

# Removal of Methylene Blue from Aqueous Solutions using silica gel derived from Algerian siliceous by- products

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**Abstract:** The effluents of wastewater in some industries contain various kinds of synthetic dyes. Methylene blue is one of the most widely used dyes in textile industries, which, due to toxicity, causes several environmental problems as well as difficulties in wastewater treatment process. Many studies have been carried out on the removal of the dye from industrial wastewater and aqueous solutions using various adsorbents.

In the present study, silica gel adsorbent was synthesized from siliceous by-products of kaolin then methylene blue dye removal from aqueous solution was studied under various operating conditions in batch experiments. The adsorption process was evaluated as a function of various operating parameters such as contact time, pH of the medium, temperature and the initial methylene blue concentration in the dye medium. It was found that, the adsorption process was pH-dependent and the maximum capacity occurs in the media with pH values of 5 to 8. Corresponding to the field of zero charge potential of silica gel. The experimental isotherm data were analyzed using the Langmuir and Freundlich models. The equilibrium data fit well the Langmuir isotherm. The experimental data were analyzed using three kinetic models: the pseudo first order, pseudo second order and intraparticle diffusion models. The pseudo second order model is the one that best describes the adsorption of methylene blue on synthesized silica gel. The results obtained in this study suggest that silica gel derived from Algerian siliceous by- products may be used as an efficient and low cost sorbent material for organic pollutants, and thus represent a promising alternative for eliminating dyes from industrial wastewaters.

## 5. References

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