

Are biotech foods *already available in* Canadian stores?

A variety of foods which have benefited from the tools of biotechnology are now available. All of these products have been rigorously tested for safety by various government agencies including Health Canada, Environment Canada and the Canadian Food Inspection Agency (CFIA) of Agriculture Canada. All foods – whether biotech foods, organic foods, or specialty foods that meet the needs of diabetics – pass the same rigorous safety tests.

To date, the CFIA reports that food safety approval has been received by Health Canada on 36 plants with novel traits. General environmental releases have been granted for 31 plants; of these, nine have been registered as crop varieties. (See Figure 2).

Already, some of these crops are grown extensively in Canada (see Figure 1) and incorporated into many of the foods we eat, especially those containing vegetable oils.

In addition, there have been 31 approvals of plants with novel traits to be used as livestock feed. Forty-one genetically engineered veterinary biologics have been registered since 1988, including animal vaccines and test kits for the diagnosis of infectious diseases of animals.

How do we know if our food is developed using biotechnology?

Government agencies and agri-food companies have produced a great deal of information on new products of biotechnology. This information is available through the media, on the Internet, and in newsletters and pamphlets. (A bibliography on biotechnology is available from SABIC.)

Canada does not require foods containing the products of biotechnology to be labeled unless new traits change the nutritional composition of the food. Products would also have to be labeled if a trait was introduced, such as a gene from a peanut, which might result in an allergic reaction in some consumers. As this has not occurred, no products of biotechnology currently require labels. ■

Fig. 1. Estimated percentage of Canadian crops that are genetically engineered

Crop	% Genetically Engineered	Reason
Canola	50	Tolerates herbicides
Corn	15	Tolerates herbicides
Soybeans	30	Tolerates herbicides
Potatoes	20	Resists pests (beetles)
Tomatoes	0*	Delayed ripening

* Approved but not grown in Canada
Source: University of Guelph, Department of Plant Agriculture

Fig.2. Crops with novel traits approved for use as foods in Canada

CORN	Herbicide tolerant corn (6 types) Insect resistant corn (4 types) Insect resistant & herbicide tolerant corn (2 types) Hybridized corn system
CANOLA	Herbicide tolerant canola (6 types) Specialty oil canolas (3 types) Hybridized canola system
TOMATO	<i>(approved but not grown in Canada)</i> Delayed ripening tomato (2 types) Reduced pectin degradation tomato (1 type)
POTATO	Potato Beetle resistant potato (1 type)
SOYBEAN	Herbicide tolerant soybean (1 type)
COTTON	Insect-resistant cotton (2 types) Herbicide resistant cotton (2 types)
FLAX	<i>(approved but not grown commercially)</i> Herbicide tolerant flax (1 type)
SQUASH	Virus resistant squash (1 type)

Source: Health Protection Branch - Food Program

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BIOTECH FOOD

What's in Store?

by Milly Ryan-Harshman, Ph.D., R.D.



A customer is writing to find out if foods in your store were developed using biotechnology. How will you answer? Some background information might help.

Biotech Foods: On Your Shelves

Biotech food has been in grocery stores since 1990 when chymosin, a genetically-engineered enzyme used in cheese-making, was first approved as a replacement for rennet. Rennet had to be obtained from the stomach lining of calves, and its quality, availability and cost could vary. The need to control these variables meant that chymosin quickly became an important option for food processors. Now, up to 60 per cent of cheese is manufactured using the genetically engineered enzyme.

Today, every grocery store carries thousands of foods with ingredients derived from biotechnology because major crops like

canola, soybeans and corn have been genetically engineered. These crops contribute oils and other ingredients to most processed foods available on store shelves. For example, 25 per cent of all items sold in supermarkets contain corn or products like corn syrup.

The answer to your customer's question, then, is "yes". Practically everything sold in grocery store may contain ingredients from biotechnology.

What Ever Happened to the FlavrSavr Tomatoes?

One early biotech project that has been widely — but not always accurately — reported is the FlavrSavr tomato. The FlavrSavr was intended to give consumers a vine-ripened tomato that tasted better than artificially ripened varieties. The concept was to produce a tomato that ripened on the vine,

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but softened slowly so that it could still be transported to grocery stores before becoming over-ripe.

