

MESTRADO CIÊNCIAS DO MAR
Ano letivo 2023/2024

TÍTULO	Chasing the enemy: Isolation and characterization of epiphytes of commercial Atlantic nori, <i>Porphyra umbilicalis</i> and <i>P. dioica</i>, produced in aquaculture
RESUMO (até c. de 2000 caracteres)	<p>Marine macroalgae are routinely exploited in blue biotechnology endeavors for the production of added-value biomaterials, bioremediation, food and feed production, and the maintenance of integrated multi-trophic aquaculture systems. Macroalgae used for culinary purposes represent a sustainable food source with the potential to contribute to food security worldwide. The <i>Porphyra</i> genus includes several species commonly known as nori and is widely used for making sushi rolls. The Portuguese company AlgaPlus hosts the only European commercial-scale nursery of Atlantic nori, namely <i>Porphyra dioica</i> and <i>P. umbilicalis</i>.</p> <p>The microbiomes of macroalgae presumably play a key role in host metabolism and health, but knowledge of microbiome-based solutions to improve macroalgal biomass production in aquaculture facilities remains limited. On the other hand, epiphytic microalgae, particularly diatoms, frequently damage the delicate macroalgae leaves, leading to significant commercial losses. This master thesis project will isolate and determine the taxonomic structure of microalgae epiphytes of <i>Porphyra</i> produced in aquaculture. It will establish a culture collection (biobank) of <i>Porphyra</i>-associated epiphytes and investigate possibilities for a microbial-driven biocontrol of epiphyte proliferation.</p> <p>The work will be developed within Work package 5 (“WP5 – Algae Vertical”) of the “Blue Bioeconomy Pact” project, in collaboration with the partner company AlgaPlus in Aveiro (https://www.algaplus.pt/en/).</p> <p>Thesis objectives and tasks:</p> <ol style="list-style-type: none"> 1. Cultivate, isolate, and identify by microscopy and molecular means (e.g., 18S rRNA gene and ITS region sequencing) microalgae, particularly diatomaceae, that grow epiphytically on blades of the macroalgae <i>Porphyra dioica</i> and <i>P. umbilicalis</i> grown in aquaculture facilities. 2. Screen already existing bacterial isolates (IST collection) from healthy <i>P. dioica</i> and <i>P. umbilicalis</i> for inhibitory activities against the epiphytes. 3. Assist the research team in tasks about cultivation-independent, molecular analyses (e.g., 16S rDNA / ITS1-2 region amplicon sequencing (metabarcoding) or shotgun metagenome sequencing) of the <i>Porphyra</i>-associated microbiome in aquaculture facilities in healthy and epiphyte-compromised stages.
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