GMO Answers

WE WANT TO DO A BETTER JOB ANSWERSING YOUR QUESTIONS

What is GMO Answers?

GMO Answers is an initiative committed to responding to your questions about how food is grown. Its goal is to make information about GMOs in food and agriculture easier to access and understand.

Join us. Ask tough questions. Be skeptical. Be open. We look forward to sharing answers.

GMOAnswers.com

Answering Consumers' Questions

gmo answers

SEARCH

GMO Basics

GMOs & You

GMOs & the Environment

Modern Agriculture

Information & Resources

Meet the Experts

About GMO Answers

Media

Educators

Home >> Search GMO

Search GMO

Share:

What is a GMO? GO

Don't see the information you're looking for? Submit a question

All | Answers | Articles | Infographics & Downloadables | Scientific Studies | Videos | International Resources

Filter by Topic: All Topics Sort by: Relevance

Featured Answer

What Is A GMO?

Typically when people refer to GMOs they are speaking about Genetically Modified Organisms (GMOs), which are crops developed with genetic engineering, a more precise method of plant breeding.

For more than 10,000 years humans have selectively cultivated plants to create new varieties of crops with desirable traits, like being resistant to pests or diseases or being tolerant to herbicides that allow farmers to better control weeds. Throughout history they have used a variety of plant breeding techniques to produce plants with useful characteristics, including selective breeding, mutagenesis and genetic engineering.

View all assets for "What is a GMO?"

Answers

See All

Q: What is a GMO?

Posted on April 15, 2014

Response from Community Manager, Moderator for GMOAnswers.com • May 04, 2016

A: What is a GMO? A GMO is a plant developed through a process in which a copy of a desired gene or section of genetic material from one plant or organism is placed in another plant. The only GMOs commercially available in the U.S. are the following nine crops: soybeans, corn (field and sweet), papaya, potato, canola, cotton, alfalfa, sugar beets and summer squash. Apple is approved and coming to market soon. What a GMO isn't: A GMO is not an ingredient. Ingredients in the foods you eat may be made using one or more of the eight GM crops. GMOs do not equal processed food. Processed foods may contain one or more of the eight GM crops, or they can be made with organic or other non-GM ingredients.

Read More

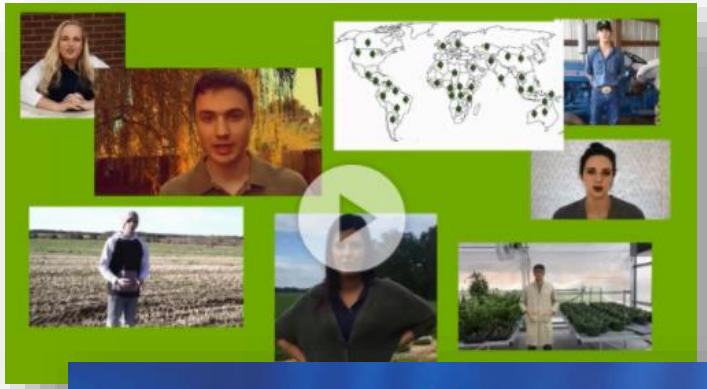
Answers: How GMOs Are Made | GMO Basics

Engaging in Online Conversation

- 1:1 Social Engagement

- Myth-busting

Resources: Educational Content

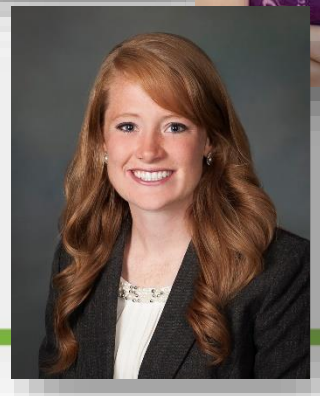


Resources: Educational Content Cont.

Meet Our Experts

- GMO Answers is committed to finding the best expert to answer your question. Depending on the nature of your question, the answer may be provided by an independent expert, industry organization, the GMO Answers Community Manager or an expert from a member company.



