

CONTENTS

| | |
|--|------------|
| Chapter 1 - Scope, aims and outline..... | 1 |
| Chapter 2 - Integrated Nitrogen Removal in Compact Systems by Immobilized Microorganisms: New-Generation Bioreactors..... | 5 |
| Chapter 3 - The Magic-Bead Concept: An Integrated approach to Nitrogen Removal With Co-immobilized Microorganisms..... | 91 |
| Chapter 4 - Production and Characterization of Double-Layer Beads for Co- Immobilization of Microbial Cells..... | 109 |
| Chapter 5 - Relevance of Rheological Properties of Gel Beads for Their Mechanical Stability in Bioreactors..... | 131 |
| Chapter 6 - Characteristics of and Selection Criteria for Support Materials for Cell Immobilization..... | 159 |
| Chapter 7 - Modeling and Evaluation of an Integrated Nitrogen Removal System with Microorganisms Co-immobilized in Double-Layer Gel Beads..... | 183 |
| Chapter 8 - Substrate and Product Profiles Across Double-Layered (De)Nitrifying Biocatalysts: Dynamic Modelling and Validation | 207 |
| Chapter 9 - pH Effects on Coupled Nitrification and Denitrification Predicted by Dynamic Modeling and Measured by Specific Microelectrodes..... | 237 |

**Chapter 10 - Simultaneous Autotrophic Nitrification and Anaerobic Ammonium
Oxidation with Co-immobilized Micro-organisms.....**267

Chapter 11 - Process Dynamics of a Fully Autotrophic Nitrogen Removal System...285

**Chapter 12 - Towards an Integrated Approach for Oxidative and Reductive
Biodegradation Processes.....**309

Summary.....341

Samenvatting.....345

Publication list.....349

***Curriculum vitae*.....**353