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**DETERMINATION OF ELECTRICAL ENERGY COST
OF DECOLORIZATION OF C.I. ACID ORANGE 7 VIA TiO₂-ASSISTED
PHOTOCATALYSIS UNDER UV ILLUMINATION
IN THE PRESENCE OF H₂O₂**

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Abstract

Decolorization of C.I. Acid Orange 7 (AO7) via TiO₂-assisted photocatalysis under UV illumination in the presence of H₂O₂ has been investigated. The effect of pH on decolorization efficiency of AO7 was investigated in TiO₂/UV/H₂O₂ process. The performance of TiO₂/UV/H₂O₂ system was also evaluated by using synthetic dye-bath effluent of AO7. Solar driven TiO₂ photocatalysis was found significantly efficient for the decolorization and degradation of AO7. The rates of decolorization and degradation of AO7 were found to follow pseudo-first order kinetics. The electrical energy consumption of decolorization of synthetic dye-bath effluent was found to be 4.1 times higher than that of AO7 solution. Similarly, the electrical energy consumption of degradation of synthetic dye-bath effluent was 2.2 times higher than that of AO7 solution under investigated conditions. Considering one order of magnitude reduction in AO7 concentration and COD value, the cost of electrical energy for decolorization and degradation of AO7 solution and synthetic dye-bath effluent of AO7 was calculated.

Keywords: Acid Orange 7, decolorization, figure of merit, solar light, TiO₂/UV/H₂O₂

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