**Excerpt from “Food: How Altered?”**

**Source # 1**

By Jennifer Ackerman

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**1**  Scientists continue to find new ways to insert genes for specific traits into plant and animal DNA. A field of promise—and a subject of debate—genetic engineering is changing the food we eat and the world we live in.

**2**  In the brave new world of genetic engineering, Dean DellaPenna envisions this **cornucopia**: tomatoes and broccoli bursting with cancer-fighting chemicals and vitamin-enhanced crops of rice, sweet potatoes, and cassava to help nourish the poor. He sees wheat, soy, and peanuts free of

**allergens**; bananas that deliver **vaccines**; and vegetable oils so loaded with therapeutic ingredients that doctors "prescribe" them for patients at risk for cancer and heart disease. A plant biochemist at Michigan State University, DellaPenna believes that genetically engineered foods are the key to the next wave of advances in agriculture and health.

**3**  While DellaPenna and many others see great potential in the products of this new **biotechnology**, some see uncertainty, even danger. Critics fear that genetically engineered products are being rushed to market before their effects are fully understood. Anxiety has been fueled by reports of taco shells **contaminated** with genetically engineered corn not approved for human **consumption**; the potential spread of **noxious** "superweeds" spawned by genes picked up from engineered crops; and possible harmful effects of biotech corn pollen on monarch butterflies.

**4**  In North America and Europe the value and impact of genetically engineered food crops have become subjects of intense debate, provoking reactions from **unbridled** optimism to **fervent** political opposition.

**5**  Just what are genetically engineered foods, and who is eating them? What do we know about their benefits—and their risks? What effect might engineered plants have on the environment and on agricultural practices around the world? Can they help feed and preserve the health of the Earth's burgeoning population?

**Q:** Who's eating biotech foods?

**A:** In all likelihood, you are.

**6** Most people in the United States don't realize that they've been eating genetically engineered foods since the mid-1990s. More than 60 percent of all processed foods on U.S. supermarket shelves—including pizza, chips, cookies, ice cream, salad dressing, corn syrup, and baking powder—contain ingredients from engineered soybeans, corn, or canola.

**7** In the past decade or so, the biotech plants that go into these processed foods have leaped from hothouse oddities to crops planted on a massive scale—on 130 million acres (52.6 million hectares) in 13 countries, among them Argentina, Canada, China, South Africa, Australia, Germany, and Spain. On U.S. farmland, **acreage** planted with genetically engineered crops jumped nearly 25-fold from 3.6 million acres (1.5 million hectares) in 1996 to 88.2 million acres (35.7 million hectares) in 2001. More than 50 different "designer" crops have passed through a federal review process, and about a hundred more are undergoing field trials.

Ackerman, Jennifer. "Food: How Altered?" National Geographic. National Geographic Magazine, n.d. Web. 02 Dec. 2013. <http://environment.nationalgeographic.com/environment/global-warming/food-how-altered/>

**cornucopia**—a symbol of food and abundance

**allergens**—a type of antigen that produces an abnormally vigorous immune response in which the immune system fights off a perceived threat that would otherwise be harmless to the body. Such reactions are called allergies.

**vaccine**—a biological preparation that improves immunity to a particular disease

**biotechnology**—the use of living cells, bacteria, etc., to make useful products

**contaminated**—made dangerous, dirty, or impure by adding something harmful or undesirable to it

**consumption**—the act of eating or drinking something

**noxious**—harmful to living things

**unbridled**—done, felt, or expressed in a free and uncontrolled way

**fervent**—having or showing very strong feelings

**acreage**—land measured in acres

**Source # 2**

# Dangers of GMO Foods

Aug 23, 2010 | By Susan Brassard

**8** According to the United States Department of Agriculture, as of 2010, at least 80 percent of corn and around 90 percent of soybeans grown in the United States are grown from genetically modified seeds. Genetically modified, or GMO foods, are crops grown from seeds **engineered** to increase output and lower **production costs**. Those in favor of GM foods say that the higher food outputs and improved nutritional content are needed for enough food for the world’s growing population. Those against it say any claimed benefits of GM foods have not been proved, and cite the lack of safety studies and the real and potential dangers to human health and the environment as reasons to ban the products.

## Health Consequences

**9** The rise in many diseases may be associated with GM foods. In a paper by the American Academy of Environmental Medicine, the authors ask all doctors to seriously think about the role of GM foods in our country’s health crisis, and to warn their patients to avoid all GM foods whenever possible. The Academy also recommends that companies stop producing and using GM seeds. It also calls for independent safety testing and the labeling of all foods with genetically modified products.

