Removal of different dyes from aqueous solution by agricultural waste products

Osama Emam Elsayed Mostafa

The present study was performed to examine the ability of some agricultural waste products to adsorb basic dyes from aqueous solutions. Three dyes were used for this purpose which are: methylene blue, crystal violet and malachite green. The main parts of the thesis are: Introduction, Materials and Methods, Results and Discussion, and References. The Introduction part contains an important part about the types of dyes according their chemical structure. General methods of dye removal from aqueous solutions were introduced also in this part. A survey of the adsorption methods used for dye removal from water was included.In the second chapter, an explanation of different apparatus and methods used in this study was introduced. It also includes the methods used for preparation of different solutions of dyes and the methods of preparation of different adsorbents. In the Results and Discussion chapter, different results obtained from the experimental work were mentioned and discussed. Different parameters examined for evaluation and optimization of the proposed method were: contact time between the dye solution and the adsorbent, pH of the working solution, stirring rate, ionic strength, initial concentration of the dye solution, dose of adsorbent and the temperature of the working solution. Three adsorption isotherms; Langmuir, Freundlich and Temkin, were examined to evaluate the adsorption process. The data were in good agreement with Langmuir isotherm model for all dyes with all adsorbents used (high values of R2), while Freundlich isotherm model could be applied for the adsorption of MB on water hyacinth and sawdust (R2 > 0.95). The application of Temkin model for different dyes showed that this model could be applied only to MB on water hyacinth and sawdust. The effect of temperature on the adsorption process was examined by using different temperatures (35, 45 and 55 Co). For all cases, the adsorption increased with increasing temperature in the studied range. The change of adsorption capacity has a different value depending on both the dye and adsorbent used. In the last chapter, a list of the references used throughout this work.