

UNDERSTANDING THE BASICS OF BIOTECHNOLOGY, GMOS AND GENE EDITING

Food production technologies that provide safe, sustainable and affordable food

For thousands of years, farmers have selectively bred plants through traditional practices like seed selection (saving seeds from plants with desirable traits), cross-pollination (transfer of pollen from one plant to another) and hybridization (crossbreeding plants from two different varieties).¹ Today, farmers have access to a variety of techniques that are even more precise and offer greater access to nutritional and environmental benefits while ensuring safety.²

Biotechnology is a broad term for a range of tools that alter living organisms to make or modify products, improve plants or develop microorganisms.¹ When used in food, biotechnology includes traditional plant breeding, bioengineering (BE) and gene editing techniques that can create health, nutrition and sustainability benefits.

Genetically Modified Organisms (GMOs) are the result of bioengineering, a precise technique that allows plant breeders to take a desirable trait found in nature and transfer it from one plant or organism to one they want to improve. Reduced food waste, disease and insect resistance, and enhanced nutritional content are some of the benefits of GMOs.

GMOs currently approved in the U.S.^{3,4}

Select varieties of each



SOYBEANS



CORN



SUGAR BEETS



ALFALFA



PAPAYA



COTTON



CANOLA



APPLES



SQUASH



RICE



POTATOES



SALMON

Gene editing is a method of selective breeding that makes precise, intentional and beneficial changes in the genetic material of plants and animals and can be done without introducing any new DNA.⁵ Working only with nature's own tools, gene editing is simpler, cheaper and faster than creating GMOs. CRISPR is one type of gene editing and stands for "Clustered Regulatory Interspersed Short Palindromic Repeats," and like other gene editing processes, can precisely change the genetic code, or DNA, within a living thing. Researchers are working on solving a range of food-related concerns for both consumers and farmers such as improved health benefits, reduced allergens and food sensitivities like gluten in wheat, and plants made more resilient to diseases and weather conditions.

Science confirms safety

Everyone has to eat. Farmers, scientists and regulators value food safety just as much as you do. Credible evidence has demonstrated that foods from bioengineered (BE) plant varieties marketed to date are as safe as comparable, non-BE foods.⁶

GMOs

Hundreds of scientific institutions, including the World Health Organization and the American Medical Association, and more than 3,000 studies have confirmed that GMOs are safe.⁷

Gene Editing

When no new DNA is introduced, the USDA, EPA and FDA regulate gene-edited foods the same as all other foods.⁸



Clearing the air on GMO misconceptions

Are there long-term studies?

↳ Yes, there have been many multigenerational studies (20+ years) confirming that GMOs are safe.⁷

Do they cause allergies?

↳ No, research demonstrates that because GMOs only use existing DNA, they don't create any new allergens.⁹

Is there industry bias?

↳ No, GMOs have been proven safe by both independent and industry studies.⁷

Do they increase pesticide use?

↳ Yes, GMOs have decreased overall pesticide use by 37%.¹⁰

The newest generation of crops are creating solutions



Food waste:

Food that lasts longer won't be thrown away as quickly or as often, reducing wasted food.



Disease and insect resistance:

Plants fight pests themselves, eliminating the need for additional insecticides and fungicides.



Herbicide tolerance:

Plants tolerate herbicides, allowing fewer applications and the use of safer herbicides on crops.



Drought tolerance:

Plants need less water and can grow in dry climates, increasing access to food.



Nutritional content:

Crops enhanced with nutrition can improve the quality of life for people in developing nations.



Improved processes:

Varieties can be easier to refine and process, reducing the need for water, land and energy used in production.



More benefits are on the horizon:

Science is currently developing GMOs and gene edited foods that will have even more benefits for consumers, including an allergen-free peanut and healthier soybean oil.¹¹