer showed that the addition of a new absorption with wave number of  $2924.09\text{ cm}^{-1}$ , which derived from C-H stretching vibrations of aliphatic (-CH<sub>2</sub>). Thus, hybridization of silica with *Tetraselmis* sp algae biomass had been performed successfully on HAS and HAS-magnetite. Surface morphology analysis on the adsorbent was applied using scanning electron microscope (SEM). Micrograph of magnetite is crystalline and micrographs of silica-magnetite tend to be amorphous. While micrograph of HAS are amorphous and HAS-magnetite is crystalline. Adsorption kinetics data of Pb (II) and Cu (II) ion on algae, HAS and HAS-magnetite tend to follow second order pseudo kinetics model. Adsorption isotherms of Pb (II) and Cu (II) ion on algae, HAS and HAS-magnetite tend to follow Freundlich isotherm models.

Keywords: adsorption, *Tetraselmis* sp algae, isotherm.

## ABSTRAK

### **SINTESIS ADSORBEN BIOMASSA ALGA *Tetraselmis Sp* DENGAN PELAPISAN SILIKA MAGNETIT UNTUK ADSORPSI ION Pb (II) DAN Cu(II)**

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Pada penelitian ini telah dilakukan sintesis hibrida alga silika (HAS), dan HAS-magnetit yang dianalisis dengan menggunakan spektrofotometer inframerah (IR), Scanning Electron Microscope (SEM), dan spektrofotometer serapan atom (SSA). Identifikasi gugus fungsi HAS, dan HAS-magnetit yang dilakukan dengan menggunakan spektrofotometer inframerah (IR) terdapat tambahan serapan baru yang terdapat pada bilangan gelombang  $2924,09 \text{ cm}^{-1}$  yang berasal dari serapan vibrasi ulur C-H dari (-CH<sub>2</sub>) alifatik menunjukkan bahwa hibridisasi silika dengan biomassa alga *Tetraselmis sp* telah berhasil dilakukan pada HAS maupun HAS-magnetit. Analisis morfologi permukaan pada adsorben dilakukan menggunakan instrumentasi Scanning Electron Microscope (SEM). Pada mikrograf magnetit bersifat kristalin dan pada mikrograf silika magnetit cenderung bersifat amorf. Sedangkan pada mikrograf HAS bersifat amorf dan HAS-magnetit bersifat kristalin. Data kinetika adsorpsi ion Pb (II) dan Cu (II) pada alga, HAS, dan HAS-magnetit cenderung mengikuti model kinetika pseudo orde dua. Isoterm adsorpsi ion Pb (II) dan Cu (II) pada alga, HAS dan HAS-magnetit cenderung mengikuti model isoterm Freundlich.

Kata kunci: adsorpsi, isoterm, alga *Tetraselmis sp*, HAS, dan HAS-magnetit