

Biosorption of Chromium (VI) Ions Using Polyaniline Coated Maize Tassels

Authors : F. Chigondo, G. Chitabati

Abstract : Hexavalent chromium is toxic and is widely used in many industries hence efficient and economical methods must be explored to remove the chromium(VI) from the environment. The removal of Cr (VI) from aqueous solutions onto polyaniline coated maize tassel was studied in batch mode at varying initial metal concentrations, adsorbent doses, pH and contact times. The residual Cr (VI) concentrations before and after adsorption were analyzed by Ultraviolet-visible spectroscopy. FTIR analysis of the polyaniline coated maize tassel showed the presence of C=C, C=N, C-H, C-N and N-H groups. Adsorption conditions were deduced to be pH of 2, adsorbent dosage 1g/L, Cr(VI) initial concentration of 40mg/L contact time of 150 minutes and agitation speed of 140rpm. Data obtained fitted best to the Langmuir isotherm ($R^2 = 0.972$) compared to the Freundlich isotherm ($R^2 0.671$). The maximum adsorption capacity was found to be 125mg/L. Correlation coefficients for pseudo first order and pseudo second order were 0.952 and 0.971 respectively. The adsorption process followed the pseudo-second order kinetic model. The studied polyaniline coated maize tassel can therefore be used as a promising adsorbent for the removal of Cr (VI) ion from aqueous solution.

Keywords : polyaniline-coated, maize tassels, adsorption, hexavalent chromium

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020