

Aerospace physiology

Quantitative Measurement of Marine and Fungal Biofilm Dynamics: Insights into Ecological and Biomedical Implications

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The formation of biofilms by marine and fungal organisms, including four marine *Vibrio* isolates and fungal isolates of *Candida* and *Rhodotorula*, represents complex ecosystems with significant implications for ecology and biomedicine. This study aimed to enhance the understanding of biofilm dynamics through accurate and comprehensive measurement techniques. Following inoculation and growth in liquid media, biofilms were developed in 96-well microplates and stained with crystal violet. The stained biofilms were then solubilized with isopropanol, and optical density measurements were used to quantify the absorbance relative to biofilm concentration. Notably, optical density readings indicated an increased amount of fungal biofilm formation when compared to marine bacterial biofilms, with statistical significance ($p < 0.05$). This finding underscores the differential biofilm formation capacities among marine and fungal isolates, highlighting the importance of advanced quantitative techniques in revealing the structure, function, and ecological significance of biofilms. The study suggests potential applications in environmental and health-related fields and calls for further research into the molecular mechanisms underlying biofilm resilience and pathogenicity.

Keywords: Biofilms, Marine *Vibrio*, *Candida*, *Rhodotorula*, Crystal Violet, Optical Density, Comparative Analysis