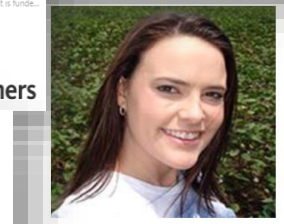


GMO Answers
GMO Answers is committed to answering all questions about GMOs and how our food is grown. It is funde...
Aug 30 · 4 min read

Agriculture 101: Asking Hard Questions And Digging For Answers

GMO Answers
GMO Answers is committed to answering all questions about GMOs and how our food is grown. It is funde...
Jul 31 · 5 min read

From Research To Startup—How This Scientist Uses Technology To Help Farmers



Dr. Yang says she's excited that technologists and investors have increasingly started to look at agriculture as a fertile ground for innovation. (Image Credit: GMO Answers)

Get to Know GMOs

GMO Basics

- GMOs are crops developed with genetic engineering, a more precise breeding technique, that enables someone to take individual traits found in nature and transfer them to another plant, or make changes to an existing trait in a plant.

GMO Basics Cont.

Why Grow GMOs?

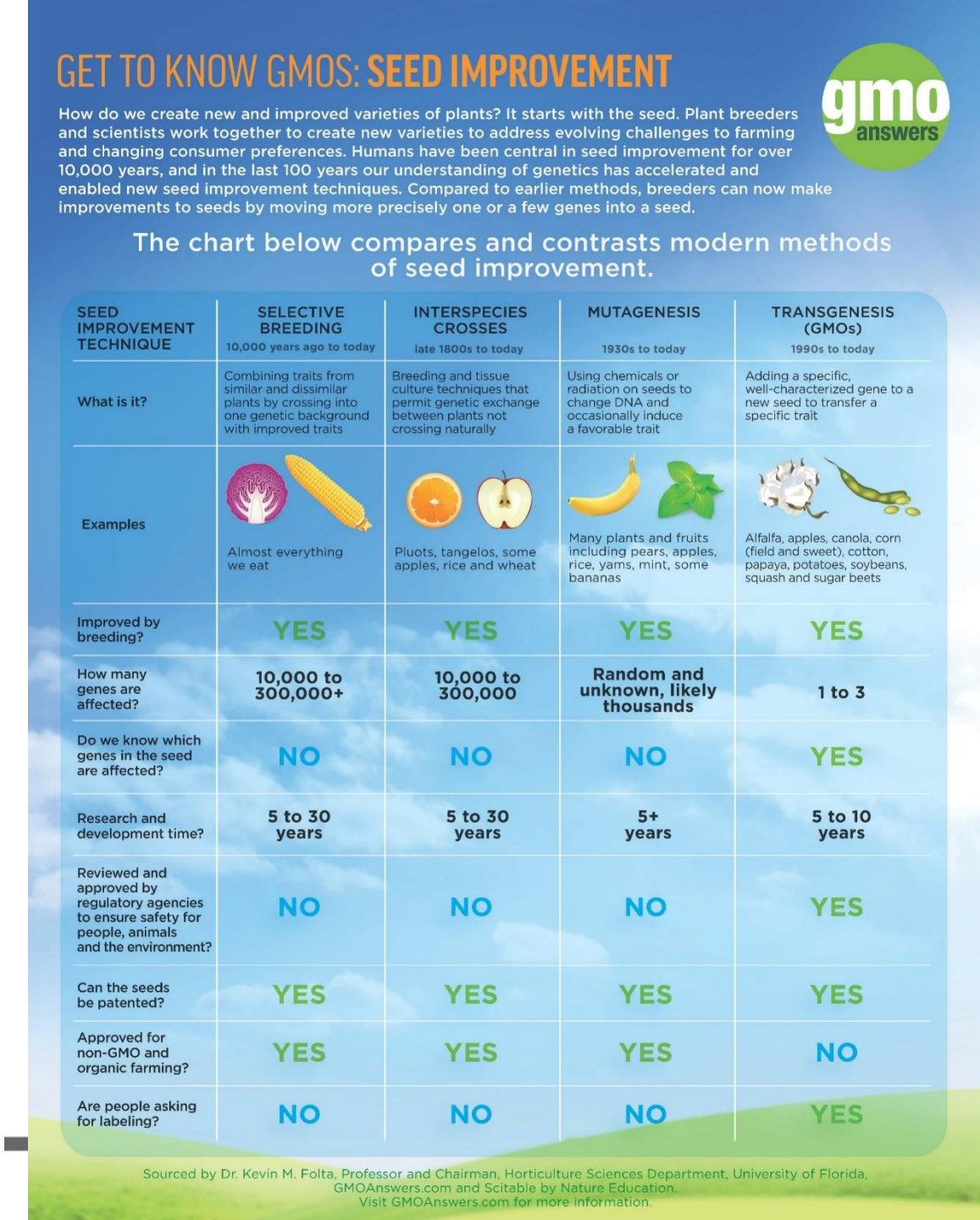
GMOs are created to achieve a desired trait, such as resistance to a pest or tolerance to drought conditions. The 10 genetically modified crops available today include: alfalfa, apples, canola, corn (field and sweet), cotton, papaya, potatoes, soybeans, squash and sugar beets. GM crops were created for:

