Designing an Improved Method of Shellfish Restoration: Increasing Shell Growth by Constructing an Artificial Structure to Increase Surface Area for Oyster (Crassostrea virginica) Spat Settlement Using Calcite Media to Improve Water Quality Parameters

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The objective of this research was to determine if the artificial structure housing calcite would have significant effects on (1) increasing average oyster (Crassostrea virginica) growth rate, (2) increasing overall number of oyster spats, and (3) improving water quality surrounding the artificial structures compared to the control groups. It was hypothesized that a significant effect on oyster growth, number of spat settlements, and improvement in water quality would occur. Water quality monitoring was performed in a temperature-controlled lab using four 40-gallon aquariums filled with simulated sea water with various pH levels. One aquarium was the control containing only the artificial structure, with three additional aquariums containing the artificial structure with calcite. Ten trials were conducted, and pH levels were recorded. Additional research was conducted at four field locations. Two cages with five live oysters were placed at each location. One with an artificial structure containing calcite and a control containing a structure without calcite. Twenty weeks of measurements were recorded of the oyster's growth and overall spat count. Water quality was monitored at each structure to evaluate the effect of the calcite. The data demonstrated a statistically significant improvement in both field and lab settings of water quality parameters with the addition of the artificial structure containing the calcite media. Oysters experienced increased productivity on the artificial structures containing this variable. Extensive studies conducted by the researcher monitoring the effects of calcite on oyster growth has led to potential solutions for a response to declining pH levels in aquatic environments.

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