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Professor Doutor Pedro Rodrigues

ijup@reit.up.pt

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21463 | Bioprospecting for cellulose-degrading microorganisms

Liliana Almeida[1,2]; Diogo Alexandrino[1,2]; Rui S. Oliveira[3]; M. Fátima Carvalho[1,4]; Marisa Freitas[1,2]

Interdisciplinary Center of Marine and Environmental Research, University of Porto[1]; ESS, Polytechnic of Porto (ESS|P.PORTO)[2]; Centre for Functional Ecology, Associate Laboratory TERRA, Department of Life Sciences, University of Coimbra, Coimbra, Portugal[3]; School of Medicine and Biomedical Sciences, University of Porto, Portugal[4]

Background & Aim: Cellulose, a complex polysaccharide, is one of the main components of plant and algae biomass and therefore the most abundant polymer found in nature, serving as a significant carbon source in various ecosystems. Bioprospecting for cellulolytic microbes is a promising strategy for discovering potential biocatalysts for the hydrolysis of lignocellulosic materials, including residues. This work aims to assess the cellulolytic potential of microbial isolates (bacteria and fungi) sourced from diverse environments and to establish a synthetic microbial consortium capable to enhance the management of cellulosic waste. **Methods:** The experimental approach encompasses biodegradation assays coupled with optimized colorimetric methods, to estimate cellulose consumption (Congo Red assay) and the concomitant production of oligomeric/monomeric sugars (Dinitrosalicylic acid assay). For bacterial strains, these biodegradation assays involve batch incubations in minimal liquid medium supplied with cellulose as the sole carbon source, while solid medium is being used for fungi. Both assays are being run under mesophilic temperatures (28-30 ºC) and aerobic conditions. Upon achieving a final selection, strains exhibiting the best cellulose degradation performances will be assembled into a synthetic consortium that will be evaluated for their cellulose degradation capability. Future steps will also include phylogenetic identification of the cellulose degrading isolates through 16S and ITS rRNA gene sequence analysis. **Conclusions:** This study has the potential to identify novel cellulolytic microbes, highlighting the substantial role microorganisms play in ecosystem processes and their diverse applications in biotechnology.

Keywords: Cellulolytic Microorganisms, Biodegradation, Biotechnology, Waste management.

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