

Book Review

Bioreactor System Design **edited by A. Asenjo and J. C. Merchuk**

*Marcel Dekker, New York, 1995; ISBN 0-8247-9002-2;
640 pp.; \$195*

This is one of the better books devoted to bioreactors. The reviewer considers the best part of the book to be the long lists of articles compiled at the end of most chapters; this can be a very useful source of relevant references.

In this book, each chapter has different authors who are obviously experts of the subject of the chapter. The chapters can be divided into two categories. One group of chapters covers the basic biology, growth media, and general topics and problems associated with the reactor. The second group covers various kinds of bioreactors for microbes, plant cells, animal cells, photobio-systems, and so on. This organization is very good in that it covers the breadth of the broad field and also gives special treatments to special types of cells, as well as unique reactor configurations. The editors must have tried hard to maintain a somewhat uniform style of presentation of subject matter in various chapters. The editing has been well done, as most chapters seem to have a general format of having an introduction, followed by a section identifying the most important subject matter, and, finally, sections covering more details.

While the book covers very different kinds of bioreactors, there are some obvious and rather unfortunate omissions. Notably, there is very little description of fungal mycelium growth, formation of pellets, and the associated transport problems and growth phenomena. Attached biofilm reactor is another type of bioreactor that might be included, as it could be useful for fungal cells, animal tissues, and plant cells. Evaluation of genetic instability associated with engineered cells represents another topic, which probably ought to be included as well in a modern bioreactor design book.

After reading this book, one is left with an unmistakable impression, i.e., the bioreactor field is still far from becoming a systematic engineering

subject. The use of empirical correlation is relied upon heavily and, in some cases, the description of the reactor systems is largely qualitative. Much room exists for future research for those who are devoted to bioreactor engineering.

The book title can be somewhat misleading. Perhaps a more accurate title would be, "Characterization of Bioractor Systems." One might be able to obtain the necessary information from this book regarding the rates of cell growth, metabolism, mass transfer, and whatever may be the other qualitative and quantitative aspects of bioprocesses. One cannot really design a reactor with this book unless Chapter 13 ("Bioreactor Operation Modes") is enlarged and expanded to a sufficient degree.

By and large, this is a good and useful book, recommended for all biochemical engineers. At the end of some chapters, a few chapters can be found for readers to do exercises with; this is also a good feature.

George T. Tsao

LORRE

Purdue University

West Lafayette, IN