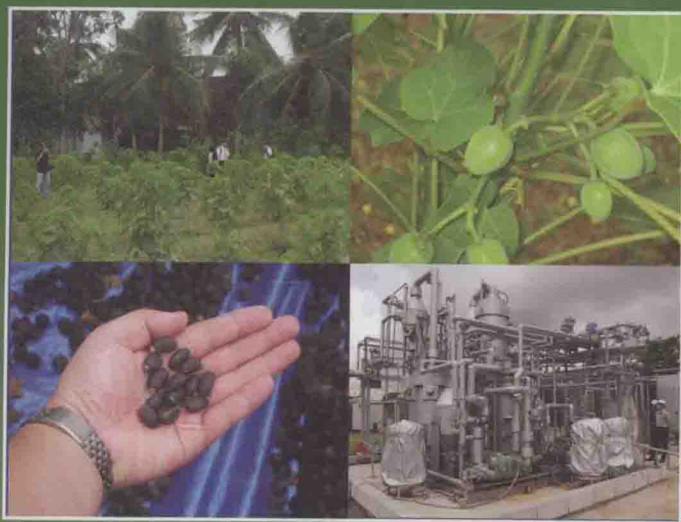


Biocatalysis *and* Biomolecular Engineering

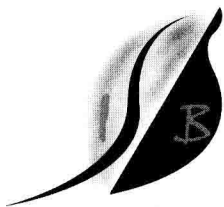


Edited by
CHING T. HOU
JEI-FU SHAW

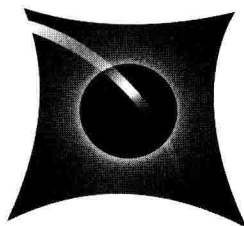
BIOCATALYSIS AND BIOMOLECULAR ENGINEERING

Edited by

CHING T. HOU AND JEI-FU SHAW



International Society of
Biocatalysis and Biotechnology



National Chung-Hsing University

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**BIOCATALYSIS AND
BIOMOLECULAR
ENGINEERING**

*To our wives, Mandy Hou and Yea-Shiow Shaw,
for their understanding and kind support during preparation of this book*



第4屆

國際生物催化與生物技術研討會

4th International Symposium on Biocatalysis and Biotechnology

November 19-21, 2008



PREFACE

This book was assembled with the intent of bringing together current advances and in-depth reviews of biocatalysis and biomolecular engineering with emphasis on agricultural biotechnology. The book consists of selected papers presented at the fourth International Symposium on Biocatalysis and Biotechnology held at the Academia Sinica, Taipei, Taiwan November 19–21, 2008. At this symposium, 60 distinguished international scientists from the United States, Japan, Korea, Canada, Brazil, Belgium, Slovak Republic, France, and Taiwan, shared their valuable research results. Additionally, there were 20 selected posters, one session for American Oil Chemists Society Asian Section, and two workshops for Biotech Developments and over 600 attendees. A few chapters contained in this book were contributed by distinguished scientists who could not attend this meeting. This meeting was a great success and we greatly appreciate President Dr. Chi-Huey Wong of Academia Sinica for providing the venue for the meeting. The contributions of local organization committee members are highly appreciated: Andrew H.-J. Wang, and Ming-Che Shih of Academia Sinica, and Yung-Sheng Huang, Chang-Hsien Yang of the National Chung Hsing University.

Recent energy and food crises point out the important of bio-based products from renewable resources and agricultural biotechnology. It is inevitable to use modern tools of molecular engineering on plants, animals and microorganisms to solve these crises and improve the wellness of humankind. There is no comprehensive book on molecular engineering of agricultural biotechnology and bio-based products from renewable resources. The authors are internationally recognized experts from all sectors of academia, industry, and government research institutes. This is the most current book on molecular engineering of agricultural biotechnology and bio-based industrial products.

