

УДК 659.1.011

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GENETICALLY MODIFIED ORGANISMS

Genetically Modified Organisms (GMOs) became a hot topic in 2012 when the people of California had the chance to vote on Proposition 37 in November.

Proposition 37 would have required labels on food that contained such products.

So what are the benefits of GMOs? According to the Office of Science at the U.S. Department of Energy, one of the pros of genetically modified crops is a better taste, increased nutrients, resistance to disease and pests and faster output of crops.

Though there are only several GM crops that are widely available, they are commodity crops that often get further processed into a variety of ingredients. The 10 genetically modified crops available in the U.S. today include: alfalfa, apples, canola, corn (field and sweet), cotton, papaya, potatoes, soybeans, squash and sugar beets. These ingredients are typically present in packaged products as: amino acids, alcohol, aspartame, ascorbic acid, sodium ascorbate, citric acid, sodium citrate, ethanol, flavorings (“natural” and “artificial”), high-fructose corn syrup, hydrolyzed vegetable protein, lactic acid, maltodextrins, molasses, monosodium glutamate (MSG), sucrose, textured vegetable protein (TVP), xanthan gum, vitamins, vinegar, yeast products.

The Food and Agriculture Organization of the United Nations also says that farmers can grow more food on less land with genetically modified crops.

Genetically modified animals have certain genes inserted into their genomes so that they can produce ‘better’ milk, eggs, and meat. These animals also are expected to have a higher resistance to disease and overall better health, with better natural waste management. In theory, genetically modified crops and animals will also be more environmentally friendly because they conserve water, soil, and energy.

The Food and Agriculture Organization of the United Nations states that one of the positives of GMOs is that farmers can produce more nutritious food. Many foods are in the works for bio-fortification for this reason. Rice, for example, feeds 50 percent of the world’s population, so ge-

netically modifying rice to have more vitamin A would reduce vitamin A deficiency in developing countries.

But what happens to these plants and animals that have been genetically modified? What happens when we eat these foods? Unfortunately, no one knows for sure what happens though evidence is mounting that genetic modification may not be a good thing.

The Office of Science at the U.S. Department of Energy also lists some of the controversies associated with genetically modified foods. One of these controversies are the potential health risks, including allergies, antibiotic resistance, and unknown effects. Other negatives that stem from GMOs is that scientists are tampering with nature by mixing genes and no one knows what this is doing to the animals or the environment.

Phil Damery and colleagues at Iowa State University describe the risks of genetically modified foods to humans in their paper, “The Debate on Labeling Genetically Modified Foods.” The agricultural food industry claims that GM foods are tested rigorously, but the food companies conduct all their own testing.

Importantly, GMOs also help to overcome poverty for the millions of resource-poor farmers and farm families around the world. PG Economics estimates that farmers in developing countries received \$3.45 for each dollar invested in genetically engineered crop seeds in 2015.

Some GMOs are even saving lives. Since the 1980’s genetic engineering has been used to develop human insulin. Currently, about five million Americans use genetically modified insulin, and without GMOs, the demand for insulin would not be met.

Genetically engineered crops are used to grow renewable fuels as well, such as ethanol and biodiesel. Ethanol is traditionally produced from GMO corn and biodiesel from GMO soybeans. Additionally, researchers are developing second generation of biofuels produced from cellulosic biomass and algae.

In addition, 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. As of 2016, the top five countries growing GMOs in terms of crop area are the United States, Brazil, Argentina, Canada and India.