

Libya
Ministry of Higher Education and Scientific
Research
AL-Asmarya Islamic University
Faculty of Engineering



**STUDY OF BATCH ADSORPTION OF
METHYLENE BLUE IN AQUEOUS SOLUTION
USING PINE ACTIVATED CARBON AS AN
ADSORBENT**

A graduation project is submitted to the Chemical Engineering Department in
partial fulfillment of the requirements for the degree of Bachelor of Science in
Chemical Engineering

BY

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ABSTRACT

Dyes have been widely used in many industries (such as; textile, paper, rubber, pharmaceutical, and food) to color their products. The presence of dyes in wastewater is harmful for human beings, living organism and has toxic effect on microorganism's live. In this study, the removal of methylene blue MB dye from aqueous solutions was investigated. The adsorption studies were carried out by batch experiments using physical activated carbon prepared from the pine tree. The effect of contact time, pH, initial dye concentration, adsorbent dose, particle size, agitation speed, and temperature was explored. In addition, isotherms adsorption studies were estimated for determination of the equilibrium adsorption capacity using two widely applied isotherms: Langmuir, Freundlich. Experimental data were also tested using two kinetic models: the pseudo-first-order model and the pseudo-second-order model. Based on these models, the kinetic parameters (rate constant and equilibrium adsorption capacity) for MB adsorption on AC were calculated.