

## **SINTESIS SELULOSA TERMODIFIKASI POLIETILENIMINA (PEI) TERTAUT SILANG GLUTARALDEHID SEBAGAI ADSORBEN ZAT WARNA ALIZARIN RED S**

Kania Sandrina Dewinta  
20/462229/PA/20201

### **INTISARI**

Penelitian mengenai sintesis adsorben selulosa ampas tebu termodifikasi polietilenimina (PEI) tertaut silang glutaraldehyd sebagai adsorben zat warna alizarin red s telah dilakukan. Tujuan dari penelitian ini, yaitu melakukan sintesis adsorben selulosa-ampas tebu termodifikasi polietilenimina (PEI) tertaut silang glutaraldehyd (SEL-GAL-PEI), menentukan pH optimum adsorpsi, dan menentukan model isoterm adsorpsi serta menentukan model kinetika adsorpsi zat warna alizarin red s menggunakan adsorben SEL-GAL-PEI. Pembuatan adsorben berbasis selulosa ini dilakukan melalui proses isolasi dari ampas tebu dengan proses hidrolisis, delignifikasi, dan *bleaching*.

Adsorben SEL-GAL-PEI dibuat dengan mensintesis selulosa ampas tebu dan dimodifikasi dengan polietilenimina yang ditautsilangkan menggunakan glutaraldehyd. Hasil dari sintesis ini kemudian dikarakterisasi dengan menggunakan spektrofotometer FT-IR, XRD, dan SEM-EDX. Hasil penelitian menunjukkan bahwa adsorben SEL-GAL-PEI stabil pada semua variasi pH. Adsorpsi zat warna alizarin red s menggunakan adsorben SEL-GAL-PEI dilakukan pada pH optimum yaitu pH 2, serta waktu kontak optimum adsorpsi terjadi pada 40 menit. Model isoterm yang digunakan pada adsorpsi zat warna alizarin red s menggunakan adsorben SEL-GAL-PEI, yaitu model isoterm Langmuir ( $q_{\max} = 30,34 \text{ mg g}^{-1}$ ) serta model kinetika orde dua semu ( $k = 2,29 \times 10^{-2} \text{ g mg}^{-1} \text{ menit}^{-1}$ ). Uji desorpsi membuktikan bahwa larutan NaOH 0,1 M merupakan larutan yang paling efektif dalam mendesorpsi zat warna alizarin red s.

Kata kunci: adsorpsi, alizarin red s, glutaraldehyd, polietilenimina.

***SYNTHESIZE OF CELLULOSE MODIFIED POLYETHYLENEIMINE  
(PEI) CROSS-LINKED BY GLUTARALDEHYDE AS AN ADSORBENT OF  
ALIZARIN RED S DYE***

Kania Sandrina Dewinta  
20/462229/PA/20201

**ABSTRACT**

Research on the synthesise of cellulose modified polyethylenimine (PEI) cross-linked by glutaraldehyde as an adsorbent of alizarin red s dye was carried out. The aims of this analysis were to synthesize the cellulose-bagasse modified with polyethylenimine (PEI) cross-linked by glutaraldehyde as an adsorbent and to determine the optimum pH of alizarin red s adsorption, determine the adsorption isotherm and kinetic model of alizarin red s using cellulose-glutaraldehyde-polyethylenimine (SEL-GAL-PEI) adsorbent. Cellulose-based adsorbent was prepared through the isolation process from bagasse using hydrolysis, delignification, and bleaching processes.

SEL-GAL-PEI adsorbent was made by synthesizing cellulose from bagasse and modified with polyethylenimine (PEI) and cross-linked using glutaraldehyde. The results of the synthesise were characterized using FT-IR, XRD, and SEM-EDX spectrophotometers. The results showed that the SEL-GAL-PEI adsorbent was stable in all pH variation. Adsorption of alizarin red s using SEL-GAL-PEI adsorbent was carried out at an optimum pH 2 while the optimum contact time for adsorption occurs at 40 minutes. Adsorption of alizarin red s using SEL-GAL-PEI adsorbent showed that followed the Langmuir isotherm model ( $q_{\max} = 30.34 \text{ mg g}^{-1}$ ) and the pseudo-second-order kinetics model ( $k = 2.29 \times 10^{-2} \text{ g mg}^{-1} \text{ min}^{-1}$ ). The desorption test declare that a 0.1 M NaOH solution was the most effective solution for desorption of alizarin red s dye.

Keywords: adsorption, alizarin red s, glutaraldehyde, polyethylenimine