## Food Supply at Risk

**10** Modified seeds are a **patented** product, and in order to buy the seeds customers must sign a contract with the seed company. Mike Adams of the Natural News website says one company controls approximately 90 percent of the GMO seed market. It is able to keep farmers from saving leftover seeds or selling them to other growers. Adams says small, independent farmers’ crops can be damaged by neighboring GM crops. When this happens, they must pay fees or risk being sued.

## Environmental Destruction

**11** Most GMO seeds are genetically engineered to be immune to **herbicide** and resistant to insects and disease. Scientists worry that GM crops may make farmers want to increase their use of herbicides, which will increase how much humans eat dangerous chemicals. GM crops also create their own pesticides, which puts more poison into humans and soil and may cause changes that we don’t yet understand into the environment. Another worry is that poisons in the GMO plants may harm other plants, animals, and insects -- like caterpillars, bees and birds.

Brassard, Susan. "Dangers of GMO Foods." *LIVESTRONG.COM*. N.p., 23 Aug. 2010. Web. 08 Dec. 2013. <http://www.livestrong.com/article/216714-dangers-of-gmo-foods/>

**engineered** – designed

**patent** – a set of exclusive rights granted by the government

**herbicides** – chemicals used to kill unwanted plants

**production costs** – the amount of money spent to grow a crop

**Source # 3**

**Genetically modified foods transform food production, but**

**critics worry about safety**

December 28, 2013 | By Mandy Locke

**12** RESEARCH TRIANGLE PARK — With many scientific breakthroughs come products and profits. Some, such as genetically modified foods, can be **controversial**.

**13** Mary-Dell Chilton had no idea what, if anything, would become of her **pioneering** discovery that plants could take on genetic traits transported through the **DNA** of bacteria. Soon, she learned just how much appetite the agricultural industry had for her research.

**14** Genetically modified foods are **heralded** as the salvation of the world’s hungry. Companies such as Monsanto and Syngenta can **manipulate** seeds to withstand some of nature’s predators and uncontrollable weather patterns.

**15** For farmers trying to increase **yield** or minimize losses during **monsoons** or **drought**, the benefits are obvious. But the risks, critics say, are unknown.

**16** Critics want more testing of the foods to be assured they are safe and say consumers ought to be warned when products they buy contain modified foods. Some of the companies’ agreements with farmers – forcing them to sign contracts to not use seeds from their current crop and buy again the following season – is considered morally **reprehensible** by some.

**Anger in Iowa**

**17** The animosity toward the industry was **palpable** last October when, according to the Des Moines Register, about 50 critics protested the World Food Prize being awarded to Chilton and other pioneers of genetically modified foods. The fierceness of the criticism was so threatening that Chilton said she and event organizers worried for her safety.

**18** “Some people feel strongly that the technology ought to be **shelved**,” said Timothy Wise, who studies genetically modified foods. “They want publicly controlled research that solves problems and they don’t want the agenda to be driven by private interests and profit motive.”

**19** “I can’t help it that we are a large company that makes money, but we can’t give away our technology,” Chilton said. “It’s the nature of the beast.”

**Not in Europe**

**20** In Europe, genetically modified foods and ingredients generally aren’t allowed to be sold to humans. In the U.S., states such as Washington have tried and failed to force food companies to label products that contain genetically modified foods. Whole Foods, a major grocery chain, has vowed to label genetically modified foods at its American stores by 2018.

**21** In any grocery store in America, you’ll find genetically modified foods in a varied collection of products. About 70 percent of the processed foods on the shelves of American grocery stores contain genetically modified ingredients.

**22** Research Triangle Park is on the leading edge of genetically modified foods. Fifty agricultural biotech firms have operations in the Triangle region, employing 7,700, according to the North Carolina Biotechnology Center.

**23** The companies are pouring money into the park. This summer, BASF opened a $33 million biotechnology complex, and Bayer CropScience completed a $2.2 million bee center this year. Syngenta, which employs about 500 people in RTP, is growing, too; this fall, it broke ground on a $94 million laboratory expansion.

**24** Chilton said she is not willing to sit idle and do nothing about the growing imbalance between people and food production. She’s confident the foods she is helping develop will help feed some of the 9 billion people expected to inhabit the world by 2050

Locke, Mandy. "NewsObserver.com." RESEARCH TRIANGLE PARK: Genetically Modified Foods Transform Food Production, but Critics Worry about Safety. N.p., 28 Dec. 2013. Web. 10 Jan. 2014. <http://www.newsobserver.com/2013/12/28/3489826/genetically-modified-foods-transform.html>

**controversial**—relating to argument that involves many people who strongly disagree about something

**pioneering**—creating or developing new ideas, methods, etc

**DNA**—a substance that carries genetic information in the cells of plants and animals

**heralded**—showing a sign that something will happen

**manipulate**—to change or control something

**yield**—to produce (something) as a result of time, effort, or work

**monsoon**—the rainy season that occurs in southern Asia in the summer

**drought**—a long period of time during which there is very little or no rain

**reprehensible**—deserving very strong criticism

**palpable**—obvious and noticeable

**shelved**—to stop doing or thinking about (something) for a period of time

**Source # 4**

**Excerpt from “Are Biotech Foods Safe to Eat?”: Most Americans have eaten genetically modified foods without knowing it, but are they safe?**

December 28, 2013 | WebMD Feature

**25** Genetically modified food has quietly become second nature in the U.S., and it may surprise you just how many foods you are eating that you never knew contained a genetically modified ingredient.