- **Insect resistance.** This category of traits provides farmers with season-long protection against target pests, reduces the need for pesticide applications, and lowers input costs.
- **Drought tolerance.** GM crops that express drought tolerance have better moisture retention and can better endure drought conditions without the need for additional irrigation.
- **Herbicide tolerance.** Crops developed to tolerate specific herbicides allow farmers to fight weeds by applying targeted herbicides only when needed and enable them to use conservation tillage production methods that preserve topsoil, prevent erosion, and reduce carbon emissions.
- **Disease resistance**. Through genetic engineering plant breeders can enable plants to resist certain diseases, like the papaya ringspot virus (PRSV). The GM Rainbow Papaya, developed to be resistant to PRSV, allowed Hawaiian papaya farmers to recover from an outbreak of this devastating disease that crippled their industry.
- **Enhanced nutritional content.** Genetically modified soybeans with an enhanced oil profile, much like olive oil, have been developed and are longer lasting and trans-fat free.
- **Reduced food waste.** Genetic engineering has been used to modify potatoes and apples in order to eliminate superficial browning and bruising (potato only) when the produce is cut or handled. These traits can help reduce the amount of produce thrown away by producers, processors, retailers and consumers.
- **Improved manufacturing processes.** Certain biotech corn varieties enable more efficient biofuels production by improving the process through which cellulose and/or starch is broken down and converted to fuel. This helps reduce the environmental impact of the manufacturing process by decreasing the amount of water, electricity, and natural gas needed to produce biofuel.

GMO Basics Cont.

This chart compares and contrasts modern methods of seed improvement.

How do we create new and improved varieties of plants? It starts with the seed. Plant breeders and scientists work together to create new varieties to address evolving challenges to farming and changing consumer preferences. Humans have been central in seed improvement for over 10,000 years, and in the last 100 years our understanding of genetics has accelerated and enabled new seed improvement techniques. Compared to earlier methods, breeders can now make improvements to seeds by moving more precisely one or a few genes into a seed.



SEED IMPROVEMENT TECHNIQUE	SELECTIVE BREEDING 10,000 years ago to today	INTERSPECIES CROSSES late 1800s to today	MUTAGENESIS 1930s to today	TRANSGENESIS (GMOs) 1990s to today
What is it?	Combining traits from similar and dissimilar plants by crossing into one genetic background with improved traits	Breeding and tissue culture techniques that permit genetic exchange between plants not crossing naturally	Using chemicals or radiation on seeds to change DNA and occasionally induce a favorable trait	Adding a specific, well-characterized gene to a new seed to transfer a specific trait
Examples	Almost everything we eat	Pluots, tangelos, some apples, rice and wheat	Many plants and fruits including pears, apples, rice, yams, mint, some bananas	Alfalfa, apples, canola, corn (field and sweet), cotton, papaya, potatoes, soybeans, squash and sugar beets
Improved by breeding?	YES	YES	YES	YES
How many genes are affected?	10,000 to 300,000+	10,000 to 300,000	Random and unknown, likely thousands	1 to 3
Do we know which genes in the seed are affected?	NO	NO	NO	YES
Research and development time?	5 to 30 years	5 to 30 years	5+ years	5 to 10 years
Reviewed and approved by regulatory agencies to ensure safety for people, animals and the environment?	NO	NO	NO	YES
Can the seeds be patented?	YES	YES	YES	YES
Approved for non-GMO and organic farming?	YES	YES	YES	NO
Are people asking for labeling?	NO	NO	NO	YES

GMOs & You

How do we ensure that GMOs are safe for use and consumption?

