

**Effect of the interspecificity and of the density-dependence
on a two complementary nutrients competition model**

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Abstract

We present two contributions to the mathematical study of models of microbial competition on two complementary substrates. Building on the limited literature in this field of multisubstrate modelling, we first examine the effect of interspecific interaction on the competition between two species for two essential substrates, using general resource-dependent kinetics [1]. We then turn our attention to the case of general density-dependent uptake kinetics, first considering an arbitrary number of competing species before deriving additional results for the cases involving two and then three species of microorganisms. Given the complexity of the models, the results are expressed primarily in terms of uniform persistence and dissipativity. The main tools are the general persistence theorems of Thieme–Zhao and Hofbauer–Hutson.

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