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Nota di contenuto	About the Special Issue Editor -- Preface to "Hybrid Modelling and Multi-Parametric Control of Bioprocesses" -- Karen Schwab, Jennifer Lauber and Friedemann Hesse Fluorometric In Situ Monitoring of an Escherichia coli Cell Factory with Cytosolic Expression of Human Glycosyltransferase GalNacT2: Prospects and Limitations -- Karen Schwab and Friedemann Hesse Estimating Extrinsic Dyes for Fluorometric Online Monitoring of Antibody Aggregation in CHO Fed-Batch Cultivations -- Maike Kuschel, Flora Siebler and Ralf Takors Lagrangian Trajectories to Predict the Formation of Population Heterogeneity in LargeScale Bioreactors -- Dominik Egger, Ivo Schwedhelm, Jan Hansmann and Cornelia Kasper Hypoxic Three-Dimensional Scaffold-Free Aggregate Cultivation of Mesenchymal Stem Cells in a Stirred Tank Reactor -- Dominik Egger, Monica Fischer, Andreas Clementi, Volker Ribitsch, Jan Hansmann and Cornelia Kasper Development and Characterization of a Parallelizable Perfusion Bioreactor for 3D Cell Culture -- Dennis Vier, Stefan Wambach, Volker Schnemann and Klaus-Uwe Gollmer Multivariate Curve Resolution and Carbon Balance Constraint to Unravel FTIR Spectra fromFed-Batch Fermentation Samples -- Julian Kopp, Christoph Slouka, Sophia Ulonska, Julian Kager, Jens Fricke, Oliver Spadiut and Christoph Herwig Impact of Glycerol as Carbon Source onto Specific Sugar and Inducer Uptake Rates and Inclusion Body Productivity in E. coli BL21(DE3) -- Rimvydas Simutis and Andreas L ¨ubbert Hybrid Approach to State

Estimation for Bioprocess Control -- Thomas Zahel, Lukas Marschall, Sandra Abad, Elena Vasilieva, Daniel Maurer, Eric M. Mueller, Patrick Murphy, Thomas Natschlger, Cécile Brocard, Daniela Reinisch, Patrick Sagmeister and Christoph Herwig Workflow for Criticality Assessment Applied in Biopharmaceutical Process Validation Stage 1 -- Thomas Zahel, Stefan Hauer, Eric M. Mueller, Patrick Murphy, Sandra Abad, Elena Vasilieva, Daniel Maurer, Cécile Brocard, Daniela Reinisch, Patrick Sagmeister and Christoph Herwig Integrated Process Modeling- A Process Validation Life Cycle Companion.

Sommario/riassunto

The goal of bioprocessing is to optimize process variables, such as product quantity and quality, in a reproducible, scalable, and transferable manner. However, bioprocesses are highly complex. A large number of process parameters and raw material attributes exist, which are highly interactive, and may vary from batch to batch. Those interactions need to be understood, and the source of variance must be identified and controlled. While purely data-driven correlations, such as chemometric models of spectroscopic data, may be employed for the understanding how process parameters are related to process variables, they can hardly be deployed outside of the calibration space. Currently, mechanistic models, models based on mechanistic links and first principles, are in the focus of development. They are perceived to allow transferability and scalability, because mechanistics can be extrapolated. Moreover, the models deliver a large range of hardly-measurable states and physiological parameters. The current Special Issue wants to display current solutions and case studies of development and deployment of hybrid models and multi-parametric control of bioprocesses. It includes: -Models for Bioprocess Monitoring -Model for Bioreactor Design and Scale Up -Hybrid model solutions, combinations of data driven and mechanistic models. -Model to unravel mechanistic physiological regulations -Implementation of hybrid models in the real-time context -Data science driven model for process validation and product life cycle management.
