



Review

A review on recent advances in the treatment of dye-polluted wastewater



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ABSTRACT

The textile effluent has an unfavorable effect on the waterbodies as well as on the human health due to the poor penetration of light by increased turbidity and higher oxygen demands. Therefore, the treatment of dye-polluted wastewater is gaining an urgent attention. This review emphasizes on the state-of-the-art technologies that have been developed for treating dye-polluted wastewater, including chemical, physical, and biological techniques alongside their benefits, challenges, and upcoming prospects. The study concludes that the single process alone may not be appropriate for the treatment of a range of dye-polluted wastewaters and approaching the quality demands as these technologies requires more time and are complex. Literature exhibiting a range of approaches for treating large volumes of effluents without producing secondary pollutants are reviewed. Moreover, the ecological impact was among the main concern due to the loss of catalysts and the production of waste sludge. On the other hand, reusability and regeneration are the integrated strategies to deal with such limitations. This review also provides a detailed environmental and techno-economic analysis, life cycle assessment, and practical implications. Moreover, the key bottlenecks requiring a major consideration concerning the universal appreciation of hybrid frameworks are emphasized.

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