

# KANEKA CORPORATION

March 10, 2009

## **Full-scale Development of the World's First Completely Bio-based Polymer with Soft and Heat-Resistant Properties**

- ◎ Kaneka Corporation (Headquarters: Osaka. President, Mr. Kimikazu Sugawara) is engaged in full-scale development of “Kaneka PHBH (tentative name)” (a copolymer of 3-hydroxybutyrate and 3-hydroxyhexanoate), which is a polyester biopolymer comprised primarily of plant oil. With the target of launching operations in 2010, equipment to test the PHBH manufacturing technology and demonstrate production of developmental polymers will be installed at the Takasago Plant (located in Takasago City, Hyogo; Plant Manager: Toshiji Kano), which has been expanded by acquiring bordering grounds. Production capacity will be 1,000 tons per year, and facility/R&D investments will be around 2.5 billion yen. While keeping an eye on market trends, the plan is to eventually raise the annual production capacity to 10,000 tons several years down the road and to gradually enhance the production facilities in order to ultimately grow the business into one that generates more than 10 billion yen in sales. This business was adopted as a commissioned development project of the Japan Science and Technology Agency as part of its “Original Technology-Seeds Development Program.”
- ◎ Kaneka holds a matter patent for PHBH. Its raw materials are biomasses such as plant oils, which are renewable resources. Polymers are accumulated in the bodies of microorganisms through strain development and cultivation technology established in joint research with Yoshiharu Doi, Executive Director of RIKEN, and PHBH is produced in a clean process whereby the polymers are refined and extracted. There are also prospects for the establishment of manufacturing technology utilizing biomasses not used for food as the primary ingredients. PHBH is stable under every day usage conditions. At the same time, it is biodegradable in either anaerobic or aerobic conditions in the natural environment, ultimately being converted into carbon dioxide and water. Because it is completely bio-based, it produces less carbon dioxide than fossil-based polymers and can contribute to the prevention of global warming.
- ◎ Moreover, increasing the ratio of 3-hydroxyhexanoate in the PHBH copolymer brings out the soft properties. Therefore, by controlling the copolymerization ratio it can be given a wide range of material properties from hard to soft. It can also be given properties similar to polyethylene and polypropylene. Compared to polylactic acid (PLA), which is finding an increasing number of applications as a biopolymer, PHBH has superior heat-resistance, biodegradability, hydrolysis resistance and water vapor barrier properties. It is the world's first completely bio-based, biodegradable polymer with soft and heat-resistant properties to be put to practical use. The main application is having it processed into film, sheets, foam, injection moldings, fibers, etc., and it is expected to be used in agricultural and construction materials, automotive interior materials, electrical devices, bottles and containers, sanitary goods, general packaging materials, etc.
- ◎ Biopolymers have rapidly come into the spotlight for their ability to contribute to reducing emissions of carbon dioxide, which is a cause of global warming, and to environmental conservation. Demand was at around 87,000 tons in 2007 and is expected to grow at an annual rate of 20% in the global market. Demand for completely bio-based soft polymers, which have not been put to practical use up to this point, is particularly strong. Utilizing the superior characteristics of PHBH, Kaneka will engage in full-scale development focusing initially on its use in flexible films such as film for agricultural mulch.