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A critical review on recent developments in the low-cost adsorption of dyes from wastewater

P. Senthil Kumar[a,*], G. Janet Joshiba[a], Carolin C. Femina[a], P. Varshini[a], S. Priyadharshini[a], M.S. Arun Karthick[a], R. Jothirani[b]

[a]*Department of Chemical Engineering, SSN College of Engineering, Chennai 603 110, India, Tel. +919884823425; email: senthilchem8582@gmail.com (P. Senthil Kumar), Tel. +9790818301; email: janujosh21@gmail.com (G. Janet Joshiba), Tel. +919003196798; email: feminacarolin@gmail.com (C.C. Femina), Tel. +917338707931; email: varshupaddy@gmail.com (P. Varshini), Tel. +9600624112; email: pspriya2411@gmail.com (S. Priyadharshini), Tel. +9884107060; email: msarunkarthik@gmail.com (M.S. Arun Karthick)*
[b]*Department of Chemistry, Adhiparasakthi Engineering College, Melmaruvathur 603 319, India, Tel. +919444342541; email: jothirani.rk@gmail.com*

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ABSTRACT

Water is one of the most important components in the environment. This is essential for all forms of life and leisurely plays a vital role in the world economy. The discharge of large amount of dye wastewater from different industries such as textile, leather, pulp, rubber pharmaceuticals, food processing, electroplating cosmetics, plastic, paper industries, etc. to the aquatic system constitutes the major hazards to the living environment. Hence, the rapid removal of these dyes from wastewater before their discharge is an important necessity of day to day life as well as for environmental safety. Several traditional treatment methods were available for the removal of dyes from water/wastewater such as chemical coagulation, filtration, flocculation, ozonation, oxidation, photocatalytic degradation, ion exchange, biodegradation, electrolysis and adsorption. Among all these treatment methods, adsorption process using activated carbon is one of the most important, effective and reliable method for the removal of dyes from aquatic system. However, the widespread application of activated carbon is restricted because of its high cost. Therefore, the attention has moved to select the low-cost and efficient adsorbents which are alternative to the existing activated carbon. Some of the natural materials, agricultural wastes, industrial wastes and biosorbents have been reported as an effective low-cost adsorbent for the removal of dyes from aquatic system by many researchers. The current review paper explains the detailed survey on the dye removal methods, and scope for the improvement can be done on the removal of dyes from industrial wastewater.

Keywords: Dyes; Methods; Removal; Adsorption; Wastewater; Toxicity

* Corresponding author.