



## GENETICALLY MODIFIED (GM) FOODS

### Introduction

Genetically modified organisms (GMOs) can be defined as organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally. The technology is often called “modern biotechnology” or “gene technology”, sometimes also “recombinant DNA technology” or “genetic engineering”. It allows selected individual genes to be transferred from one organism into another, as well as between non-related species.<sup>2</sup>

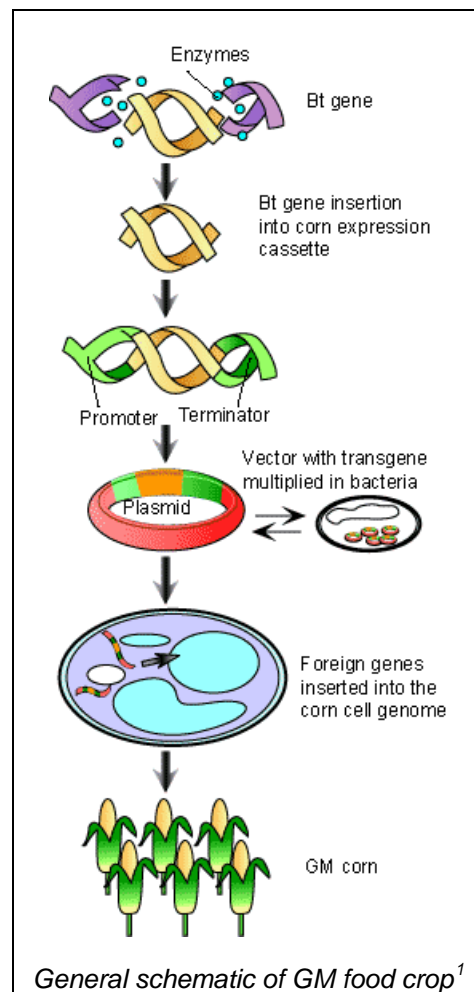
Genetically modified (GM) foods, or GM organisms (GMOs), have become the subject of a lot of controversy in the past few years with many arguments both for and against GM foods.

### Considerations and Challenges

The Canadian Food Inspection Agency (CFIA) and Health Canada share responsibility for the regulation of products derived from biotechnology (GMOs) including plants, animal feeds, fertilizers, and veterinary biologics.<sup>3</sup> All GM foods are regulated under *The Novel Foods Regulations* under the *Food and Drug Act*. Before a company can sell a new “novel food”, it has to be approved by the Health Products and Food Branch of Health Canada. A pre-market safety assessment will be made before the product is allowed into the marketplace.

While Health Canada ensures that GM foods (as well as drugs, cosmetics, medical devices, and pest control products) do not pose a risk to human health, CFIA assesses the potential risk that GMOs pose to the environment.

Both opponents and proponents to GMOs have many arguments for the use and discontinuation of GM food. Proponents argue that farmers have been modifying crops for as long as agriculture has



<sup>1</sup> Chaudry, Arshad. “Genetically Modified Foods.” *The Science Creative Quarterly*. September 2007. <http://www.scq.ubc.ca/genetically-modified-foods/>

<sup>2</sup> World Health Organization. 20 questions about genetically modified (GM) foods. <http://www.who.int/foodsafety/publications/biotech/20questions/en/index.html>

<sup>3</sup> Health Canada. (2006) Frequently Asked Questions: Biotechnology and Genetically Modified Foods. [http://www.hc-sc.gc.ca/fn-an/gmf-agm/fs-if/faq\\_1-eng.php](http://www.hc-sc.gc.ca/fn-an/gmf-agm/fs-if/faq_1-eng.php)

been around, selecting the best seeds, cross breeding and creating hybrids, and selecting plants with the most desirable qualities. Genetically modifying these organisms in a lab simply speeds up a time-consuming and inaccurate process. Proponents of GMOs argue that GM foods are the answer to the earth's growing population and shortage of arable land. Some advantages of GM foods include: pest resistance, herbicide tolerance, disease resistance, cold tolerance, and drought tolerance.

Proponents also argue that GM foods present nutritional benefits as well. Often, populations dependent on foods such as rice are malnourished because the rice does not have all of the essential life-sustaining nutrients that the body needs. Genetically modified rice can address this deficiency if vitamins and nutrients not ordinarily present in rice are genetically inserted.

Opponents of GMOs also present insightful arguments, including the risks that GMOs pose to the environment, human health, and the economy. GMOs can sometimes unintentionally cause harm to other living organisms. The most frequently used example is of Bt Corn (corn modified with *Bacillus thuringiensis*, a bacterium that naturally produces a protein lethal to insect larvae) which, in one study, was found to cause high mortality rates in monarch butterfly caterpillars. It was found that pollen from the corn could blow onto the milkweed, the natural food for the caterpillars, and be consumed by the caterpillars causing them to perish.

Opponents also argue that GMOs can cause pesticide resistance in insects and pests. Gene transfer from GM plants to non-GM plants can create populations of herbicide resistant plants (possibly creating 'superweeds'). Gene transfer can also happen when GM crops are in fields near non-GM crops causing a hybrid of the two. This situation was illustrated when a farmer in western Canada was sued by Monsanto for growing their patented 'Roundup Ready' seeds. The farmer never bought the seeds and maintained that the seed was blown in from a neighbouring field. Unfortunately for the farmer the judge in this case concluded that regardless of how the seeds ended up in his field, he had committed patent infringement. The plants and all of the farmers' profits from that year were awarded to Monsanto.

Genetically modifying foods also poses risks to human health by potentially exposing people to foods such as nuts and other high risk allergy foods. Introducing genes into a plant may create a new allergen or allergic reactions. The final major argument presented by opponents to GMOs is that the potential long term health affects of GMOs have not been studied, and therefore, the long-term health implications of GMSs are still uncertain.<sup>4</sup>

Currently GM foods are only required to be labeled as such if the content in question can potentially cause a severe allergic reaction. Health Canada and the CFIA share the responsibility for food labeling policies under the *Food and Drugs Act*. Canada does not require foods to be identified as "Genetically modified" or "GMO free".

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<sup>4</sup> Whitman, Deborah B. (2000) "Genetically Modified Foods: Harmful or Helpful?" *CSA Discovery Guides*.  
<http://www.csa.com/discoveryguides/gmfood/review.pdf>

Labelling in the European Union is mandatory for products derived from modern biotechnology or products containing GMOs. In 2001, the European Commission adopted two new legislative proposals on GMOs concerning traceability and reinforcing current labeling rules.<sup>5</sup>

### **For More Information**

For more information, please consult the following organizations or websites.

Health Canada - Genetically Modified (GM) Foods and Other Novel Foods:

<http://www.hc-sc.gc.ca/fn-an/gmf-agm/index-eng.php>

Canadian Food Inspection Agency (CFIA) – Biotechnology/Plants with Novel Traits (PNTs):

<http://www.inspection.gc.ca/english/plaveg/bio/pbobbve.shtml>

World Health Organization (WHO) – 20 questions on genetically modified (GM) foods:

<http://www.who.int/foodsafety/publications/biotech/20questions/en/>

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<sup>5</sup> WHO. 20 questions on genetically modified (GM) foods.