

FROM SEA TO LAND: ENHANCING COASTAL BIOMES AND URBAN ECOSYSTEMS WITH KAPPAPHYCUS ALVAREZII AND OTHER SEAWEED-BASED SOLUTIONS

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RESUMO

Liquid extracts obtained from the seaweed *Kappaphycus alvarezii* holds significant potential as a potent biofertilizer, capable of enhancing the productivity of a diverse array of plant species and crops. In this study we investigate an innovative cultivation method for this macroalgae, being currently implemented on a farm situated in Ilha Grande (Angra dos Reis Municipality), along the southern coast of Rio de Janeiro, in Brazil. Our aim was to assess newly standardized operational procedures (SOPs), incorporating experimental vessels, adapting protocols on site, and applying the Algae Growth Unit (UCA) technology. Seaweed extracts produced through these processes were quantified and characterized, taking into account their chemical composition, including macronutrients, micronutrients and the presence of active phytohormones. The assessment of water quality in the vicinity of the seaweed farm indicates a direct correlation between the presence of seaweed and positive environmental and conservation-related outcomes including: water clarity, localized enhancement of dissolved oxygen (DO) levels, and higher diversity of species across various trophic levels within the same local marine biome. Our findings suggest that the implementation of such a system could directly contribute to the environmental well-being and also the socioeconomic development of vulnerable coastal communities. Furthermore, we propose that this seaweed-based biostimulant could be utilized to support and sustain native plant populations in urban environments facing nutrient deficiencies due to various factors such as climate change and uncontrolled urbanization. We contend that the adoption of the *Kappaphycus alvarezii* cultivation method, coupled with the judicious application of its liquid biostimulant extract in diverse urban settings, represents a sustainable and significant environmental tool for fostering the growth and proliferation of plant species, including those found in sites like Sítio Burle Marx (Rio de Janeiro), the Bosque da Ciência and the Museu da Amazônia (MUSA) in Manaus.

PALAVRAS-CHAVE: Blue economy, Sustainable agriculture, *Kappaphycus alvarezii*, environmental health

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