

Contents

Chapter 1.	Interaction between fluid flow and microbial cells: importance of the operating scale	1
1.1	Different scales involved in the development of microbial bioprocesses	1
1.2	Hydrodynamic modeling of the substrate heterogeneities perceived by cells	4
Chapter 2.	Stochastic simulation of the displacement of microbial cells along concentration field	9
2.1	Microbial stress response: different timescales involved	10
Chapter 3.	Experimental results gained from the physiological response of GFP biosensors in scale-down conditions	17
3.1	General stress response in scale-down bioreactors: <i>rpoS::GFP</i>	21
3.2	Use of destabilized GFP variants	28
Chapter 4.	Another source of information: protein leakage and the study of the secretome	31
References		36