

New Enzymes for Biotechnological Applications

Brief description

Industrial biotechnology includes the practice of using cells or enzymes acting on renewable feedstocks to generate useful bioproducts. It is expected to have an increasing impact in several industries and it will enable economies to become less dependent on fossil fuels. Recently, we have focused our research towards the study of enzymatic bioconversions of lignin-based compounds. Lignin is a complex aromatic biopolymer found in the cell walls of vascular plants, which make it an interesting renewable source for aromatic chemicals. However this polymer is highly recalcitrant towards degradation. In nature, lignin is primarily degraded by fungal secreted enzymes, such as peroxidases and laccases, which are capable of oxidizing lignin substructures. This proposal focuses on the characterization and engineering of bacterial lignolytic enzymes. We will undertake a multidisciplinary approach to understand the key structural and functional determinants of lignolytic enzymes. For example, through site directed mutagenesis we will examine how replacing key amino acid residues affects enzyme properties. Studies will be undertaken in order to get deep insight over the general mechanistic pathways of substrate degradation. Our system for improving enzyme properties towards industrial application is to resort to directed evolution techniques, followed by robotic high-throughput screening.

Supervisor

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Duration

6-12 meses

Place

Laboratório de Tecnologia Microbiana e Enzimática, Instituto de Tecnologia Química e Biológica, Universidade Nova de Lisboa, Oeiras.

Students

1 or 2