

# Food Freedom - Part 2

## What You're Not Told About GMO Crops and Foods



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You've been told that genetically modified (GM) crops and foods are needed to feed the world's growing population and to meet challenges facing farmers – climate change as well as pests and diseases.

You've also been told that GM crops can make agriculture more sustainable, with higher yields, reducing pesticide use, and providing more nutritious food.

They tell you GM foods are as safe as non-GMO foods.

*Is it really true?*

### What You're NOT Told

In contrast, studies point to potential and actual harm to animal and human health, and the environment from GM crops and the foods derived from them. Yet, this evidence doesn't reach

the public and is instead buried under a deluge of exaggerations such as the ones above, generated by a well-funded pro-GM lobby.

Now we're being introduced to "gene-edited" GM crops and the same inflated claims are being made. This time we're told that gene editing our food supply can protect it from the challenges of climate change.

Even our livestock animals are being "gene-edited" in the name of "improving" them. This narrative of the moment that humans can improve on the creation of God is essentially overlooked.

Evidence is showing that the new gene-editing techniques are not as precise, predictable, or natural as they're being claimed. Most important is that they pose *major risks*. The result of these techniques will be a huge disappointment – or even dangerous.

Just like old GM, "new GM" will gobble up valuable resources and distract from existing proven organic solutions to the problems of food production and agriculture.

Let's weigh four of the main myths vs. the facts:

## 1. Food Production for the World

**MYTH:** We need GM crops to feed the world's growing population

**FACT:** There is no global or regional shortage of food.

The world produces enough food for 14 billion people, far more than we will ever need to feed the projected world population in 2050 of 9 billion.

## 2. GM Crop Yields

**MYTH:** GM crops give higher yields.

**FACT:** GM crops do not produce higher yields.

Conventionally bred plants continue to outperform GM crops in terms of yield and other useful traits, such as tolerance to extreme weather conditions and poor soils, disease resistance, and enhanced nutritional value.

## 3. Natural Farming and Food Security

**MYTH:** There are no alternatives to GM if we are to increase food production.

**FACT:** Low-input farming can provide food security for future generations.

Agroecology (a range of low-input farming methods) can ensure enough food for the current population and that the land improves in productivity in the future.

## 4. Dangerous Unintended Outcomes of Gene Editing

**MYTH:** Gene editing is precise, controllable, and as safe as natural breeding.

**FACT:** Gene-editing techniques can have unexpected outcomes that could pose dangers.

A growing body of scientific research shows that gene-editing gives rise to *unpredictable* results, including unexpected mutations (damage to DNA) both at the site targeted for editing (“on-target mutations”) and elsewhere in the genome (“off-target mutations”).

The list can go on.

Despite huge leaps forward made in understanding genetics, we’re also realizing there are vast amounts that people in science have yet to learn.

John Vandermeer, Professor of Ecology and Evolutionary Biology at the University of Michigan, has said: “We now know that there are an enormous number of complications that are involved ... Molecular biology has now advanced to the point that we now understand that the genome is like a complicated ecosystem. Doing just one thing such as inserting a piece of DNA into a big genome and expecting just the single protein you are planning for and nothing else is probably not possible. Genetic engineering is based on a dramatically incomplete knowledge of the genome.”

Despite what seems obvious, biotechnology companies are mounting an aggressive campaign to convince the world that the products of new genetic engineering techniques such as CRISPR are, in fact, non-GMO.

It’s completely unsupported by scientific reality yet, developers of these products are so determined to distance themselves from the consumer rejection of GMOs that they’re willing to ignore facts and hope no one catches on. Unfortunately for them, that attempt is gladly failing.

## What Are GMO’s Anyway?

### Herbicide Tolerant

Most GM crops now being grown have been engineered with a gene from a soil bacterium (*Agrobacterium tumefaciens*) that makes them herbicide tolerant (HT). In other words, DNA from bacteria has been inserted into the DNA of crops such as corn and soybeans so they can be sprayed with certain chemical pesticides without dying.

This type of GMO has been highly profitable for the chemical companies that develop them, patent them, and sell the herbicides to be used with them, but the technology is starting to fail.

Recently, there's been a "superweed" epidemic resulting from increased glyphosate use on HT crops. The biotech industry's response is by developing crops to be tolerant to increasingly toxic chemicals, resulting in higher toxicity in our food. This strategy has so far met with disastrous results.

## Insect Resistant

The other common trait for traditional GMOs is insect resistance. This type of transgenic crop takes genes from a different type of soil bacterium (*Bacillus thuringiensis* [Bt]) and engineers it into the plant.

This effectively turns the entire plant into an insecticide factory. If an insect eats any part of a Bt crop, it will die—unless that insect has developed a Bt tolerance. As is the case with HT crops, pest resistance to Bt crops is seriously threatening this technology.

## What Is Genetic Engineering?

Genetic engineering, also called biotechnology, bioengineering, or genetic modification, is a technology that encompasses a variety of techniques.

It's essentially "in vitro nucleic acid techniques". Meaning the **Nucleic Acid** portion of **DNA** or **RNA** being manipulated "in glass".

All genetic engineering relies on unproven and unreliable assumptions about the predictability of a gene's function in isolation from its original DNA sequence.

For example, as a human being, your genome is made up of approximately 20,000 genes, which are in turn composed of approximately 3 billion base pairs of DNA. This genome that codes for everything that makes you biologically unique is copied into virtually every single cell of your body.

The complexity and sophistication with which these gene sequences interact are far beyond the capacity of our current scientific understanding.

## What Is New Genetic Engineering?

New genetic engineering techniques such as CRISPR, RNAi, ODM, gene drives and other types of so-called "gene editing" products generally do not contain foreign DNA.

However, that doesn't mean that the process itself is not transgenic. For example, current CRISPR products are created by using the same soil bacterium used in HT crops (*Agrobacterium tumefaciens*) to carry another foreign bacterial or archaeobacterial gene inside the cell nucleus of a plant.

In this process, the DNA of the host plant is modified to produce a new enzyme changing the plant's DNA.

Although the finished CRISPR product doesn't contain the transgenes from the bacteria, it does retain changes made to the DNA, and the process still relies on transgenic techniques.

We don't need more drought-resistant, high yielding, or disease-resistant crops, as many such crops already exist.

Our food production requirements can benefit us more, by far, with agricultural systems *functioning as an integrated whole with Mother Earth.*

See part 3 of this series on Food Freedom in our next newsletter.

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