Isolation and Characterization of Marine Microorganisms in Narragansett Bay

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The marine hydrosphere covers over two-thirds of the planet, however only 0.1 percent of marine microorganisms have been successfully cultivated within a lab. With the vast majority of microorganisms remaining uncultivable, the ocean contains untapped potential for new antibiotics, enzymes, and compounds from these microorganisms. In order to combat this great plate anomaly, novel techniques have emerged to more closely simulate growth conditions experienced by these microorganisms in their natural habitat.

The goal of this study was to identify sampling and isolation conditions conducive to the *in situ* growth of marine microorganisms from Narragansett Bay. Raw seawater was collected from facilities at Roger Williams University and the University of Rhode Island Bay Campus. Microbes were collected by water filtration over a 0.2μm pore size filter or centrifugation, then plated on oligotrophic media (Actinomycete isolation agar and R2A agar) under aerobic and anaerobic growth conditions.

Filtration produced a greater abundance and diversity of colonies than centrifugation of the equivalent volume of water. In comparing media, Actinomycete isolation agar was found to recover a greater diversity of colonies than R2A agar, as assessed by colony morphology. Fifteen isolates were prepared for polymerase chain reaction (PCR) amplification of the 16S rRNA and ITS regions for identification of bacteria and fungi respectively. The purified PCR products were Sanger sequenced and isolates were identified to the genus level using nucleotide BLAST. Future research will focus on further subculturing to isolate additional colonies as well as comparing aerobic and anaerobic growth.

In summary, through the use of filtration and centrifugation of seawater samples and cultivation on low-nutrient media, bacterial and fungal isolates from Narragansett Bay were cultured and characterized. This research will help to establish protocols for the cultivation of microorganisms that will enable monitoring of changes in marine ecosystems geographically, seasonally, and in response to climate change.