This book composes of 30 chapters divided into three sections. The first 10 chapters describe the world's newest research on improvement of agronomic and microbial traits. Included are: Insights into the Structure and Function of Acyl-CoA: Diacylglycerol Acyltransferase, Improving Enzyme Character by Molecular Breeding-Preparation of Chimeric Genes, Production and Accumulation of Unusual Fatty Acids in Plant Tissues, Preparation of Oleaginous Yeast by Genetic Modification and Its Potential Applications, Improving Value of Oil Palm Using Genetic Engineering, Potential in Using Arabidopsis Acyl-Coenzyme-A-Binding Proteins in Engineering Stress-Tolerant Plants, Modification of Lipid Composition by Genetic Engineering in Oleaginous Marine Microorganisms: Thraustochytrid, Integrated Approaches to Manage Tomato Yellow Leaf Curl Viruses, Carbohydrate Acquisition During Legume Seed Development, and Biotechnology Enhancement of Phytosterol Biosynthesis in Seed Oils. The second section includes 8 chapters devoted to Functional Foods and Biofuels: Dietary Phosphatidyl Inositol in Metabolic Syndrome, Biotechnological Enrichment of Cereals with Polyunsaturated Fatty Acids, Brown Seaweeds Lipids as Possible Source for Nutraceuticals and Functional Foods, Lipophilic Ginsenosides Derivative Production, Processes for Production of Biodiesel Fuel, Noncatalytic Alcoholysis Process for Production of Biodiesel Fuel—Its Potential in Japan and Southeast Asia, Use of *Coniochaeta ligniaria* to Detoxify Fermentation Inhibitors Present in Cellulosic Sugar Streams, and Omics Applications to Biofuel Research. The third section with 12 chapters describes Renewable Bioproducts: Biotechnological Uses of Phospholipids, Application of Partition Chromatographic Theory on the Routine Analysis of Lipid Molecular Species, Dehydrogenase-Catalyzed Synthesis of Chiral Intermediates for Drugs, Engineering of Bacterial Cytochrome P450 Monooxygenase as Biocatalysts for Chemical Synthesis and Environmental Bioremediation, Glycosynthase from Inverting Hydrolases, Molecular Species of Diacylglycerols and Triacylglycerols Containing Dihydroxy Fatty Acids in Castor Oil, Biocatalytic Production of Lactobionic Acid, Recent Advances in Aldolase-Catalyzed Synthesis of Unnatural Sugars and Iminocyclitols, Production of Value-Added Products by Lactic Acid Bacteria, Enzyme Synthesis of Glycosides Using Alpha-Amylase Family Enzymes, Biological Synthesis of Gold and Silver Nanoparticles Using Plant Leaf Extracts and Antimicrobial Application, and Potential Approach of Microbial Conversion to Develop New Antifungal Products of Omega-3 Fatty Acids.

This book serves as reference for teachers, graduate students, and industrial scientists who conduct research in biosciences and biotechnology.

CHING T. HOU

Peoria, IL USA

JEI-FU SHAW

Taichung, Taiwan

CONTRIBUTORS

Hirofumi Adachi, Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan

Zuzana Adamechova, Department of Biochemical Technology, Faculty of Chemical and Food Technology, Slovak University of Technology, Radlinskeho 9, Bratislava, Slovak Republic

Tsunehiro Aki, Department of Molecular Biotechnology, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan

Nur Hanin Ayub, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia

Hassan Azaizeh, Institute of Applied Research Center (Affiliated with University of Haifa), The Galilee Society, Shefa-Amr, Israel

Vivek K. Bajpai, Department of Biotechnology, Daegu University, Kyongsan, Kyongbook, Republic of Korea

Pankaj K. Bhowmik, National Research Council—Plant Biology Institute Saskatoon, Saskatchewan, Canada

Kenneth M. Bischoff, Renewable Product Technology Research Unit, National Center for Agricultural Utilization Research, Agricultural Research Service, United States Department of Agriculture, 1815 N. University St., Peoria, IL, USA

