

Adhesion forces of spherical bacteria investigated by scanning force microscopy

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Biofilms create a favorable environment for the embedded bacteria and are therefore of growing interest for technical systems such as biofilm reactors. To optimize the growth conditions for a biofilm, we investigated the influence of different environmental factors on the adhesion forces by single cell force spectroscopy. Besides different pH values, ionic strengths and contact times we also studied various surfaces and a gram-negative as well as a gram-positive bacterium.

The gram-negative seawater bacterium *Paracoccus seriniphilus* showed the strongest adhesion forces for acidic pH values and an increased ionic strength compared to the growth medium.

Further, we performed contact angle, zeta potential and scanning force microscopy measurements to link the change in adhesion forces of bacteria to the variation of environmental conditions and the resulting properties of the bacteria. These measurements proof that the results of the force spectroscopy experiments can be completely explained by the electrostatic forces between cell and surface.