

In recent years, the importance of “white biotechnology” is being focused on especially in U.S. and European countries.

There are mainly three applications of biotechnology processes: medical (red biotechnology), agricultural (green biotechnology), and industrial processes. Biotechnology applied to industrial processes is called “white biotechnology”, which will have a great impact on future industrial production as well as enormous potential for creating a sustainable environment and society. White biotechnology is mainly based on biocatalysis and fermentation technology.

Detailed case studies conducted by leading companies operating in white biotechnology and a market analysis by the global consultancy firm McKinsey&Company confirmed that the social(People), environment(Planet) and economic(Profit) benefits(The Triple-P benefits) of white biotechnology go hand in hand. It was also estimated that 10 to 20% of all chemicals would be produced using biotechniques by 2010. Today the level is approximately 5%, and is presumed to develop at a rate of 11 to 22 billion Euro/year. In the field of fine chemicals, biotechniques are expected to be responsible for producing up to 60% of the products by 2010.

Conventionally, polymers have been produced from exhaustible fossil resources such as petroleum and natural gas. Meanwhile, biotechniques have developed polymers using renewable resources such as sugar and corn and some biopolymers have been marketed already. One example is NatureWorks® developed by Cargill Dow LLC (U.S.) using corn as the raw material. NatureWorks® is used for a variety of purposes including clothing and packaging.

White biotechnology also contributes to energy production using biomass as a renewable resource. Manufacturers currently produce ethanol from corn starch, potato starch, or cane sugar as a substitute for gasoline. Henry Ford planned to use ethanol as the primary fuel for his initial Model-T Ford. Currently in Brazil, pure or 20% ethanol derived from cane sugar is marketed as a substitute for gasoline. In the United States, 10% ethanol (E10 fuel) constitutes 30% of automotive fuels. Approximately 18% of the corn produced in U.S. is used for ethanol production. In Europe, the proportion of biofuels is projected up to 5.75% for use in automobiles. The current level is 0.3%. In order to achieve the

targeted percentage, it is necessary to produce or import 9.3 million tons of biofuels per year by 2010.

It is one of the key strategic challenges of the 21st Century to create a sustainable environment and society using new developments in biotechniques. In 2005, the OECD launched a two-year project named “The Bioeconomy to 2030”. The bioeconomy is a new concept that encompasses many economic activities- each of which benefits from new discoveries, related products and services arising out of the biosciences.

European countries possess high-level accumulations of white biotechnology. They produce 70% of the enzymes in the world. In addition, the governments as well as the people are quite aware of the necessity to build a sustainable society. In the United States, they place the development of white biotechnology as a key strategy and invest in research and development nearly 10 times more than European countries do. Representatives from different governmental bodies, industry, agriculture, and academia worked together on a project called “Vision 2020.”



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