

# A New Mathematical Model for the Growth Phase of the Biofilm

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**Abstract:** Biofilms are bacterial colonies growing on a submerged surface and embedded in the polymeric extracellular matrix. The three-dimensional structure of the biofilm is very important for its development. Biofilm systems are of great interest for industrial and medical applications.

In this talk I will present a new mathematical model based on conservation laws. The equations model the viscoelastic behavior of the biofilms and the volumetric growth of the colony. The growth of the colony inside the volume makes it impossible to use standard elasticity theory, which is normally based on some 'reference configuration'.

Within this framework it is possible to take into account different species, extracellular matrix and bulk fluid separately. For this purpose multicomponent approach is used. Also it is possible to include important chemicals. The latter can be included into the system via usual reaction-diffusion equations.

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