SORPTION OF CRYSTAL VIOLET FROM AQUEOUS SOLUTION USING CHITOSAN−CHARCOAL COMPOSITE

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Abstract- The study investigated the removal efficiency of Crystal violet from aqueous solution using chitosan− charcoal composite as adsorbent. Deproteination was carried out by placing 200g of powdered snail shell in 4% w/v NaOH for 2hours. The sample was then placed in 1% HCl for 24hours to remove $CaCO_3$. Deacetylation was done by boiling in 50% NaOH for 2hours. 10% Oxalic acid was used to dissolve the chitosan before mixing with charcoal at 55^0C to form the composite. The composite was characterized by Fourier Transform Infra-Red and Scanning Electron Microscopy measurements. The efficiency of adsorption was evaluated by varying pH of the solution, contact time, initial concentration and adsorbent dose. Maximum removal of crystal violet by composite and activated charcoal was attained at pH10 while maximum removal of crystal violet by chitosan was achieved at pH 8. The results showed that adsorption of both dyes followed the pseudo-second –order rate equation and fit the Langmuir and Freundlich isotherms. The data showed that composite was best suited for crystal violet removal. Thermodynamic parameters such as enthalpy change (ΔH^o), free energy change (ΔG^o) and entropy change (ΔS^o) indicate that adsorption process of Crystal violet was endothermic, spontaneous and feasible respectively.

Keywords- crystal violet, chitosan−charcoal composite, extraction process, sorption

Biography:

IKEKE KINGSLEY is principal instructor in the Department of Science Laboratory Technology, Edo State Institute of Technology and Management, Usen. He started his academic career when he joined the Institute as an Instructor in 2006. He has risen through academic and administrative position and he is currently the Head, Department of Science Laboratory Technology, Edo State Institute of Technology and Management, Usen. He is a researcher with two post graduate degrees.

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