GM Food Newsletter

September 2004
Published by Food and Public Health Branch

食物環境衞生署
Food and Environmental Hygiene Department

Biotechnology and Genetically Modified (GM) Food

Development Timeline

"Biotechnology" was being practised long before the word was invented. When human beings first realised that they could plant their own crops and breed their own animals; when they first discovered that fruit juices could be fermented into wine, or that milk could be converted into cheese or yogurt, or that beer could be made by fermenting solutions of malt and hops, they learned to use biotechnology. "Biotechnology" refers to the use of plants, animals and microorganisms to create products or to do tasks for ourselves.

Biotechnology can be applied in the medical field to produce new medicines and provide new ways of detecting diseases. For environmental protection, organisms modified by biotechnology can be used to remove wastes and pollution. Biotechnology can also be applied in food production such as the development of GM food.

Every new technology brings potential benefits as well as problems. For instance, planting GM crops might cause impacts on ecosystems resulting from unintended movement of genes from the GM species to the wild species through cross-pollination. However, international standards and agreements have been developed to safeguard the human health and environment from the potential impacts. It is important to properly manage the potential risks while enjoying the benefits of the development of new technology.

To provide a comprehensive review of the development of food biotechnology, this issue of GM food newsletter will guide you through a series of significant events in the development of food biotechnology and GM food. There are also some predictions about the future development of GM food.

Now, let us start our journey from a long long time ago.....

6000BC

— Sumerians and Babylonians used yeast to make beer.

4000BC

— Egyptians used yeast to make bread.
— Chinese discovered the use of bacteria and moulds in fermentation.

Late 1700s

— First systematic breeding of flowers was conducted in the Netherlands, which suggested how different strains of crops could be crossbred to develop new types.

1866

— Gregor Mendel published his work on pea plants which established the pattern of inherited characteristics.

Early 1900s

— The development of staining method allowed scientists to identify the detailed structure of cells, including chromosomes.

1953

— James Watson and Francis Crick proposed the double helix structure of DNA.

1986

— The US Environment Protection Agency approved the release of the first GM crop - the GM virus resistant tobacco plants.

1990

— The World Health Organization (WHO) and the Food and Agricultural Organization (FAO) started the discussion on the safety of GM food. They identified the limitation of application of traditional toxicological testing methods to the safety assessment of whole food and recommended a comparative principle whereby the GM food being assessed is compared with the conventional counterpart that has an accepted level of safety.

1993

— The Organisation for Economic Co-operation and Development (OECD) further elaborated the comparative principle developed by WHO and FAO.

1994

— FlavrSavr® tomato - the first GM food product, received approval from the US Food and Drug Administration for sale in the market.

1996

— WHO and FAO refined and endorsed the comparative principle elaborated by OECD. The comparative principle is the basic principle for the safety assessment of GM food.

2000

— Codex Alimentarius Commission established a task force to develop guidelines for risk analysis and safety assessment of GM food based on the internationally agreed comparative principle.

2003

— The principles and guidelines developed in the task force were adopted in Codex meeting as international standards for safety assessment of GM food.

— A legally binding international agreement named "Cartagena Protocol on Biosafety" which addresses the environmental issues associated with living modified organisms[1] (LMOs) became effective on 11 September 2003. The Protocol aims to ensure safe transfer, handling and use of LMOs that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account the indirect risks imposed on human health*.

21st Century (GM Food in the future)

— Future generations of GM crops/foods are expected to have the following properties:

- Increased nutritional content;
- Elimination of allergens in food;
- Lower fat and oil levels;
- Salt tolerance;
- Drought resistance; and
- Drugs and vaccines in plants and food.

[1] *A Living Modified Organism (LMO) is defined as any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology. Common LMOs include agricultural crops that have been genetically modified for greater productivity or for resistance to pests or diseases. Examples of modified crops include tomatoes, cassava, corn, cotton and soybeans. LMO, however, does not include processed food products.*

* *In Hong Kong, the environmental issues related to LMOs are under the jurisdiction of the Agriculture, Fisheries and Conservation Department which proposed to extend the application of the Cartagena Protocol on Biosafety to Hong Kong for better protection of biological diversity in December 2003.*

For more information on GM food, please visit the FEHD website

www.fehd.gov.hk/safefood/gmf/index1.html