- GMO crops are studied extensively to make sure they are safe for people, animals and the environment
- GM seeds take an average of $136 million and 13 years to bring to market because of research, testing and regulatory approvals conducted by government agencies in the United States and around the world.[1]

GMOs & You Cont.

GMO Safety

- GMOs available today are *as safe as* their non-GMO counterparts.
- They do not cause new allergies, cancer, infertility, ADHD, autism or any other diseases or conditions.
- The safety of GMOs has been affirmed by:

NATIONAL ACADEMY OF SCIENCES

FAO FIAT PANIS

World Health Organization

AMA AMERICAN MEDICAL ASSOCIATION

AAAS ADVANCING SCIENCE, SERVING SOCIETY

Don't believe us? Hear from GMO Answers volunteer expert and registered dietitian Connie Dikeman:

GMOs & the Environment

- Between 1996 and 2015, crop biotechnology was responsible for an additional 180.3 million tons of soybeans, 357.7 million tons of corn, 25.2 million tons of cotton lint and 10.6 million tons of canola, without having to bring more land into production. To produce the same amount of crops without GM technology, farmers would have needed to cultivate 48 million additional acres of land.
- In 2015, 58.9 billion pounds of atmospheric carbon dioxide emissions were reduced by conservation tillage and decreased fuel use made possible by genetically modified crops. That's equal to removing nearly 12 million cars from roads for one year.

gmo answers

GMOs & the Environment Cont.

- **With an estimated world population of 9.7 billion by 2050, farmers will need to produce up to 70 percent more food than they do today to satisfy global demand.** GMOs help farmers to use less land, fewer inputs and less energy while producing the food needed to meet this demand.

Learn more about the environmental benefit of GMOs here:

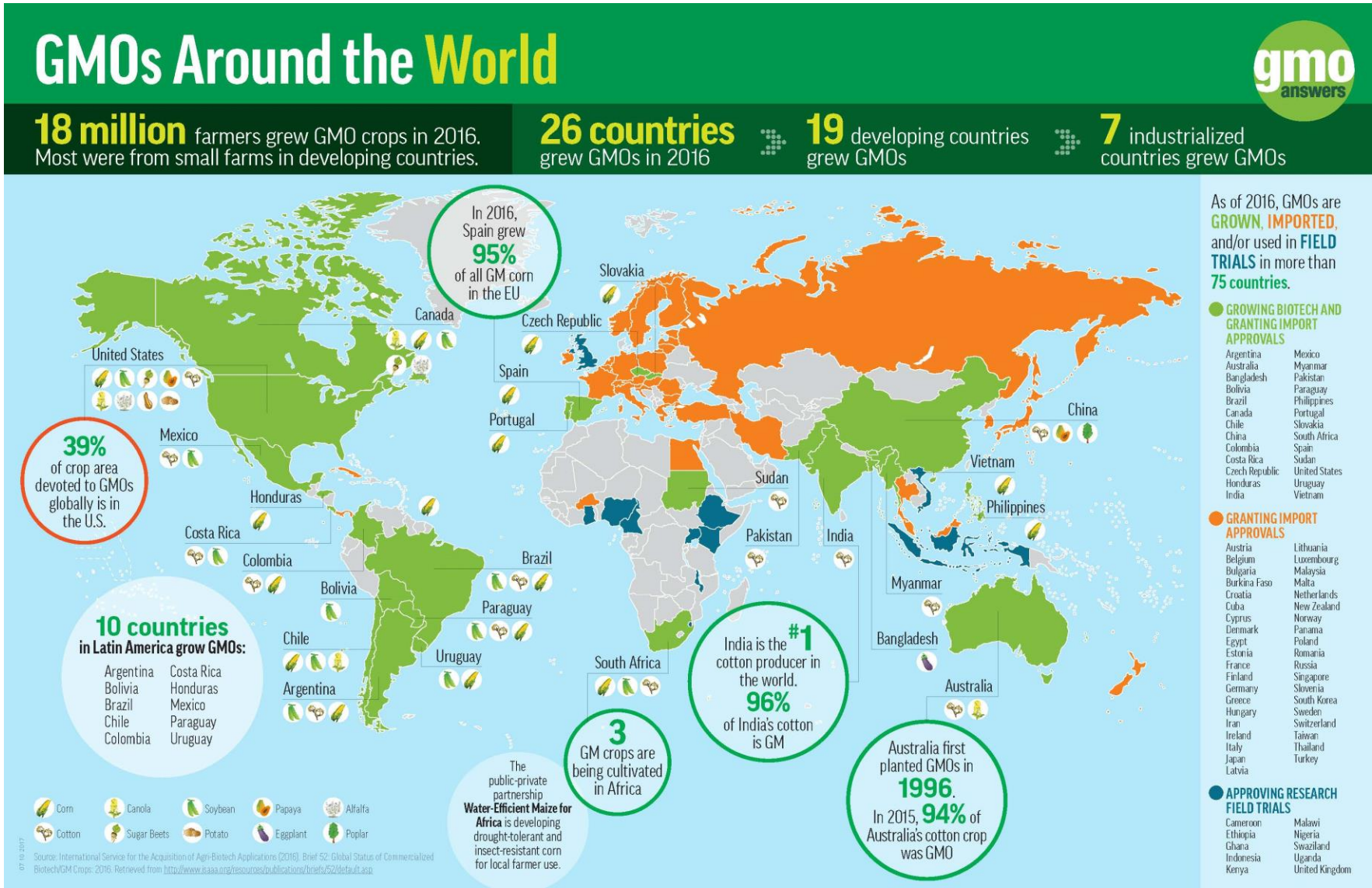
Modern Agriculture

- From GPS guided self-driving tractors to drones monitoring crop health, today's modern farms use an array of innovative technologies to grow crops and utilize resources more efficiently than ever before. GMOs are one of modern agriculture's many innovations and they are already allowing farmers to grow more food with fewer resources. GMOs are also contributing to innovations beyond the farm as well, including GMO crops that can help to reduce food waste, nutritionally enhanced GM crops that can help to alleviate under-nourishment around the world and new medicines that are being developed with genetic engineering.

See how some of today's science enthusiasts would use biotechnology to tackle some of the world's most pressing food challenges:

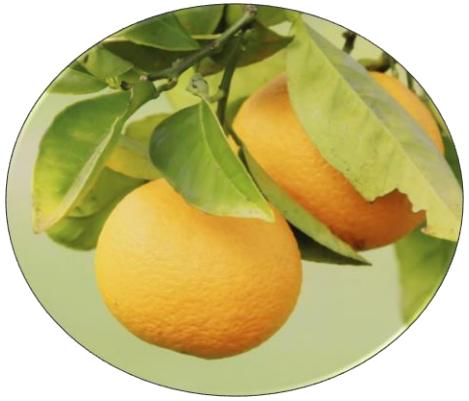
Modern Agriculture – GMOs Globally

- GMO crops are grown around the world by approximately 18 million farmers, most of them in developing countries.
- In total, more than 75 countries import, grow and/or research GMOs, and in 2016, 26 countries (seven industrial and 19 developing) planted biotech crops.
- As of 2016, the top five countries growing GMOs in terms of crop area are the United States, Brazil, Argentina, Canada and India.



Future of GMOs

Beyond food production, genetic engineering has many applications that benefit us and our planet, including medicine, plant restoration and disease resistance.





Looking for More Information?

- **Explore**: Visit GMOAnswers.com for information and resources on GMOs and biotechnology in a simple, visual and user friendly way.
- **Ask**: Submit a question and have it answered by one of our over 200 independent, volunteer experts.
- **Engage**: Join the conversation by posting a comment and participating in a dialogue with other members of the science community online.

Facebook.com/GMOAnswers

Pinterest.com/GMOAnswers

@GMOAnswers

Youtube.com/GMOAnswers