

ABSTRAK

SINTESIS HIBRIDA ALGA *Porphyridium* sp. DENGAN TEKNIK PELAPISAN SILIKA MAGNETIT (Fe₃O₄) SEBAGAI ADSORBEN ZAT WARNA KRISTAL VIOLET

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Pada penelitian ini telah dilakukan sintesis adsorben hibrida alga *Porphyridium* sp. menggunakan teknik pelapisan silika (HAS) dan hibrida alga *Porphyridium* sp. dengan teknik pelapisan silika magnetit, Fe₃O₄ (HASM). Adsorben hasil sintesis dikarakterisasi menggunakan spektrofotometer inframerah (IR) untuk mengidentifikasi gugus fungsi yang terdapat pada adsorben, *X-Ray Diffraction* (XRD) untuk menentukan tingkat kekristalan terutama dari hasil modifikasi HAS dan magnetit serta *Scanning Electron Microscopy with Energi Dispersive X-Ray* (SEM-EDX) untuk menganalisis morfologi permukaan dan komposisi unsur dalam adsorben. Hasil adsorpsi kristal violet terhadap HAS dan HASM dianalisis dengan menggunakan spektrofotometer UV-Vis. Tingkat optimum adsorpsi kristal violet terhadap adsorben HAS dan HASM terjadi pada pH 8 dengan waktu kontak 120 menit. Laju adsorpsi kristal violet terhadap HAS dan HASM cenderung mengikuti model kinetika pseudo orde dua dengan nilai k_2 masing – masing sebesar $0,477 \times 10^{-5}$ dan $0,046 \times 10^{-5}$ g mmol⁻¹ menit⁻¹ serta nilai koefisien korelasi (R^2) mendekati 1. Isoterm adsorpsi kristal violet terhadap HAS dan HASM cenderung mengikuti model isoterm Freundlich.

Kata Kunci : Alga *Porphyridium* sp., Silika, Hibrida Alga Silika, Magnetit, Kristal Violet.

ABSTRACT

SYNTHESIS *Porphyridium* sp. ALGAE HYBRID USING THE COATING TECHNIQUE OF MAGNETITE (Fe₃O₄) SILICA AS AN ADSORBENT OF CRYSTAL VIOLET DYES

By

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This study has been carried out the synthesis of the hybrid adsorbent algae *Porphyridium* sp. using silica coating (HAS) and *Porphyridium* sp. algae hybrid with magnetite silica coating technique, Fe₃O₄ (HASM). The synthesized adsorbent was characterized using an infrared spectrophotometer (IR) to identify the functional groups contained in the adsorbent, *X-Ray Diffraction* (XRD) to determine the crystallinity is mainly modify by HAS and magnetite and then *Scanning Electron Microscopy with Energy Dispersive X-Ray* (SEM-EDX) to analyze surface morphology and element composition in the adsorbent. The results of crystal violet adsorption on HAS and HASM were analyzed using a UV-Vis spectrophotometer. The optimum level of crystal violet adsorption for HAS and HASM adsorbents occurred at pH 8 with a contact time of 120 minutes. The rate of crystal violet adsorption on HAS and HASM tends to follow the second order pseudo kinetics model with the values of k_2 is $0,477 \times 10^{-5}$ and $0,046 \times 10^{-5} \text{ g mmol}^{-1} \text{ minute}^{-1}$ and then the correlation coefficient (R^2) is close to 1. Crystal violet adsorption isotherms for HAS and HASM tend to follow the Freundlich isotherm model.

Keyword: *Porphyridium* sp. Algae, Silica, Silica Algae Hybrids, Magnetite, Crystals Violet.