

Introduction

MARK FINKELSTEIN

National Renewable Energy Laboratory

BRIAN H. DAVISON

Oak Ridge National Laboratory

The proceedings of the 19th symposium on *Biotechnology for Fuels and Chemicals*, held in Colorado Springs, Colorado, May 4–8, 1997, had over 200 attendees. This meeting continues to provide a unique forum for the presentation of new applications and recent research advances in the production of fuels and chemicals through biotechnology. The utilization of renewable resources, and in particular cellulosic biomass, has broad implications in today's world of greenhouse gases, global warming, ozone layers, climate change, energy sustainability, and carbon emissions. It also has relevance to the chemical industry's continuing need to both lower current chemical production costs and produce novel chemicals. Biotechnology and bioprocessing are now making it possible to convert this biomass to fuels and chemicals in a commercially attractive fashion.

The 19th Symposium captures a wide range of technical topics from an academic, industrial, or government perspective. A variety of biomass feedstocks are discussed in Session 1, along with several updated and innovative pretreatment processing approaches. The ability to turn lignocellulosic materials into simple sugars offers great opportunities to generate cost-effective feedstocks to be used in biotechnological processes for the production of fuels and chemicals.

Through the advent of genetic engineering, the development of a series of exciting new biocatalysts and microbes were presented in Session 2. The ability to enhance the metabolic capabilities of microorganisms and further refine them into minifactories is becoming increasingly routine. Enzymes are being dissected, re-assembled, and altered for heightened kinetic properties.

In Session 3, new reactor designs and innovative conversion processes were the focus. These were further refined in Session 4 as past, current, and future integrated operations were discussed in the context of state and industrial needs, as well as estimated and actual costs. This session was a particularly exciting forum for discussion of the near-term feasibility of biomass-based ethanol plants.

The application of biotechnology to the production of bulk and specialty chemicals was the spotlight of Session 5. A number of microbes or plants were genetically modified to produce enzymes, key chemical intermediates, or perform novel bioconversions. The paper and pulp industry was the beneficiary of the power of biotechnology as a variety of enzymes were exploited in Session 6.

The technical program consisted of 37 oral and 138 poster presentations covering topics in feedstock supply and processing, applied biological research, bioprocessing research, commercialization and process economics, specialty chemicals with emphasis on environmentally benign products and processes, and biotechnology in the paper and pulp industry. Two special topics sessions discussed "Extremophiles and Their Enzymes" and "Climate Change and Global Warming." The productive interactions of the 200 attendees between technical sessions in addition to the banquet and tour of the National Renewable Energy Laboratory's ethanol Process Development Unit helped continue the fond tradition of this Symposium.

The Nineteenth Symposium was sponsored by the Office of Fuels Development (DOE), Office of Industrial Technologies (DOE), the National Renewable Energy Laboratory, Oak Ridge National Laboratory, Idaho National Engineering Laboratory, Lockheed Martin Energy Research, Arkenol, Nedalco B.V., American Chemical Society-Division of BioChem Technology, Chronopol Inc., Raphael Katzen Associates, Colorado Institute of Research for Biotechnology, A. E. Staley, DuPont, Henkel Corporation, Cargill, Inc., Bio-Technical Resources, L.P., Grain Processing Corporation, and the Coors Brewing Company.

Organization of the Symposium was as follows:

Organizing Committee

Mark Finkelstein, Conference Chairman, National Renewable Energy Laboratory

Brian H. Davison, Conference Co-chairman, Oak Ridge National Laboratory

David Boron, US Department of Energy

Ting Carlson, Cargill

Kathleen Clarkson, Genencor

Bruce Dale, Michigan State University

James Doncheck, Bio-Technical Resources, L.P.