

## What makes food genetically engineered (GE) or a genetically modified organism (GMO)?

Definitions of what constitutes genetically engineered food differ across the world and even within different government entities. (In part, this has created some of the problems for achieving (GE) transparency and reaching consensus on how best to identify and communicate this with consumers.) But on the whole, most would define GE food or genetically modified organism (GMOs) as a living organism whose genetic material (otherwise known as DNA) has been artificially manipulated in a laboratory through genetic engineering. Genetic engineering creates combinations of plant, animal, bacteria, and virus genes that do not occur in nature or through traditional crossbreeding methods.

## Isn't this what farmers have been doing for centuries?

No. Traditional plant and animal breeding methods, such as grafting, cross-cultivation, seed selection, and even *in vitro* fertilization, are not the same as the methods that are considered GE. While there is a diverse and constantly evolving set of GE techniques, the underlying premise behind GE is the manipulation and alteration of an organism's underlying DNA. To achieve this manipulation scientists often delete or insert foreign DNA into the target organism's DNA. These alterations and insertions would not occur in nature or even with assisted breeding methods.

## Why is GE a problem?

The issues surrounding GE food and its production are complex and must be looked at from both external ecosystems impacts and internal health impacts perspectives.

For the vast majority of GE foods, the plant's genetic code has been modified to withstand the application of chemicals that would otherwise kill the plant. The most prominent example of this is Roundup Ready corn—corn that has been genetically modified to withstand the application of glyphosate (the active ingredient in Roundup). Since the introduction of GE corn and other crops since 1996, global use of glyphosate has increased 15-fold in just two decades.<sup>i</sup> Once billed as safe by its maker Monsanto (now owned by Bayer), just two decades later scientists, doctors, and governments have begun to raise alarms over emerging ecological and health impacts.

On the ecology side of the issue, weed resistance to glyphosate has spurred the exponential increase in use and demands for new GE varieties of herbicide resistance crops, creating a chemical treadmill. While more research is needed, recent studies and analysis have identified concerns over low-dose impacts on microbiomes, antibiotic resistance, pollinators and aquatic systems.<sup>ii</sup> Beyond glyphosate and chemically-based GE, there are concerns about introduction of manipulated genetic material into natural habitats and the unknown impacts on native species of plants and animals. For example, could GE salmon (Atlantic salmon that have had their growth-hormone gene replaced with a Pacific Chinook growth regulating gene) escape into the natural environment negatively impact already struggling native Chinook?

From the human health perspective, the first and foremost concern is with the chemicals inherent in the majority of GE production. Looking at glyphosate once again, the Global Health Organization determined in 2015 that glyphosate is "probably carcinogenic to humans." Research has shown that for some crops, like soy, glyphosate accumulates at higher

residues in GE varieties, increasing exposure for humans and animals that consume these products.<sup>iii</sup> Because chemicals are required in the production of GE, there is also the exposure concerns for farmworkers and their families.

For non-chemically based GE crops, a lot is still being learned about how GE techniques impact the target organism DNA as a whole and the unknown impacts of genetic manipulation on the organism and those that consume it. For example, in certain cases foreign DNA might be allergen based, yet the food being consumed would not obviously be an allergen.

Overall, these issues and potential risks are significant enough that at the very least, consumers have a right make informed choices as to whether they wish to consume products using GE.

## What is PCC's standard on genetically engineered foods?

A longtime proponent of GE transparency, in 2012, PCC determined that it would no longer accept high risk GE ingredients in new grocery products. Currently, high risk GE crops include corn (except popcorn), soy, sugar beet, zucchini and yellow summer squash, cotton, papaya, Canola, and alfalfa, Arctic Apples, AquAdvantage Salmon, and White Russet potatoes. Derivatives of these crops (e.g., soy lecithin or citric acid) and some products (fresh meats, fresh milk, and fresh eggs) from the animals that consume these GE crops are also on PCC's list of ingredients that must be organic or Non-GMO Project Verified. For PCC's produce, 95% is certified USDA Organic, which prohibits to use of GE. For the remaining 5% that is not organic, we require Non-GMO Project Verification or independent testing to confirm no GE. See [PCC's GE Ingredient and Labeling Standard](#) for more details.

## What is not covered by PCC's GE standard?

Categories that have proven challenging to apply this policy include processed and frozen meat products, cheeses and other dairy products, supplements, microbes and enzymes, yeasts and emerging GE ingredients that may be unknown. Wherever possible PCC prioritizes organic and Non-GMO Project Verified in these categories.

## Does this mean that there are no GE ingredients in PCC's stores?

No. Unfortunately, we cannot guarantee that that our stores are free of GE ingredients or that certain animal products weren't produced from animals fed GE feed. This is a primary reason that we have advocated for GE transparency—so that we and our customers could have better access to supply chain information and make informed choices on purchasing. We believe that consumers have a right to know how their food was produced and what potential impacts it may have on their health and will continue to push for increased transparency even beyond the new rules.

## How can I avoid GE altogether?

Certified Organic and Non-GMO Project Verified offer the best assurances against GE ingredients. PCC has a long-standing priority on organic and we will continue to expand our organic and Non-GMO Project Verified offerings to provide GE-free options to our members and customers.

## Does the federal government have any regulations for GE foods?

The National Bioengineering Food Disclosure law, passed by congress in 2016, directed the United States Department of Agriculture (USDA) to establish a national mandatory standard for disclosing foods that are or may be "bioengineered," also known more commonly as genetically engineered. The standard was passed at the end of 2018 and requires food manufacturers, importers, and certain retailers to ensure that final products containing detectable genetically modified material to be appropriately disclosed. While PCC supports labeling and transparency for genetically engineered ingredients, there were many flaws in the standard that PCC and other organizations felt were not in the best interest of consumers. To learn more about PCC's coverage of GE labeling issues and advocacy efforts, visit our [GE Policy Advocacy Page](#) and the [Sound Consumer](#).

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<sup>i</sup> Benbrook, Charles, Environ Sci. Eur., Trends in glyphosate herbicide use in the United States and globally, 2016, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5044953/>.

<sup>ii</sup> Van Bruggen AHC, Environmental and health effects of the herbicide glyphosate, Mar. 2018, <https://www.ncbi.nlm.nih.gov/pubmed/29117584>; see also <file:///C:/Users/aimee.simpson/Downloads/glyphosate-and-soil-health-full-report.pdf>

<sup>iii</sup> T. Bohn, Compositional differences in soybeans on the market: Glyphosate accumulates in Roundup Ready GM soybeans, July 2013, <file:///C:/Users/aimee.simpson/Downloads/Environmental-and-Toxicological-Impacts-of-Glyphosate-with-Its-Formulating-Adjuvant.pdf>.