

# Preface

In recent years, biotechnology research and development (R&D) in China has been receiving increasing attention from the world. With the open-door policy of the Chinese government, many international publications (for academia) and large market potential (for industry) constitute the two big reasons for the above phenomenon. Biotechnology has become one of the priorities in Mainland China for solving many important problems, such as food supply, health care, environment protection, and even energy. The central government has been implementing a couple of programs which cover a wide spectrum in basic research, high-tech development and industrialization, such as Basic Research Program (973 Plan), Hi-Tech R&D Program (863 Plan), Key Science & Technology Problem Solving Program (Gong-guan Plan), as well as the establishment of centers of excellence - Key Laboratories and Engineering Centers, etc. The funding from various local governments and industry for R&D has also been increasing continuously. Biotechnology centers in Shenzhen, Shanghai and Beijing have been established. There are more than 400 universities, research institutes and companies and a total of over 20,000 researchers involved in biotechnology in the Mainland. The number of research papers published internationally and patent applications is also increasing rapidly. In addition, the huge market potential with about 1.4 billion population, which is already open to the outside world, has provided numerous opportunities for international and domestic companies to invest in biotechnology, which pushes forward the biotechnology industrialization in China.

After organizing the 13th International Biotechnology Symposium & Exhibition (IBS2008, October 12–17, 2008, Dalian, China), under the auspices of the International Union of Pure and Applied Chemistry (IUPAC), recognized as the premier international biotechnology event, we are honored to be invited by the Series Editor Professor T. Scheper and Springer to edit a special volume on “Biotechnology in China,” which is expected to provide a window for international colleagues to observe the current status of Chinese biotechnology. In this special volume, some examples of biotechnology R&D activities in Chinese universities and institutes are presented, covering biocatalysis and biotransformation, secondary metabolites from higher fungi and plant tissues, protein production by animal cell culture, HPLC purification of proteins, biodegradation/bioremediation and wastewater treatment technologies.

The importance of chiral issues in active pharmaceutical ingredients has been widely recognized not only by pharmacologists, but also by chemists, chemical engineers and administrators. Chapter 1 by Professor Jian-He Xu and his colleagues focuses on the biocatalytic synthesis of chiral compounds useful for the pharmaceutical industry. Biotransformation of nitriles mediated by nitrile-amide converting enzymes has attracted much attention and developed rapidly in China in recent years as it offers a valuable alternative to the traditional chemical reaction which requires harsh conditions. Professor Yu-Guo Zheng and his co-workers have overviewed the microbial transformation of nitriles to high-value acids or amides (Chap. 2).

Secondary metabolites from higher fungi and plant tissues include various unique bioactive compounds. Zhong and Xiao have reviewed the discovery, bioactivity and bioproduction of secondary metabolites from higher fungi including medicinal mushrooms (Chap. 3). In Chap. 4, Professor Kee-Yoeup Paek and his collaborators have demonstrated the large scale cultivation of ginseng adventitious roots for the production of ginsenosides, which is one of the most famous oriental medicinal plants used as crude drugs in Asian countries and is now being used worldwide for preventive and therapeutic purposes.

Some high value proteins and vaccines for medical and veterinary applications through animal cell culture have an increasing market in China. Chapter 5 by Professor Yuanxing Zhang summarizes the studies on optimization of animal cell culture processes in view of substrate metabolism regulation and protein expression improvement. Purification of proteins from cell cultures is generally a crucial step for a cost-effective process. Preparative liquid chromatography is widely used for the purification of chemical and biological substances. Professor Yan Sun and his colleagues demonstrates several approaches to high-performance preparative chromatography of proteins (Chap. 6).

Our society is facing serious environmental challenges such as curbing greenhouse gas emissions, finding renewable energy sources, managing waste and controlling pollution and diseases. In recent years, environmental pollution has become a big problem in the world and has been receiving great attention from people and governments. In this book, two chapters are dedicated to the recent development of environmental biotechnology research in China focusing on biodegradation and bioremediation. Professor Ping Xu and his co-workers have reviewed the recent progress in biodesulfurization of fossil fuels (Chap. 7). In Chap. 8, Professor Han-Qing Yu and his group members demonstrate the characterization, modeling and application of aerobic granular sludge for wastewater treatment.

I thank all the authors for their cooperation and significant contribution, Professor Scheper and Dr. Hertel for their strong support, Ms. Ingrid Samide and Mrs. Kreusel for their coordination and assistance, and my colleagues Profs. Wei Zhang and Fengwu Bai as co-editors. Also, I greatly appreciate the generosity of Shanghai Jiao Tong University, my colleagues and lab members at both SJTU and ECUST, and my friends and my family for their continuous support.

Biotechnology in China I

From Bioreaction to Bioseparation and Bioremediation

Zhong, J.-J.; Bai, F.-W.; Zhang, W. (Eds.)

2009, XIII, 322 p. 101 illus., 2 illus. in color., Hardcover

ISBN: 978-3-540-88414-9