

Growing biofilms on elastic substrates

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In this study, we aim to investigate the influence of substrate properties on biofilm spreading using a simplified model tailored to elastic substrates. The contact angle plays a key role in biofilm spreading and is related to the spreading velocity. To facilitate our mesoscale analysis, we use a model of wetting energy as a function of film height, denoted $f(h)$. In a departure from the conventional view of rigid solid substrates, our research aims to uncover the profound influence of mechanical substrate properties on biofilm behavior. By manipulating substrate compliance, covering the spectrum from the solid state ($s < 10$) to the elastic range ($10 < s < 1 \times 10^5$), while keeping the values of surface tension ($\gamma_h = 0.1$) and droplet volume ($V = 1 \times 10^5$) constant, our study focuses on the comprehensive evaluation of critical parameters, including wettability, biofilm growth production, and substrate softness.

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