The FlavrSavr tomato performed well in consumer taste tests, but a couple of changes will be necessary before the tomato can be made widely available. The first is that the technology will have to be applied in more popular varieties. Second, tomato transporters will have to adopt more careful handling practices because all ripe tomatoes bruise more easily than hard, green tomatoes.

Biotechnology: Benefits for Farmers

To date, crops have been genetically engineered mainly to add improved traits that allow farmers to fight weeds and insects more effectively. For example, canola and soybean plants have been modified to protect them from herbicides. This allows farmers to control weeds with different herbicide treatments which can reduce the overall use of chemicals.

Like corn, potatoes are protected from insect damage by a new biotechnology using *Bacillus thuringiensis* (Bt). Bt is a bacteria that is toxic to insects but does not hurt people or animals. Organic farmers have used Bt sprays for several decades to provide natural plant protection. With biotechnology, Bt is actually incorporated into the plant, reducing the need for pesticides.

Future research will bring even more improved traits. Examples include frost-resistant wine grapes, which were planted for the first time this season. Grapes are a risky crop in Canada because an early frost can damage the vines. Virus

resistant squash, approved in the spring of 1998, is welcomed by vegetable growers – 50 per cent of a squash crop can be lost to viruses.

While it is true that most biotechnology to date has been directed toward crop improvements that benefit growers, much of what has been learned will provide future direction for the enhancement of foods for consumers.

Better Foods Through Biotech

What new biotech foods can we expect in the future? How about french fried potatoes which absorb less oil? Other research will change the fatty acid profile of oils. Already two types of canola with improved processing characteristics have been approved in Canada. In some cases, these changes will make oils healthier for consumers.

Food biotechnology is still in its early phase and scientists are gaining knowledge about how to improve the food supply. In addition to better french fries, consumers may one day have foods with enhanced health benefits. Plant chemicals, or phytochemicals, may provide protection against chronic illnesses such as cancer and heart disease. For example, enhancing the lycopene (the red pigment) content of tomatoes, or transferring it to other vegetables, may help those at high risk for prostate cancer.

Selling safe foods that meet the needs of consumers – whether for specialty foods with health benefits or simply foods that people like to eat – is the business of grocery stores. Food biotechnology will help grocers provide safe, healthy and flavourful foods well into the 21st century. ■

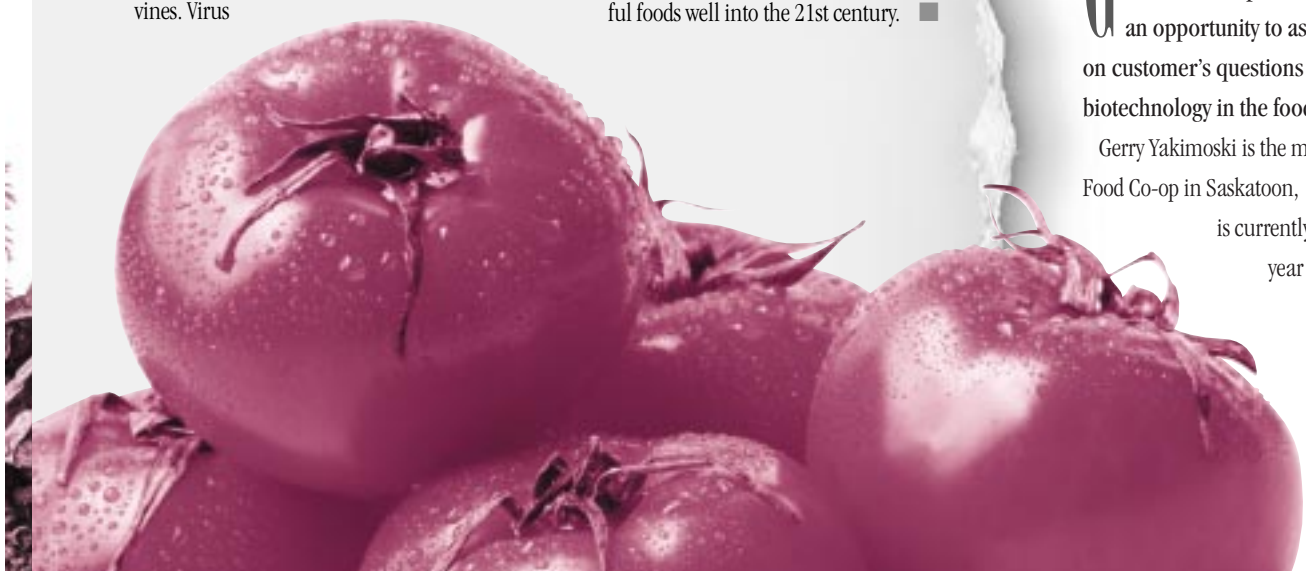
WHAT IS Agricultural or Food

Biotechnology involves the use of biological technologies to produce agricultural products and manufacture foods. The term biotechnology is sometimes used to describe traditional food processing methods, such as the use of microbes in the manufacture of cheese, wine and bread. More often, biotechnology is used to describe advanced methods of plant and animal breeding, including genetic engineering.

