

## ACKNOWLEDGED

# This Could Threaten the Future of Food – Destroying the Entire Food Chain...

Posted By [Dr. Mercola](#) | February 02 2011 | 40,807 views

Roundup, Monsanto's glyphosate-based herbicide, is causing Sudden Death Syndrome (SDS), a serious plant disease, in many fields. Study after study shows that glyphosate is contributing not only to the huge increase in SDS, but also to the outbreak of numerous other diseases.

Glyphosate is the world's bestselling weed killer; it was patented by Monsanto for use in their Roundup brand, which became more popular when they introduced "Roundup Ready" crops -- genetically modified (GM) plants that can withstand applications of normally deadly Roundup.

But the herbicide doesn't destroy plants directly; instead, it creates a unique perfect storm of conditions that activates disease-causing organisms in the soil, while at the same time wiping out plant defenses against those diseases.

The Institute for Responsible Technology reports:

*"By weakening plants and promoting disease, glyphosate opens the door for lots of problems in the field. According to Don [Huber, a plant pathologist], 'There are more than 40 diseases of crop plants that are reported to increase with the use of glyphosate ...'*

*Some of the fungi promoted by glyphosate produce dangerous toxins that can end up in food and feed ... They've 'been linked to the plague epidemics' of medieval Europe, 'large-scale human*

*toxicosis in Eastern Europe,' esophageal cancer in southern Africa and parts of China, joint diseases in Asia and southern Africa, and a blood disorder in Russia."*

## Sources:

Institute for Responsible Technology January 14, 2011

## Dr. Mercola's Comments:

More than:

- 75 percent of soybeans
- 65 percent of cotton
- 10 percent of corn grown in the United States

... contain the genetically modified (GM) Roundup Ready gene, which allows farmers to spray Monsanto's Roundup herbicide directly onto their fields, killing weeds without harming the crops ... theoretically.

However, this convenience comes at a steep price, as evidence shows that Roundup's active ingredient, glyphosate, is actually devastating crops and human and animal health around the world, even when the exposure is restricted to residues leftover in the soil.

## "The Perfect Storm" for Plant Devastation

Glyphosate is the world's bestselling weed killer, and it's found in more than 30 percent of all herbicides. While Roundup Ready crops can withstand the toxin because of GM genetic material from viruses and bacteria, the weed killer is thought to be contributing to Sudden Death Syndrome (SDS), a deadly plant disease that causes plants to turn yellow and die.

As reported by GM expert Jeffrey Smith, numerous studies have linked glyphosate to increases in SDS, including in crops that have never been sprayed with the herbicide but were planted in a field that received an application the previous season.

As Smith points out:

*"The herbicide doesn't destroy plants directly. It rather cooks up a unique perfect storm of conditions that revs up disease-causing organisms in the soil, and at the same time wipes out plant defenses against those diseases. The mechanisms are well-documented but rarely cited."*

In fact, Roundup herbicide weakens plants and promotes disease in a number of ways, including:

- Acting as a chelator of vital nutrients, depriving plants of the nutrients necessary for healthy plant function
- Destroying beneficial soil organisms that suppress disease-causing organisms and help plants absorb nutrients

- Interfering with photosynthesis, reducing water use efficiency, shortening root systems and causing plants to release sugars, which changes soil pH
- Stunting and weakening plant growth
- Promoting disease-causing organisms in soil, which then overtake the weakened crops

So the glyphosate in Roundup is not only weakening plants, it's changing the makeup of soil and boosting the number of disease-causing organisms, a deadly recipe for crops around the globe.

As Don Huber, a plant pathologist at Purdue University, stated:

*"There are more than 40 diseases of crop plants that are reported to increase with the use of glyphosate, and that number keeps growing as people recognize the association between glyphosate and disease."*

As the use of Roundup has increased, so too has the prevalence of potentially devastating plant diseases, which could threaten future food crops and the food chain that depends on them.

## Dangers for People and Animals Too

It's not only plant life that's threatened by the use of Roundup -- human and animal toxins are created too. As Smith reported, glyphosate promotes the formation of certain types of fungi that are dangerous to people and contaminate food and animal feed. One such fungi, the *Fusarium* fungus, has been linked to plague epidemics, cancer, infertility and animal diseases.

Residues of Monsanto's Roundup herbicide found in GM food and feed have also been linked to cell damage and even death, even at very low levels. Researchers have also found it causes membrane and DNA damage, and inhibits cell respiration.

