



# Microbial Extracellular Polymeric Substances: Characterization, Structure and Function

*Jost Wingender, Thomas R. Neu, Hans-Curt Flemming*

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Microbial extracellular polymeric substances (EPS) are the key components for the aggregation of microorganisms in biofilms, flocs and sludge. They are composed of polysaccharides, proteins, nucleic acids, lipids and other biological macromolecules. EPS provide a highly hydrated gel matrix in which microbial cells can establish stable synergistic consortia. Cohesion and adhesion as well as morphology, structure, biological function and other properties such as mechanical stability, diffusion, sorption and optical properties of microbial aggregates are determined by the EPS matrix. Also, the protection of biofilm organisms against biocides is attributed to the EPS. Their matrix allows phase separation in biofiltration and is also important for the degradation of particulate material which is of great importance for the self purification processes in surface waters and for waste water treatment.

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