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## KINETICS CONSIDERATIONS CONCERNING THE OXIDATIVE DEGRADATION BY PHOTO-FENTON PROCESS OF SOME ANTIBIOTICS

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### Abstract

The aim of this study is the evaluation of photo-Fenton as a suitable advanced oxidation process to degrade ampicillin and streptomycin antibiotics. The degradation was studied by monitoring the organic substrate concentration changes in aqueous solution as a function of reaction time using COD analysis. The oxidation process follows two successive stages. In the first stage (I) the oxidation of the antibiotics takes place with high reaction rate, leading to intermediate oxidation products. In the second stage (II) the reaction rate is much lower, the intermediate compounds being more resistant towards the oxidation process. For each oxidation stage, the process follows a pseudo-first-order kinetics according to the Lagergren model, the first-order kinetic constants being  $k_1^I$  (magnitude order of  $10^{-3} \text{ s}^{-1}$ ) and  $k_1^{II}$  (magnitude order of  $10^{-4} \text{ s}^{-1}$ ). The kinetics constant  $k_1^I$  and  $k_1^{II}$  values are correlated with the nature and structure of the antibiotic and the intermediate oxidation products, which determine the oxidation reactivity.

*Key words:* antibiotics, kinetics, oxidation, photo-Fenton

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