SINTESIS BIOKOMPOSIT BERBAHAN DASAR DARI LIMBAH PERTANIAN TERLAPISI NATRIUM ALGINAT DAN APLIKASINYA DALAM ADSORPSI ZAT WARNA METILEN BIRU

ABSTRAK

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Telah dilakukan penelitian mengenai sintesis material biokomposit adsorben dari limbah pertanian kulit kacang tanah dan sekam padi yang dilapisi dengan natrium alginat. Limbah pertanian diayak dengan ukuran 150 μm, diaktivasi dengan HNO_3, disonikasi dan dienkapsulasi dengan $CaCl_2$ 0,5 M. Material yang telah disintesis dikarakterisasi dengan *Fourier Transform Infra Red* (FTIR), *Scanning Electron Microscopy* (SEM), *X -Ray Difraction* (XRD). Hasil Adsorpsi zat warna metilen biru menunjukkan pH optimum adsorpsi terjadi pada pH 11, variasi massa menggunakan massa 0,05; 0,075; 0,1; dan 1,5 gram. Variasi konsentrasi dari 10, 20, 30, 40, dan 50 ppm. Penentuan isoterm adsorpsi mengikuti model Freundlic, sedangkan kinetika reaksi mengikuti orde kedua-semu linear tipe 2. Variasi suhu digunakan untuk penentuan efek termodinamika yang menunjukkan adsorpsi reaksi adsorpsi terjadi secara spontanitas dan endotermik.

Kata Kunci: adsorpsi, natrium alginat, metilen biru

SYNTHESIS OF BIOCOMPOSITE BASED ON AGRICULTURAL WASTE COATED WITH SODIUM ALGINATE AND ITS APPLICATIONS IN ADSORPTION OF METHYLENE BLUE

ABSTRACT

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The synthesis of adsorbent biocomposite materials from agricultural waste peanut shells and rice husks coated with sodium alginate has been carried out. Agricultural waste was sieved with 150 m, activated with HNO3, sonicated and encapsulated with 0.5 M CaCl2. The synthesized material was characterized by Fourier Transform Infra-Red (FTIR), Scanning Electron Microscopy (SEM), and X-Ray Diffraction (XRD). The adsorption results of methylene blue dye showed that the optimum pH of adsorption occurred at pH 11; the mass variation used a mass of 0.05; 0.075; 0.1; and 1.5 grams. Concentration variations of 10, 20, 30, 40, and 50 ppm. Determination of the adsorption isotherm followed the Freundlich model, while the reaction kinetics followed a quasi-linear second-order type 2. Temperature variations were used to determine the thermodynamic effect, which indicated that the adsorption reaction occurred spontaneously and endothermically.

Keywords: adsorption, sodium alginate, methylene blue