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**Master Thesis Defense**

Entitled

*INVESTIGATING THE MASS MORTALITY INDUCED FACTORS OF PEARL OYSTER (PINCTADA RADIATA) AT ABU  
DHABI PEARLS FARM, UAE*

by

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Abstract

The aquaculture of shellfish plays a crucial role in enhancing maritime environments by mitigating algal blooms and improving water quality through the filtration of organic matter, nutrients, and bacteria. This study investigated the environmental factors influencing oyster mortalities through a comprehensive analysis of water quality in Al Mirfa and Al Mughirah farming sites of Abu Dhabi (UAE), from February 2021 to February 2022. To reach such understanding of the main factors led to mass mortalities of cultivated oysters, different monthly sampling and both chemical and biological analyses of the farm water, sediments as well as for both living and dead oyster shells have been carried out during the study period. The results analyses revealed seasonal variations in water temperature, with elevated temperatures adversely affecting physiological rates, growth, and survival of pearl oysters. High seawater temperatures during summer months were identified as a primary factor influencing oyster mortality. Salinity fluctuations and acidic pH conditions negatively impacted oyster health and shell integrity, further increasing mortality rates. Low dissolved oxygen levels, coupled with fouling organism presence, contributed to increased mortality incidents. Toxic dinoflagellates, specifically *Pyrodinium bahamense*, competed with nutritious algae, causing food shortages and potential toxicity issues, thus triggering oyster mortality. Statistical analyses revealed strong relationships between oyster mortality rates and environmental parameters, with temperature, salinity, pH, dissolved oxygen levels, chlorophyll concentration, and the presence of toxic dinoflagellates identified as significant predictors. This study shows the importance of ongoing monitoring and research to understand the interactions between environmental factors and pearl oyster health for sustainable aquaculture management and marine ecosystem conservation. Moreover, proactive measures such as temperature regulation, harmful algal bloom control, and water quality management are essential for minimizing the impact of environmental stressors on pearl oyster populations.

**Keywords:** Oyster Farm Management; Arabian Gulf; Oyster Mortality; Environmental and Biological influencing parameters; Toxic algae.