

ADHESION OF BIOFILMS FORMED BY PSEUDOMONAS FLUORESCENS.

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Decrease in the free energy of adhesion, like in other physicochemical processes, is the driving force of bacterial adhesion.

Pseudomonas fluorescens, a bacterium present in natural waters, was chosen as a biofilm producer. The biofilms were formed on metallic surfaces - aluminium, copper and brass - which are widely used in industrial equipments.

Biofilm thickness was measured after 2 days of formation. The free energy of adhesion (ΔG^{adh}) was determined by means of interfacial free energies (γ). The surface free energies of the metal surfaces and biofilms were calculated from contact angle measurements.

In general, the results obtained show that thicker biofilms were formed when ΔG^{adh} is more negative (see table). Thus, this thermodynamic approach seems to be a useful tool for the prediction of biofilm formation. In the case of brass, it is possible that Zn ions may have a toxic effect on bacteria.

METAL	G^{adh} (mJ.m ⁻²)	Thickness (μ m)
aluminium	- 36.3	50
copper	- 29.7	55
brass	- 32.8	33

Notes :