

MICRO BRAGA 01 DEC - 03 DEC BIOTEC'11

PORTUGUESE SOCIETY FOR MICROBIOLOGY
PORTUGUESE SOCIETY FOR BIOTECHNOLOGY

ICVS
Life and Health Sciences Research Institute
Instituto de Investigação em Saúde da Universidade do Porto

IBB

INSTITUTE FOR BIOTECHNOLOGY AND BIOENGINEERING



Universidade do Minho
Faculdade de Ciências



Universidade do Minho
Faculdade de Engenharia

xpbt

Associação
Portuguesa de
Biotecnologia



Sociedade Portuguesa de Microbiologia

PS3: 73

Biodegradation of four fluoroquinolone antibiotics by a bacterial consortium followed by a validated HPLC-FD method**Alexandra Maia^{1,4}, A. F. Duque², A. R. L. Ribeiro^{1,2}, M.E. Tiritan^{1,3}, P. M. L. Castro²**

¹Centro de Investigação em Ciências da Saúde (CICS), Instituto Superior de Ciências da Saúde-Norte, Gandra, Portugal; ²CBQF/Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Porto, Portugal; ³CEQUIMED-UP, Laboratório de Química Orgânica e Farmacêutica, Departamento de Química, Faculdade de Farmácia, Universidade do Porto, Porto, Portugal; ⁴Instituto de Ciências Biomédicas Abel Salazar (ICBAS), Universidade do Porto, 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 normally found in aquatic ecosystems at ng L^{-1} to $\mu\text{g L}^{-1}$ range. Antibiotics are a therapeutic class extensively studied due to its persistence and implications on development of multi-resistant bacteria. 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 by the work group: *Rhodococcus* sp. Strain FP1, *Labrys portucalensis* strain F11, and *Rhodococcus qingshengii* strain S2, known to degrade different aromatic fluorinated compounds. The experiments were conducted in batch mode using minimal salts medium supplemented with acetate and 10 mg l^{-1} of each compound or 10 mg l^{-1} of a mix of the four fluoroquinolones. The bacterial consortium was capable of aerobic biodegradation of OFL, NOR, CPF, and MOX during successive feedings of the compounds to the medium, as measured by monitoring the removal of the compounds by a validated HPLC-FD method and fluoride release by potentiometry. Degradation profile of the fluoroquinolones used in this study indicated that intermediate metabolites were accumulated. Two of the initial constituting strains, F11 and S2, were recovered from the medium, F11 predominating in cultures fed with MOX and CPF whereas S2 was mostly found in OFL and NOR cultures. No cultivable isolates

95

195

were recovered from the mixture assay. After 19 days, OFL presented the higher extent of degradation according to the compound removal followed by HPLC-FD, with a degradation rate of 98.3%.

This work was financially supported by CESPÚ - 09-GCQF-CICS-09 and FCT - PTDC/EBB-EBI/111699/2009