**26** Experts say 60% to 70% of processed foods on U.S. grocery shelves have genetically modified ingredients. The most common genetically modified foods are soybeans, maize, cotton, and rapeseed oil. That means many foods made in the U.S. containing field corn or high-fructose corn syrup, such as many breakfast cereals, snack foods, and the last soda you drank.

**27** But what exactly is genetically modified food? Is it safe to eat? Why isn't it labeled in the U.S.? The European Union and the U.S. are boxing it out.

**28** The U.S. government's position: Genetically engineered crops are safe, resist disease better, and can provide much-needed food in starving nations.

**29** The EU position: Keep it out. We prefer organic, which is much healthier. The risk of genetically modified foods to health and the environment outweigh the benefits. Only the multinational biotech companies will benefit, dominating the world food supply and squeezing out traditional farmers.

**30** The U.S. is the largest producer of genetically modified crops.

**31** More than a dozen countries around the world have latched on to the technology, including Argentina, Canada, China, Australia, India, and Mexico.

**'Frankenfood' Fears**

**32** The term genetically modified food (also known as biotech or genetically engineered food) refers to crop plants that have been modified in the laboratory to strengthen desired traits, such as resistance to herbicides or improved nutritional content. Experts say this science, like any other, has no guarantees.

**33** Risks include:

Introducing allergens and toxins to food

Accidental contamination between genetically modified and non-genetically modified foods

**Antibiotic** resistance

Adversely changing the nutrient content of a crop

Creation of "super" weeds and other environmental risks

**34** Benefits include:

 Increased pest and disease resistance

 Drought **tolerance**

 Increased food supply

**Are Genetically Modified Foods Safe?**

**35** Gregory Jaffe, director of the Biotechnology Project at the Center for Science in the Public Interest, agrees that overall, the current genetically modified crops -- which he says are generally one-gene additions -- are safe. He says no food is 100% safe -- genetically modified or not -- and the odds of having an adverse reaction to a genetically modified food are slim. "Even though we've done all of the tests and everything else, one might say, 'Yes, there is still some risk and we don't know the long-term effects.' That's true, but we have enough knowledge … to have confidence that this is a safe food now."

**36** Others strongly disagree.

**37** "When you're doing genetic engineering, you're getting into a whole different mode of manipulating plants, and one, do we need to do it? Two, have enough studies been done in the past to really make it viable for commercial use?" Margaret Wittenberg tells WebMD. She is vice president of marketing and public affairs for Whole Foods Market, a certified organic supermarket chain that supports mandatory labeling of GM foods. "There are just a lot of question marks, and I think many people have registered the concern that we need to have more answers before we move forward on having it commercially available at this point in time."

**38** One immediate health concern with eating genetically modified foods is allergens. Opponents point to an incident involving Starlink modified corn. In 2000, StarLink (approved by the EPA for animal feed in 1998 but not for human consumption because of concerns it contained a protein that could cause dangerous allergic reactions) turned up in many Kraft products, including their Taco Bell corn shells. Some corn crops were accidentally contaminated with the StarLink seed. Several people reported severe allergic reactions, and major recalls resulted.

**39** "Contamination is a very real risk in terms of growing genetically modified crops," says Lisa Archer, grassroots coordinator for the Safer Foods-Safer Farms campaign and Kraft campaign at the nonprofit organization Friends of the Earth -- the group that sparked the StarLink investigation. "[Genetically modified crops] can contaminate neighboring crops relatively easily. Once you get this stuff out into nature it's very difficult to control where it goes, and StarLink is a great example of that."

"Genetically Modified Foods (Biotech Foods) Pros and Cons." WebMD. WebMD, 2003. Web. 09 Jan. 2014. <http://www.webmd.com/food-recipes/features/are-biotech-foods-safe-to-eat?page=3>

**antibiotic**—a drug that is used to kill harmful bacteria and to cure infections

**tolerance**—the ability to become adjusted to something (such as a drug) so that its effects are experienced less strongly

**viable**—capable of being done or used

**mandatory**—required by a law or rule