

ADSORPSI COOMASSIE BRILLIANT BLUE DENGAN NANOPARTIKEL ALGINAT-KITOSAN

Jihan Arlia Putri
16/398569/PA/17530

INTISARI

Studi adsorpsi *coomassie brilliant blue* (CBB) dengan nanopartikel alginat-kitosan telah dilakukan. Studi ini bertujuan untuk membuat nanopartikel alginat-kitosan sebagai adsorben untuk mengadsorp CBB, mempelajari pengaruh pH, massa adsorben, waktu kontak, dan konsentrasi awal CBB terhadap kemampuan nanopartikel alginat-kitosan dalam mengadsorp CBB, dan mempelajari kinetika dan isoterm adsorpsi CBB dengan nanopartikel alginat-kitosan.

Penelitian ini dilakukan dengan mensintesis nanopartikel alginat-kitosan dengan membuat emulsi alginat-kitosan kemudian ditetaskan natrium tripolifosfat (TPP) dan CaCl_2 . CBB sebelum dan sesudah adsorpsi di uji absorbansinya dengan spektrofotometer UV-Vis. Nanopartikel kemudian dikarakterisasi dengan spektrofotometer inframerah (FT-IR), *Scanning Electron Microscopy* (SEM), *Transmission Electron Microscopy* (TEM), dan Zetasizer.

Hasil yang diperoleh dari penelitian ini yaitu nanopartikel alginat-kitosan mampu mengadsorp dengan kapasitas adsorpsi sebesar 14,90 mg/g pada pH 2, massa teradsorp sebesar 0,45 mg dengan massa adsorben 0,05 g, kapasitas adsorpsi sebesar 9,58 mg/g pada waktu kontak 90 menit, dan kapasitas adsorpsi sebesar 53,25 mg/g pada konsentrasi awal adsorbat 100 ppm. Nanopartikel alginat kitosan merupakan serbuk berwarna putih gading memiliki permukaan kasar dengan ukuran rata-rata 50,62 nm. Proses adsorpsi zat warna CBB mengikuti kinetika orde dua semu dan mengikuti model isoterm Dubinin-Radushkevich.

Kata kunci: adsorpsi, alginat, *coomassie brilliant blue*, kitosan, nanopartikel

ADSORPTION OF COOMASSIE BRILLIANT BLUE BY ALGINATE-CHITOSAN NANOPARTICLES

Jihan Arlia Putri
16/398569/PA/17530

ABSTRACT

The adsorption studies of coomassie brilliant blue (CBB) have been carried out by alginate-chitosan nanoparticles. The purposes of this study are to synthesize alginate-chitosan nanoparticles as an adsorbent to adsorb CBB, analyze the effect of pH, adsorbent mass, contact time, and the initial concentration of the adsorbate on the ability of alginate-chitosan nanoparticles to adsorb CBB, and study the kinetics and adsorption isotherm model of CBB adsorption by alginate-chitosan nanoparticles.

This research was performed by synthesizing alginate-chitosan nanoparticles by making an alginate-chitosan emulsion then dropped with sodium tripolyphosphate and CaCl_2 . CBB before and after adsorbed were analyzed for their absorbance using a UV-Vis spectrophotometer. The nanoparticles were characterized by an infrared spectrophotometer (FT-IR), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Zetasizer.

The results obtained from this study were that the alginate-chitosan nanoparticles were able to adsorb CBB with a maximum adsorption capacity of 14.90 mg/g at pH 2, the adsorbed mass was 0.45 mg at a mass of 0.05 g, a maximum adsorption capacity of 9.58 mg/g at the contact time of 90 min, and a maximum adsorption capacity of 53.25 mg/g at the initial concentration of 100 ppm adsorbate. Alginate-chitosan nanoparticles were ivory white powder that has a rough surface with an average size of 50.62 nm. The adsorption process of CBB followed pseudo-second order kinetics and the Freundlich isotherm model.

Keyword: adsorption, alginate, chitosan, coomassie brilliant blue, nanoparticles