It's also possible that glyphosate is significantly altering the nutrient content of our food, through its chelating mechanism, leading to widespread mineral deficiencies in animals and humans. Smith writes:

*"The same nutrients that glyphosate chelates and deprives plants are also vital for human and animal health. These include iron, zinc, copper, manganese, magnesium, calcium, boron, and others. Deficiencies of these elements in our diets, alone or in combination, are known to interfere with vital enzyme systems and cause a long list of disorders and diseases ..."*

*Glyphosate-induced mineral deficiencies can easily go unidentified and untreated. Even when laboratory tests are done, they can sometimes detect adequate mineral levels, but miss the fact that glyphosate has already rendered them unusable.*

*Glyphosate can tie up minerals for years and years, essentially removing them from the pool of nutrients available for plants, animals, and humans. If we combine the more than 135 million pounds of glyphosate-based herbicides applied in the US in 2010 with total applications over the past 30 years, we may have already eliminated millions of pounds of nutrients from our food supply."*

## Roundup in the Environment

Monsanto long used the slogans, "It's Safer than Mowing," "Biodegradable," and "Environmentally Friendly" to describe Roundup -- until the real effects of this toxic herbicide were revealed and they were forced to discontinue their deceptive advertising.

The truth is Monsanto's own tests showed that only 2 percent of the herbicide broke down after 28 days, which means it readily persists in the environment. Glyphosate is actually the most commonly reported cause of pesticide illness among landscape maintenance workers in California. Additionally:

- The surfactant ingredient in Roundup is more acutely toxic than glyphosate itself, and the combination of the two is even more toxic.
- Glyphosate is suspected of causing genetic damage.
- Glyphosate is acutely toxic to fish and birds and can kill beneficial insects and soil organisms that maintain ecological balance.
- Laboratory studies have identified adverse effects of glyphosate-containing products in all standard categories of toxicological testing.

In one animal study, rats given 1,000 mg/kg of glyphosate resulted in a 50 percent mortality rate, and skeletal alterations were observed in over 57 percent of fetuses!

And just so you understand, GM crops that are resistant to Roundup are the most widely sold GM varieties. So if you eat GM foods, there is a very good chance those foods contain Roundup residues -- and possibly hefty amounts of them.

According to Smith, by 2004 farmers used an estimated *86 percent more herbicide* on GM soy fields compared to non-GM. Higher levels of herbicide residue in this GM soy might cause health problems, and many symptoms identified in one UK soy allergy study are also related to glyphosate exposure.

The allergy study identified irritable bowel syndrome, digestion problems, chronic fatigue, headaches, lethargy, and skin complaints including acne and eczema, all related to soy consumption.

Symptoms of glyphosate exposure include nausea, headaches, lethargy, skin rashes, and burning or itchy skin. It is also possible that glyphosate's breakdown product AMPA, which accumulates in GM soybeans after each spray, might contribute to allergies.

Again, the use of Roundup herbicide has increased dramatically since the GM Roundup Ready crops were introduced. In the first 13 years, American farmers sprayed an additional 383 million pounds of herbicide due to these herbicide-tolerant crops. And now the repeated exposures have given Mother Nature all she needs to stage her comeback in the form of devastating superweeds.

## **How Can You Avoid Roundup and Roundup Ready Crops?**

Did you know that genetically modified foods are so prevalent in the United States that if you randomly pick an item off your grocery store's shelves, you have a 75 percent chance of picking a food with GM ingredients?

It's true. At least seven out of every 10 processed food items have been genetically modified, and there's more to come.

The potential health ramifications of these world-wide experiments with our food supply are frightening to say the least. If you care about the health and future of your family, I strongly urge you to refuse to participate in this destructive trend.

How?

It's actually simpler than you might think... By buying only **non-GM** foods.

The True Food Shopping Guide is a great tool for helping you determine which brands and products contain GM ingredients. It lists 20 different food categories that include everything from baby food to chocolate.

Additionally, here are four simple steps to decrease your consumption of GM foods as much as possible:

- **Reduce or eliminate processed foods in your diet.** The fact that 75 percent of processed foods contain GM ingredients is only one of the many reasons to stick to a whole foods diet.
- **Read produce and food labels.** Conventionally raised soybeans and corn make up the largest portion of genetically modified crops. Ingredients made from these foods include high fructose corn syrup (HFCS), corn flour and meal, dextrin, starch, soy sauce, margarine, and tofu.
- **Buy organic produce.** By definition, food that is certified organic must be free from all GM organisms, produced without artificial pesticides and fertilizers and from an animal reared without the routine use of antibiotics, growth promoters or other drugs. Additionally, grass-fed beef will not have been fed GM corn feed.

You can also get involved in helping to defeat GM crops at the regulatory level. Right now the USDA is considering the approval of Monsanto's Roundup Ready alfalfa, which would lead to the application of millions more pounds of Roundup herbicide each year.

