EFFECT OF BIOAUGMENTATION ON THE DEGRADATION OF 4-FLUOROCINNAMIC ACID IN A ROTATING BIOLOGICAL CONTACTOR

C. L. Amorim[1,2], A. F. Duque[1], C. M. M. Afonso[2] and P. M. L. Castro[1]

[1] CBQF/Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Rua Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal

[2] CEQUIMED-UP, Faculdade de Farmácia da Universidade do Porto, Rua Aníbal Cunha nº164, 4050-047 Porto, Portugal

Persistent organic compounds are of global concern as they pose a threat to the environment and to human health. They are commonly used for the commercial production of agrochemicals, pharmaceuticals and fine chemicals. The EU legislation is becoming stricter and, consequently, the development of biotreatment processes to remove such compounds is useful. Rotating biological contactors (RBCs) are attached growth bioreactors, extremely promising for the biological treatment of wastewaters containing recalcitrant compounds.

The main aim of this study was to investigate the performance of a laboratory scale RBC towards shock loadings of 4-fluorocinnamic acid (4-FCA) and to assess the potential of bioaugmentation to promote 4-FCA degradation. Organic shock loadings of 4-FCA were applied to a bioreactor established with innocula from a wastewater treatment plant but the indigenous population was not able to mineralize it. Bioaugmentation of the RBC with a specialized degrading strain was carried out and on subsequent organic shock loadings, degradation of 4-FCA was achieved, reinforcing the need of bioaugmentation to deal with recalcitrant compounds. Along its operation, other bacterial strains able to degrade 4-FCA were recovered from the established biofilm. The bioreactor proved to be robust and highly efficient to deal with the recalcitrant compound.

Acknowledgements:

C.L: Amorim wish to acknowledge a research grant from Fundação para a Ciência e Tecnologia (FCT), Portugal (Ref. SFRH/BD/47109/2008) and Fundo Social Europeu

(Programa Operacional Potencial Humano (POPH)). This work was supported by the FCT Project - PTDC/BIO/67306/2006.