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Implementation of cutting-edge technologies for the benefit of culture collections: the case of Micoteca da Universidade do Minho

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Since 1890, microbial culture collections (CCs) have been providing services to the scientific community, acting as reservoirs and providers of microorganisms, including their living cells, genomes, and information, being key players for the development of new and more sustainable products, compounds, and practices. For this reason, the Organisation for Economic Cooperation and Development (OECD) recognized CCs as "a key component of the scientific and technological infrastructure of the life sciences and biotechnology". Along with preservation, deposit, and transfer of microorganisms, CCs can provide additional services such as strain identification and characterization, consulting, patent deposit, and training. Through these activities, CCs play a fundamental role in different fields, including agriculture, food security and safety, genetics, industrial and medical microbiology.
However, to increase knowledge and maximise the benefits of their holdings for biotechnological applications, CCs must face new challenges and embrace the cutting-edge technologies that allow them to better characterize the microbial strains in their possession. CCs must thoroughly study strain capabilities, dedicating time and resources to the research and characterization of promising strains for biotechnological applications. Furthermore, the generated information regarding function, biosafety, taxonomy, and application, among others, must be made publicly available in CCs catalogues to promote the extensive use of such promising strains.
This work will present the example of Micoteca da Universidade do Minho (MUM) and how it is implementing several cutting-edge technologies for the benefit of biotechnology and to respond to client demands, following a strategy integrated in a coordinated effort inside the MIRRI-ERIC Portuguese node. By installing several technological platforms, including cryopreservation in liquid nitrogen, ultra-performance liquid chromatography-mass spectrometry (UPLC-MS), matrix-assisted laser desorption ionization–time-of-flight mass spectrometry (MALDI-TOF MS), and next generation sequencing (NGS), MUM will advance and improve the conservation, biochemical, physiological, and genetic characterisation of more than 1,000 strains it has available in its catalogue, while also assuming a leading role in the microbiome revolution that we are currently living.

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