

The Role of Ionic Strength and Mineral Size to Zeta Potential for the Adhesion of *P. putida* to Mineral Surfaces

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Abstract : Electrostatic interaction energy (ΔE_{EDL}) is a part of the Extended Derjaguin-Landau-Verwey-Overbeek (XDLVO) theory, which, together with van der Waals (ΔE_{VDW}) and acid base (ΔE_{AB}) interaction energies, has been extensively used to investigate the initial adhesion of bacteria to surfaces. Electrostatic or electrical double layer interaction energy is considerably affected by surface potential, however it cannot be determined experimentally and is usually replaced by zeta (ζ) potential via electrophoretic mobility. This paper focuses on the effect of ionic concentration as a function of pH and the effect of mineral grain size on ζ potential. It was found that both ionic strength and mineral grain size play a major role in determining the value of ζ potential for the adhesion of *P. putida* to hematite and quartz surfaces. Higher ζ potential values lead to higher electrostatic interaction energies and eventually to higher total XDLVO interaction energy resulting in bacterial repulsion.

Keywords : XDLVO, electrostatic interaction energy, zeta potential, *P. putida*, mineral

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