Testing the Effectiveness of Sabellastarte spectabilis as a Potential Bioremediator

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Water pollution is an issue that affects living organisms worldwide. As human activity continues to increase pollution in our oceans, the livelihood of all marine creatures is affected, from tiny crustaceans to massive blue whales. Bioremediation is the use of naturally occurring or deliberately introduced organisms to consume and break down environmental pollutants in order to clean up a polluted site. This experiment aimed to test the effectiveness of a marine filter feeder, Sabellastarte spectabilis, as a potential bioremediator. S. spectabilis, also known as the Hawaiian feather duster, is a species of benthic marine tube worm abundant in the waters of Hawaii. Simulation tanks with elevated nitrate, phosphate, and turbidity were engineered in order to test the feather dusters' ability to affect each water parameter separately. The results suggest that S. spectabilis has some degree of bioremediating abilities. They were most effective at reducing turbidity (-54.6%, $p < 0.03$), moderately effective at reducing phosphate (-17.8%, $p < 0.37$), and slightly effective at reducing nitrate (-1.3%). Trials were also run on ocean water samples, with similar findings. Their ability to reduce turbidity led to further experimentation on whether or not they could sequester microplastics from the water column . In these tests, S. spectabilis organisms were able to visibly incorporate microplastics into their tubes. One organism was even able to completely rebuild its tube strictly out of microplastics. It is clear that S. spectabilis has potential as a bioremediator, and could possibly be a sustainable, cost effective, and natural solution to combat water pollution.

Awards Won:
Third Award of $1,000