

Photochemical Degradation of Ibuprofen in Aqueous Solutions

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Abstract : Day after day more pharmaceutical compounds that are not efficiently removed by conventional treatment methods are found in treated wastewaters and drinking waters. Due to their refractory nature, they escape conventional wastewater treatment facilities, and thus advanced oxidation processes have to be utilized to effectively eliminate them. In the present study, the removal of Ibuprofen from aqueous solutions containing the commercial drug Algofren (non-steroidal, anti-inflammatory) using UV irradiation, hydrogen peroxide, titanium dioxide and ferric ions was examined. All experiments were conducted in a batch photoreactor operated for 120 min. The main target was to select the most effective operating conditions for the mineralization of the solutions treated. The combination of Fe(III)/ H₂O₂/UV proved to be very efficient in terms of total organic carbon removal and ibuprofen conversion. For solutions containing 5 mg/L ibuprofen and initial total carbon 51.1 mg/L, complete mineralization was achieved by means of 2.2 ppm Fe(III) and 333 mg/L H₂O₂.

Keywords : pharmaceuticals, photocatalytic, photo-Fenton, TiO₂

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