Ultrasonic-assisted marine antifouling strategy on epoxy primer

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Abstract Ultrasonic technology has drawn a resurgence of interests for its great potential in marine antifouling applications. However, its effects on the adhesion behavior of marine fouling organisms on marine structures remain underexplored. This work has investigated how ultrasonic treatment impacted the adhesion of Pseudoalteromonas on the marine epoxy primer. And the process parameters for ultrasonic treatment were optimized using response surface analysis of Design-Expert software. The results revealed that ultrasonic treatment disrupted the cellular structure of Pseudoalteromonas, causing deformation and fragmentation of cell membrane, leading to the bacterial death. Additionally, ultrasonic treatment reduced the particle size and zeta potential value of Pseudoalteromonas, which disrupted the stability of bacterial suspensions. It also increased the relative surface hydrophobicity of Pseudoalteromonas cells, resulted in the reduction of the adhesion to the marine epoxy primer. This study demonstrated that ultrasonic treatment has significantly disturbed the adhesion behavior of microorganisms like Pseudoalteromonas on the marine epoxy primer, which provided an effective approach for controlling marine biofouling.

Keywords Ultrasonic treatment; *Pseudoalteromonas*; Marine epoxy primer; Adhesion behavior; Marine biofouling.

Reference

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