World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:13, No:10, 2019

A Study of Anthraquinone Dye Removal by Using Chitosan Nanoparticles

Authors : Pyar S. Jassal, Sonal Gupta, Neema Chand, Rajni Johar

Abstract : In present study, Low molecular weight chitosan naoparticles (LMWCNP) were synthesized by using low molecular weight chitosan (LMWC) and sodium tripolyphosphate for the adsorption of anthraquinone dyes from waste water. The ionic-gel technique was used for this purpose. Size of nanoparticles was determined by “Scherrer equation”. The absorbance was carried out with UV-visible spectrophotometer for Acid Green 25 (AG25) and Reactive Blue 4 (RB4) dyes solutions at λmax 644 and λmax 598 nm respectively. The removal of dyes was dependent on the pH and the optimum adsorption was between pH 2 to 9. The extraction of dyes was linearly dependent on temperature. The equilibrium parameters, RL was calculated by using the Langmuir isotherm and shows that adsorption of dyes is favorable on the LMWCNP. The XRD images of LMWC show a crystalline nature whereas LMWCNP is amorphous one. The thermo gravimetric analysis (TGA) shows that LMWCNP thermally more stable than LMWC. As the contact time increases, percentage removal of Acid Green 25 and Reactive Blue 4 dyes also increases. TEM images reveal the size of the LMWCNP were in the range of 45-50 nm. The capacity of AG25 dye on LMWC was 5.23 mg/g, it compared with LMWCNP capacity which was 6.83 mg/g respectively. The capacity of RB4 dye on LMWC was 2.30 mg/g and 2.34 mg/g was on LMWCNP.

Keywords : low molecular weight chitosan nanoparticles, anthraquinone dye, removal efficiency, adsorption isotherm
Conference Title : ICWPRW 2019 : International Conference on Water Pollution, Recycle and Wastewater
Conference Location : London, United Kingdom
Conference Dates : October 23-24, 2019