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Spatial patterning of bacterial colonization on leaf surfaces

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We present a mathematical model applied to bacterial aggregation on leaf surfaces, a phenomenon influenced by spatial heterogeneity in water and nutrient availability, and interactions among bacterial populations. These interactions, which may be cooperative or competitive, can result in diverse spatial patterns. By leveraging insights from the kinetic theory of active particles and classical macroscopic models, we derive a reaction-diffusion system for two interacting bacterial populations on a leaf surface. We perform numerical simulations that contribute to the understanding of microbial spatial organization and pattern formation.