

# BIOTECHNOLOGY AND FOOD



## Introduction

For centuries, humans have been selecting, sowing, and harvesting seeds to produce food products that will sustain them. In this present age, global food demand has increased the need for improved crops. Biotechnology offers the needed technology to produce higher crop yields, plants that are naturally protected from disease and insects, and potentially more nutritious and better tasting foods. A general definition of biotechnology is the use of a living organism or its products for commercial purposes. Today, biotechnology involves the use of techniques which take genetic material from one organism and put it into another, thus obtaining desired qualities or products. Crops produced by biotechnology include soybeans, corn, cotton, canola, papaya, tomatoes and squash. Also, an enzyme used to make cheese and yeast to make bread is commonly produced by biotechnology.

## Benefits of Biotechnology

- **Protection of the environment.** Scientists have made some foods, such as papayas and potatoes, more resistant to disease. These crops need less chemical spray to protect them from harmful insects or viruses, which is better for water and wildlife. Other crops are protected from herbicides that are used to control weeds, thus allowing farmers to conserve soil by tilling the ground less often.
- **Greater Crop Yields.** Farmers can use biotechnology to help plants survive, warding off insects and better tolerance to herbicides. This allows a better harvest from these hardier plants.
- **Better Tasting, Fresher Foods.** Sweeter peppers and tomatoes that ripen more slowly are examples of how biotechnology can produce fresher and better tasting food.
- **Grow more food on less land.** By the year 2050, the earth's population is estimated to be nine billion people. Using biotechnology, farmers can produce more crops on the land they already have. This way, countries do not have to devote more land to farming. In turn, developing countries can benefit most, since they will have the largest population growth.
- **Keep food safe to eat.** Scientists can more accurately find unwanted viruses and bacteria that may be present in food. This will cause an even lower risk of food-borne illnesses. Some types of fungus, which can be found in corn, release

substances that can harm animals that eat them. These substances are already regulated in the United States, and biotechnology provides another tool that can help further reduce the amount of these substances in corn.

- **New food varieties.** Biotechnology can extend advances in cross-breeding, allowing for new food varieties. For example, seedless melons and mini avocados. Farmers can also develop food with better flavor and a better nutrient profile.

## Health and Medical Benefits of Biotechnology

- Modern food biotechnology may help promote public health, providing fruits, vegetables and grains with more nutritional benefits. These include more proteins, vitamins and minerals, or less fat and saturated fat. Already some oils have a better fatty acid profile, less saturated fat and trans fat, and more monounsaturated fat. This can promote heart health.
- For those with food allergies, biotechnology is seeking ways to reduce allergens in peanuts, wheat and other crops.
- Non-food applications of biotechnology may result someday in new vaccines and medications to treat heart disease, cancer and diabetes. For example, some fruits and vegetables will contain more antioxidants, such as vitamins C and E. Scientists have already developed a type of rice containing vitamin A and iron, thus reducing the risk of blindness and anemia where this is a main staple in their diet.

## The Safety of Food Biotechnology

The Food and Drug Administration (FDA), along with the Environmental Protection Agency (EPA) and the United States Department of Agriculture (USDA) combine to regulate genetically engineered foods. The FDA ensures that foods made from genetically engineered plants are safe for humans and animals to consume; the USDA makes sure the plants are safe to grow, and the EPA ensures that pesticides introduced into these plants are safe for both human and animal consumption and for the environment. Foods produced through either biotechnology or conventional methods must all meet the same high safety standards.

## Labeling Requirements

The FDA has decided that this new technique for changing the genetic makeup of plants does not differ significantly from traditional plant breeding techniques. Therefore, no special labeling is required. However, common food allergy proteins would require labeling. For example, if genetic material from a peanut is put into a tomato, the tomato would require labeling. The special labeling requirement would let people with an allergy to peanuts know that the tomato may contain peanut proteins which could cause an allergic reaction. Also, if the nutritional content or the composition of the food changes substantially, additional labeling is required.

## References

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This information has been reviewed by university faculty.  
[cals.arizona.edu/pubs/health/az1066.pdf](http://cals.arizona.edu/pubs/health/az1066.pdf)

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