

The Perfect Slime: Microbial Extracellular Polymeric Substances (EPS)

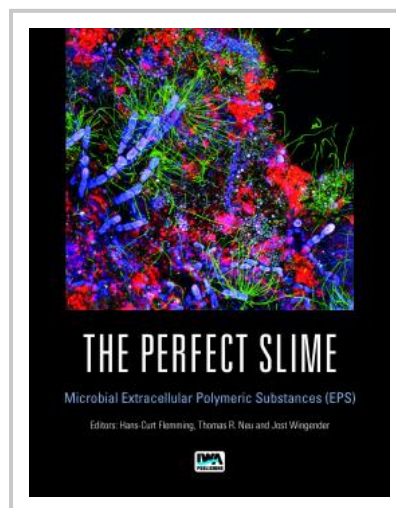
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The Perfect Slime presents the latest state of knowledge and a wide range of aspects of the extracellular polymeric substances (EPS) matrix – from the ecological and health to the antifouling perspectives. The book brings together all the current material in order to expand our understanding of the functions, properties and characteristics of the matrix as well as the possibilities to strengthen or weaken it.

The EPS matrix represents the immediate environment in which biofilm organisms live. From their point of view, this matrix has paramount advantages. It allows them to stay together for extended periods of time and form synergistic microconsortia, it retains extracellular enzymes and turns the matrix into an external digestion system and it is a universal recycling yard, it protects them against desiccation, it allows for intense communication and represents a huge genetic archive. They can remodel their matrix, break free and eventually, they can use it as a nutrient source. The EPS matrix can be considered as one of the emergent properties of biofilms and is a major reason for the success of this form of life.

Nevertheless, the EPS have been termed the “black matter of biofilms” for good reasons. First of all: the isolation methods define the results. In most cases, only water soluble EPS components are investigated; insoluble ones such as cellulose or amyloids are much less included. In particular in environmental biofilms with many species, it is difficult to impossible isolate and separate the various EPS molecules they are encased in, and to define which species produced which EPS. The regulation and the factors which trigger or inhibit EPS production are still very poorly understood.

Furthermore: bacteria are not the only microorganisms to produce EPS. Archaea, fungi and algae can also form EPS. This book investigates questions such as: what is their composition, function, dynamics and regulations and what do they all have in common



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