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Characterizing the Pathogenic Potential of *Vibrio parahaemolyticus*: Phenotypic and Genotypic Analysis of Biofilm Formation and Virulence Gene Expression in Clinical and Environmental Strains on Mussel Shells

Content

Vibrio parahaemolyticus is a major food-borne pathogen associated with contaminated seafood and capable of causing varying degrees of gastroenteritis in humans. Its pathogenicity is mediated by multiple virulence factors, including flagella and adhesion factors, and is further enhanced by its ability to form biofilms, increasing its resistance to environmental stress. However, the mechanisms underlying its pathogenicity remain incompletely understood.

The main objective of this study is to examine the biofilm formation ability and virulence gene profiles of *V. parahaemolyticus* isolates on mussel shells, comparing genotypic and phenotypic traits of clinical reference and environmental strains at 25°C, 30°C and 37°C. A total of 25 strains were examined. Motility was assessed by swimming and swarming assays, while biofilm formation was determined by crystal violet staining. The presence of 32 associated genes was analyzed using real-time qPCR.

While the reference strain *V. parahaemolyticus* RIMD 2210633 contained all target genes, some strains lacked key adhesion genes. Swarming motility appeared inversely regulated with biofilm formation. Gene expression analyses following biofilm formation on mussel shells will be conducted to further elucidate regulatory mechanisms.

Keywords

Vibrio, biofilm, virulence, shellfish

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