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PHENOL DEGRADATION STUDY USING DIFFERENT ADVANCED OXIDATIVE PROCESSES

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INTRODUCTION

The wastewater generated from industrial plants such as oil refineries and petrochemical plants, has dischargedin watercourses, cause serious environmental problems. In these effluents is common to find persistent organic pollutants (POP) that even at low concentrations show a high potential carcinogenic and mutagenic as phenol offering risk to the environment, especially the water reaching the flora and fauna. The principal objective of this study was identify and quantify the presences the phenol and their intermediate's products using High Performance Liquid Chromatography (HPLC) and Total Organic Carbon (TOC). In this work has identified of phenol and were evaluated the degradation of these compounds. This degradation was obtained employing Advanced Oxidation Process (AOP):$Fe^{2+}/H_2O_2/UV$ (photo-Fenton) and $TiO_2/H_2O_2/UV$, applying photochemical reactor void bench with UV-A radiation.

MATERIALS AND METHODS

Solution phenol (200 mg.L^{-1}) → **Treatment Annular Reactor** → **Processes (Fe(II)/H2O2/UV)-(TiO2/H2O2/UV)** → **Analysis HPLC /TOC**

RESULTS

The photo-Fenton process was realized under the following conditions, [Fe^{2+}] = 14.15 mg.L^{-1}, [H_2O_2] = 1663.40 mg.L^{-1} at pH 3 at 126.18 minutes(Figure 1a and 2b). It obtained a degradation and mineralization 99.89 and 99.71%, respectively. On $TiO_2/H_2O_2/UV$ method using [TiO_2] = 130.50 mg.L^{-1}, [H_2O_2] = 1350 mg.L^{-1} at pH 6 at 280.91 minutes resulted in 99.99 and 63.40% of phenol degradation and TOC mineralization (Figure 2a and 2b), respectively. Thus, it was possible to see from the application of homogeneous AOP (photo-Fenton) was more efficient in the degradation and mineralization of phenol.

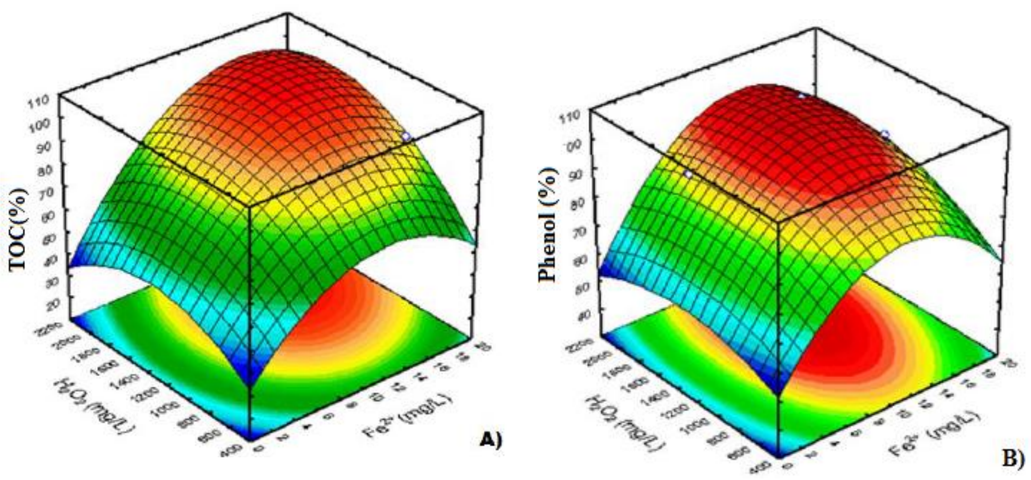

Figure 1: a) surface mineralization of phenol b) degradation of phenol applying photo-Fenton process.

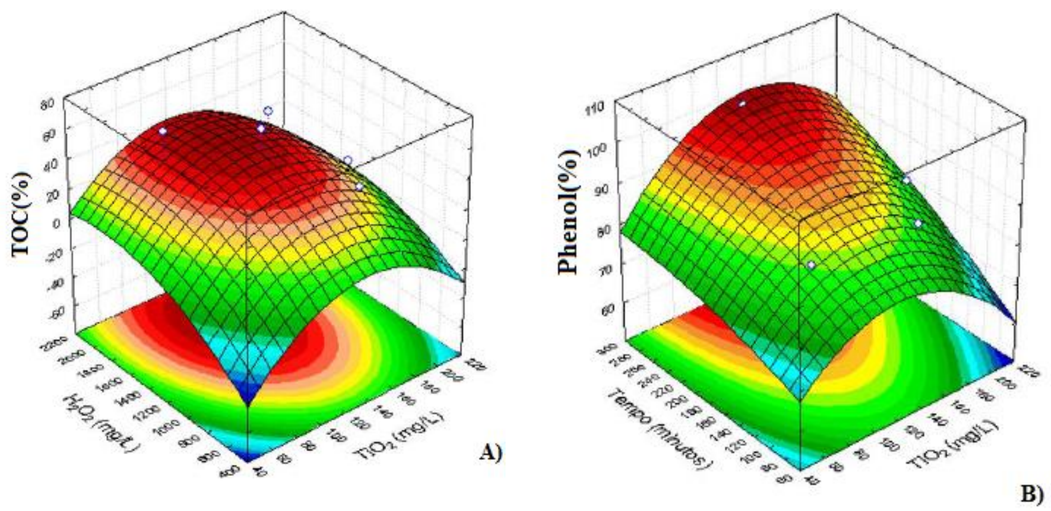

Figure 2. Surface mineralization of phenol b) degradation of phenol applying TiO2/H2O2/UV process.

CONCLUSION

It was shown that the treatment of the phenol through photo-Fenton and TiO2/H2O2/UV processes indicated satisfactory results under certain test conditions. It can be applied in industrials treatments and water reuse.

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