

Libya
Ministry of Education
AL-Asmarya Islamic University
Faculty of Engineering



**NOVEL RENEWABLE CATALYSTS FOR
PHOTOCATALYTIC OXIDATION OF METHYLENE
BLUE DYE IN AQUEOUS SOLUTION**

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

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ABSTRACT

The present research work reports for the first time, development of novel photocatalysts from date syrup-based biomass and TiO_2 for photocatalytic oxidation of methylene blue (MB dye) in wastewaters. The properties of the derived photocatalysts have been studied using Fourier Transform Infrared spectroscopy (FTIR). The performance for photocatalytic oxidation of MB dye was investigated in batch slurry reactor. The effects of operating conditions including, contact time, photocatalyst amount, pH, initial concentration, and temperature on photocatalytic oxidation behavior of MB dye were investigated. The Langmuir-Hinshelwood kinetic model was applied to study the kinetics of photocatalytic oxidation of MB dye. The results revealed that the derived photocatalysts exhibited an extremely high potential for photocatalytic oxidation of MB dye. A maximum ~88% conversion of MB dye was achieved at 50 °C and atmospheric pressure. The finding of this study may open a new avenue for not only improving the photocatalytic performance in wastewater treatment, but also for further research areas.