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ABSTRACT

The degradation of Metoprolol (MET) by photo-Fenton was studied in different photo-reactors. The importance of the irradiation source, UVC (λ=254 nm), black blue lamps (λ=365 nm) and simulated sunlight, was investigated at lab-scale experiments. Moreover, compound parabolic collectors (CPC), at pilot-scale with sunlight, have been also applied. Photo-Fenton treatment employing black blue lamps gave the best results, in terms of mg MET removal per accumulated energy. Using the highest Fe2+ (10 mg/L) and H2O2 (150 mg/L) concentrations, the best results of MET degradation and mineralization were obtained for BLB: 100% of MET elimination (0.41 kJ/L, 7 min) and 81.2% of TOC conversion (5.30 kJ/L, 90 min). Using Solarbox (SB) 97.3% of MET elimination (1.50 kJ/L, 7 min) and 78.8% of TOC conversion (25.8 kJ/L, 120 min) were reached. With UVC 100% of MET elimination (4.8 kJ/L, 20 min) and 17.6% of TOC conversion (14.4 kJ/L, 60 min) were obtained. Finally, in CPC, 100% of MET elimination (0.67 kJ/L, 3 min) and 83.7% of TOC conversion (33.9 kJ/L, 150 min) were achieved. A general pathway of Metoprolol degradation by photo-Fenton process is proposed according to the intermediates