

CURRENTLY AVAILABLE ON THE MARKET

Food Biotech Products



Food biotech products have been available in the market for sometime now. These modified crops look like their unmodified counterparts, but they possess special characteristics that make them better. These crops benefit not only the grower, but also the consumer. Growers reap higher crop yields while consumers are given wider product choices all year round. These new varieties also have the potential to help protect our already very fragile environment.

Currently on the market

Food biotech products currently on the market have been modified to contain traits and attributes such as:

- Disease resistance
- Reduced pesticide use
- More nutritious composition
- Herbicide resistance
- More rapid growth of crops
- Better taste and quality

BIOTECH SOYBEAN

Soybean is the oil crop of greatest economic relevance in the world. It contains proportionally more essential amino acids than meat, thus making it one of the most important food crops today.

Herbicide-resistant soybean

Herbicide-resistant soybean provides better weed control and reduces crop injury. It also improves farm efficiency by optimizing yield, using arable land more efficiently, saving time for the farmer, and eliminating crop rotation restrictions. It also encourages the adoption of no-till farming—an important part of soil conservation practices.

This new variety is the same as other soybeans in nutrition, composition, and



Pocket Ks are Pockets of Knowledge, packaged information on crop biotechnology products and related issues available at your fingertips. They are produced by the Global Knowledge Center on Crop Biotechnology (<http://www.isaaa.org>). For more information, please contact the International Service for the Acquisition of Agri-biotech Applications (ISAIA) SEAsiaCenter/c/o IRRRI MCPP, Box 3127, Makati City 1271, The Philippines.
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GLOSSARY

Bt: short for *Bacillus thuringiensis*, a common soil bacterium that produces an insect toxin.
Coat protein (CP): a major component of viruses. The primary function of CPs is to protect viral genetic information.
Enzyme: a protein that regulates chemical reactions inside every living cell and organism.
Gene: a biological unit that determines an organism's inherited characteristics.
Herbicide: chemicals frequently used in agriculture to control weeds that compete for soil nutrients, water, and sunlight.
Laurate: an important fatty acid in soaps and detergents, mainly sourced from coconut and palm oil.
Oleic acid: a monounsaturated fatty acid found in animal and vegetable oils. Monounsaturated fats are the most benign of the fat sources and are generally considered safe as they do not cause disease or other health problems.

Examples of currently available food biotech products

PRODUCT	TRAIT
Canola	Herbicide resistance
Canola	High laurate levels
Canola	High oleic acid levels
Corn	Herbicide resistance
Corn	Insect resistance
Cotton	Herbicide resistance
Cotton	Insect resistance
Papaya	Virus resistance
Potato	Insect resistance
Potato	Virus resistance
Soybean	Herbicide resistance
Soybean	High oleic acid resistance
Squash	Virus resistance
Tomato	Delayed ripening

For more information on the global status of these products and the life science companies that developed them, please check www.agbios.com/_Synopsis.asp. This web site provides a summary of the nature and types of biotech products that have received regulatory approval for environmental release, use in livestock feed, or use in human food in one, or more, countries.

CONCLUSION

In the developed world, it is clearly evident that the use of these GM crops has resulted in significant benefits. These "first generation" crops have proven their ability to increase crop yields, reduce farm costs, increase farm profit, and help protect the environment. Now, research is focused on "second generation" GM crops that will feature increased nutritional and/or industrial traits. These varieties should prove valuable in countries where millions of people suffer from dietary deficiencies.

Are these food biotech products safe? Find out from the next Pocket K. For information on GM crops and related issues, check our CropBiotech.Net Web site at www.isaaa.org

Photos courtesy of Lon Alden
(www.foodsubs.com), Canola Council of Canada
(www.canola-council.org), and the United States
Department of Agriculture (www.usda.gov)

BIOTECH CORN

Corn is one of the three most important grains of the world.



Herbicide-resistant corn

This corn variety works similarly to herbicide-resistant soybean. It allows growers to spray corn plants with herbicide for better control over more than 100 grasses, weeds, and vines that compete for soil nutrients, water, and sunlight. Available in Argentina, Canada, European Union, Japan, and the US.

Insect-resistant corn

This modified corn contains an in-built insecticide protein from a naturally occurring soil microorganism (*Bt*). The protein gives corn plants season-long protection from corn borers. These pests can cause significant damage and yield loss for many growers. This corn requires fewer insecticide applications. Available in Argentina, Canada, European Union, Japan, Switzerland, UK, and the US. □

BIOTECH CANOLA

Canola is a genetic variation of rapeseed and was developed by Canadian plant breeders specifically for its nutritional qualities, particularly its low level of saturated fat.