Bahariah Bohari, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia

- Milan Certik**, Department of Biochemical Technology, Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava, Slovak Republic
- Hsin-Liang Chen**, Biodiversity Research Center, Academia Sinica, Taipei, Taiwan
- Qin-Fang Chen**, School of Biological Sciences, The University of Hong Kong, Pokfulam Road, Hong Kong, China
- Qilin Chen**, National Research Council Canada—Plant Biotechnology Institute, 110 Gymnasium Place, Saskatoon, Saskatchewan, Canada
- Mee-Len Chye**, School of Biological Sciences, The University of Hong Kong, Pokfulam, Hong Kong and State (China) Key Laboratory of Agrobiotechnology, Chinese University of Hong Kong, Shatin, Hong Kong
- Fengjie Cui**, Department of Food, Agricultural, and Biological Engineering, The Ohio State University/Ohio Agricultural Research and Development Center, Wooster, USA
- Robert de la Pena**, AVRDC—The World Vegetable Center, Shanhua, Tainan, Taiwan
- Bruce S. Dien**, Bioenergy Research Unit, NCAUR, USDA-ARS, Peoria, IL, 61604, USA
- Ahmad Kushairi Din**, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia
- Wei Gao**, School of Biological Sciences, The University of Hong Kong, Pokfulam Road, Hong Kong, China
- William A. Greenberg**, Department of Chemistry, The Scripps Research Institute, 10550, N. Torrey Pines Rd., La Jolla, CA 92037, USA
- Shoji Hagiwara**, National Food Research Institute, NARO, Kan-nondai, Tsukuba, Ibaraki, Japan
- J.J. Han**, Doosan Glonnet, B5F, Advanced Convergence Institute of Technology, 864-1 IUI-dong, Suwon, Gyeonggi, Korea
- Ahmad Tarmizi Hashim**, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia
- T. Hatanaka**, Kobe University, Kobe, Japan
- Kiyoshi Hayashi**, National Food Research Institute, 2-1-12 Kan-nondai, Tsukuba, Ibaraki, Japan
- Xiaohua He**, Western Regional Research Center, United States Department of Agriculture, Albany, California, USA
- David Hildebrand**, Agronomy Department, University of Kentucky, Lexington, Kentucky, USA

- Tsugihiko Hirano**, Renesas Northern Japan Semiconductor, Inc., 145-1 Nakajima Nanae-cho Kameda-gun, Hokkaido, Japan
- Zhangyong Hong**, Department of Chemistry, The Scripps Research Institute, 10550, N. Torrey Pines Rd., La Jolla, CA 92037, USA
- Masashi Hosokawa**, Faculty of Fisheries Sciences, Hokkaido University, 3-1-1 Minato, Hakodate, Japan
- Ching T. Hou**, Microbial Genomic and Bioprocessing Research Unit, National Centre for Agricultural Utilization Research, ARS, USDA, Peoria, IL, USA
- Jiang-Ning Hu**, Department of Food Science and Technology, Chungnam National University, 220 Yusung Gu, Gung-Dong, Daejeon, Republic of Korea
- J. Hughes**, AVRDC—The World Vegetable Center, Shanhua, Tainan, Taiwan
- Zamzuri Ishak**, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia
- Hiroaki Iwasaka**, Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan
- Ghulam Kadir Ahmad Parveez**, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia
- P. Kadirvel**, AVRDC—The World Vegetable Center, Shanhua, Tainan 71499, Taiwan
- Toshihide Kakizono**, Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan
- Yasushi Kamisaka**, Institute for Biological Resources and Functions, National Institute of Advanced Industrial Science and Technology, Japan
- Sun Chul Kang**, Department of Biotechnology, College of Engineering, Daegu University, Gyungsan City, Gyungbook, Korea
- Seiji Kawamoto**, Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan
- Hiroko Kawasaki**, Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan
- L. Kenyon**, AVRDC—The World Vegetable Center, Shanhua, Tainan 71499, Taiwan
- Beom Soo Kim**, Department of Chemical Engineering, Chungbuk National University, 12 Gaeshindong, Heungdeokgu, Cheongju, Chungbuk, Korea

Hak-Ryul Kim, Department of Animal Science and Biotechnology, Kyoungpook National University, Daegu, Republic of Korea

Takaaki Kiryu, Osaka Municipal Technical Research Institute, Osaka, Japan

Taro Kiso, Osaka Municipal Technical Research Institute, Osaka, Japan

Motomitsu Kitaoka, Enzyme Laboratory, National Food Research Institute, 2-1-12 Kannondai, Tsukuba, Ibaraki, Japan

Takashi Kuriki, Biochemical Research Laboratory, Ezaki Glico Co., Ltd., 4-6-5 Utajima, Nishiyodogawa-ku, Osaka, Japan

K.T. Lee, Department of Food Science and Technology, Chungnam National University, 220 Gung-Dong Yusung-Gu, Daejeon, South Korea

