

## SOLID-STATE CULTIVATION OF FUNGAL STRAINS ON SPENT COFFEE GROUNDS FOR THE EXTRACTION OF ANTIOXIDANT PHENOLIC COMPOUNDS AND PROTEINS

P79

**E. M. S. Machado, J. A. Teixeira, S. I. Mussatto**

IBB/Institute for Biotechnology and Bioengineering, Centre of Biological Engineering, University of Minho, Campus Gualtar, 4710-057, Braga, Portugal

e-mail: [erciliamachado@deb.uminho.pt](mailto:erciliamachado@deb.uminho.pt)

Four fungal strains (*Aspergillus ustus* PSS, *Mucor* sp. 3P, *Penicillium purpurogenum* GH2 and *Neurospora crassa* ATCC10337) were cultivated under solid-state conditions on spent coffee grounds (SCG) aiming to extract antioxidant phenolic compounds and proteins. Cultivations were performed at 30 °C for 6 days. The produced extracts were characterized regarding the contents of total phenolic compounds, flavonoids, proteins, and antioxidant activity, which was determined by two methods (ferric reducing antioxidant power (FRAP) assay and 1,1-diphenyl-2-picrylhydrazyl (DPPH) method). *N. crassa* released the highest contents of phenolic compounds (10.99 mg gallic acid equivalents/g SCG) and 0.83 mg protein/g SCG. *P. purpurogenum* released the highest contents of protein (0.90 mg/g SCG) and flavonoids (0.53 mg quercetin/g SCG) from this raw material. In terms of antioxidant activity, the extract produced by *Mucor* sp. presented the highest values either by the FRAP (0.047 mM Fe(II)/g SCG) and DPPH (81.9%) methods, and the extract produced by *A. ustus* also contained elevated antioxidant activity by the DPPH method (81.6%). These results reveal that the studied fungal strains have different ability to degrade SCG, and the selection among them must be done based on the product that is desired to obtain. Solid-state cultivation with fungi was proved to be a useful and environmentally-friendly alternative to extract valuable compounds from SCG.

### Acknowledgements:

The authors are grateful to NovaDelta – Comércio e Indústria de Cafés, Lda (Campo Maior, Portugal) for providing the spent coffee grounds. This study was funded by Fundação para a Ciência e a Tecnologia through FCT grant SFRH/BD/75195/2010.