

Proceedings of the US-EC Workshop:

Applications of Molecular Biology for the Production of Plants for Biobased Products and Biofuels



US-EC Task Force on Biotechnology Research
Western Regional Research Center
Agricultural Research Service
U.S. Department of Agriculture
Albany, California
April 28-30, 2004





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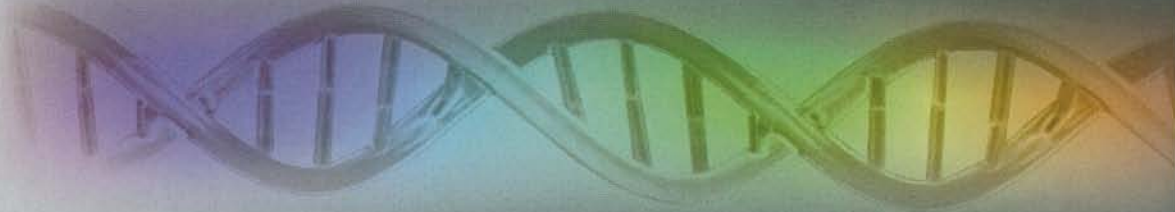
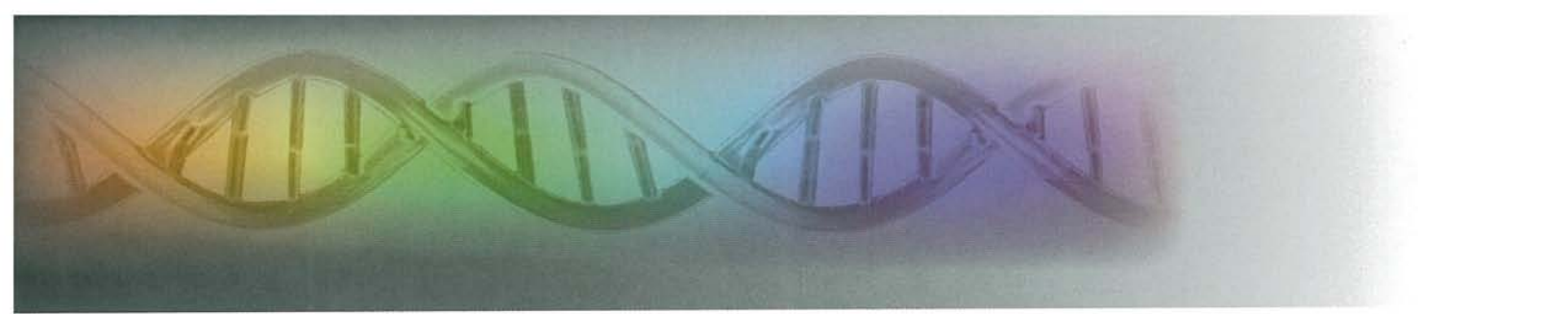


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Preface

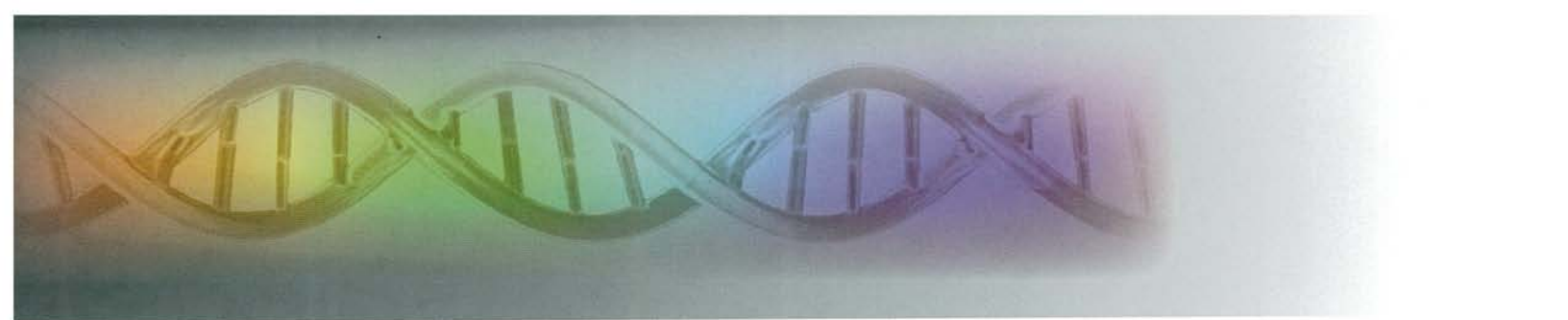
These proceedings summarize the presentations, discussions, and recommendations made during the US-EC Workshop entitled “US-EC Workshop on Applications of Molecular Biology for the Production of Plants for Biobased Products and Bioenergy”. This meeting was held at the USDA, ARS Western Regional Research Center (WRRRC), Albany CA, USA. The purpose of the workshop was to bring together an interdisciplinary group of leading researchers from the U.S. and Europe to assess the future of this new endeavor and to identify challenges and research opportunities. The workshop participants made presentations related to their expertise, participated in round table discussions, and then made recommendations that will be carried through the Task Force to US Government research agencies and to the Commission of the European Union on opportunities for research and collaborative activities that will enhance the development of this exciting new field.