R. Li, Plant Science, University of Kentucky, Lexington, KY, USA

Qing-Shan Li, Division of Applied Life Sciences, Graduate School of Agriculture, Kyoto University, Kitashirakawa-oiwakecho, Sakyo-ku, Kyoto 606-8502, Japan

Wen-Hsiung Li, Genomics Research Center, Academia Sinica, Taipei, Taiwan and Biodiversity Research Center, Academia Sinica, Taipei, Taiwan

Yebo Li, Department of Food, Agricultural, and Biological Engineering, The Ohio State University/Ohio Agricultural Research and Development Center, Wooster, OH, USA

Jiann-Tsyh Lin, Western Regional Research Center, ARS, USDA, Albany, CA, USA

Qin Liu, Agricultural Lipid Biotechnology Program, Department of Agricultural, Food and Nutritional Science, University of Alberta, 4-10 Agriculture/Forestry Centre, Edmonton, Alberta, Canada

Siqing Liu, Renewable Product Technology Research Unit, National Center for Agricultural Utilization Research, Agricultural Research Service, United States Department of Agriculture, 1815 N. University St., Peoria, IL61604, USA

Maria J. López, Departamento de Biología Aplicada, University of Almería, Almería, Spain

Thomas McKeon, Western Regional Research Center, United States Department of Agriculture, Albany, California, USA

Kazuo Miyashita, Faculty of Fisheries Sciences, Hokkaido University, 3-1-1 Mirato, Hakodate, Japan

Joaquín Moreno, Departamento de Biología Aplicada, University of Almería, Almería, Spain

Hiromi Murakami, Osaka Municipal Technical Research Institute, Osaka, Japan

Hiroshi Nabetani, Head of the Laboratory. Reaction and Separation Engineering Laboratory Food Engineering Division National Food Research Institute, National Agriculture and Food Research Organization, 2-1-12 Kan-nondai, Tsukuba, Ibaraki, Japan

Koji Nagao, Laboratory of Nutrition Biochemistry, Department of Applied Biochemistry and Food Science, Saga University, Saga, Japan

Mitsutoshi Nakajima, National Food Research Institute, NARO, Kan-nondai, Tsukuba, Ibaraki, Japan

Hirofumi Nakano, Osaka Municipal Technical Research Institute, 6-50, Morino-miya 1-chome, Joto-ku, Osaka, Japan

Maya Nanko, Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan

Nancy N. Nichols, Bioenergy Research Unit, NCAUR, USDA-ARS, Peoria, IL 61604, USA

Mamoru Nishimoto, National Food Research Institute, 2-1-12, Kannondai Tsukuba Ibaraki, Japan

Takahisa Nishimura, Biochemical Research Laboratory, Ezaki Glico Co., Ltd., 4-6-5 Utajima, Nishiyodogawa-ku, Osaka, Japan

Hiromi Nishiura, Biochemical Research Laboratory, Ezaki Glico Co., Ltd., 4-6-5 Utajima, Nishiyodogawa-ku, Osaka, Japan

Koji Nomura, Biochemical Research Laboratory, Ezaki Glico Co., Ltd., 4-6-5 Utajima, Nishiyodogawa-ku, Osaka, Japan

Jun Ogawa, Division of Applied Life Sciences, Graduate School of Agriculture, Kyoto University, Sakyo-ku, Kyoto, Japan

Kazuhisa Ono, Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, Japan

Abrizah Othman, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia

Jocelyn A. Ozga, 4-10 Agriculture/Forestry Centre, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada

Ramesh Patel, SLRP Associates, Biotechnology Consulting Firm, Bridgewater, NJ, USA

