

Enhancing the restoration success of *Laminaria ochroleuca* through microbiome manipulation

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Kelp forest perseverance is of great concern globally considering the effects of climate change. They are indispensable in marine ecosystems since they contribute greatly to primary productivity but also increase marine biodiversity by providing shelter, nurseries and food. Increasing temperature and acidification in coastal areas have been shown to affect kelp growth, pathogen resistance and ability to overcome physical disturbances of seaweeds as well as their overall stability and competitive strength in the ecosystem. Golden kelp (*Laminaria ochroleuca*) is disappearing from Portuguese coasts because of these effects. As part of the Biodiversa+ project RestoreSeas, we are aiming to enhance the restoration success of *Laminaria ochroleuca* using microbiome manipulation to increase resilience of young kelp against climate change. Individuals from southern to northern locations along the East Atlantic ocean's coast (Portugal, North of France, South of the UK) have been collected and the bacteria communities living on the different thallus regions (holdfast, meristem, blade) have been characterised using 16S amplicon sequencing. We are designing probiotics from bacteria that we have isolated from these different populations. The composition of the probiotic will be based on genomic potential of the bacteria and their presence on the adult individuals. We will test if probiotics are able to provide protection against acidification and heat waves. We hypothesize that there will be specificity of bacterial communities associated with the different thallus regions, connected to their protective or growth-enhancing functions and that there will be more heat stress mediating bacteria found in the southern than in the northern locations.

Keywords

Restoration ecology; Probiotics; Microbiome; Kelp Forest