

**Methylene Blue Adsorption From Aqueous Solutions by
Platanus Orientalis L. Sawdust**

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Abstract

Dyes are one of the most dangerous and considerable water pollutants since some dyes cause toxic or mutagenic, teratogenic and carcinogenic effects on aquatic life and also on humans when present in waters even at low concentrations. Because of the common utilization of cationic dyes in industrial applications, the removal of them from industrial wastewaters is important in terms of protection of public health, environment and aquatic life. The adsorption technique by using a low cost adsorbent represents a powerful alternative for removal of dyes and also other pollutants from aqueous solutions.

In the present study, the natural and H₂SO₄ modified plane sawdust (*Platanus orientalis* L.) has been utilized as a low cost and highly effective adsorbent in removal of a toxic cationic dye, methylene blue (MB), from aqueous solution by batch adsorption technique. The characterization of the adsorbents was performed by Boehm titration, moisture content, pH_{pzc} and FTIR techniques. Then the effects of experimental parameters such as initial pH of the solution, contact time, initial MB concentration, adsorbent concentration, and ionic strength were studied in detail upon the adsorption process. The process was found to be independent from initial solution pH and the adequate time for the adsorption of MB was selected as 120 min. The experimental data were analysed by the Langmuir, Freundlich, Temkin and Dubinin Radushkevich (D-R) isotherm models. The kinetics of the adsorption was tested using pseudo-first order, pseudo-second order, and intraparticle diffusion models. The results showed that the adsorption of MB onto both adsorbents proceeds according to the pseudo-second order model.

The experimental results indicated that the plane sawdust (*Platanus orientalis* L.) can be successfully used for removal of toxic cationic dyes from aqueous solutions.

Keywords: Adsorption, Removal, Methylene blue, Platanus orientalis L.