Degradation of the antibiotic chloramphenicol using photolysis and advanced oxidation process with UVC and solar radiation

Otidene Rossiter Sá da Rocha a,*, Rannúzya Brandão Pinheiro a, Marta M.M. Bezerra Duarte a, Renato Falcão Dantas b, Andrea Pacheco Ferreira a, Mohand Benachour a, Valdinete Lins da Silva a

aDepartment of Chemical Engineering, Universidade Federal de Pernambuco, Av. Prof. Arthur de Sá, S/N, Cidade Universitária, Recife 50740-521, Brazil
Tel. +55 81 2126 7291; Fax: +55 81 21267278; email: otidene@eq.ufrn.br
bDepartment of Chemical Engineering, University of Barcelona, Martí i Franques, 1, Barcelona 108028, Spain

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ABSTRACT

In this work, an aqueous solution of the antibiotic chloramphenicol was treated by photolysis and an advanced oxidation process using hydrogen peroxide combined with UVC and solar radiation. In this system, a reactor containing three UVC lamps (30 W) was used. A factorial plan $2^2$ was designed with the following variables: time and a concentration of hydrogen peroxide and evaluated using the percentage of chloramphenicol degradation as the response. Twelve hours of exhibition to UVC and solar radiation obtained 83 and 21% of chloramphenicol degradation, respectively. When $\text{H}_2\text{O}_2$/UV was used, 98 and 5% of degradation were obtained after one and a half hours of exhibition to UVC and solar radiation with 3 mmol L$^{-1}$ of hydrogen peroxide. The time-based kinetic constant was calculated as $6.3 \times 10^{-2} \text{min}^{-1}$ with $r^2$ equal to 0.9878.

Keywords: Advanced oxidation; Antibiotic; Chloramphenicol; Photolysis