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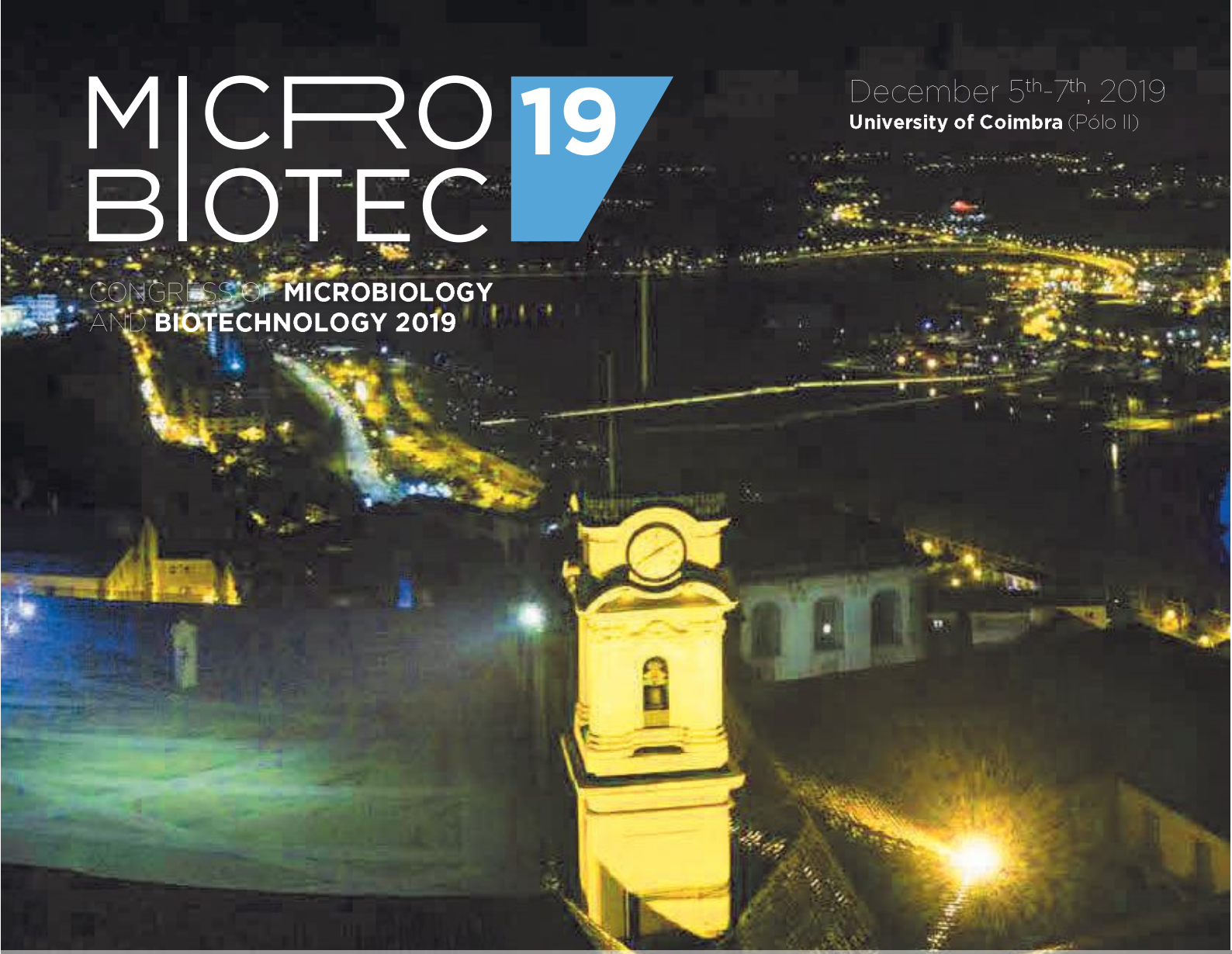

BOOK OF ABSTRACTS

SPM
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I1. Environmental Microbiology and Biotechnology

P77. Use of fungi in biocementation of sand

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Concrete is the most widely used construction material in the world being cement one of its main components. Cement production accounts for 5-8% of anthropogenic carbon dioxide (CO2) emissions into the atmosphere. Most of the world's infrastructures are produced from reinforced concrete and cracking is one of the major drawbacks for its durability. The cracks in concrete reduce their resistance capacity and allow the entry of harmful agents both for their microstructure and for the reinforcements located inside the structure. Sustainable solutions aimed at reducing costs and environmental impacts for this problem have been researched. The bioscience of precipitation mechanisms with microbiologically induced calcium carbonate (MICCP) is an alternative to traditionally used methods and a way to mitigate the environmental impact of using more cement and polymers. The biocement presents a more environmentally friendly alternative because it does not generates CO2 in its manufacturing process and when is produced, through metabolic conversion of calcium salts, the CO2 is converted in the calcium carbonate (CaCO3) mineralisation which can promote the improvement of the mechanical properties and durability of cementitious materials. Most of the biocementation studies present bacteria as microorganisms responsible for the CaCO3 induction process. Fungi are potentially better for the biocementation process because they have more biomass and are filaments, which may aid in the mechanical behaviour of the formed bioconcrete. Thus, the present work proposes the use of two urease-positive fungi (Penicillium chrysogenum MUM 9743 and Neurospora crassa MUM 9208) in the sand biocementation in column to produce sandstone. The microstructure and chemical constituents of biosandstone formed due to MICP were observed under Scanning electron microscopy (SEM). SEM showed fungal mycelia as bio-based fiber in bio- sandstones and cluster of probable calcite crystals on and around mycelia. These results envision a promising future use of fungal isolates in the maintenance of concrete structures.