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Bioprospecting microalgae for treatment of marine aquaculture wastewater PC 52

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Abstract

The high demand for water resources and inefficient wastewater treatment strategies are major drawbacks to the aquaculture industry sustainability [1]. Accordingly, the EU's Blue Growth strategy fosters the development of technologies for proper treatment of aquaculture wastewaters enabling water reuse. Biofilm systems are promising for wastewater treatment, especially those using granules due to their high microbial biomass and cost-effective separation from treated water [2]. Microalgae and bacteria have the ability to grow using nutrients and other organics present in wastewater. The combination of both microorganisms within the same structure could prove beneficial as the synergy established could make the treatment process more efficient.

This study aimed to obtain microalgae strains from a marine environment that will be further used to develop algal-bacterial granular sludge to treat marine aquaculture wastewater. Water samples were collected from a marine aquaculture facility in Murtosa, Portugal. Samples were spread plated in different culture media for microalgae growth. Axenic cultures were obtained after successive streaking and DNA barcoding of the nuclear gene 18S rDNA was used for phylogenetic affiliation. Different algae genera were identified e.g. *Chloroidium*, *Interfilum*, *Pseudochloris*. Simultaneously, enrichment cultures were established from water samples using F/2 culture medium and kept at constant agitation to favour microalgal growth. The dynamics of the microbial communities throughout the enrichment process were followed.

Overall, this study will allow the identification of suitable microalgae for the development of algal-bacterial granules overcoming the challenge regarding biomass separation in wastewater treatment using microalgae.

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