A Novel Approach for Coral Rehabilitation: Growth Enhancement With Electrochemical Deposition of $CaCO_3$

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Coral reefs are one of the world's most spectacular ecosystems which are visible even from space making them the most diverse marine ecosystem. One-quarter of all ocean species depend on reefs for food and shelter. Corals contribute approximately $10 trillion a year globally and more than $3 billion a year domestically to the economy. Coral reefs are slowly disappearing due to changing water temperatures, ocean acidification, invasive species, weather patterns, and physical impacts from storms. 30 to 50 percent of Coral reefs have been lost meaning that without significant intervention, tropical reef ecosystems could face global extinction by the end of the century. Unfortunately, corals are one of the slowest growing ecosystems. In a year coral can be expected to grow from half an inch up to 8 inches. To fully form a coral reef and produce a group of larvae, it could take anywhere between 100,000 to 30,000,000 years. Currently, coral restoration efforts are taking longer than the coral destruction rate due to one of the natural limiting factors of the slow growth rate of corals. Anatomically, Calcium Carbonate skeletons are the building blocks of coral as they make up about 50% of the coral's weight. This study focuses on improving calcium carbonate deposition rates using hydroelectricity to expedite the growth of corals. Through these studies, it was concluded that with 8 - 10 volts, corals can grow 2.5 times faster than current methods. This study's sustainable process will help to reduce the coral restoration times significantly.