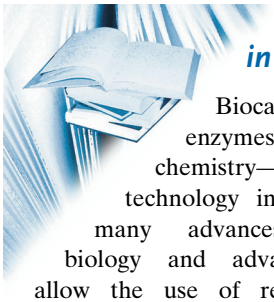

Enzyme Catalysis in Organic Synthesis

Biocatalysis—the use of enzymes in synthetic organic chemistry—has matured as a technology in several ways, due to many advances. Firstly, molecular biology and advances in biochemistry allow the use of recombinantly expressed well-characterized enzymes rather than crude mixtures. Secondly, the progress in protein engineering, by random or directed mutagenesis or by shuffling methods, makes it possible to tailor enzymes for applications with non-natural substrates or under non-physiological reaction conditions. Thirdly, genome sequencing and metagenomic technologies give access to a vast diversity of enzymes. And finally, screening for new reactions, improvements in process technology, and the exploitation of enzyme promiscuity have led to new syntheses being established, on both the laboratory and the industrial scales. Enzymes have undoubtedly become accepted and established tools in the catalysis toolbox.

It was therefore the right time to undertake the task of compiling a completely revised and significantly enhanced edition of "Drauz and Waldmann", which in its previous two editions had established itself as one of the reference standards in the field, if not indeed the standard textbook on the subject.

The new editorial team again takes both the industrial and the academic points of view into consideration, and has succeeded in bringing together a global team of experts in their respective fields as contributors to individual chapters. Overall, the new edition covers and adds all important aspects of biocatalysis that have developed in the last decade, i.e., since the second edition.

The third edition follows the tradition of the previous editions by grouping and ordering the enzymes according to the chemical reactions, irrespective of the origin or biological background of the enzymes. Therefore, it is intuitive and easy to read for the organic chemist who is looking for a certain reaction or reaction class. All of the chapters on reactions have been thoroughly updated and refer to recent literature. It is impressive to read how many new enzymes have now found routine use in the laboratory, and how many new substrates are discovered for the known enzymes. Consequently, the work has grown considerably in content and size, and now comprises three volumes, with almost twice the number of pages.

The introduction (Part I) now covers the molecular biology tools in much greater depth, and is up-to-date on enzyme discovery and improvement. The chapter on reaction and process engineering, unlike that in the previous edition, does not contain examples and data, but rather consists of general considerations on the topic. It would have been beneficial to discuss at least some aspects with concrete examples. However, the third edition now contains new chapters on industrial applications for every major reaction type. This distinction was not made previously, and it helps in quickly evaluating which reactions and enzymes have been worked on only at laboratory scale or also on an industrial scale. In a future edition, there could be some harmonization and cross-referencing, as in some cases industrial processes are still integrated into the general chapters, and the symbols used for describing processes differ between Chapter 7 and the corresponding applications chapters. But in general this new approach is very useful and should be continued, and these minor issues do not distract the reader from the essential information.

Thanks to the efforts of the editorial team and the authors, the third edition is certainly up-to-date. Therefore, the book will undoubtedly take its rightful place as the new standard reference in the field, and will be used appreciatively by many biocatalysis practitioners. It is an essential work for all libraries of chemical institutes and industry. It is to be hoped that the field will continue to flourish and that in a fourth edition we will see many new applications, but, more importantly, new reactions.

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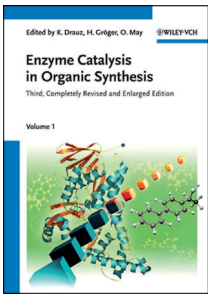

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