MICRO BIOTEC 21

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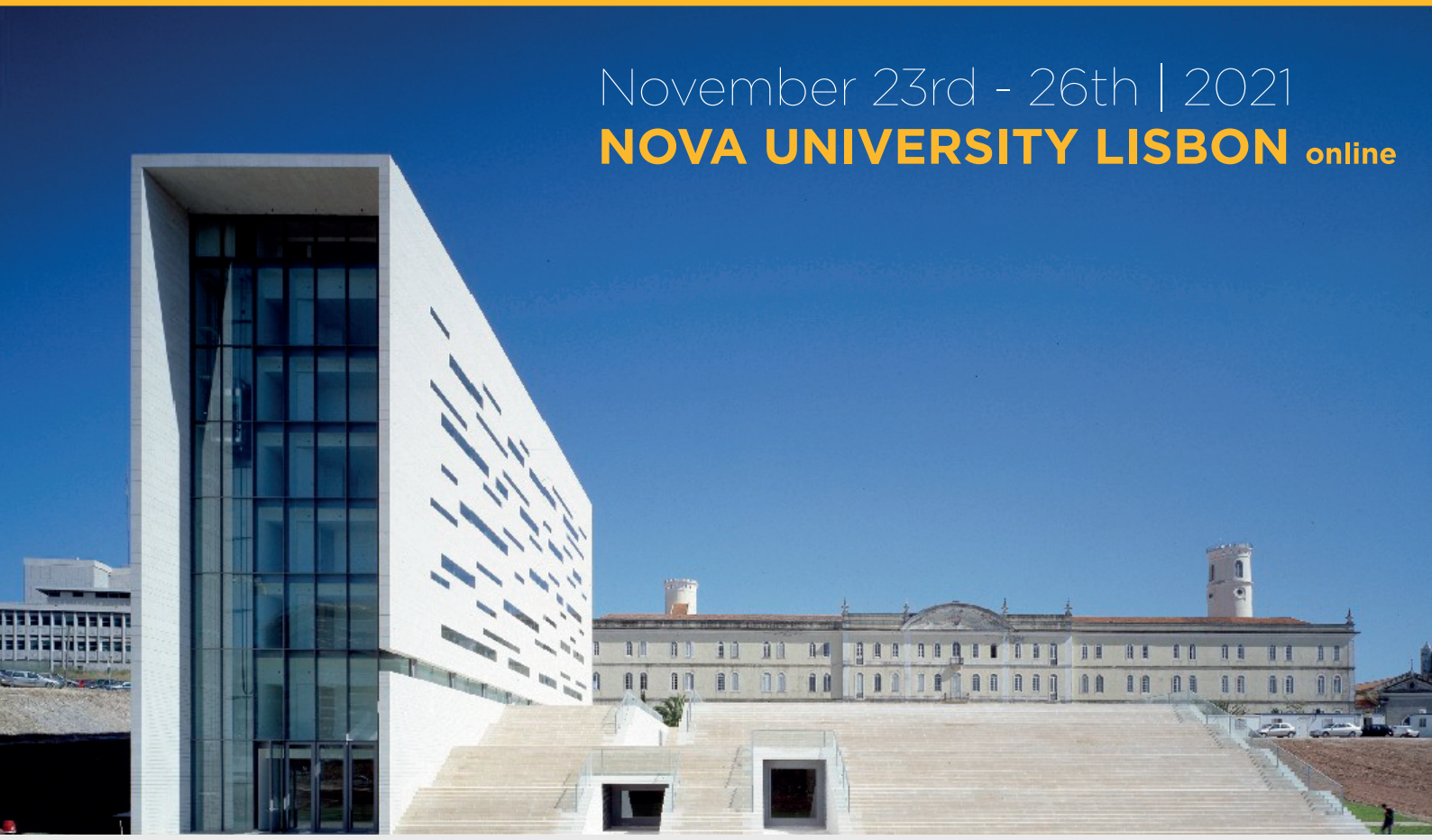
CONGRESS OF **MICROBIOLOGY** AND **BIOTECHNOLOGY 2021**



Abstracts Book

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428. Microalgae-bacterial granular sludge for the treatment of low carbon and nutrient loaded effluents

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Granular sludge technology has plenty of advantages over conventional suspended sludge, mainly attributed to its extraordinary capacity for nutrient removal, efficient settling properties, and the feasibility of the operation. Over the last few decades, the application of microalgae-bacterial based systems for wastewater treatment has gained interest in the scientific community. The symbiotic relationship that could be established could be favorable for both microorganisms and the metabolic diversity could improve the wastewater treatment process. The main aim of the present study was to evaluate the capacity of microalgae to attach to bacterial granular sludge and to assess the ability of the mixed granular sludge to treat streams with low organic and nutrient levels while following the microbiome dynamics. For that, a photobioreactor was inoculated with bacterial granules from a full-scale WWTP and a suspended microalgae consortium composed by strains isolated from sludge of a freshwater aquaculture filtration system. During 8 months, the reactor was fed with wastewater containing extremely low carbon and nutrients content, with an increasing number of treatment cycles per day throughout reactor operation. Most of the ammonium fed was removed through nitrification without nitrite accumulation in the effluent. Proteobacteria and Bacteroidetes were the most abundant phyla within the AGS microbiome. A core microbiome was present, mostly composed by bacterial groups related to nitrification, denitrification, and phosphate removal processes. The microalgae-bacterial granules were efficient for the treatment of streams mimicking those of freshwater aquaculture which extremely low carbon and nutrient concentrations represent a major challenge in the treatment process.

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