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# The Impact of Shear Forces and Surface Hydrophobicity on Coccoid Cyanobacterial Biofilm Development

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Biofouling is a natural process in marine environments with associated economic and ecological problems. Thus, understanding the conditions that affect cyanobacterial biofilm development is crucial to develop new antibiofouling strategies and decrease the impact of biofilms in the marine environment. In this study, we investigated the relative importance of shear forces and surface hydrophobicity on biofilm development by two coccoid cyanobacteria with different biofilm formation capacities. The strong biofilm-forming *Synechocystis salina* was used along with the weaker biofilm-forming *Cyanobium* sp. Biofilms were developed in defined hydrodynamic conditions using glass (a model hydrophilic surface) and a polymeric epoxy coating (a hydrophobic surface) as substrates. Biofilms developed in both surfaces at lower shear conditions contained a higher number of cells and presented higher values for wet weight, thickness, and chlorophyll *a* content. The impact of hydrodynamics on biofilm development was generally stronger than the impact of surface hydrophobicity, but a combined effect of these two parameters strongly affected biofilm formation for the weaker biofilm-producing organism. The antibiofilm performance of the polymeric coating was confirmed at the hydrodynamic conditions prevailing in ports. Shear forces were shown to have a profound impact on biofilm development in marine settings regardless of the fouling capacity of the existing flora and the hydrophobicity of the surface.

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