

# GENETIC ENGINEERING AND CALIFORNIA AGRICULTURE

## CALIFORNIANS FOR GE-FREE AGRICULTURE

*If you are interested in finding out more about this issue and how you can help stop genetically engineered agriculture in California, please contact us. Californians for GE-Free Agriculture is a unique coalition of sustainable farming environmental and consumer organizations and individuals united to prevent the commercialization of genetically engineered agriculture in California. We encourage and support farmers in their rejection of transgenic crops in the state. We are committed to economically and ecologically sustainable farming which is threatened by the introduction of genetically engineered food and fiber crops.*

*Join us in preventing the genetic engineering of California's agriculture.*

*Our members include:*

- California Certified Organic Farmers
- Center for Food Safety
- Community Alliance with Family Farmers
- Ecological Farming Association
- Four Elements Farm
- Genetic Engineering Action Network
- Occidental Arts and Ecology Center
- Organic Consumers Association

*To find out more about CGEFA, how you can get involved or to make a donation, please contact:*



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## WHAT IS GENETIC ENGINEERING?

Genetic engineering (GE) in agriculture is a new process used by scientists to insert genes from various organisms (human, plant, animal, bacteria or virus) into crop plants. This technology, which has been present in the food we are eating for less than ten years, differs fundamentally from traditional plant breeding in that it forces the exchange of genes across species barriers – a process that does not occur in nature. For example, genetic engineers have inserted viral and fish genes into tomatoes, spider genes into goats, jellyfish and chicken genes into potatoes, and even human genes into rice. Currently, the two most commonly engineered traits on the market are (1) resistance to herbicides that would normally kill the crop, and (2) the ability to produce an insecticide that kills a wide spectrum of insects, including the target insect pest. Currently, GE corn, soy, canola and cotton are grown on a large scale, and hundreds of other GE crops are being developed. A new branch of GE research called “pharming” creates plants that produce pharmaceutical drugs and industrial chemicals. For example, in California rice with human genes is being grown to produce drugs.

## WHAT FOODS CONTAIN GE INGREDIENTS?

GE ingredients, which include soybeans, soy oil, soy lecithin, corn, corn syrup, canola oil, cottonseed oil, and papaya, can be found in items such as cookies, crackers, taco shells, soft drinks, and salad dressing. GE crops such as corn, cotton and soy also comprise a large percentage of animal feed. The Grocery Manufacturers of America estimate that 70 to 80 percent of the processed food on US supermarket shelves contains GE ingredients.<sup>1</sup>

## HOW ARE GE FOODS REGULATED?

When the first GE foods were being introduced onto the market in the mid-1990s, the US government decided that no new laws would be passed to regulate the technology. Even though numerous government scientists had stated that the process of GE is unpredictable and could create new hazards to human health and the environment, the US Food and Drug Administration (FDA) ruled GE foods to be “substantially equivalent” to other foods.<sup>2</sup> As a result, no independent safety testing is conducted during the approval process. Companies bringing a new GE food to market are not even required to notify the FDA beforehand.<sup>3</sup>

## WHY ARE PEOPLE CONCERNED ABOUT GE?

Consumers in the US and around the world are refusing to eat GE food and are demanding that food companies and supermarkets sell GE-free foods. An ABC News poll in June 2001 found that 93 percent of Americans believe the government should require labeling of GE foods. Another 57 percent said they'd be less likely to buy foods labeled as being GE.<sup>4</sup> Farmers in Canada and the Midwestern US, where GE crops have been growing since 1996, are losing billions of dollars in export markets because of this marketplace rejection. Many independent scientists have raised concerns about the potential hazards of genetic engineering and the need for a rigorous science based approach in evaluating the food safety of biotech foods. Concerns are also mounting over the long term environmental impacts of GE foods, the implications for farmers, and the absence of democratic discourse and adequate regulation over this mostly untested and highly unpredictable technology.

## THREATS TO OUR HEALTH

**FOOD ALLERGIES.** GE increases the likelihood that new food allergens could be introduced into our food supply. Because humans have never consumed many of the novel proteins present in GE foods, we have no way to predict if they could cause an allergic reaction. In 2000, more than 300 food products were recalled after being contaminated with GE StarLink corn, which was not approved for human consumption due to the presence of a possible food allergen.<sup>5</sup>

**NOVEL TOXINS IN THE FOOD SUPPLY.** Though very few studies have been conducted, there is mounting evidence that some GE foods may produce unexpected toxic effects. In 1989, a GE version of a nutritional supplement, L-tryptophan, caused 37 deaths and permanently disabled more than 5,000 people.<sup>6</sup> A study in 1999 by British scientist Dr. Arpad Pusztai showed that GE potatoes caused damage to the immune systems and vital organs of rats.<sup>7</sup>

**RESISTANCE TO ANTIBIOTICS.** Genetic engineers commonly use antibiotic resistance “marker genes” in the process of gene splicing. Doctors say this could weaken the effectiveness of antibiotics in treating serious diseases. As a result of this practice, the British Medical Association has called for a moratorium on GE foods.<sup>8</sup>

## THREATS TO OUR ENVIRONMENT

**INCREASED PESTICIDE USE.** Biotech companies claim that the use of GE crops results in the reduction of pesticide use, however the data do not consistently show this to be true. USDA reports state that while reductions in some herbicides occur, there has been a concurrent increase in the use of glyphosate (Roundup).<sup>9</sup> A study by the former head of the agricultural division of the National Academy of Sciences found that farmers who plant Monsanto’s GE soy use two to five times more pesticides than their conventional counterparts.<sup>10</sup>

**LOSS OF BIODIVERSITY.** Despite Mexico’s ban on planting GE corn, native varieties of the country’s indigenous corn are now contaminated with GE corn from the US.<sup>11</sup> Once released into the environment, genetic contamination is impossible to recall, and can cross-pollinate with domestic and wild plant relatives. At the centers of the world’s greatest crop diversity, such as in Mexico where corn originated, precious genetic resources that plant breeders rely upon to combat disease and pest problems are at risk of being permanently destroyed.

