

Impact of Ph on Cr (VI) Ions Remediation from Contaminated Water Using Endod Saponin-Chitosan-Zeolite-Metal Oxide Nanocomposite

Beatrice Anyangó*, Pauline Nawiri, Hudson Nyambaka, and Dickson Andala

Abstract

Abstract – Contamination of water bodies by heavy metals due to discharge of metal containing effluents into the water bodies is one of the environmental issues. Long term exposure of Cr (VI) levels of over 0.1ppm causes respiratory problems, kidney and liver damage. Sorption has proved to be the most efficient method of removal of toxic heavy metals from wastewater because of easy operation and availability of cheap adsorbents. This study aimed at removing Cr (VI) ion from contaminated water. Impact of pH was studied in the removal of Cr (VI) ions. The study involved assembling chitosan impregnated with saponin and zeolite. In addition, the oxides and hydroxides of Iron and Aluminum were cross linked in the matrix. Chitosan was the only biopolymer in the matrix. Batch experiments were carried out to investigate the impact of pH. The adsorption of Cr (VI) ions as a function of pH was in the initial pH range of 1 to 8. The results indicated that acidic pH strongly favored the adsorption. The Langmuir model was used as experimental data. The data obeyed the Langmuir model ($R^2=0.99$) which shows a multilayer adsorption of Cr (VI) onto the heterogeneous surface. FTIR spectroscopy, XRD analysis were done on the adsorbent before Cr (VI) attachment. This study concluded that adsorption of Cr (VI) was pH depended, removal efficiency of the nanocomposite increased with decreasing pH. Maximum removal was at pH 2 where about 1.1ppm was the residual chromium concentration from an initial of 10ppm.

https://www.researchgate.net/profile/Hudson-Nyambaka/publication/349767660_Impact_of_Ph_on_Cr_VI_Ions_Remediation_from_Contaminated_Water_Using_Endod_Saponin-Chitosan-Zeolite-Metal_Oxide_Nanocomposite/links/611546ac0c2bfa282a3eb95b/Impact-of-Ph-on-Cr-VI-Ions-Remediation-from-Contaminated-Water-Using-Endod-Saponin-Chitosan-Zeolite-Metal-Oxide-Nanocomposite.pdf