

European Chemistry Congress

June 16-18, 2016 Rome, Italy

Laccases: Biocatalysts towards new heterocyclic cores

M Paula Robalo^{1,2}, A C Sousa^{1,2} and L O Martins³¹Instituto Politécnico de Lisboa, Portugal²Universidade de Lisboa, Portugal³Universidade Nova de Lisboa, Portugal

The oxidation of molecules is a central transformation in organic chemistry for the introduction of chemical functionality/ diversity in simple and available starting materials. Biocatalysis can be faced as a green solution, since enzymes operate under mild reaction conditions, physiological pH and temperature, in a non-polluting solvent (water) and they have a relatively small environmental footprint. Laccases are multicopper oxidases (EC 1.10.3.2) that catalyze the oxidation of a wide range of substituted phenols and anilines, leading to the formation of value-added products for dye and pharmaceutical industries by more sustainable methodologies and higher yields. The process uses molecular oxygen as the oxidizing agent and produces water as the only by-product, showing clearly environmental advantages. We previously showed that aromatic amines can be transformed by laccases leading to dimeric and trimeric dyes, phenazine, phenoxazinone and benzocarbazole derivatives, with moderate to good yields. These diverse structural motifs were obtained from the homo and heteromolecular coupling of radical intermediates formed directly by the laccase oxidation. These results prompted us to extend our studies to other aromatic substrates looking for the production of different heterocyclic cores, increasing the scope of scaffolds obtained by this approach. These results highlighted the potential of these enzymes for the green production of diverse heterocycle cores, which are well-defined building blocks for the development of biologically active molecules.

Biography

M Paula Robalo is currently Coordinator Professor at Chemical Engineering Department, Instituto Superior Engenharia de Lisboa (ISEL). She earned her PhD in Inorganic Chemistry from the Faculty of Sciences, University of Lisbon, in 1993. After, she got a position as Assistant Professor at Chemical Department, University of Évora and coordinated the Organic Chemistry subarea until 2002, where she moved to ISEL. She has published more than 40 papers in reputed journals. Her research interests include the synthesis of transition metal complexes as NLO materials or anti-cancer agents; the electrochemical studies of antitumor metallo-drugs as well as the synthesis of aromatic cores with biological interest by biocatalysis with laccases.

mprobalo@deq.isel.ipl.pt

Notes: