

Preface

You shall bring forth your work as a mother brings forth her child: out of the blood of your heart. Each act of creation shall leave you humble, for it is never as great as your dream and always inferior to that most marvelous dream which is Nature.

"Decalogue of the Artist," Gabriela Mistral, Chilean Nobel Laureate

This book is primarily intended for chemical and biochemical engineering students, but also for biochemists, chemists, and biologists dealing with biocatalytic processes. It was purposely written in a format that resembles the Schaum's textbooks of my long gone college years. An abridged coverage of the subject is provided in each chapter, followed by a number of sample exercises in the form of solved problems illustrating resolution procedures and the main concepts underlying them, along with supplementary problems for the reader to solve, provided with the corresponding answers. Learning through problem solving is designed to be both challenging and exciting to students. There is no book on enzyme biocatalysis with this format and purpose, so we sincerely hope to have made a contribution to the toolbox of graduate and undergraduate students in applied biology, chemical, and biochemical engineering with formal training in college-level mathematics, organic chemistry, biochemistry, thermodynamics, and chemical reaction kinetics. The book pretends to be a complement of a previous book, *Enzyme Biocatalysis* (Springer, 2008), which I had the privilege and pleasure to edit.

Chapter 1 is an introduction, giving an updated vision of enzyme biocatalysis, its present status, and its potential development. Chapters 2 and 3 refer to enzyme kinetics in homogeneous and heterogeneous systems, respectively, considering both fundamental and practical aspects of the subject. Chapter 4 is devoted to enzyme reactor design and operation under ideal conditions, while Chapters 5 and 6 deal with the main causes of nonideal behavior (mass-transfer limitations and enzyme inactivation, respectively). Chapter 7 presents an overview of the optimization of enzyme reactor operation and different tools for optimization. The book is complemented by two documents. Appendix A refers to mathematical methods for those readers not sufficiently acquainted with the subject, while Epsilon Software Information presents a software program (epsilon) for solving and representing enzyme reactor performance under different scenarios.

Writing is certainly a most exciting endeavor. Undoubtedly, writing about enzymes is beyond being the subject of our expertise, because enzymes are the catalysts of life, so writing about enzymes lies in the boundaries of writing about life. And life, as the Iraqi poet Abdul Wahab said, is about standing straight, never bent or bow, about remaining glad, never sad or low. We hope our readers will keep straight and glad while getting a little more acquainted with these catalysts of life.

A book is a journey from expectation to consolidation, an act of love from conception to birth. It has been a most rewarding experience to travel and conceive in the company of my

co-authors, two brilliant young colleagues of mine, Dr. Carlos Vera and Dr. Lorena Wilson, who were formerly my students and now fly well over my shoulders. My gratitude also to my colleague Dr. Raúl Conejeros, who authored Chapter 7 and beyond that contributed to spice this book throughout with mathematical modeling and elaborated thinking. Do not blame him too much; he is a good mix of wisdom and kindness. Our gratitude also to Dr. Felipe Scott for developing, together with Dr. Carlos Vera, the software Epsilon, presented in Epsilon Software Information to the development of the Epsilon Software.

A significant part of this book was written in Spain, at the Chemical Engineering Department of the Universitat Autònoma de Barcelona, where I was (again) warmly hosted while undertaking a sabbatical (my third one there) during the second semester of 2012. My personal gratitude to my colleagues there, Dr. Josep López and Gregorio Álvaro, who made me feel at home and who shared the ecstasy and the agony of this pregnancy.

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■ Last but not least, my gratitude to my life partner Dr. Fanny Guzmán, expert in peptide synthesis, loving care, and *savoir-vivre*.

■ Engineering is about products and processes. A book is both. We hope you will enjoy the product as much as we have enjoyed the process.

Andrés Illanes

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