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**Frederic Mazenc** (`Frederic.Mazenc@ensam.inra.fr`), Projet MERE INRIA-INRA, UMR Analyse des Systemes et Biometrie INRA, 2 pl. Viala, Montpellier, **Michael Malisoff\*** (`malisoff@lsu.edu`), Department of Mathematics, 301 Lockett Hall, Louisiana State University, Baton Rouge, LA , and **Patrick De Leenheer** (`deleenhe@math.ufl.edu`), Department of Mathematics, University of Florida, 411 Little Hall, PO Box 118105, Gainesville, FL. *On the Stability of Periodic Solutions in the Perturbed Chemostat.*

We study the chemostat model for one species competing for one nutrient. For appropriate choices of the nutrient concentration and time-varying dilution rate, we use a Lyapunov-type analysis to prove the stability of the corresponding reference signal for the species concentration. We show that the stability is maintained when the model is augmented by additional species that are being driven to extinction. We also give an input-to-state stability result for the chemostat tracking equations for cases where there are small perturbations acting on the dilution rate and initial concentration. (Received September 26, 2006)