

CZYNNIKI WARUNKUJĄCE ADHEZJĘ DROBNOUSTROJÓW DO POWIERZCHNI ABIOTYCZNYCH

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Factors affecting the adhesion of microorganisms to solid surfaces

Abstract: This review paper presents a basic knowledge about factors affecting the adhesion of microorganisms to solid surfaces. Bacterial colonisation of abiotic surfaces has important consequences in medicine (contamination of prostheses and catheters) and in the food industry (contamination of food product lines). Adhesion process includes the following steps: physical interactions between microorganisms and surface (transport of microorganisms to the substrate), initial nonspecific adhesion of bacteria to unprotected sites of the substrate, specific adhesion (mainly microbial interactions) and biofilm formation. The adhesion of microorganisms to the surface is one of the first stages in the development of a biofilm and is influenced by a number of factors, such as: hydrophobicity of cell surface, extracellular production of polymeric substances (mainly proteins and polysaccharides), factors connected with physico-chemical properties of solid surface, environmental factors (kind of media, ionic strength, pH, presence of surfactants and polyvalent ions) and other factors (growth phase of microorganisms, viability of cells, microbial competition). A lot of disagreements were appeared in the literature relating which factors and how far affecting the adhesion of microorganisms to solid surfaces. The apparent conflict in these observations is probably related to the bacterial species tested, the method used to detect bacteria on the surface, the physico-chemical parameters of the surface and the degree of surface roughness. Studies on attachment of microorganisms to solid surface represents important aspects in the establishment decontamination procedures directed of minimizing health hazards.

1. Introduction. 2. Mechanisms of adhesion. 3. Factors affecting the adhesion. 3.1. Hydrophobicity of cell surface. 3.2. Extracellular production of polymeric substances. 3.3. Factors connected with kind of surface. 3.4. Environmental factors. 3.5. Other factors. 4. Recapitulation

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