You can urge U.S. Secretary of Agriculture Tom Vilsack to NOT approve Roundup Ready alfalfa, which would lead to the addition of more Roundup on U.S. fields and in our food, by using this action form from the Institute for Responsible Technology

# Genetically Modified Foods

According to the World Health Organization, Genetically Modified Organisms(GMOs) are "organisms in which the genetic material (DNA) has been altered in such a way that does not occur naturally."<sup>1</sup> This technology is also referred to as "genetic engineering", "biotechnology" or "recombinant DNA technology" and consists of randomly inserting genetic fragments of DNA from one organism to another, usually from a different species. For example, an artificial combination of genes that includes a gene to produce the pesticide Cry1Ab protein (commonly known as Bt toxin), originally found in *Bacillus thuringiensis*, is inserted in to the DNA of corn randomly. Both the location of the transferred gene sequence in the corn DNA and the consequences of the insertion differ with each insertion. The plant cells that have taken up the inserted gene are then grown in a lab using tissue culture and/or nutrient medium that allows them to develop into plants that are used to grow GM food crops.<sup>2</sup>

Natural breeding processes have been safely utilized for the past several thousand years. In contrast, "GE crop technology abrogates natural reproductive processes, selection occurs at the single cell level, the procedure is highly mutagenic and routinely breeches genera barriers, and the technique has only been used commercially for 10 years."<sup>3</sup>

Despite these differences, safety assessment of GM foods has been based on the idea of "substantial equivalence" such that "if a new food is found to be substantially equivalent in composition and nutritional characteristics to an existing food, it can be regarded as safe as the conventional food."<sup>4</sup> However, several animal studies indicate serious health risks associated with GM food consumption including infertility, immune dysregulation, accelerated aging, dysregulation of genes associated with cholesterol synthesis, insulin regulation, cell signaling, and protein formation, and changes in the liver, kidney, spleen and gastrointestinal system.

There is more than a casual association between GM foods and adverse health effects. There is causation as defined by Hill's Criteria in the areas of strength of association, consistency, specificity, biological gradient, and biological plausibility.<sup>5</sup> The strength of association and consistency between GM foods and disease is confirmed in several animal studies.<sup>2,6,7,8,9,10,11</sup>

Specificity of the association of GM foods and specific disease processes is also supported. Multiple animal studies show significant immune dysregulation, including upregulation of cytokines associated with asthma, allergy, and inflammation.<sup>6,11</sup> Animal studies also show altered structure and function of the liver, including altered lipid and carbohydrate metabolism as well as cellular changes that could lead to accelerated aging and possibly lead to the accumulation of reactive oxygen species (ROS).<sup>7,8,10</sup> Changes in the kidney, pancreas and spleen have also been documented.<sup>6,8,10</sup> A recent 2008 study links GM corn with infertility, showing a significant decrease in offspring over time and significantly lower litter weight in mice fed GM corn.<sup>8</sup> This study also

found that over 400 genes were found to be expressed differently in the mice fed GM corn. These are genes known to control protein synthesis and modification, cell signaling, cholesterol synthesis, and insulin regulation. Studies also show intestinal damage in animals fed GM foods, including proliferative cell growth<sup>9</sup> and disruption of the intestinal immune system.<sup>6</sup>

Regarding biological gradient, one study, done by Kroghsbo, et al., has shown that rats fed transgenic Bt rice trended to a dose related response for Bt specific IgA.<sup>11</sup>

Also, because of the mounting data, it is biologically plausible for Genetically Modified Foods to cause adverse health effects in humans.

In spite of this risk, the biotechnology industry claims that GM foods can feed the world through production of higher crop yields. However, a recent report by the Union of Concerned Scientists reviewed 12 academic studies and indicates otherwise: "The several thousand field trials over the last 20 years for genes aimed at increasing operational or intrinsic yield (of crops) indicate a significant undertaking. Yet none of these field trials have resulted in increased yield in commercialized major food/feed crops, with the exception of Bt corn."<sup>12</sup> However, it was further stated that this increase is largely due to traditional breeding improvements.

Therefore, because GM foods pose a serious health risk in the areas of toxicology, allergy and immune function, reproductive health, and metabolic, physiologic and genetic health and are without benefit, the AAEM believes that it is imperative to adopt the precautionary principle, which is one of the main regulatory tools of the European Union environmental and health policy and serves as a foundation for several international agreements.<sup>13</sup> The most commonly used definition is from the 1992 Rio Declaration that states: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."<sup>13</sup>

Another often used definition originated from an environmental meeting in the United States in 1998 stating: "When an activity raises threats to the environment or human health, precautionary measures should be taken, even if some cause and effect relationships are not fully established scientifically. In this context, the proponent of an activity, rather than the public, should bear the burden of proof (of the safety of the activity)."<sup>13</sup>

With the precautionary principle in mind, because GM foods have not been properly tested for



human consumption, and because there is ample evidence of probable harm, the AAEM asks:

- Physicians to educate their patients, the medical community, and the public to avoid GM foods when possible and provide educational materials concerning GM foods and health risks.
- Physicians to consider the possible role of GM foods in the disease processes of the patients they treat and to document any changes in patient health when changing from GM food to non-GM food.
- Our members, the medical community, and the independent scientific community to gather case studies potentially related to GM food consumption and health effects, begin epidemiological research to investigate the role of GM foods on human health, and conduct safe methods of determining the effect of GM foods on human health.
- For a moratorium on GM food, implementation of immediate long term independent safety testing, and labeling of GM foods, which is necessary for the health and safety of consumers.

(This statement was reviewed and approved by the Executive Committee of the American Academy of Environmental Medicine on May 8, 2009.)

Submitted by Amy Dean, D.O. and Jennifer Armstrong, M.D.

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