**HARM TO INSECTS AND OTHER WILDLIFE.** Several studies are demonstrating that GE crops are harming beneficial insects, earthworms and birds. For example, in 1999 researchers at Cornell University revealed that GE corn was toxic to Monarch butterflies.<sup>12</sup>

## THREATS TO FARMERS

**LOSS OF MARKETS.** Because so many countries are refusing to accept GE crops, US farmers are losing export markets. It is estimated that US taxpayers have paid out \$12 billion in subsidies to make up for losses resulting from the production of GE soy and corn.<sup>13</sup> Some of the largest trading partners of the US in Asia and the European Union have restrictive regulations for GE foods. The National Food Processors Association, the world’s largest food and beverage association, has stated “In the absence of demonstrated effective controls and procedures to ensure against contamination, NFPA continues to vigorously oppose the use of food or feed crops to produce [plant made pharmaceuticals].”<sup>14</sup>

**GENETIC CONTAMINATION.** Pollution of non-GE crops by neighboring GE crops is impossible to control, and many cases of contamination have occurred in the Midwest and Canada. Unwanted genetic contamination can lead to the loss of markets that are GE-free (for example, the organic sector, and many export markets), and can also mean extra production costs due to the need for testing and segregation. Organic farmers in Canada and Argentina have launched lawsuits against Monsanto and Bayer corporations for the contamination of their crops.

**LIABILITY.** Farmers are at risk of lawsuits from biotech companies for patent infringement if they knowingly or unknowingly violate any of the terms of the contracts accompanying GE seed purchases. Seventy-three farmers have been sued by Monsanto, and several hundred others have been threatened with legal action. Some farmers have even been sued for patent violations when their crops have been contaminated by patented GE crops. Farmers growing GE crops may also be liable for damages and the cost of cleanup if their crops contaminate the food supply or neighboring farms.

## KEEPING CALIFORNIA GE-FREE

To date, though hundreds of field trials are underway in California, only GE cotton is grown in any significant amount. California plays a vital role in this global issue. It is the country’s largest producer and exporter of food, and a world leader in organic and sustainable agriculture. California produces over 350 crops, and the biotech industry desperately needs to engineer as many of them as possible if it is to economically survive. In the next few years, the industry hopes to commercialize several GE crops in California, including:

- Bayer Corporation’s herbicide-tolerant rice
- Ventria Bioscience Corporation’s pharmaceutical rice
- Monsanto Corporation’s herbicide-tolerant strawberries, lettuce, and rice

California farmers and consumers can lead the world in the rejection of these and other GE foods, and in the strengthening of an economically and environmentally sustainable food and farming future.

<sup>1</sup> Elizabeth Weise, “Americans are iffy on genetically modified foods,” USA Today, September 17, 2003.

<sup>2</sup> Steven Druker, [www.biointegrity.org](http://www.biointegrity.org)

<sup>3</sup> Emily Gersema, “FDA opts against further biotech review,” Associated Press, June 17, 2003.

<sup>4</sup> David Morris, “Genetic resistance poll: modified foods give consumers pause,” ABC News, July 15, 2001.

<sup>5</sup> Sarah Lueck and Scott Kilman, “Biotech-corn problems lead to recall of 300 products, disrupt farm belt,” Wall Street Journal, November 2, 2000.

<sup>6</sup> P. Raphals, “Does medical mystery threaten biotech?” Science, Vol. 249, 1990 p.619.

<sup>7</sup> S.W.B. Ewen and A. Pusztai, “Effects of diets containing genetically modified potatoes expressing galanthus nivalis lectin on rat small intestine,” The Lancet, 1999, v. 354, p. 1353-4.

<sup>8</sup> Marie Woolf, “Brit Doctors’ Association (BMA) sounds alarm on GM food,” Sunday Independent, May 16, 1999.

<sup>9</sup> Ralph E. Heimlich et al., Economic Research Service/USDA, Agricultural Outlook, August 2000. [www.ers.usda.gov/publications/agoutlook/aug2000/contents.htm](http://www.ers.usda.gov/publications/agoutlook/aug2000/contents.htm)

<sup>10</sup> Charles M. Benbrook, “Glyphosate efficacy is slipping and unstable transgene expression erodes plant defenses and yields,” May 3, 2001. [www.biotech-info.net/troubledtimes.html](http://www.biotech-info.net/troubledtimes.html)

<sup>11</sup> Carol Kaesuk Yoon, “Genetic modification taints corn in Mexico,” New York Times, October 2, 2001.

<sup>12</sup> J.E. Losey, et al., “Transgenic pollen harms monarch larvae,” Nature, 1999, v.399, p.214.

<sup>13</sup> Soil Association, “Seeds of doubt: experiences of North American farmers of genetically modified crops,” June 5, 2003. [www.soilassociation.org/seedsdoubt](http://www.soilassociation.org/seedsdoubt)

<sup>14</sup> National Food Processors Association statement. [www.nfpa-food.org/News\\_Release/NFPANewsRelease080603.htm](http://www.nfpa-food.org/News_Release/NFPANewsRelease080603.htm)