Bioremediation of *Sargassum* using Antifungal Bacteria

Alexandra Ash, Junseong Kang, Yi Zhou, Dr. Won Bo Shim
Bioenvironmental Sciences, Department of Plant Pathology and Microbiology, Texas A&M University

Abstract

Sargassum, a floating brown algae, significantly impacts marine ecosystems and coastal tourism due to its excessive accumulation. While its potential as a biofuel is noted, this study investigates Sargassum's role in bioremediation by assessing its use as a 'bioamendment' to promote the growth of antifungal bacteria. We tested various Sargassum concentrations in PDA media and found that while bacterial growth is optimal at 0.1% seaweed concentration, higher concentrations (0.5%, 1%) reduce bacterial activity and induce bleaching effects. Future research will evaluate the impact of elevated Sargassum levels in ISP2 media on bacterial antifungal properties. This multi-disciplinary approach aims to transform an environmental challenge into a beneficial opportunity for conservation and agriculture.

Introduction and Objectives

- ***Sargassum,* a floating brown algae, plays a vital role in marine ecosystems.** However, its excessive accumulation along shorelines poses significant ecological and anthropogenic challenges. Not only does it harm seagrasses, corals, and sea turtles, but it also blocks essential sunlight. Moreover, the algae leaches pollutants into the water, emitting a 'rotten egg' smell that deters tourists.
- **Managing *Sargassum* is critical for coastal biodiversity, water quality, and sustaining the tourism industry.**

While existing research highlights *Sargassum's* biofuel potential, this project focuses on bioremediation. Specifically, this research explores whether *Sargassum* can be used as a 'bioamendment' to foster the growth of bacteria with antifungal properties.

- **By bridging conservation, microbiology, and agriculture, this multi-disciplinary project aims to transform an environmental issue into an opportunity.**

Fig. 01 Punta Maroma, Quintana Roo 2021

Methods

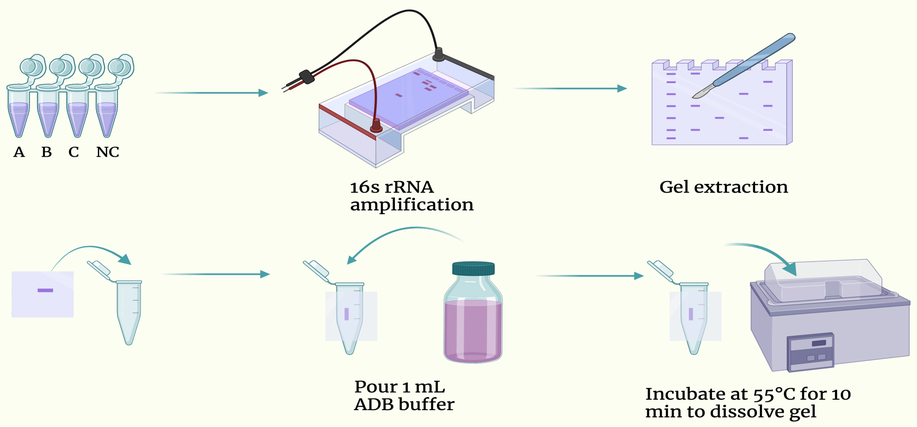

Fig. 02 Gel DNA extraction of 16s rRNA region of A, B, C (27f/1492r primers)

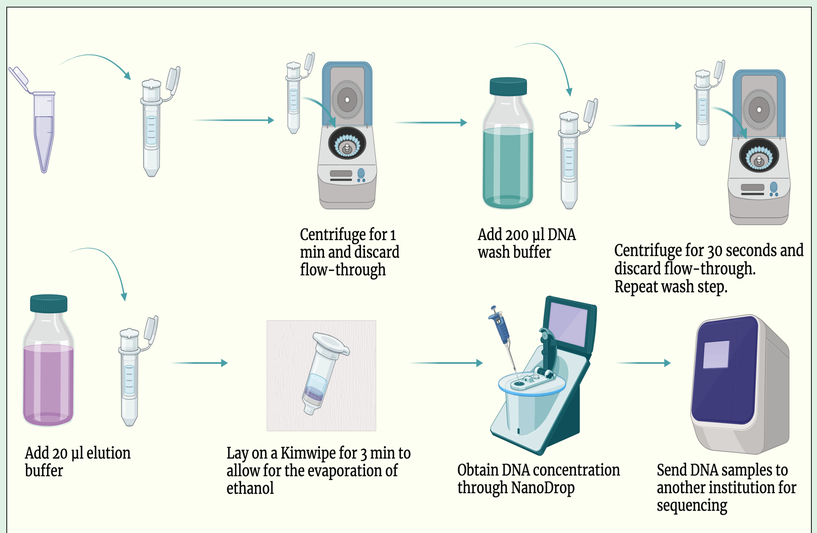

Fig. 03 Gel DNA extraction of 16s rRNA region of A, B, C (Part 2)

