

Waste Water Treatment with Surfactant-Modified Fuller's Earth for Removal of Acid Blue 29. A Statistical Approach

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In this work, Fuller's earth modified with sodium dodecyl sulphate was investigated for removal of Acid blue 29 dye from waste water samples. The effect of various parameters on batch adsorption experiments and various kinetics, isotherms and mass transfer mechanisms were studied. About 98.5% adsorption efficiency was achieved within 60 min at pH 3. The pseudo-second-order kinetics model and Dubinin-Radushkevich isotherm model were found best fit to the adsorption data with correlation value ($R^2=0.999$). In statistical evaluation, the individual as well as the interaction effect of various factors on adsorption was investigated and it was observed that concentration, pH and adsorbent dose are the significant factors with p values of 0.0001, 0.004 and 0.006 respectively. The coefficient of determination ($R^2=0.930$) shows that % adsorption is highly dependent on the studied factors and their interactions. The adsorbent shows higher adsorption capacity of 1514.3 mg g^{-1} with 3 regeneration cycles.

Keywords: sodium dodecyl sulphate, fuller's earth, acid blue 29, isotherms, adsorption kinetics