Herbicide-resistant canola

Herbicide-resistant canola works similarly to other such crops. For benefits, see herbicide-resistant soybean. Available in Canada, Japan, and the US.

High laurate canola

This canola variety contains high levels of laurate. Oil processed from these novel varieties is similar to coconut and palm oils.

This new canola oil is being sold to the food industry for use in chocolate candy coatings, coffee whiteners, icings, frostings, and whipped toppings. Even the cosmetic industry uses it. Available in Canada and the US.

Oleic acid canola

This new type of canola contains high levels of oleic acid. For benefits, see oleic acid soybean. Available in Canada. □

BIOTECH COTTON

Herbicide-resistant cotton

This cotton works similarly to other such crops. For benefits, see herbicide-resistant soybean. Available in Argentina, Canada, Japan, and the US.

Insect-resistant cotton

This cotton variety works similarly to insect-resistant corn. It contains an insecticide protein that provides the plant with in-built protection from budworms and bollworms. The need for additional insecticide

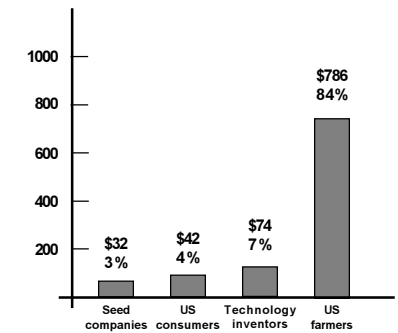
applications for these pests is reduced or eliminated. Available in Argentina, Australia, Canada, China, Japan, Mexico, South Africa, and the US. □



BENEFITS

Farmers gain the lion's share of financial benefits from food biotech products, with consumers also receiving tens of millions of dollars in savings.

Distribution of benefits (in million dollars) from herbicide-resistant soybeans, 1997



Source: Falck-Zepeda, J.B., G. Traxler, and R.G. Nelson. 2000. Rent creation and distribution from biotechnology innovations: The case of Bt cotton and herbicide-tolerant soybeans in 1997; Department of Agricultural Economics and Rural Sociology, Auburn University, U.S.A.

Dominant GM Crops, 2000

CROPS	M/ha*
Herbicide-resistant soybean	25.8
Bt corn	6.8
Herbicide-resistant canola	2.8
Herbicide-resistant corn	2.1
Herbicide-resistant cotton	2.1
Bt/Herbicide-resistant cotton	1.7
Bt cotton	1.5
Bt/Herbicide-resistant corn	1.4
Total	44.2

*Million hectares

James, C. 2000. *Global status of commercialized transgenic crops: 2000*. ISAAA Briefs No. 21: Preview. ISAAA: Ithaca, NY.

BIOTECH POTATO

Insect-resistant potato

This biotech potato works similarly to insect-resistant corn. It contains an insecticide protein that provides the plant with an in-built protection from the Colorado potato beetle. Thus, this potato needs no additional protection for this pest, benefiting farmers, consumers, and the environment. Available in Canada, Japan, and the US.



Virus-resistant potato

Several potato varieties have been genetically modified to resist potato leafroll virus (PLRV) and potato virus Y (PVY). These potatoes contain viral genes which they use to fight against the viruses themselves. Available in Canada and the US. □

BIOTECH SQUASH

A biotech yellow crookneck squash is now on the market. It is able to resist watermelon mosaic virus (WMV) and zucchini yellow mosaic virus (ZYMV). This new variety contains the coat protein genes of both viruses. This biotech approach bypasses aphid control and therefore, it may reduce or eliminate the use of insecticides. Available in Canada and the US. □



BIOTECH TOMATO

Delayed-ripening tomato

The delayed-ripening tomato became the first genetically modified food crop to be produced in a developed country. This tomato variety has an extended shelf life. It contains a gene that slows the natural softening process that accompanies ripening.



These tomatoes spend more days on the vine than other tomatoes thus resulting in more flavor. Further, the longer shelf life has commercial advantages in harvesting and shipping that can reduce the costs of production. Available in Canada and the US. □

BIOTECH PAPAYA

Virus-resistant papaya

This Hawaiian-developed papaya contains a viral gene that encodes for the coat protein of papaya ringspot virus (PRSV). This protein provides the papaya plant with an in-built protection against PRSV. A gene from the pathogen is used to fight against the pathogen itself. Available in the US. □

