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Assessing the Safety of GMOs

The Need for FDA Standards

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The use of genetic modification in crops is a hotly debated and controversial topic. Supporters of genetically modified organism (GMO) crops claim that due to the growing world population and shrinking resources such as arable land, there is a dire need for deploying GMO crops to keep food production in pace. This claim has been refuted by scientists and members of the sustainable agricultural community that assert practices such as organic, biodynamic and indigenous farming methods, done within local and small farm ecosystems, can provide more than enough food to feed the world's population. Furthermore, such practices avoid risks to human and agricultural health caused by GMO foods and their reliance on man-made pesticides and factory farming methods.

Consider a big vegetarian dinner with fresh plump corn kernels, wonderfully firm soybean tofu and a salad of squash with delicious dressing made with canola oil. And later, vegan ice cream with sweetener from sugar beets. What a healthy meal. Or, is it?

A new study suggests that those ingredients, all of which are likely genetically engineered food (GMOs), are not the same as the ones that grandma grew in her backyard. The GMO version of soy, for example, may likely have 250 percent less glutathione, one of nature's most important antioxidants, and likely accumulates high levels of formaldehyde, a known cancer- causing chemical.

What is a GMO?

Ninety-seven percent of the soy in the United States is genetically engineered. A GMO, to be clear, is the product of genetic engineering. GMOs are created by taking the gene of another organism, such as a fish, and inserting it into the gene of another organism, such as soy. This kind of genetic transfer takes place in a laboratory and is asexual—meaning no sex took place to create it. In natural plant breeding, two organisms of the same variety have a full exchange of genes through sexual reproduction. Therefore, natural plant breeding is not the same as genetic engineering as some mainstream media publications, including *The New York Times,* have stated and confused the public.

How did GMOs like GMO soy get released into the environment?

Contrary to the popular belief that the Food and Drug Administration (FDA) tests and approves the release of GMOs, the FDA does not make any conclusion or determination of the safety of GMO products. Consider Bill and Harry start a GMO blueberry company. To get approval to sell the GMO blueberry, all they must do is simply inform the FDA that they tested the difference between the GMO and the non-GMO version and found them to be "substantially equivalent" based on criteria that Bill and Harry chose. The FDA has a safety consultation with Bill and Harry and issues a letter acknowledging that Bill and Harry have told the FDA that they did some testing.

In summary, it is all based on self-reporting. There is no independent verification of Bill and Harry's testing, whether they in fact did them, how they did them or the quality of their testing. Unbelievable as this may seem, this is the fact of how GMOs are approved for release into the environment.

The need for real safety assessment standards for GMO

In a 2015 research study of GMO soy published in *Agricultural Sciences,* glutathione and formaldehyde levels were found to be significantly different between the GMO and the non-GMO varieties. If the manufacturers of GMO soy had included the levels of these two molecules in the criteria for establishing the equivalence of the two, then they would have seen that they are indeed not equivalent. However, because of no oversight on how the equivalence testing is done, GMO manufacturers have the leeway to manipulate the testing process and criteria to somehow establish the "equivalence" of the GMO variety with that of the non-GMO variety.

What we need to have is real safety assessment standards to determine what criteria should be selected for testing equivalence of the GMO and non-GMO varieties. And these criteria need to be objective. For example, in the above research study done using CytoSolve technology, a revolutionary computer-based platform created at MIT that allows integration of multiple molecular pathway models, it became clear that the criteria of formaldehyde and glutathione levels are key to determining equivalence when testing GMO soy. Such objective criteria need to be established by the FDA for GMO testing of every other crop as well.

The imminent need for the world and the environment is not to decide for or against GMO, but rather to implement real objective standards to assess safety of GMOs. We do not have any objective standard of GMO safety, and without them, it is unscientific and reckless to allow GMOs to be approved for public consumption.

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