

## Photocatalytic Degradation of Phenolic Compounds in Wastewater Using Magnetically Recoverable Catalyst

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**Abstract :** Phenolic compounds (PCs) exist in the wastewater effluents of some industries such as oil refinery, pharmaceutical and cosmetics. Phenolic compounds are extremely hazardous pollutants that can cause severe problems to the aquatic life and human beings if disposed of without treatment. One of the most efficient treatment methods of PCs is photocatalytic degradation. The current work studies the performance of composite nanomaterial of titanium dioxide with magnetite as a photo-catalyst in the degradation of PCs. The current work aims at optimizing the synthesized photocatalyst dosage and contact time as part of the operational parameters at different initial concentrations of PCs and pH values in the wastewater. The study was performed in a lab-scale batch reactor under fixed conditions of light intensity and aeration rate. The initial concentrations of PCs and the pH values were in the range of (10-200 mg/l) and (3-9), respectively. Results of the study indicate that the dosage of the catalyst and contact time for total mineralization is proportional to the initial concentrations of PCs, while the optimum pH conditions for highly efficient degradation is at pH 3. Exceeding the concentration levels of the catalyst beyond certain limits leads to the decrease in the degradation efficiency due to the dissipation of light. The performance of the catalyst for degradation was also investigated in comparison to the pure TiO<sub>2</sub> Degussa (P-25). The dosage required for the synthesized catalyst for photocatalytic degradation was approximately 1.5 times that needed from the pure titania.

**Keywords :** industrial, optimization, phenolic compounds, photocatalysis, wastewater

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