Potential of *Pisolithus tinctorius* to tolerate and to degrade trifluoroacetate into fluoroform

Albina Franco[1], Miguel Ramos[1], Sara Cravo[2], Carlos Afonso[2], Paula Castro[1]

[1]CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Universidade Católica Portuguesa/Porto

[2]CEQUIMED-UP, Laboratório de Química Orgânica e Farmacêutica, Centro Interdisciplinar de Investigação Marinha e Ambiental (CIIMAR/CIMAR), Departamento Ciências Químicas, Faculdade de Farmácia, Universidade do Porto

Trifluoroacetate (TFA) is a persistent fluorinated organic compound originated from the degradation of fluorinated compounds, such as HCFC and isoflurane, or as a side product from the thermolysis of fluoropolymers, like Teflon. TFA can reach soil through precipitation, where it persists in water and soil, and may contribute to forest decline. In this study, we assessed the capacity of *P. tinctorius*, an ectomycorrhizal fungus (ECMF), to tolerate and/or degrade TFA. *In vitro* studies in glucose-supplemented solid medium showed that the fungus tolerated up to 8.77 mM TFA. *P. tinctorius* also degraded 88.3 %, 89.9 %, and 42.1 % of 0.88, 2.39, and 4.39 mM TFA, respectively, in liquid cultures. No TFA accumulation was detected on the fungus mycelium, suggesting that TFA depletion was due to fungal degradation. Defluorination was not detected. A volatile compound with a structure and behavior compatible with fluoroform (CHF_3), a potent greenhouse gas, was detected using GC-MS/MS, only in the gas phase of sealed *P. tinctorius* cultures supplied with TFA. Further confirmation of this compound is needed. Nevertheless, the study shows that *P. tinctorius* was capable to degrade TFA possibly through a similar pathway to that found on marine sediments. The results evidence the role of ECMF may play in the degradation of fluorinated organic compounds, enhancing their potential contribution on establishing tree growth in soils exposed to organic contamination.

A. Franco thanks FCT the grant SFRH/BD/47722/2008. This work was supported by FCT Project -PTDC-AGR-CFL-111583-2009 and PEst-OE/EQB/LA0016/2011.