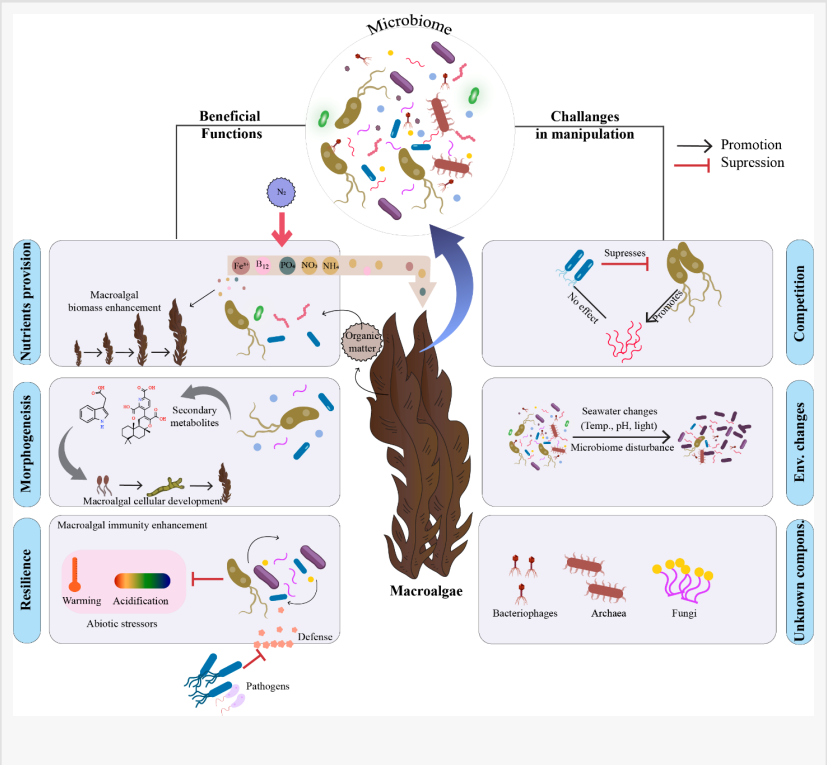
Microbial solutions for boosting seaweed farming and carbon capture



FAYETTEVILLE, GA, UNITED STATES, January 27, 2025 /EINPresswire.com/ -- Researchers from Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences, reveal how manipulating the microscopic life living on seaweed could revolutionize seaweed farming and boost its potential for fighting climate change. This innovative approach could transform seaweed cultivation from a regional industry into a powerful tool for carbon capture and sustainable resource production.

Seaweed farming has captured global attention as a potential solution to remove atmospheric carbon dioxide and offer eco-friendly alternatives to carbon-intensive food and industrial products. However, the successful expansion of seaweed farming from a regional industry into a global solution faces major hurdles due to changing oceanic conditions, increasing pathogenic diseases and nutrient limitations.

In a study (10.1016/j.greenca.2024.11.001) published in the KeAi journal Green Carbon, researchers from the Qingdao Institute of Bioenergy and Bioprocess Technology (QIBEBT), Chinese Academy of Sciences (CAS), revealed how manipulating the microscopic life living on seaweed can contribute to developing industrial-scale seaweed farming and boost its potential for fighting climate change.

“A diverse community of microbes live on seaweed, much like probiotics for seaweed – specific microbes can protect seaweed from diseases, provide essential nutrients, and help them thrive in challenging conditions,” explains corresponding author Yongyu Zhang. "This is particularly important as our previous study has shown that rising ocean temperatures and acidification will likely increase seaweed pathogenic diseases.”

The research highlights the areas that need to be focused on to overcome current limitations in seaweed microbiome manipulation, such as complete knowledge regarding the total microbiome composition and timing of inoculation.

“Early life stages of seaweeds, being more susceptible to microbial colonization, present a critical window for establishing beneficial microbes that might persist throughout the seaweed's life cycle,” says first author Shailesh Nair., “Some seaweeds can even pass these beneficial microbes to their offspring, suggesting potential long-term benefits across generations.”

The researchers propose a framework for future seaweed microbiome manipulation, emphasizing the need for integration of advanced technologies like multi-omics, high-throughput isolation techniques, artificial intelligence-based tools and robust validation.

"Microbial solutions must be deployed for sustainable macroalgae farming,” adds Zhang. “By harnessing the power of beneficial microbes, farmers could potentially create more stable and productive seaweed farms, making large-scale ocean farming more feasible than ever before.”
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References
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Lucy Wang
BioDesign Research
email us here