

The UCCCB collection as a resource for bacteria PHA producers' genetic diversity assessment

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The University of Coimbra Bacteria Culture Collection (UCCCB) is the Portuguese bacterial culture collection that integrates the World Federation of Culture Collections the Portuguese microBiological Resource Centre Network (Pt-mBRCN/MIRRI-PT). The collection includes 3 sub-collections according to the origin of isolation: i) Environmental collection with isolates from water and sediments from hydrothermal zones on the ocean floor, hospital environments with different levels of antibiotic resistance, metal-contaminated environments, river sediments, and from soil; ii) Human host collection with isolates from hospital inpatient samples; iii) Host-interaction collection with isolates from plants, endophytic or plant pathogens, frog and nematodes.

In order to find not yet described bacterial polyhydroxyalkanoates (PHA) producers, 110 strains from the 3 sub-collections, belonging to 5 different phyla, 11 classes, 24 orders, and 50 families were screened. The 33 selected polymers-producing strains belonged to 5 different classes. A deep characterization of the producers revealed four strains belonging to genera that have never been reported as PHA producers. The genomic analysis of these strains revealed the presence of *phaC* gene in all strains, although belonging to different phylogenetic classes, with a diversity in the organization and the number of additional genes. The chemical characterization of the polymers revealed structural differences when comparing polymers produced by strains belonging to different genera.

The work performed at UCCCB highlighted the relevance of this culture collection as a valuable source of novel and unique strains that are an important resource for the discovery of new compounds with biotechnological applications. UCCCB is funded by National and European projects and works as a technical platform to support research in UC and abroad, and will maintain novel microorganisms awaiting future exploitation by biotechnology.