

Master Research Project

Synthesis of new biological catalysts for removal of environmental contaminants

Supervisors: Inês Cardoso Pereira (ipereira@itqb.unl.pt)/ Mónica Martins (msmartins@itqb.unl.pt)

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Host laboratory/Institution: Laboratory of Bacterial Energy Metabolism/ ITQB.UNL, Oeiras

Abstract:

Anaerobic microorganisms have been applied for the removal and recovery of precious metals from wastes producing biological metal nanoparticles (Bio-metals), a new class of biologic catalysts. The Bio-metals have attracted considerable attention due to their potential applications and interesting physical, chemical, and biological properties. These nanoparticles have a high catalytic activity compared with the bulk form of the same metal which makes them ideal for use in many industrial applications. In fact, Bio-metals are considered as a very promising alternative for bioremediation of environmental contaminants, such as in dehalogenation of organic contaminants and Cr(VI) removal. However, their application in removal of pharmaceutical pollutants (PhP) is poorly explored.

Pharmaceutical pollutants (PhP) have been considered one of the most problematic emergent contaminants due to their widespread occurrence in surface, drinking waters and effluents of wastewater treatment plants. The accumulation and persistence of PhP in the environment can produce harmful effects, not only in to aquatic organisms but also to human health. Therefore, it is of the extreme importance to investigate efficient methodologies to remove PhP from the environment. The present proposal intends to synthesize metal nanoparticles using several anaerobic bacterial strains and explore their potential as biocatalysts for removal of pharmaceutical contaminants.

This work will improve the knowledge about the bioremediation of environments contaminated with pharmaceutical products and will contribute to the valorization of wastes containing metals.