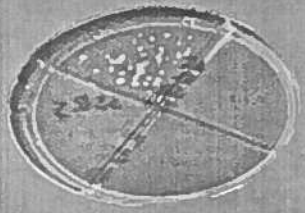
IV INTERNATIONAL CONFERENCE
ON ENVIRONMENTAL, INDUSTRIAL
AND APPLIED MICROBIOLOGY

BioMicroWorld 2011

Torremolinos, Málaga, Spain / 14-16 September 2011

http://www.formatex.org/biomicroworld2011



Book of Abstracts

Biodegradation of fluoroquinolones by a bacterial consortium

A. Maia[1,4], A. F. Duque[2], A. R. L. Ribeiro[1,2], M. E. Tiritan[1,3] and P. M. L. Castro[2]

[1] Centro de Investigação em Ciências da Saúde (CICS), Instituto Superior de Ciências da Saúde-Norte, Rua Central de Gandra 1317, 4585-116 Gandra, Portugal
[2] CBQF/Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Rua Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal
[3] CEQUIMED-UP, Laboratório de Química Orgânica e Farmacêutica, Departamento de Química, Faculdade de Farmácia, Universidade do Porto, Rua Aníbal Cunha 164, 4050-047 Porto, Portugal
[4] Instituto de Ciências Biomédicas Abel Salazar (ICBAS), Universidade do Porto, Largo Prof. Abel Salazar 2, 4099-003 Porto, Portugal

The present concern in pharmaceuticals in the environment is well known and research studies in this area have been regularly reported. Pharmaceuticals reach the environment by several ways but mostly due to their incorrect disposal and the incomplete elimination during the treatment processes in Wastewater Treatment Plants (WWTP). These residues continuously enter aquatic environments and many of them are resistant to degradation, being so called as pseudo-persistent pollutants. In aquatic compartments, pharmaceutical residues reach concentrations in the ng L^{-1} to µg L^{-1} range.

This work describes the biodegradation of four fluoroquinolones, Ofloxacin (OFL), Norfloxacin (NOR), Ciprofloxacin (CPF) and Moxifloxacin (MOX), by a bacterial consortium constituted by three bacterial species isolated in our labs, namely F11, FP1 and S2, known to degrade different aromoatic fluorinated compounds. The experiments were conducted in batch mode using a mineral medium supplemented with acetate and 10 mg l^{-1} of each compound or 10 mg l^{-1} of a mix of the compounds. The bacterial consortium was capable of aerobic biodegradation of OFL, NOR and CPF during successive feedings of the compounds to the medium, as measured by monitoring removal of the compounds by HPLC-FD and fluoride release by potenciometry. Degradation profile of the fluoroquinolones used in this study indicated that intermediate metabolites were accumulated. Two of the initial constituting strains, F11, belonging to the α-proteobacteria group, and S2, belonging to the Actinobacteria group, were recovered from the medium, F11 predominating in cultures fed with moxifloxacin whereas S2 was mostly found in the remaining cultures. Degradation by single bacteria is under evaluation.

Keywords Biodegradation; Pharmaceuticals; Fluoroquinolones

Acknowledgements:
This work was financially supported by CESPU (09-GCQF-CICS-09) and PTDC/EBB-EBI/111699/2009.