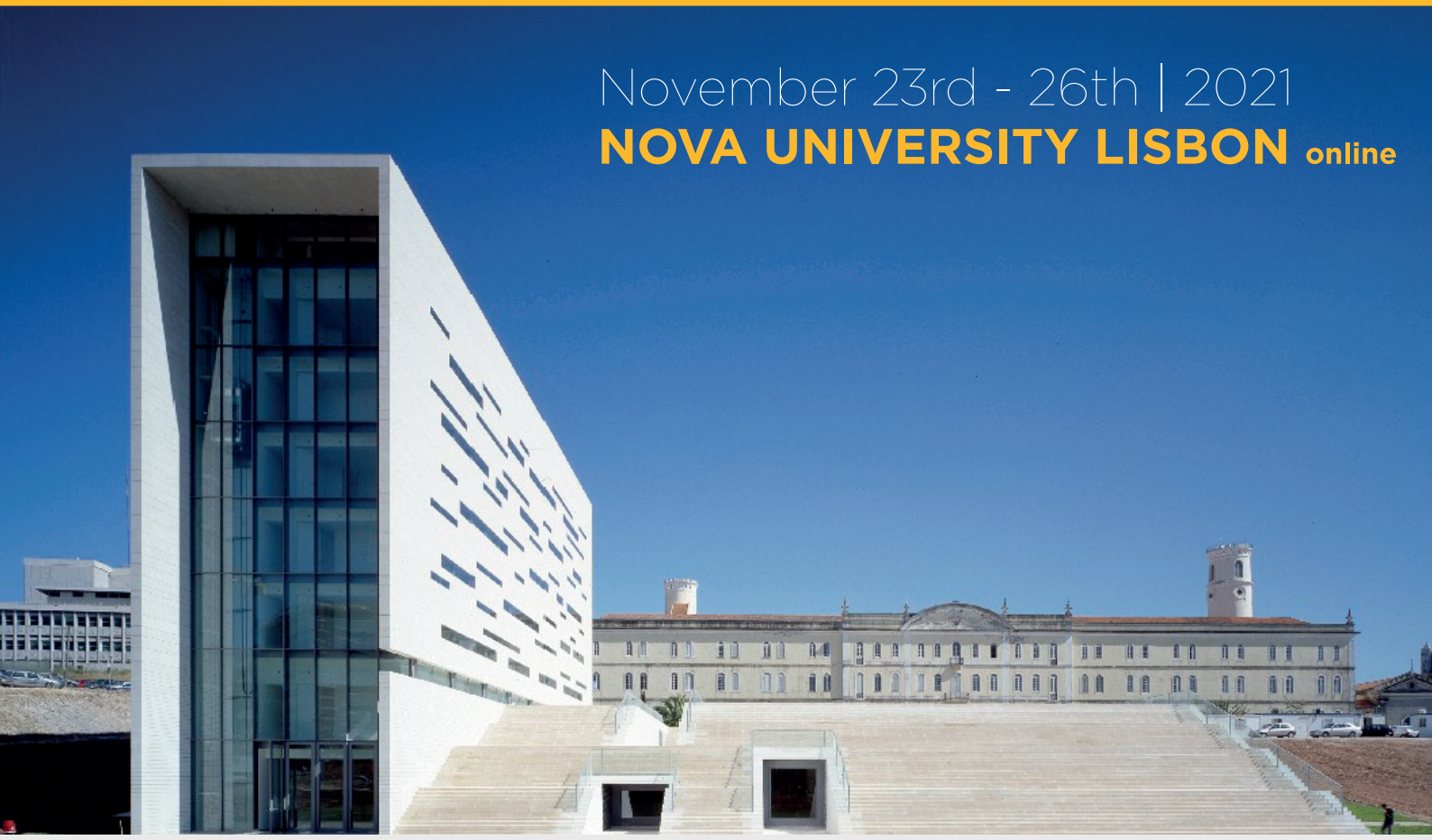
MICRO BIOTEC 21

Webconference

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



Abstracts Book

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O.120. Microalgae granular systems feasible for the treatment of marine aquaculture streams containing florfenicol antibiotic

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Land-based aquaculture industries generate high volumes of wastewater containing low concentration of carbon and nutrients that, if not properly handled, can pose a major environmental impact on the receiving water bodies and ecosystems. To face the current water scarcity and mitigate the pollution triggered by the rapid expansion of these industries, the development of treatment systems that allow water recirculation is of utmost importance.

Florfenicol (FF), a broad-spectrum antibiotic, is sporadically present in aquaculture streams which may cause deleterious effects on the biological wastewater treatment systems and on the receiving ecosystems.

This work aimed to evaluate the granulation of microalgae biomass with marine aquaculture effluents, without the need of any carrier, and its ability to remove nutrients in streams containing FF. A photo-sequencing batch reactor was inoculated with a suspended microalgae consortium enriched from water collected at a marine aquaculture facility and was fed with synthetic wastewater mimicking marine aquaculture streams. Rapid granulation occurred, with microalgae granules representing ca. 49% of the total reactor biomass around day-21. Overall, the microalgae granules exhibited high and stable organic carbon and ammonium removal efficiencies of more than 40 and 90%, respectively. During FF shock loads, ammonium removal efficiency slightly decreased to ca. 80% while carbon removal was unaffected. Nitrate was the main N species in the reactor effluent, but nitrite concentration exceeds the fish toxicity limit for adequate water recirculation. Up to 11% of the fed FF was removed in the reactor. Production of pigments, biomarkers of cell viability, increased exponentially until day-64, ca. 23 times, stabilizing thereafter.

This study emphasizes the robustness of microalgae granules to remove carbon and ammonium from marine aquaculture streams, even in periods of FF load. The implementation of such systems in marine aquaculture facilities is a feasible and compact solution, however further improvement of the removal performance is needed to reduce nitrite levels if water recirculation is aimed for.

Acknowledgements: This work was financed by National Funds from FCT through the project GReAT-PTDC/BTA-BTA/29970/2017 (POCI-01-0145-FEDER-029970). Authors thank the scientific collaboration of CBQF under the FCT project UIDB/50016/2020.

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