

ABSTRACT

*Dye contamination in water environments has recently occurred, especially in developing countries. Coal fly ash which has been considered as waste, in fact it has the potential to be used as an adsorbent, but needs innovative applications to be more easily to applied. This study aims to determine the ability of the raw fly ash (RFA), fly ash with alkaline hydrothermal activation (AFA), and AFA which encapsulate with elephant foot yam (*Amorphophallus campunalatus*) glucomannan (AFA-Suweg) as methylene blue dye adsorbent. The adsorption process was run on batch method with variation of adsorbent dose, acidity of adsorbate solution, contact time and initial concentration of adsorbate. The adsorption data result, SEM image and FTIR spectra indicate activation successfully effect. The results showed that the adsorption process of these three adsorbents fit to Langmuir isotherm model. Adsorption capacity based on Langmuir model for RFA, AFA and AFA-Suweg was 2.3 mg/g; 10.0 mg/g and 10.3 mg/g.*

Key words : *Adsorption, Amorphophallus campunalatus, Encapsulation, Fly Ash, Methylene Blue*

ABSTRAK

*Pencemaran zat warna di lingkungan air oleh efluen limbah industri marak terjadi, khususnya di negara-negara berkembang. Fly ash batubara yang selama ini dianggap sebagai limbah, nyatanya memiliki potensi sebagai adsorben, namun perlu inovasi penerapan agar lebih mudah untuk digunakan di lapangan. Penelitian ini bertujuan untuk mengetahui kemampuan fly ash (RFA), fly ash yang diaktivasi secara alkali hidrotermal (AFA), dan AFA yang dienkapsulasi menggunakan glukomannan umbi suweg (*Amorphophallus campunalatus*) (AFA-Suweg) sebagai adsorben zat warna methylene blue. Proses adsorpsi dilakukan secara batch dengan variasi dosis adsorben, pH larutan adsorbat, waktu kontak dan konsentrasi awal adsorbat. Hasil data adsorpsi, citra SEM dan spektra FTIR menunjukkan keberhasilan aktivasi. Hasil penelitian menunjukkan proses adsorpsi ketiga jenis adsorben mengikuti model isoterm Langmuir. Kapasitas adsorpsi berdasarkan model Langmuir untuk RFA, AFA dan AFA-Suweg berturut-turut senilai 2,3 mg/g; 10,0 mg/g dan 10,3 mg/g.*

Kata kunci : Abu Terbang, Adsorpsi, *Amorphophallus campunalatus*, Biru Metilen, Enkapsulasi