A set of follow-up activities were agreed upon, as follows: (1) issue the following proceedings from this workshop, (2) prepare a strategy paper that encourages international collaborations on biobased product research, building on existing models of international collaboration, (3) identify one or more “flagship” projects and formulate the standards of such a project so that it will benefit society, prove useful to consumers and gain public acceptance, and (4) make communication and personnel exchange between EC and US scientists a priority. Further scientist-to-scientist collaborations and involvement of scientists in key committees (such as the National Academy of Sciences and International Food Biotechnology Council) to consider issues of biotechnology should be encouraged and facilitated by the burgeoning Working Group for Biobased Products. A committee to facilitate follow-up activities was established.

The views expressed in this document are those of the workshop participants, and do not necessarily reflect the views of the sponsors or governments.

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Executive Summary

At the 13th meeting of the US-EC Task Force on Biotechnology Research, the Task Force agreed to sponsor a workshop on applications of molecular biology to enhance plants for the purpose of producing biobased products and bioenergy. The purpose of the workshop was to bring together an interdisciplinary group of leading researchers from the United States and Europe to assess the future of this new endeavor and to identify challenges and research opportunities. The workshop was held at the Western Regional Research Center (WRRC) of the Agricultural Research Service (ARS), U.S. Department of Agriculture (USDA), in Albany, California, from April 28 to 30, 2004. There were 47 participants, moderators, rapporteurs and guests/observers that attended from various U.S. and European scientific offices and institutions. The workshop was organized in five panels: I) Research Supporting a Biobased Economy; II) Case Studies/Applications; III) the Scientific Basis for Regulation; IV) Opportunities in the Future; and V) Wrap-up Discussion, Conclusions and Recommendations. Individual panel summaries and abstracts of the presentations follow by section.

Some common themes of mutual interest that emerged from the workshop are:

- Green plants have the potential to become an expanded resource for sustainable industries, provide new industrial products from renewable resources, reduce dependence on petrochemicals, and create exciting new markets for farmers. There is a need for improved fundamental tools/knowledge, such as:
 - o increased exploitation of the vast arrays of data that genome efforts have created.
 - o a better “toolbox” for studying the plant cell wall (efficient coupling of analytical chemistry to molecular techniques).
 - o further development of plant-derived oils as bio-lubricants and chemical precursors.
 - o A better understanding of containment, what it is, and how to achieve it at production

scale levels.

- Metabolic engineering is an important strategy for modifying plants to express desired compounds; however, increased knowledge of intricate metabolic pathways is critical to fully develop this technology.
- White biotechnology can produce compounds at much higher yields in comparison to green biotechnology. Green biotechnology can play an important role for white biotechnology in supplying improved feedstocks. Moreover, green biotechnology can generate compounds that white biotechnology cannot.
- Scientists can address the extrinsic risks (experimentally definable) of biotechnology and should communicate their results to the public. There is also a need to help address the intrinsic risks (political, economic or social values) even if these are based on perception.
- Life Cycle Assessment, a technique for assessing all environmental effects and potential impacts associated with a product or underlying processes, represents an approach to help guide and refine sustainable development of biotechnology applied to biobased production and bioenergy.
- The US-EC Working Group for the Environment encouraged collaborations between early career US and EC scientists. This aspect of that previous program received positive reviews by participants. These participants should be contacted to evaluate the impact upon their careers with consideration for implementing a similar approach to a biobased product initiative.

A set of follow-up activities were agreed upon:

1. Prepare and issue the proceedings from this workshop
2. Prepare a strategy paper that encourages international collaborations on biobased product research, building on existing models of international collaboration such as the Solanaceous genomics platform.