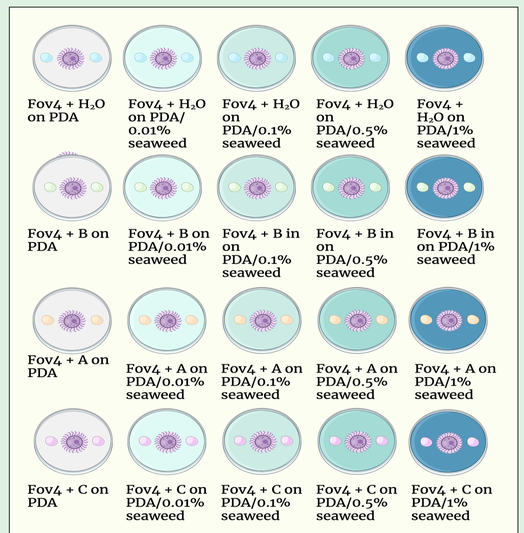

Fig. 04 Co-inoculation of Fov4 and bacteria (A,B,C) on PDA + seaweed amended media

Results

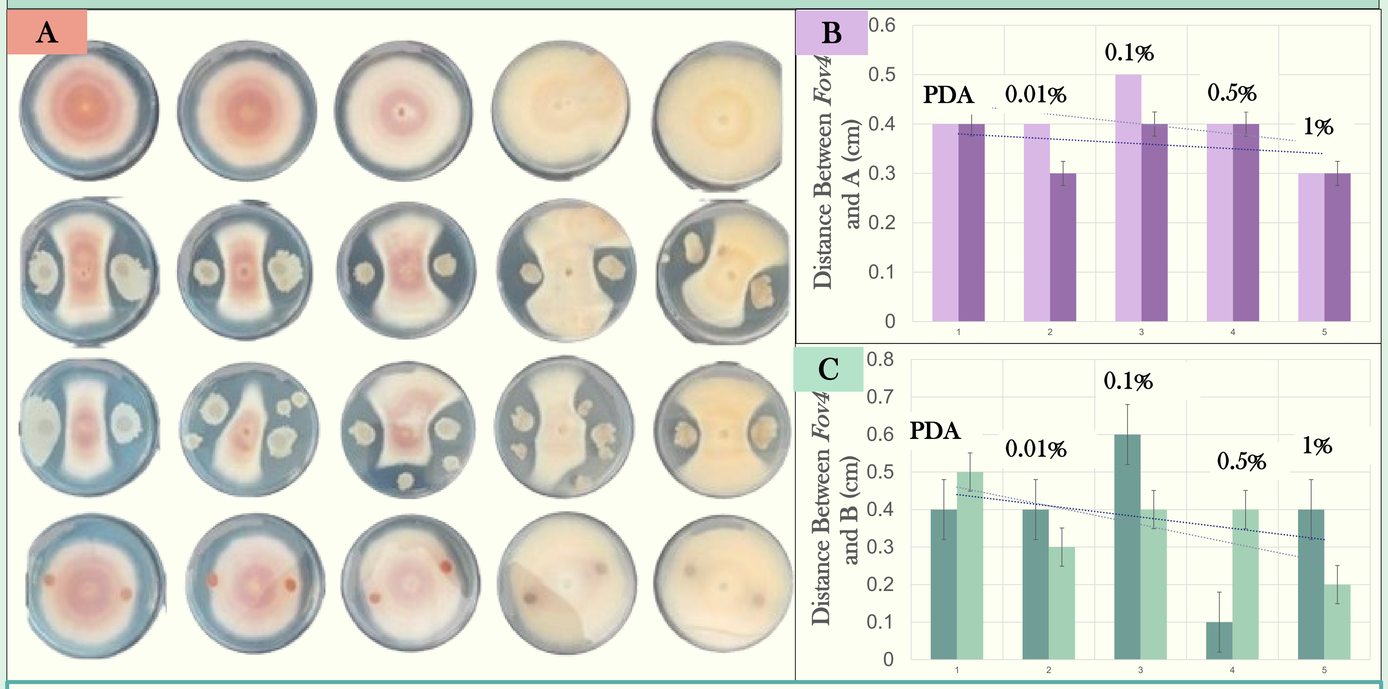

Fig. 06 A. Co-inoculation of *Fov4* and bacteria (A,B,C) on PDA + seaweed amended media, B. Distance Between *Fov4* Hyphae and Bacteria A on Varying PDA/Seaweed Media, C. Distance Between *Fov4* Hyphae and Bacteria B on Varying PDA/Seaweed Media

Conclusion

While both A and B exhibit strong antifungal properties, C shows no antifungal activity, as indicated by the absence of inhibition zones in Fig. 5. Bacterial growth is most pronounced in 0.1% seaweed media for both strains, but decreases significantly in higher concentrations (0.5%, 1%). Overall, there is a declining trend in the relationship between seaweed concentration and inhibition zones against bacteria and Fov4. Interestingly, higher seaweed concentrations (0.5%, 1%) lead to bleaching effects on both *Fov4* and C.

Future Directions

In summary, PDA media inoculated with *Sargassum* negatively impacts antifungal bacterial growth and induces bleaching effects. Subsequent experiments will explore the effects of higher *Sargassum* concentrations in ISP2 media on bacterial activity.

References

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