GROCCERS' FORUM

Groccers' Forum is a regular feature of this newsletter. It provides food retailers with an opportunity to ask questions – and pass on customer's questions – about the use of biotechnology in the food industry.

Gerry Yakimoski is the manager of Steep Hill Food Co-op in Saskatoon, The 500 member Co-op is currently celebrating its 20th year of operation. It specializes in organic, locally-grown foods; mem-



Biotechnology

What is genetic engineering?

Genetic engineering describes certain processes used to introduce new traits into food plants, animals or microorganisms. Traits such as size or the ability to resist disease are controlled by genes, the basic units of heredity in all living things. Using genetic engineering, scientists can reorganize the arrangement of genes or insert specific genes from another organism. This allows crop plants or animals to display new characteristics. Genetic engineering gives researchers more precise control over new traits and allows the introduction of a wider range of traits than traditional breeding. Biotechnology also speeds up the breeding process.

bers also have a preference for bulk, non-processed products. Yakimoski says, “Steep Hill members want their food to be natural, the way God made it. They are concerned about taste and texture, more so than appearance, especially when it comes to apples, oranges and tomatoes. I would say that our average member is very concerned that biotechnology and genetic engineering will take us one more step away from natural food. I have two questions.”

1. Why is biotechnology necessary?

Gardeners and farmers have always been careful to select the best plants and animals as breeding stock for the next generation. Selecting plants or animals that are more productive or resistant to disease – or that grow well in a particular environment such as the prairies – only makes sense.

Gradually, we have come to understand that breeding works by altering a plant or animal’s genetic makeup. As the understanding of genetics increased, breeding has become more sophisticated

How is biotechnology benefiting food production?

So far, biotechnology has been used mainly to improve crop performance on the farm. For example, crops such as potato, squash and canola have been genetically engineered to increase their ability to withstand insect pests and diseases, and to tolerate certain kinds of herbicides. Biotech crops have been widely accepted by farmers because they allow them to use less pesticides or more effective herbicides, resulting in higher net income.

Biotechnology has also been used in animal agriculture to produce new vaccines for livestock, in the food industry to develop fast and effective tests for

and led to improvements in farm productivity and adaptability. For example, breeders have developed tomatoes that produce fruit early in places with a short summer and wheat that resists diseases such as rust. It is probably safe to say that there is not one crop grown in our gardens or on our farms that has not been subjected to extensive development through selective breeding.

Gardeners and farmers are always looking for new varieties that meet their needs. Meanwhile, grocers want to offer consumers safer foods, with more variety, better quality and wider availability. At the same time, the exploding world population demands an ongoing commitment to higher yields. Biotechnology helps breeders meet these demands by increasing the precision and speed of breeding efforts. It also increases the range of new traits that can be added to crops.

the presence of contaminants and pathogens, and in crop breeding to produce environmentally-friendly oils for consumer products.

Where is biotechnology taking us?

Research currently underway will greatly increase the numbers and uses of the products of biotechnology. For example, researchers are developing foods with improved nutritional qualities, plants that can resist drought and animals with higher meat quality.

Biotechnology is considered to be one of the most important ways to increase farm productivity in a sustainable and environmentally friendly way, helping the agri-food industry to meet the increasing demand for food from a rapidly expanding world population. ■

2. What are the goals of those who promote biotechnology?

One is to develop new varieties of plants and animals that meet the current needs of farmers and consumers. For farmers, these include crops that are: more resistant to pests and environmental stress, such as drought; more environmentally-friendly; and more profitable. Consumers want high quality and enhanced nutritional value, such as foods with healthier oils. They also want food to be plentiful and inexpensive.

Another goal is wealth creation. Certainly, biotech companies want to make more money. This is done by delivering products that appeal to producers and consumers because they meet their needs. ■

