

Conference Reports

The World Congress on Industrial Biotechnology and Bioprocessing

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Introduction

The first World Congress on Industrial Biotechnology and Bioprocessing was held April 21–23, 2004, in Orlando, Florida. More than 400 executives, academics, and government officials attended the three-day meeting. The Biotechnology Industry Organization (BIO), American Chemical Society (ACS), and the National Agricultural Biotechnology Council organized the Congress. The event attracted attendees from 38 states, seven Canadian provinces, and 22 countries. The high attendance and the number of different universities and companies represented – including many from the Fortune 500 list – was tangible evidence that industrial biotechnology has come of age.

Industrial biotechnology has been described as the 'third wave in biotechnology' and will be a major force in transforming manufacturing and sustainability considerations around the globe. The intent of this 'first' World Congress was to examine the social, political, and technological benefits of industrial biotechnology in creating new value chains for business, and the hurdles that must be overcome to create 'biosustainability' in the manufacturing sector. In addition, the Congress explored the use of innovative scientific tools, such as genomics, proteomics, and bioinformatics for the applied development of industrial bioprocessing. Projects discussed ranged from energy derived from biological fuel cells and agricultural waste to new ways to discover and produce pharmaceuticals. At least three major messages were highlighted at the conference.

1 We are now entering the 'Bioterials Age'

Biotechnology and the development of bioproducts through bioprocessing are at the gateway of a new age. We have passed through the Industrial Age, the Information Age, and we have entered into the Bioterials Age, an age when biology is the driver for transforming the products of our industries, the quality of our environment, and the well-being of our society. We must think and act globally with new sustainable industries. Our environmental focus must move from protection to enhancement. We must seek new ways to share the positive and economic benefits of this third wave of biotechnology with the public. This means addressing the societal concerns of ethics, safety, education, job displacements/job opportunities, and health.

Carl Feldbaum, the President of BIO offered several points of advice for attendees during the opening plenary session:

- Focus first on products that make people's lives better;
- Look for the safety or ethical controversies the technologies and products may raise and deal with them honestly, transparently, and up front; and,
- Reach out to the environmental and agricultural communities, because these groups are politically and economically powerful groups, and will prove invaluable allies in earning government support for research and development as well as marketplace acceptance.

2 Globally, we must seek sustainable development based upon renewable feedstocks and energy

Sustainable development is an on-going process where we seek a balance between economic, environmental, and societal priorities. Industrial biotechnology and bioprocessing will provide the foundation for a biobased economy, an economy based upon renewable resources, and where the new biological technologies will be capable of improving human welfare and the environment. However, the biggest hindrances to sustainable development are poverty and ignorance.

Patrick Moore, a keynote speaker and founder of Greenpeace, and later of an environmental organization called Greenspirit, commented

that the anti-GMO (genetically modified organisms) movement, and the organic farm movement have actually contributed to poverty and the 'fear' of science and technology by the public. He noted that the philosophy 'Better Dead Than GM Fed', and the promotion and strict adherence to the precautionary principles by Greenpeace and other groups have allowed millions of people to die in Africa, Asia, and South America. Mr. Moore stated that he left Greenpeace because its extremist environmental movement had become a 'religious ideology', an ideology frequently not based in science. In his closing remarks, Mr. Moore advised the attendees "to engage in long-term processes in a roundtable format" with environmental groups.

3 The science and technology critical to industrial bioprocessing are developing at an 'exponential rate'

In addition to plenary sessions, the World Congress encompassed 47 educational sessions and workshops, exploring how new science and technologies are rapidly helping to overcome barriers to production, harvest, and utilization of biomass feedstocks for production of biobased products and energy. Some of the topics and examples discussed included:

- Novel processes and products. One session dealt with the European advances in marine biotechnology for food, pharmaceuticals, and energy, while another session addressed the use of biocatalysis for production of novel plant-oil derived industrial products.
- Use of enzymes to manufacture renewable, sustainable energy and plastics from plant matter, including agricultural and garden wastes, as well as wood-processing waste. This nascent technology uses industrial biotechnology enzymes to break apart cellulose to make sugars for conversion to ethanol or polymers, including hard plastics and textile fibers.
- Use of enzymes and cells in chemical and paper manufacturing. Enzymes can allow manufacturers to lower energy requirements and toxic emissions. For example, wood-pulp processors are using xylanase to help bleach paper, dramatically reducing dioxin emissions. Whole cells are being used to make products such as vitamins B2 and C at lower cost and with less environmental impact.
- Use of industrial biotechnology to improve defense and security. Many people think primarily of vaccines and therapies when they think of biotechnology's potential for bolstering defense and national security. But biotechnology researchers are also developing lighter, biodegradable batteries for field use; biosensors to monitor troop health; materials for stronger protective clothing and armoring tiles; and camouflaging substances.

Lastly, the roles of state and Federal governments were emphasized in sessions on 'Federal policy and programs for biorefinery development' and 'State initiatives to jumpstart a biobased economy'.

One of the displays at the World Congress to show the potential of bioproducts from crops was the display by the United Soybean Board. The Board is made up of farmer-directors who oversee investments of the soybean checkoff program, a research and promotion program funded by United States soybean farmers. The Board has prepared a catalog to help consumers and businesses identify commercially available industrial soy products and ingredients. The Web site for this catalog is: www.unitedsoybean.org/newuses.

The sponsors announced that they plan to make the World Congress an annual event. Abstracts submitted prior to the conference are available from BIO, and summaries of all sessions are to be posted on BIO's Web site, www.bio.org.