REMOVALOF Cu(II) AND Cr(III) IONS BY HUMIC ACID EXTRACTED FROM MUTHURAJAWELA PEAT

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Water is an essential component for the continuation of life. The usage of water increases day by day with the global increase of animal and human population. Being the most intelligent living beings of the world, humans have discovered many innovations to make the life comfortable. The major drawbacks of these discoveries are pollution of the environment, specifically water, making treatment of water a necessity. Consequently, many water treatment methods have been developed during the past few decades, among which the use of adsorbents for treatment of wastewater is an environmentally friendly and a cost effective approach. Peat is one such adsorbent introduced lately through many scientific studies. Humic acid comprises approximately 30% peat, and it is a major supportive component for the removal of heavy metals from contaminated water. Therefore, it is relevant to understand the efficiency of heavy metal removal from humic acid.

Although different types of natural adsorbents are available, recently invented adsorbents used in the industrial scale are synthetic. Therefore, promotion of the use of low cost, natural adsorbents is of highly significance. Humic acid, extracted from Muthurajawela peat, whose characteristics are similar to those of an authentic sample of humic acid, has shown higher removal efficiency for Cu(II) than that of Cr(III). Significant changes in the surface morphology and the bonding environment of the humic factor are obsereved during the removal. The point of zero charge of extracted humic acid lies at pH of 3.7, and the surface charge of humic acid becomes negative with increasing solution pH. The adsorption studies of humic acid with Cu(II) and Cr(III) gave adsorption capacities of 20,000 mg kg^{-1} and 1500 mg kg^{-1}, respectively. The removal mechanism of Cu(II) and Cr(III) by humic acid neither follows the Langmuir isotherm model nor the Freundlich model. Interaction of humic acid with Cu(H) and Cr(III) ions followed pseudo second order kinetics with the regression coefficients of 0.999 and 0.989, respectively. Interferences of NO_3^-, Na^+, K^+, PO_4^{3-}, SO_4^{2-} and Al^{3+} ions on Cu(II) removal by humic acid is comparatively low. Therefore, there is higher tendency to decrease the removal efficiency due to interference effects. Humic acid shows higher affinity to remove Cu(II) form wastewater than Cr(III). Therefore, humic acid is suggested as a selective adsorbent for Cu(II) removal.