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Dynamics of a model of allelopathy and bacteriocin with a single mutation. (English)

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Summary: We discuss a model of allelopathy and bacteriocin in the chemostat with a wild-type organism and a single mutant. Dynamical properties of this model show the basic competition between two microorganisms. A qualitative analysis about the boundary equilibrium, a state at that both microorganisms vanish, is carried out. The existence and uniqueness of the interior equilibrium is proved. Its dynamical properties are given by using the index theory of equilibria. We further discuss its bifurcations. Our results are demonstrated by numerical simulations.

MSC:

34C60 Qualitative investigation and simulation of ordinary differential equation models
92D25 Population dynamics (general)

Keywords:

population dynamics; saddle-node; index of equilibrium; center manifold; bifurcation

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