Removal of some Compounds from Bleached Kraft Mill Effluent by UV Oxidation in the Presence of Hydrogen Peroxide Utilizing TiO₂ as Photocatalyst

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Effluents from pulp and paper mills are highly toxic and are a major source of aquatic pollution. Bleached Kraft Mills Effluent (BKME) discharged large volume of brown-colored effluent because of the different operations used in the processing of wood and pulp. These effluents consist of a complex mixture of organic constituents and the composition can be markedly influenced by the type of pulping and bleaching technology employed, wood furnish and the extent of primary and secondary effluent treatment [1-3].

This study aimed to remove adsorbed organic halogen (AOX), total nitorgen and lignin compounds from paper mill industry (4500m³/h) wastewaters, which is discharged to sea from a plant located in the western Turkey. The photocatalytic degradation of AOX, total nitorgen and lignin compounds in photocatalytic reactor has been investigated in different parameters, such as times, H₂O₂ and TiO₂ concentration. The AOX, total nitrogen and chlorinated lignin and pure lignin concentration goes through a minimum when the concentration of H₂O₂ and TiO₂ increases at constant pH and UV intensity. In addition, the photocatalytic degradation kinetics was investigated and was seen as a pseudo-first-order model. From the experimental results, it was seen that kₜ (degradation rate, min⁻¹) values for four compounds with UV/TiO₂/H₂O₂ were higher than that of UV/H₂O₂. The observations of these investigations clearly demonstrate that UV/TiO₂/H₂O₂ process proved capable of degradation of AOX, total nitrogen, and lignin in Bleached Kraft Mill Effluent (BKME).

References

