

**SINTESIS KOMPOSIT KITOSAN-MAGNETIT TERMODIFIKASI ASAM OLEAT DAN APLIKASINYA SEBAGAI ADSORBEN ZAT WARNA REMAZOL YELLOW FG**

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**INTISARI**

Telah dilakukan adsorpsi *Remazol Yellow FG* oleh komposit kitosan-magnetit termodifikasi asam oleat. Penelitian ini bertujuan untuk melakukan sintesis komposit kitosan-magnetit termodifikasi asam oleat (KMTAO), mempelajari pengaruh variasi perlakuan terhadap adsorpsi zat warna *Remazol Yellow FG* oleh komposit, mempelajari kinetika adsorpsi dan isoterm adsorpsi zat warna, serta melakukan *recovery* adsorben dengan memanfaatkan sifat kemagnetan komposit.

Sintesis magnetit dilakukan dengan metode kopresipitasi, yaitu dengan menambahkan larutan  $\text{NH}_4\text{OH}$  ke dalam larutan yang mengandung campuran  $\text{Fe}^{3+}$  dan  $\text{Fe}^{2+}$  dan ditambahkan asam oleat. Dalam sintesis komposit, kitosan dan magnetit TAO ditambahkan ke dalam larutan asam asetat. Campuran kemudian ditambahkan larutan glutaraldehid dan dibiarkan terjadi reaksi kait-silang. Komposit dikumpulkan dengan pemisahan secara magnetik, lalu magnetit akan dikompositkan dengan kitosan dan dimodifikasi menggunakan asam oleat, lalu dikarakterisasi dengan *Fourier Transform Infrared (FTIR)*, *X-Ray Diffractometer (XRD)*, *Scanning Electron Microscopy (SEM)*, dan *Vibrating Sampel Magnetometer (VSM)*.

Hasil penelitian menunjukkan bahwa komposit kitosan-magnetit termodifikasi asam oleat telah berhasil disintesis. Ukuran partikel komposit berkisar antara 11,62- 28,14 nm. Hasil kajian adsorpsi *Remazol Yellow FG* oleh komposit KMTAO menunjukkan bahwa adsorpsi maksimal terjadi pada pH 4. Kajian kinetika adsorpsi *Remazol Yellow FG* oleh komposit KMTAO mengikuti kinetika orde dua semu dengan harga k sebesar  $0,057 \text{ g mg}^{-1} \text{ menit}^{-1}$ . Data isotermal adsorpsi mengikuti model Isoterm Freundlich dengan nilai kapasitas adsorpsi sebesar  $1,907 \text{ L g}^{-1}$ .

Kata kunci: Adsorpsi, Asam oleat, Kitosan, Komposit, Magnetit

## **SYNTHESIS OF OLEIC ACID MODIFIED CHITOSAN-MAGNETITE COMPOSITE AND THE APPLICATION AS ADSORBENT OF REMAZOL YELLOW FG DYES**

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### **ABSTRACT**

Adsorption of Remazol Yellow FG using chitosan-magnetite composite modified by oleic acid has been done. This research's purposes were to synthesize oleic acid modified chitosan-magnetite composite (KMTAO), to study the effect of various treatments on the adsorption of Remazol Yellow FG by composite, to study the adsorption kinetics and adsorption isothermal of dyes, and to recover the adsorbent by using the magnetic effect of the composite.

Magnetite synthesis was performed with coprecipitation method, by adding aqueous  $\text{NH}_4\text{OH}$  to a solution containing  $\text{Fe}^{3+}$  and  $\text{Fe}^{2+}$  followed by added oleic acid. In composite synthesis, chitosan and magnetic modified oleic acid were added to acetic acid solution. The mixture was added by glutaraldehyde solution and aged to perform the cross-linking reaction. Composite was collected by magnetic separation and will be composited with chitosan and modified using oleic acid, and was characterized with Fourier Transform Infrared (FTIR), X-Ray Diffractometer (XRD), Scanning Electron Microscopy (SEM), and Vibrating Sample Magnetometer (VSM).

The results showed that magnetite-chitosan composite modified oleic acid was successfully synthesized. The particle size of composite was around 11.62–28.14 nm. The adsorption study of Remazol Yellow FG on KMTAO composite showed the maximum adsorption occurs at pH 4. The adsorption kinetic study of Remazol Yellow FG belongs to the pseudo second order kinetic with the value of  $k$   $0.057 \text{ g mg}^{-1} \text{ min}^{-1}$ . Adsorption isothermal data followed the Freundlich isotherm model with the value of adsorption capacity at  $1.907 \text{ L g}^{-1}$ .

Keywords: Adsorption, Chitosan, Composite, Magnetite, Oleic acid