

LIQUID CHROMATOGRAPHY MASS SPECTROMETRY AND HIGH-RESOLUTION FOURIER TRANSFORM ION CYCLOTRON RESONANCE MASS SPECTROMETRY (LC/ESI-FT-ICR-MS) APPLIED TO THE IDENTIFICATION OF PHARMACEUTICAL PHOTODEGRADATION BYPRODUCTS

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There are growing public attention and concern about the possibility of ecosystem and human health effects from pharmaceuticals in water. Their widespread use in human and veterinary medicine gives rise to an increasing contamination of different water environments.

Studies of photodegradation pathways can be useful in order to foresee the environmental fate of common pharmaceutical compounds released into the aqueous systems, and to develop adequate remediation methods for the environment protection [1].

The photodegradation of pharmaceuticals catalyzed by TiO₂ has been extensively studied in the past few years aiming at the purification of wastewater [2,3].

In this work the formation of main photoproducts arising from the photolysis and photocatalysis reactions of some pharmaceuticals was monitored over time by liquid chromatography mass spectrometry, and their structures were proposed by exact mass determinations obtained using electrospray ionization Fourier transform ion cyclotron resonance mass spectrometry (LC/ESI-FT-ICR-MS). Accurate mass measurements were obtained for each of the degradation products, and their empirical molecular formulae were proposed on the basis of known photochemical pathways and the structure of the mother molecules. Results contributed to enhance the knowledge about the environmental fate of pharmaceuticals investigated.

[1] A. Agüera, L.A. Pérez Estrada, I. Ferrer, E.M. Thurman, S. Malato and A. R. Fernández-Alba, *J. Mass Spectrom.*; 40 (2005), 908–915.

[2] A.Y.C. Tong, R. Braund, D.S. Warren, B.M. Peake., *Cent Eur J Chem*, 10 (2012), 989–1027

[3] F.J. Rivas, F.J. Beltrán, A. Encinas, *J Environ Manage*, 100 (2012), 10–15