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Sinopsis

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Biotechnology is a rapidly moving field, which builds on the competence and interplay of many different disciplines; biochemistry, microbiology, molecular biology and chemical engineering. The quantitative treatment of biological processes is today a prerequisite for both the design of new bioprocesses and the analysis of cellular function.

The present text is an extensively revised edition of the textbook first published in 1994. The quantitative treatment of bioprocesses is a central theme in this book. The book has been restructured to make it more easily accessible to the reader, the material has been updated and several new topics have been added in the text.

The focus is on the bioreactor and the processes that occur in the reactor, i.e. the coupling between the reactions occurring in the cell and its environment. The microbial cellular metabolism is the starting point in the treatment. Tools for the quantitative analysis of cellular functions - macroscopic mass balancing, thermodynamics of microbial processes, metabolic network analysis and kinetic modelling - are gradually introduced. After analysis of the cellular reactor, the interaction between the cell and its environment is treated in chapters concerning mass transfer and design of bioprocesses. Finally, the complex subject of scale-up is presented.

The book combines, in a rather unique way, a quantitative treatment of physiology at the cellular level with a treatment of the bioreactor and interaction between the cellular reactor and the bioreactor. Many examples and problems are used to illustrate important concepts in the text.