

February 9, 2009
 Nippon Oil Corporation
 Mitsubishi Heavy Industries, Ltd.
 Toyota Motor Corporation
 Kajima Corporation
 Sapporo Engineering Ltd.
 Toray Industries, Inc.

Partnership of Six Corporations to Establish
 Bioethanol Research Association
 –R&D Aimed at Full-scale Production of Cellulosic Bioethanol–

Tokyo – Nippon Oil Corporation, Mitsubishi Heavy Industries, Ltd., Toyota Motor Corporation, Kajima Corporation, Sapporo Engineering Ltd. and Toray Industries, Inc. announce that they will jointly establish a bioethanol research association, to be named the Research Association of Innovative Bioethanol Technology, to research and develop full-scale production technologies for cellulosic bioethanol*1 that does not affect the supply of materials needed for food.

Biofuels are an important tool in the fight against global warming. The Kyoto Protocol Target Achievement Plan adopted by the Japanese Cabinet in 2005 sets a target of an annual supply of transport-use biofuel equivalent to 500,000 kiloliters of crude oil to be introduced by the end of March 2011.

However, to ensure a stable energy supply it is essential that the introduction of biofuels ensures reliable raw-material procurement, lower costs and price stability. It is also important to explore means to overcome some of the shortcomings associated with biofuel production, namely competition with food supplies and the destruction of forests and other ecosystems. Moreover, although the Kyoto Protocol treats biofuels as a carbon-neutral energy source, the need exists to conduct a life-cycle assessment (LCA)*2 of the actual CO₂-reduction benefits of biofuel use.

To this end, the six corporations mentioned above have agreed to form a partnership to utilize their own elemental technologies for each stage of the production of non-food-source cellulosic bioethanol.

The association will aim to deliver production technologies allowing stable and economical mass-production of bioethanol. In particular, the ultimate goal is to develop production-process technology by 2015 that will enable 200,000 kiloliters of bioethanol-priced at 40 yen per liter to compete with crude oil-to be produced annually. In order to develop the groundbreaking technology needed to achieve this, the association will team up with the University of Tokyo—a base for cutting-edge research on biomass resources—and also cooperate with research institutions involved in the areas of agriculture, forestry and fisheries (the National Agriculture and Food Research Organization and the Forestry and Forest Products Research Institute), the Akita Research Institute for Food and Brewing within the Akita Prefectural Agriculture, Forestry and Fisheries Research Center, and Hokkaido University.

Overview of the Research Association of Innovative Bioethanol Technology

Director	Ikutoshi Matsumura (representative director, executive vice president, Nippon Oil Corporation)
Location	The University of Tokyo Entrepreneur Plaza, 7-3-1 Hongo, Bunkyo-ku, Tokyo
Establishment	Scheduled for late February 2009
Aims	1) Development of production technology for energy-source plants 2) Development of pretreatment, enzyme saccharification, yeast fermentation, and concentration and dehydration process technology 3) Full-scale production process bench verification testing (25 kiloliter/year)
Research &	Joint Research: University of Tokyo Affiliates: Research institutions involved in areas of

Development Organization	agriculture, forestry and fisheries (National Agriculture and Food Research Organization; Forestry and Forest Products Research Institute); Akita Research Institute for Food and Brewing within the Akita Prefectural Agriculture, Forestry and Fisheries Research Center; Hokkaido University
Timeframe	March 2009 to March 2014 (approx. 5 years)

*1 The combination of technologies, such as energy-source plants production technology; pretreatment, enzyme saccharification, yeast fermentation, concentration and dehydration technologies, and those technologies needed to link the different stages of production.

Development of these technologies has been made a national policy of the United States, which is investing heavily in them and continuing to promote research and development. These technologies are also important to the energy security of Japan, given its reliance on imported resources.

*2 A study that clarifies the environmental impact (amount of CO₂ produced) created by a product or service over the course of its life (production, shipping, sale, use, disposal and reuse) and gives an overall environmental impact assessment.

Appendix 1.  [Cellulosic bioethanol manufacturing process and technical issues](#)

Appendix 2.  [Structure of the Research Association of Innovative Bioethanol Technology](#)

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