

**Project area:** Fungal developmental biology

**Supervisor:** Doctor Cristina Silva Pereira, Head of the Applied and Environmental Mycology group at ITQB (<http://aem.itqb.unl.pt/>)

**Duration:** 9 to 12 months

**Host institution:** ITQB

**Number of students:** 1

**Project Summary: Morphological alterations in filamentous fungi induced by fungal metabolites produced under imposition of an ionic liquids stress**

Ionic liquids are generally defined as salts that are liquid below 100 °C, and some are regarded as green solvents due to their inherent properties. However, ionic liquids comprise a very heterogeneous group of fluids that are not intrinsically green.

Our group has produced extensive knowledge on the toxicity of these compounds using filamentous fungi as model organisms.<sup>1-4</sup> Moreover, we have produced data revealing that exposure to ionic liquids at sub-inhibitory concentrations can lead to alterations in the metabolic footprint of fungi, suggesting the induction of the biosynthesis of a diverse array of new metabolites.<sup>5</sup>

In order to better understand the role of these metabolites, we are interested in investigating the alterations in the morphology of filamentous fungi provoked by them. Amongst others, we want to focus on alterations on polarized growth, branching patterns and sexual/asexual development and possibly to determine signalling pathways associated with these changes. The project plan consists on extraction of fungal metabolites, microscopic analysis of fungi, *q*RT-PCR analysis of target genes that might be involved in these morphological alterations and other techniques that are made necessary. This work will greatly increase the knowledge on fungal secondary metabolites, ionic liquids stress and their potential applications.

1. M. Petkovic, J. L. Ferguson, H. Q. N. Gunaratne, R. Ferreira, M. C. Leitão, K. R. Seddon, L. P. N. Rebelo and C. Silva Pereira, *Green Chem.*, 2010, **12**, 643-649.
2. M. Petkovic, K. R. Seddon, L. P. N. Rebelo and C. Silva Pereira, *Chem. Soc. Rev.*, 2011, **40**, 1383-1403.
3. M. Petkovic, D. O. Hartmann, G. Adamová, K. R. Seddon, L. P. N. Rebelo and C. Silva Pereira, *New J. Chem.*, 2012, **36**, 56-63.
4. D. O. Hartmann and C. Silva Pereira, *New J. Chem.*, 2013, DOI: 10.1039/C1033NJ00167A.
5. M. Petkovic, J. Ferguson, A. Bohn, J. Trindade, I. Martins, M. B. Carvalho, M. C. Leitão, C. Rodrigues, H. Garcia, R. Ferreira, K. R. Seddon, L. P. N. Rebelo and C. Silva Pereira, *Green Chem.*, 2009, **11**, 889-894.