1. Record Nr. UNINA9910830022003321

Autore	Heinzle Elmar
Titolo	Development of sustainable bioprocesses [[electronic resource]] : modeling and assessment / / Elmar Heinzle, Arno P. Biwer, Charles L. Cooney
Pubbl/distr/stampa	Chichester, England ; ; Hoboken, NJ, : John Wiley & Sons, c2006
ISBN	1-280-73996-7 9786610739967 0-470-05891-9 1-60119-837-X 0-470-05890-0
Descrizione fisica	1 online resource (318 p.)
Altri autori (Persone)	BiwerArno P CooneyCharles L. <1944->
Disciplina	660.63 660.63011
Soggetti	Biochemical engineering - Economic aspects Biochemical engineering - Environmental aspects Biochemical engineering - Computer simulation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Development of Sustainable Bioprocesses; Contents; Preface; Acknowledgments; List of Contributors; PART I Theoretical Introduction; 1 Introduction; 1.1 Bioprocesses; 1.1.1 History of Biotechnology and Today's Situation; 1.1.2 Future Perspectives; 1.2 Modeling and Assessment in Process Development; 2 Development of Bioprocesses; 2.1 Types of Bioprocess and Bioproduct; 2.1.1 Biocatalysts and Process Types; 2.1.2 Raw Materials; 2.1.3 Bioproducts; 2.2 Bioreaction Stoichiometry, Thermodynamics, and Kinetics; 2.2.1 Stoichiometry; 2.2.2 Thermodynamics; 2.2.3 Kinetics 2.3 Elements of Bioprocesses (Unit Operations and Unit Procedures) 2.3.1 Upstream Processing; 2.3.2 Bioreactor; 2.3.3 Downstream Processing; 2.3.4 Waste Treatment, Reduction and Recycling; 2.4 The Development Process; 2.4.1 Introduction; 2.4.2 Development Steps and Participants; 3 Modeling and Simulation of Bioprocesses; 3.1 Problem

Structuring, Process Analysis, and Process Scheme; 3.1.1 Model Boundaries and General Structure; 3.1.2 Modeling Steps; 3.2 Implementation and Simulation; 3.2.1 Spreadsheet Model; 3.2.2 Modeling using a Process Simulator; 3.3 Uncertainty Analysis
3.3.1 Scenario Analysis3.3.2 Sensitivity Analysis; 3.3.3 Monte Carlo Simulation; 4 Sustainability Assessment; 4.1 Sustainability; 4.2 Economic Assessment; 4.2.1 Capital-Cost Estimation; 4.2.2 Operating-Cost Estimation; 4.2.3 Profitability Assessment; 4.3 Environmental Assessment; 4.3.1 Introduction; 4.3.2 Structure of the Method; 4.3.3 Impact Categories and Groups; 4.3.4 Calculation of Environmental Factors; 4.3.5 Calculation of Indices; 4.3.6 Example Cleavage of Penicillin G; 4.4 Assessing Social Aspects; 4.4.1 Introduction; 4.4.2 Indicators for Social Assessment
4.5 Interactions between the Different Sustainability DimensionsPART II Bioprocess Case Studies; Introduction to Case Studies; 5 Citric Acid - Alternative Process using Starch; 5.1 Introduction; 5.2 Fermentation Model; 5.3 Process Model; 5.4 Inventory Analysis; 5.5 Environmental Assessment; 5.6 Economic Assessment; 5.7 Conclusions; 6 Pyruvic Acid - Fermentation with Alternative Downstream Processes; 6.1 Introduction; 6.2 Fermentation Model; 6.3 Process Model; 6.3.1 Bioreaction and Upstream; 6.3.2 Downstream Processing; 6.4 Inventory Analysis; 6.5 Environmental Assessment
6.6 Economic Assessment6.7 Conclusions; 7 l-Lysine - Coupling of Bioreaction and Process Model; 7.1 Introduction; 7.2 Basic Strategy; 7.3 Bioreaction Model; 7.4 Process Model; 7.5 Coupling of Bioreaction and Process Model; 7.5.1 Assumptions; 7.6 Results and Discussion; 8 Riboflavin - Vitamin B2; 8.1 Introduction; 8.2 Biosynthesis and Fermentation; 8.3 Production Process and Process Model; 8.3.1 Upstream Processing; 8.3.2 Fermentation; 8.3.3 Downstream Processing; 8.4 Inventory Analysis; 8.5 Ecological Assessment; 8.6 Economic Assessment; 8.7 Discussion and Concluding Remarks
9 a-Cyclodextrin

Sommario/riassunto

Bioprocess technology involves the combination of living matter (whole organism or enzymes) with nutrients under laboratory conditions to make a desired product within the pharmaceutical, food, cosmetics, biotechnology, fine chemicals and bulk chemicals sectors. Industry is under increasing pressure to develop new processes that are both environmentally friendly and cost-effective, and this can be achieved by taking a fresh look at process development; - namely by combining modern process modeling techniques with sustainability assessment methods. Development of Sustainable Bioprocesses: