

GMO, Can We Trust You?

Imagine this: you are walking through the grocery store when you see a label that catches your eye: “GMO.” Immediately, a flood of questions arise—is it safe? Should you be worried about it? GMO, can we trust you? Hi, I am Thomas Duan, and today, we will untangle the science, the fears, and the real story behind them.

GMO stands for genetically modified organisms. Whether it is proudly displayed on the package or hidden in the least noticeable corner, these letters have become a lightning rod of controversy. Some people conjure up images of sterile labs, white coats, and test tubes brimming with neon-colored chemicals. Others have read about the possible advantages, which include increased yields, insect resistance, and the ability to fight starvation in areas where climate change threatens staple crops. For example, golden rice is a crop engineered to produce beta-carotene to solve the biggest problem in vitamin A deficiency communities (IRRI, 2018). But for many, the thought of messing with an organism’s DNA sparks an uneasiness rooted in the fear of the unknown: Could it generate unpredictable environmental side effects? Could it cause cancer? Could it even make me grow another finger or ear? According to a 2020 Pew Research Center survey, only 27% of Americans believe that it is safe to eat, while 38% directly think they are not safe at all. Meanwhile, a similar proportion expresses skepticism over whether scientists have reached a consensus on GMO safety. These fears may not be surprising, given how “unnatural” the term “genetic modification” can sound.

So, what do scientists say? Well, it’s goddamn safe. In 2016, the National Academies of Sciences, Engineering, and Medicine released a report titled *Genetically Engineered Crops: Experiences and Prospects*. A committee of over 50 scientists analyzed more than 900 studies on genetically modified crops. Their conclusion was fairly direct: they found no substantiated evidence that foods derived from genetically modified crops were less safe than foods from non-GM crops. Of course, no large-scale scientific report can account for every nuance and every new study, but this analysis serves as one of the broadest attempts to synthesize decades’ worth of data. Likewise, a comprehensive review evaluated decades of research on GMO safety. The review highlights that multiple studies, including assessments and feeding trials, have found no substantial differences in the nutritional composition or health effects of genetically modified crops compared to non-GMO (Todd, 2014). Regulatory agencies, including the FDA and EFSA, have consistently found no credible evidence linking GM foods to adverse health outcomes. If there were significant risks, they would have likely surfaced in long-term studies by now, yet the findings remain consistent—GM foods meet the same safety standards as non-GM varieties.

However, for every conclusion drawn from data, there’s a lot of public discussion, and grasping that discussion requires us to take a moment away from the lab. Various media sources, including columns in well-known newspapers and blog posts, have influenced how GMOs are perceived by the public. Some voices in social media and blogs have suggested that consumers should have the right to know more clearly if their food is genetically modified (Fergusson, 2018; Lamb, 2020). This transparency can help people make informed choices, but those same opinion pieces often create some worry—highlighting that we still don’t know the long-term effects or that large biotech companies might have too much power. On the other hand, supporters of biotech and some farmer groups believe that new technologies can often be misinterpreted. They point out that genetically modified crops have the potential to decrease

pesticide use and increase yields in areas affected by drought, which could be advantageous for both the environment and our food supply.

However, it would be a mistake to paint the public as merely ignorant of scientific facts. Studies indicate that the acceptance or rejection of GMO foods has just as much to do with trust—trust in government, in scientists, and in corporations (Siegrist et al., 2011). When people have had experiences where large institutions acted deceptively—whether those experiences are tied to drug or environmental pollution, to name just a few—they carry that memory into new contexts. The result is heightened skepticism when corporations declare, “Our brand new product is safe.” So when it comes to GMOs, individuals may indeed see the data but hesitate to accept it wholeheartedly, thinking of historical instances in which data were manipulated. In addition, our broader cultural conversation around health and wellness frequently promotes the virtue of anything labeled “natural.” This can set up a subconscious bias against anything that appears engineered, chemical, or synthetic, no matter how solid the supporting research might be.

One of the more subtle points in this discussion is that “GMO” is not a monolithic category. The label itself can mask immense variety in both the methods used and the traits introduced. Genetic engineering might involve transferring genes from one species to another—often called “transgenic” modification—or it might involve using CRISPR, which is a technology to tweak genes that are already present in the organism (Jinek et al., 2012). For instance, scientists may remove the portion of a gene that makes apples turn brown when sliced, leading to an “Arctic Apple” that looks fresher and is genetically very similar to its natural counterpart. Or researchers might insert a bacterial gene into a crop to make it resistant to a specific pest. Despite these nuanced distinctions, we typically see just one label—GMO—on a package. So, if someone has a problem with a transgenic crop that produces its own pesticide, they might conflate it with a CRISPR-engineered crop that merely removes the gene for browning. This conflation can fuel misunderstandings and lead to sweeping judgments that fail to recognize the variety and precision of modern genetic engineering tools.

You might wonder why so many people feel uneasy about that phrase, “modifying the genes.” Some of the answer probably comes from our natural connection with the environment. For a lot of people, there’s this almost dreamy idea of farming: the farmer in overalls, planting seeds in tidy rows under the morning sun, working together with the land. The concept of a seed created in a lab, where DNA is altered by adding or removing pieces, seems really disconnected from the traditional farming vision. Yet it’s crucial to remember that humans have been modifying crops for thousands of years, although in less direct ways. Traditional selective breeding is essentially a slow form of genetic modification, where farmers choose seeds from the best plants—maybe those that are the sweetest or the largest—and plant them next season. Over decades, this process has dramatically changed staple crops. Corn, for example, bears almost no resemblance to its wild ancestor, teosinte (Beadle, 1980). The only difference is that modern biotechnology can accomplish in years—or even months—what took our ancestors centuries to achieve, and with more precision.

When you pull back and see all these threads—health data, environmental impact, corporate control, cultural values—you begin to understand why “Can we trust you?” is such a complicated question. Safety and trust are rarely absolute; it’s about risk assessment and management. From a purely scientific standpoint, the vast bulk of research indicates that GMOs currently on the market are safe to eat. However, this doesn’t mean future GMOs will always be

safe, nor does it mean every GMO is free from ecological or socioeconomic concerns. Instead, it points to the notion that any new GMO product should be rigorously tested, just as any new pharmaceutical or medical technology would be, to confirm its safety profile. Government departments such as the U.S. The Food and Drug Administration requires extensive risk assessments before approving GMO foods for commercial use (FDA, 2024). Still, these processes vary by country, and they can be a source of controversy when people believe that corporate influence or inadequate government oversight may undermine rigorous evaluation.

With that being said, one way for us to acknowledge valid concerns while also incorporating scientific evidence and innovation is through open dialogue. Researchers who have dedicated years to studying crop genetics might sometimes seem dismissive if they view public concerns as just ignorance or anxiety. That position will not be beneficial for anyone. Instead, trying to improve transparency—by using labels, getting the public involved, and providing easy-to-understand educational materials—can help create a better environment. When scientists step out of their labs to explain technology in simple terms, tackle uncertainties without talking down to anyone, and really pay attention to the public’s concerns, it can make the whole process a lot clearer. Some universities host outreach programs that allow farmers, consumers, and school groups to observe gene-editing techniques in action. These efforts demonstrate that genetic modification isn’t an unethical thing, but actually another option we have in our agricultural toolbox.

For those who remain skeptical, the next step is to consult credible sources: studies published in peer-reviewed journals, statements from recognized scientific organizations, and analyses that compare GMO outcomes across different regions. It can also be helpful to listen to farmers who have real-world experience growing these crops—farmers who can talk about yield, pesticide use, and economic viability. Another option is to remain conscious of the way that fear-based headlines and viral videos can influence our perceptions. While it’s wise to retain a healthy dose of skepticism, we should also remember that science progresses through careful accumulation of evidence rather than sensational claims.

So, GMO, can we trust you now? Perhaps a better question is: “How do we weigh the evidence in a world where science, commerce, and culture intersect so tightly?” Based on the cumulative scientific data, GMOs are no more inherently dangerous than any other foods produced through modern agricultural methods. Yet, the intricate questions of corporate ethics, regulatory oversight, and long-term sustainability remain open for continued dialogue and scrutiny. The key, I believe, is to approach this not as an all-or-nothing judgment but rather as an ongoing conversation—one that can evolve alongside new research, new technologies, and changing societal values. Thanks for listening. I’m Thomas Duan, and have a nice day.

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