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Chapter 11

Efficient Removal of Methylene Blue Dye from Textile Industry Effluent Using Rice Husk Peanut Shell Biochar: Adsorption Studies, Isotherm Profiling, and Kinetics Analysis



Neha Mumtaz , Tabish Izhar, Syed Aqeel Ahmad, and Md. Jamshaid

Highlights

- A novel type of biochar was prepared by combined pyrolysis of rice husk and peanut shell for methylene blue dye removal from textile wastewater.
- The high surface area and adsorptive capacity of the synthesized biochar resulted in the effective removal of methylene blue dye.
- The process is low-cost, highly efficient, and eco-friendly.

11.1 Introduction

Globally, the chief causes of synthetic dye pollution (Ahmad et al. 2020) in water bodies are wastewater discharge from industries like pharmaceutical and personal care products (PPCPs) (Bai et al. 2021), agro-food industry (Embrandiri et al. 2019), healthcare industry (Mia et al. 2021), plastic (Law et al. 2022), pulp and paper (Wang et al. 2018), rubber (Lin et al. 2019), textile (Ahmad Khan et al. 2022), paints and coatings industry (Wang et al. 2020).

Dye manufacturing is gradually expanding in developing nations such as China and India (Mupa et al. 2018). Methylene blue (MB) (3,7-bis(Dimethylamino)-phenothiazine-5-iumchloride) is a thiazine cationic dye (Dionisio et al. 2018). It is extensively used as a stain in microbiology (Bharti et al. 2019), a chemical reagent, an antimethemoglobinemic drug (Dabholkar et al. 2021), a polymerization inhibitor

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