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Biophysical Mechanics of the Dental Bacteria Biofilm and Polyphenols as Reactive Oxygen Species Reducers YOURA OH, George Washington University, RICHARD KYUNG, CRG-NJ — Biofilms are thin layers that consist of colonies of bacteria. These biofilms are full of matrices of extracellular polymeric substance. Biofilms specifically formed by pathogenic Gram-negative Escherichia coli strains are often resistant to antimicrobial agents and they can be truly deleterious to dental structures causing infections. Accumulation of various bacteria that forms dental plaque causes the periodontal disease. Diffusing through a pellicle and adaptive interactions of the microbial molecules with the microorganisms make them resistant to antimicrobial agents. In this research, molecular mechanisms of the process were studied through computational simulations. Computational modeling was employed to find the electrostatic and hydrophobic interaction of a component of a bacterial protein's side chain and a component of the acquired pellicle. In addition, polyphenols, which inhibit the formation of plaque caused by the Streptococcus mutans, were computationally modeled and biochemically analyzed to find their bond properties and enthalpy of formations.

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