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Adsorption Studies of Textile Dye (Chrysoidine) from Aqueous Solutions Using Activated Sawdust
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Abstract
Chrysoidine is a type of industrial azo dye and a well-known toxicant. Due to its good dyeing characteristics, it is widely used for dyeing leather, paper, feather, grass, wood, bamboo, etc. Hence, it is very important to remove or reduce its concentration below the contamination level in the waste line by using low-cost technologies. Sawdust is a plentiful material available very cheaply from sawmills and woodworks. Therefore, the present work was conducted to study sorption ability of both raw sawdust and chemically activated sawdust carbon on the removal of chrysoidine from the aqueous solutions. Adsorption isotherms of the dye on sawdust were determined and correlated with usual isotherm equations like Freundlich and Langmuir. Experimental results have shown that sawdust has a high adsorption efficiency, and the adsorption of chrysoidine followed Freundlich's isotherm. Although raw sawdust proved to be slightly less efficient in comparison to chemically treated sawdust but in economic terms, raw sawdust is more cost-effective as the difference in the percent dye removal is less than the difference in the manufacturing costs. The influence of several parameters such as effect of temperature, adsorbent dose, adsorption time, etc., on the adsorption process was studied along with thermodynamic parameters such as enthalpy (ΔH°) and entropy (ΔS°). © 2019 Muhammad Waqar Ashraf et al.

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