Umi Salamah Ramli, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia

S. Rao, Plant Science, University of Kentucky, Lexington, KY, USA

- Dennis M. Reinecke**, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta
- J.S. Rhee**, Department of Biological Sciences, Korea Advanced Institute of Science and Technology, 373-1, Guseong-dong, Yuseong-gu, Daejeon, Korea
- Ravigadevi Sambanthamurthi**, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia
- Rolf D. Schmid**, Institut für Technische Biochemie, Universität Stuttgart, Allmandring 31, Stuttgart, Germany
- Ming-Che Shih**, Agricultural Biotechnology Center, Academia Sinica, Taipei, Taiwan
- Yuji Shimada**, Osaka Municipal Technical Research Institute, Osaka, Japan. 1-6-50 Morinomiya, Joto-ku, Osaka, Japan
- Sakayu Shimizu**, Division of Applied Life Sciences, Graduate School of Agriculture, Kyoto University, Kitashirakawa-oiwakecho, Sakyo-ku, Kyoto, Japan
- Bungo Shirouchi**, Laboratory of Nutrition Biochemistry, Department of Applied Biochemistry and Food Science, Saga University, Saga, Japan and Food Function and Labeling Program, National Institute of Health and Nutrition, 1-23-1 Toyama, Shinjuku-ku, Tokyo, Japan
- Rodrigo M. P. Siloto**, Agricultural Lipid Biotechnology Program, Department of Agricultural, Food and Nutritional Science, University of Alberta, 4-10 Agriculture/Forestry Centre, Edmonton, Alberta, Canada
- J.K. Song**, Chemical Biotechnology Research Center, Korea Research Institute of Chemical Technology, Yuseong-gu, Daejeon, Korea
- Jae Yong Song**, Department of Chemical Engineering, Chungbuk National University, Cheongju, Chungbuk, Republic of Korea
- Lucia Slavikova**, Department of Biochemical Technology, Faculty of Chemical and Food Technology, Slovak University of Technology, Radlinskeho 9, Bratislava, Slovak Republic
- Kazuhisha Sugimoto**, Biochemical Research Laboratory, Ezaki Glico Co., Ltd., Osaka, Japan
- Masakazu Sugiyama**, AminoScience Laboratories, Ajinomoto Co. Inc., 1-1 Suzukicho, Kawasakiku, Kawasaki, Japan, 210-8681
- Huang-Mo Sung**, Department of Life Sciences, National Cheng Kung University, Tainan, Taiwan
- Ahmed Tafesh**, Institute of Applied Research Center (Affiliated with University of Haifa), The Galilee Society, Shefa-Amr, Israel

- Koretaro Takahashi**, Graduate School of Fisheries Science, Hokkaido University, 3-1-1 Minato, Hakodate, Japan
- J.R. Thoguru**, Plant Science, University of Kentucky, Lexington, KY, USA
- Takayuki Tsukui**, Faculty of Fisheries Sciences, Hokkaido University, 3-1-1 Minato, Hakodate, Japan
- Vlada Urlacher**, Institut für Technische Biochemie, Universität Stuttgart, Allmandring 31, Stuttgart, Germany
- S. Venkatesan**, AVRDC—The World Vegetable Center, P.O. Box 42, Shanhua, Tainan 71499, Taiwan
- Mohd Basri Wahid**, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia
- Tzi-Yuan Wang**, Genomics Research Center, Academia Sinica, Taipei, Taiwan
- Yomi Watanabe**, Osaka Municipal Technical Research Institute, 1-6-50 Morinomiya, Joto-ku, Osaka, Japan
- Randall J. Weselake**, Department of Agriculture, Food and Nutritional Sciences, University of Alberta, Edmonton, Alberta, Canada
- M. Airanthi K. Widjaja-Adhi**, Faculty of Fisheries Sciences, Hokkaido University, 3-1-1 Minato, Hakodate, Japan
- Chi-Huey Wong**, Department of Chemistry, The Scripps Research Institute, 10550 N. Torrey Pines Rd., La Jolla, CA 92037, USA
- Shi Xiao**, School of Biological Sciences, The University of Hong Kong, Hong Kong, China
- Teruyoshi Yanagita**, Department of Applied Biological Sciences, Saga University, Saga, Japan
- Suk Hoo Yoon**, Korea Food Research Institute, San 46-1, Baekhyun-Dong, Bundang-Ku, Songnam-Si, Kyunggi-Do, Korea
- Abdul Masani Mat Yunus**, Malaysian Palm Oil Board, No. 6, Persiaran Institusi, Bandar Baru Bangi, Kajang, Selangor, Malaysia
- Jitao Zou**, Plant Biotechnology Institute, National Research Council Canada, 110 Gymnasium Place, Saskatoon, Canada

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