

INTRODUCTION TO THE PROCEEDINGS  
OF THE SIXTEENTH SYMPOSIUM ON  
BIOTECHNOLOGY FOR FUELS AND CHEMICALS

Brian H. Davison  
Chemical Technology Division  
Oak Ridge National Laboratory\*  
Oak Ridge, Tennessee 37831-6224

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**Introduction to the Proceedings  
of the Sixteenth Symposium on  
Biotechnology for Fuels and Chemicals**

Brian H. Davison  
*Oak Ridge National Laboratory*  
Charles E. Wyman  
*National Renewable Energy Laboratory*

Biotechnology is both an old and new technology. It has expanded from the fermentation industry to applied molecular biology.

Biotechnology can be defined as the use of biologically derived materials and biocatalysts to carry out desired transformations from one material to another. These biocatalysts can be enzymes or microorganisms. The transformation may be of raw materials into useful compounds or for the destruction of industrial wastes. One use of biotechnology is for the production of fuels and chemicals. These may be produced from renewable resources or fossil fuels.

This has been the broad area focused on by this Symposium for the past 16 years. The **Symposium on Biotechnology for Fuels and Chemicals** presents both applied and fundamental work in this area performed by universities, industries, and government institutions. The goal, whether near term or long term, is to find and demonstrate efficient, economical methods for the use of biotechnology to supply society's needs for fuels and chemicals. The Symposium allows interactions among the researchers in an intimate setting to foster the interactions that will be necessary to commercialize and use these technologies. Efforts presented include all aspects of the process: the pretreatment and beneficiation of the raw material, the biological conversion in some reactor, the separation and recovery of the desired product, and the treatment of the waste streams from this and earlier legacy processes. There are also efforts of the sensing, monitoring, and control of the process and well and the economic analysis to estimate the overall utility and impact.

The **Sixteenth Symposium on Biotechnology for Fuels and Chemicals** provided a forum for the exchange of ideas. There were 34 oral presentations and 81 poster presentations for a total of 115. These were organized into sessions of thermal, chemical, and biological processing; bioprocessing research; process economics and commercialization; and environmental biotechnology. There was also a special session on Past, Present, and Emerging Concepts in Applied Biological Research held in honor of Dr. C. D. Scott and marking the establishment of an award in his honor.

The Sixteenth Symposium was sponsored by the Biofuels Systems Division and Advanced Industrial Concepts Division of the U.S. Department of Energy (DOE); the Oak Ridge National Laboratory; National Renewable Energy Laboratory; Idaho National Engineering Laboratory; Amoco Corporation; Archer Daniels Midland Company, Bio-Technical Resources, L.P.; Dorr-Oliver Incorporated; Enzyme Bio-Systems Ltd.; Genencor International; Gist-Brocades; Golden Technologies Company, Inc.; Grain Processing Corporation; Martin Marietta Energy Systems, Inc.; Michigan Biotechnology Institute; New Energy Company of Indiana, L.P.; PSI, Process Systems, Inc.; Raphael Katzen Associates International, Inc.; Roquette America, Inc.; Solvay Enzymes, Inc.; A. E. Staley; Weyerhaeuser; and the Division of Biochemical Technology of the American Chemical Society.

Organization of the symposium was as follows:

## Organizing Committee

Jonathan Woodward, *Chairman, Oak Ridge National Laboratory*  
Charles E. Wyman, *Cochairman, National Renewable Energy Laboratory*  
Graham F. Andrews, *Idaho National Engineering Laboratory*  
Antonios A. Antonopoulos, *Argonne National Laboratory*  
Rakesh Bajpai, *University of Missouri*  
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Michael E. Himmel, *National Renewable Energy Laboratory*  
Donald L. Johnson, *Grain Processing Corporation*  
Raphael Katzen, *Raphael Katzen Associates International, Inc.*  
Richard F. Moorer, *U.S. Department of Energy*  
Mark E. Reeves, *Oak Ridge National Laboratory*  
John N. Saddler, *University of British Columbia*

## Session Chairpersons and Cochairpersons

### Session 1: Thermal, Chemical, and Biological Processing

Bruce E. Dale, *Texas A&M University*  
Gene Petersen, *National Renewable Energy Laboratory*

### Session 2: Past, Present, and Emerging Concepts in Applied Biological Research

Arthur E. Humphrey, *Pennsylvania State University*  
Charles E. Wyman, *National Renewable Energy Laboratory*

### Session 3: Bioprocessing Research

William A. Weigand, *University of Maryland*  
Eric N. Kaufman, *Oak Ridge National Laboratory*

### Session 4: Process Economics and Commercialization

Raphael Katzen, *Raphael Katzen Associates International, Inc.*  
James Doncheck, *Bio-Technical Resources, L.P.*

### Session 5: Environmental Biotechnology

James Petersen, *Washington State University*  
Frederick Colwell, *Idaho National Engineering Laboratory*

### Poster Session

Karel Grohmann, *U.S. Citrus and Subtropical Products Research Laboratory*  
Antonios A. Antonopoulos, *Argonne National Laboratory*

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This symposium has been held annually since 1978. We are pleased to have the proceedings of the Sixteenth Symposium currently published in this special issue to continue the tradition of providing a record of the contributions made.

The Seventeenth Symposium is planned for May 7-11, 1995, in Vail, Colorado. We encourage comments or discussions relevant to the format or content of that meeting.