

# Plant Biotechnology

Post.. click on for videos + articles

## Biotechnology, GMO, GE... What do they mean?

### Biotechnology (Biotech)

A general term used to describe the use of biological processes to make products or improve plants/animals. For example, using yeast to make beer, or altering plant genes using genetic engineering.



method of biotechnology

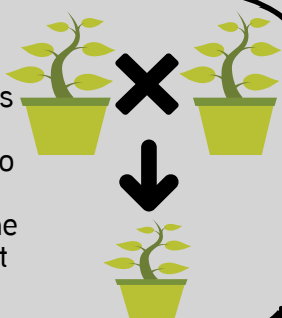
### Genetic Modification (GM)

A general term which refers to any intentional change to the heritable traits of an organism. A "GMO" is a genetically modified organism.

examples of genetic modification

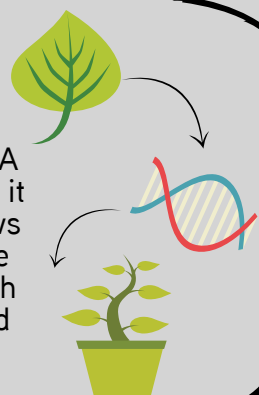
### Traditional Breeding

In crop production, 'parent' plants which have desirable characteristics (traits) are bred to produce 'offspring'. The genes from each parent combine and the offspring has a mixture of parent traits.



### Genetic Engineering (GE)

The technique of removing, modifying or adding genes to a DNA molecule to change the information it contains. Genetic engineering allows scientists to isolate a specific gene for a particular trait in a plant - such as resistance to insect attack - and transfer it into another plant.



Herbicide resistance & insect resistance are the 2 most common GE traits

GE crops currently approved to grow in Canada:

6

CORN  
SOYBEAN

SUGARBEET  
CANOLA

NEW "INNATE" POTATO

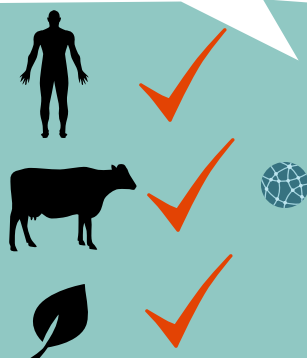
NEW ARCTIC<sup>®</sup> APPLE

## Are GM/GE products safe?

The World Health Organization (WHO) states that all GM products currently on the market have met the safety assessment policies of the countries they have been approved in and are "not likely to present risks for human health."

Health Canada and the Canadian Food Inspection Agency evaluate all biotechnology products for:

1. The potential effect of the product on human health;
2. The potential effect of the product on livestock animal health;
3. The potential environmental impact of the product.



## How does a new product get to market?



Research  
5-7 years



Confined field trials  
2-3 years



Evaluation  
1-3 years



Re-evaluation  
ongoing

Developers use genetic engineering to introduce a new trait or reduce negative traits in the plant. Successful products will go to trial.

Researchers grow the plant on small plots to monitor how it performs. Safety information is assessed and collected.

Data from research and field trials is submitted to Health Canada and the Canadian Food Inspection Agency. The GE plant is assessed for safety.

10+ YEARS  
\$150 MILLION  
to bring a new plant biotech product to market

1994

First genetically engineered crop is approved in Canada.

1996

1.7 million hectares planted with biotech crops globally

2014

181 million hectares planted with biotech crops globally



Canada grew 13.8 million hectares of biotech crops in 2017  
1 Hectare=2.47 acres



1 in 8 JOBS IN CANADA ARE IN THE AGRI-FOOD SECTOR



### BIOTECHNOLOGY careers:

- ~ Scientist or researcher
- ~ Regulatory officer
- ~ Sales and marketing
- ~ Field trial technician
- ~ Quality assurance

Explore these careers and more at:



Growing Careers.ca  
Ontario Agri-Food Education Inc.

Learn more about plant biotechnology at:

allaboutfood.aitc.ca



AgScape<sup>®</sup>  
The voice of Agriculture in the Classroom Ontario

© 2015 AgScape<sup>®</sup> (Ontario Agri-Food Education Inc.) All rights reserved.

Teachers are granted permission to reproduce activities and information from this document for classroom use only. Reproduction for purposes other than classroom use, in any format, requires written permission from AgScape<sup>®</sup>. info@agscape.ca

Ontario

Registered Charitable Number: 13237 2285 RR001

[http://www.hc-sc.gc.ca/sr-sr/pubs/biotech/reg\\_gen\\_mod-eng.php](http://www.hc-sc.gc.ca/sr-sr/pubs/biotech/reg_gen_mod-eng.php)  
<http://www.hc-sc.gc.ca/sr-sr/biotech/about-apropos/gloss-eng.php#b>  
<http://www.hc-sc.gc.ca/fn-an/gmf-agm/appro/index-eng.php>  
[http://www.who.int/topics/food\\_genetically\\_modified/en/](http://www.who.int/topics/food_genetically_modified/en/)  
<http://www.croplife.ca/just-the-facts>  
<http://www.hc-sc.gc.ca/fn-an/gmf-agm/fs-if/genetically-genetiquement-eng.php>  
<http://ow.ly/i/69y9M/original>  
<http://www.isaaa.org/resources/publications/briefs/49/toptenfacts/default.asp>  
<https://www.producer.com/2018/07/canadian-producers-are-major-gmo-adopters/>  
<http://www.inspection.gc.ca/plants/plants-with-novel-traits/general-public/overview/eng/1338187581090/1338188593891>