



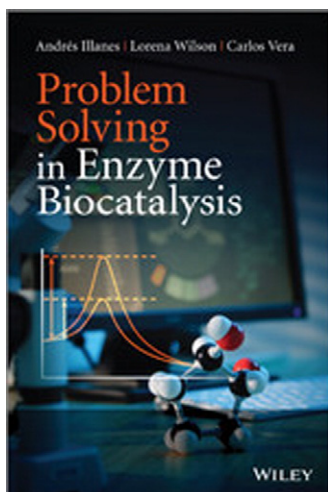
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Book review

Andrés Illanes, Lorena Wilson, Carlos Vera, Problem solving in enzyme biocatalysis, J. Wiley & Sons, Ltd., 2014, ISBN: 978-1-118-34171-1 [344 pp.]



This book is a very valuable contribution to undergraduate and graduate teaching of enzyme biocatalysis. Up to my knowledge, this is the first text focused on enzyme biocatalysis teaching via problem solving. By the first time, an impressive number of completely solved and proposed problems are presented in detail after a synoptic and clear presentation of the principles involved.

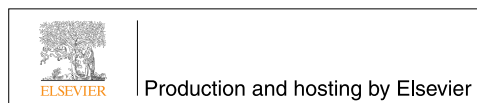
The book is organized in seven chapters and one appendix. The inclusion of one very complete nomenclature section is deeply acknowledged. Through the successive chapters, the different aspects involved in enzyme biocatalysis are progressively treated.

Chapter one is an introduction to the topic and presents the properties and applications of enzymes as process catalysts, and includes an overview of the present and future enzyme market.

Chapter two is devoted to enzyme kinetics of homogenous reactions. Basic concepts are clearly exposed including the sometimes overlooked concept of enzyme activity. Then, 24 problems of increasing complexity are presented and solved in detail. This chapter finishes with 22 proposed problems with their respective answers.

In the third chapter, heterogeneous enzyme kinetics is treated. The main enzyme immobilization techniques are presented and discussed, as well as the mass transfer limitations associated to this type of catalysts. Seventeen solved high complexity problems are included followed by 19 proposed problems and their answers.

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Chapter four treats the design and operation of enzyme reactors under ideal conditions of flow regime, constant operation conditions and absence of enzyme inactivation and mass transfer limitations. After discussing the proper strategies for the design and operation evaluation of reactors, mathematical models are presented related to kinetics, operation mode and comparison of the behavior of different types of reactors. The chapter is illustrated with 14 solved problems and 10 proposed problems with their answers.

The principles of sequential operation of batch reactors and of continuous reactors under conditions of mass transfer limitations are treated in chapter five, together with the presentations of the respective mathematical models. These principles are illustrated with seven solved problems and six proposed problems with their answers.

The interesting and complex topic of the design and operation of enzyme reactors under conditions of biocatalyst inactivation is presented in chapter six. This section contains material that has received little attention elsewhere and constitutes a valuable contribution of the authors. Firstly, the basic principles involved and attack strategies are presented in a clear and concise manner, followed by nine complex solved problems and 10 proposed problems and their answers.

The last chapter is devoted to the optimization of enzyme reactor operation, a topic that also represents a novel contribution to enzyme biocatalysis. The main methods of mathematical optimization are clearly presented followed by six problems solved in detail and two proposed problems and their answers.

Special mention must be made to the appendix in which the mathematical tools required for solving the problems are clearly exposed.

As a whole, this is a novel and very useful textbook for enzyme biocatalysis students of biochemical engineering and related areas.

Finally, a word about the authors: Professor Illanes is a recognized international authority in enzyme biocatalysis. He has previously authored two other books on the topic and in this occasion he gathered a selected group of specialists in enzyme catalysis. Professor Wilson has an extensive experience in immobilized enzymes and enzyme inactivation and reactivation. Dr. Vera is a young promise of biochemical engineering in general and biocatalysis in particular. Together with them, the book received important contributions from Professor Raúl Conejeros, a well-known specialist in mathematical modeling and optimization and Felipe Scott, a graduate student that greatly contributed to the development of the software associated to the problem resolution.

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