

KNOW MORE – GENETICALLY MODIFIED FOOD

The Fundamentals

I. NEW TECHNOLOGY - GENETIC MODIFICATION

1. What are genes?

Genes are made of DNA (Deoxyribonucleic Acid). A gene is a unit of hereditary material, which carries the information to produce protein(s) that determines the characteristics of an organism. Plants and animals, from which foods are derived, have thousands of genes in their cells.

2. Where do Genetically Modified (GM) foods come from?

Without knowing the exact mechanism, farmers centuries ago made use of various breeding methods to produce grains and plants which were bigger, tastier or easier to grow. Nowadays, scientists are learning to identify and modify genes controlling specific characteristics through the development of modern biotechnology. With the help of biotechnology, genes can be more selectively and precisely inactivated or transferred from one organism to another to produce genetically modified organisms (GMOs).

Any food derived from this way is put under the umbrella of the name 'GM foods'.

3. What are the differences between genetic modification and traditional breeding?

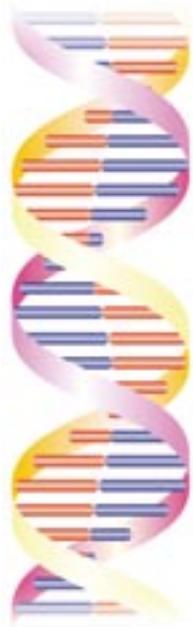
Both genetic modification and traditional breeding involve altering the genetic make-up of living organisms so as to produce the desired traits. However, the two techniques have the following differences -

GENETIC MODIFICATION

- isolation and transfer of well-defined genes
- introduction of desired genes across the species barrier
- faster and less costly
- desired changes can be achieved in one generation

TRADITIONAL BREEDING

- crossing of thousands of genes at one time
- gene transfer usually within species
- more time consuming in the process of observation and natural selection to achieve the desired characteristics



4. What are the examples of GM crops/foods?

GM foods available on the market come in many forms. Some are whole foods like crops, but most are processed foods. The characteristics of the GM crops/foods currently available on the market are similar to their traditional counterparts, except they may have the advantages of being more resistant to herbicides or insects, reducing wastage of production, etc. Some examples of GM foods are -

CROP	GM TRAIT	COMMON FOOD PRODUCTS
SOYA BEAN	Herbicide tolerance	Soy beverages, tofu, soy oil, soy flour, emulsifiers (i.e. lecithin), and as ingredients in breads, pastries and edible oil.
CORN	Insect resistance Herbicide tolerance	Corn oil, flour, sugar or syrup, and as ingredients in snacks, bakery products, confectionery and soft drinks.
TOMATO	Delay softening of tissue	Tomato puree and tomato juice.

II. POTENTIAL BENEFITS OF GM FOODS

Why did scientists start research and development of GM foods?

It is because researchers envisage the development of GM foods will help -

- Increase crop yields
- Increase the tolerance of crops to adverse growing conditions, e.g. drought
- Improve the nutrient composition of crops, e.g. increase the protein content of rice
- Provide resistance to crop pests and reduce the use of pesticides
- Improve sensory attributes of food, e.g. flavour, texture
- Improve processing characteristics so as to reduce wastage and costs
- Eliminate allergy-causing properties in some foods

III. CONCERNS OVER GM FOODS/CROPS

What are the concerns over GM foods/crops of green and consumer groups ?

- unintended modification of similar species in the neighbouring fields due to cross pollination
- disturbing the balance of ecosystems
- development of super pests
- whether it is acceptable to move genes between plants or animals which do not normally interbreed
- some people may worry about eating a food containing a gene from something they would not eat for religious, health or other reasons



IV. FREQUENTLY ASKED QUESTIONS

1. How long have GM foods been on the market?

The application of modern biotechnology in food production was started in the 90s. The first GM whole food, FLAVR SAVR™ tomato, was marketed in the United States in 1994.

2. What are the most common GM food ingredients or food products in the market?

The most common GM foods currently available in the market are soya bean and corn. Soya bean can be further processed into soy oil and soy flour to make food items such as pastries, edible oil and other soy products. Corn can be further processed into corn oil, flour or syrup to make food items such as snacks, bakery products and soft drinks.

3. Which countries are the major producers of GM foods?

The major producers of GM crops/foods are the United States, Argentina, Brazil and Canada.

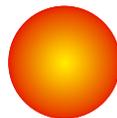
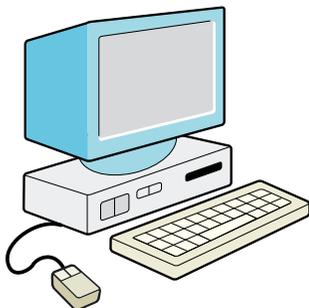


4. How to identify GM foods in the market?

Basically, physical appearances of most GM foods are similar to their conventional counterparts. Biochemical analyses such as Polymerase Chain Reaction (PCR) or Enzyme Linked Immunosorbent Assay (ELISA) are ways to differentiate them.

5. Will the development of herbicide-resistant crops actually increase the use of herbicide by farmers?

In general, herbicide-resistant crops will reduce the use of herbicides. The herbicide-resistant crops are usually resistant to “new generation” herbicides that are less toxic and less persistent in the environment. The development of crops with resistance to these herbicides may increase the use of these “new generation” herbicides but may at the same time decrease the use of herbicides that are more persistent in the environment. Nevertheless, the use of herbicides could be assessed by international authority to ensure that human health is not adversely affected.

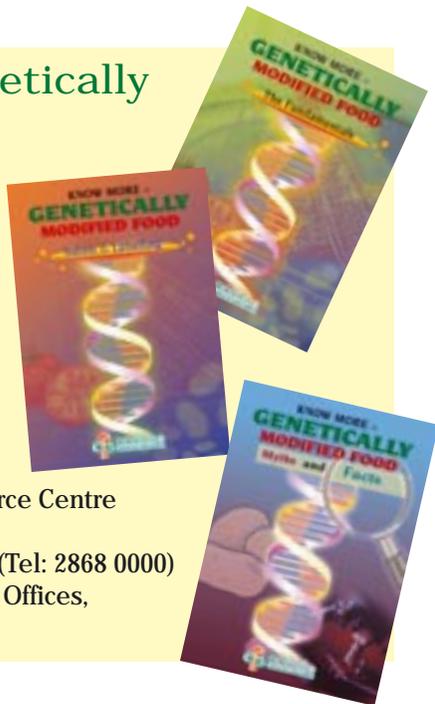


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