

Abstract

Bacterial adhesion is a process of attachment of a planktonic cell to the surface and the necessary step for further biofilm formation. Most bacterial species are capable of biofilm formation. Bacteria within biofilm exhibit increased resistance to antibiotics and other external factors, which makes the eradication of adhered bacteria rather difficult. Bacterial adhesion is very complex process affected by many physical and chemical factors as well as by the adhesive molecules present on the substrate and cell surface. Accurate description of these factors enables to design appropriate modifications of both the substrate and the environment with the aim to fabricate the antiadhesive and antibacterial surfaces or to increase the efficiency in bacteria-based biotechnological processes. Whereas in medical applications the main goal is to decrease bacterial adhesion, the increased adhesion is desirable in certain processes employing bacteria, as is for example the wastewater treatment.

This thesis reviews main theories used for prediction of bacterial adhesion, describes the process of adhesion and physical, chemical and biological factors that influence it. It also contains an overview of antiadhesive and antibacterial surfaces.

Key words: Bacteria, adhesion, pili, flagellum, antiadhesive and antibacterial surfaces.