

Herbicide Pollution and GMO Labelling

Open letter to the Minister of Health

by Dr. Thierry Vrain

To the Honourable Rona Ambrose, Minister of Health:

The confusion about the safety of GMOs is quite simple to address. The only GMOs in our agriculture are glyphosate modified organisms, also known as RoundUp Ready (RR) crops, and the only GMOs in our food supply are from those crops. RoundUp Ready crops are engineered to be sprayed with the herbicide RoundUp and this technology has become so successful that RoundUp has become a major pollutant.

This chemical pollution is antibiotic, it impacts the microbiome, impairs CYP enzymes and depletes food of essential mineral micronutrients. I recently spoke on these points to the American College of Nutrition conference in San Diego (Texas), and most of the studies I cited were published in the last five years.

Descaling agent

Glyphosate is the active ingredient of the herbicide RoundUp, a new molecule created in 1960 by Stauffer Chemicals—a U.S. company with a business of cleaning industrial pipes and boilers of mineral scales. The mineral deposits (same as in electric kettles) are called scales, and the pipe-cleaning chemicals are called descaling agents. Glyphosate was patented in



1964 in the U.S. as a powerful and very broad-spectrum descaling agent. Meaning, it binds to metals indiscriminately and does a great job at “dissolving and preventing minerals from being reactive or bioavailable in solution.”

When the descaling solution was disposed of in nature, it was obvious that it killed plants. The chemical company Monsanto promptly bought the molecule, patented it as an herbicide in 1969, and got it commercialized in 1974. This molecule is making history because glyphosate has become the most successful agricultural chemical in North and South America wherever RR seeds are used. The farmers using this technology get simpler and cheaper weed management and, despite higher input bills, sometimes disappointing yields and fast-spreading weed resistance, they adopted it in droves.

Novel kill

The herbicide RoundUp had a completely novel chemistry

for an herbicide in 1969. It was deemed to kill plants by bonding to only one protein enzyme in the chloroplasts—the same enzyme that is also in bacteria and fungi. Enzymes are metalloproteins with a metal atom as a cofactor at the active site of the molecule. Bacteria and plants and fungi have a metalloprotein called EPSPS for short and 5-enol pyruvyl shikimate-3 phosphate synthase if you want to know what it does. It works with other metalloproteins to “make” several of the building blocks of proteins, the aromatic amino acids. These molecules are also building blocks for a large number of aromatic molecules we call secondary compounds. Glyphosate binds tightly to the manganese atom at the centre of the EPSPS metalloprotein, so tightly that the protein cannot move and do its work making aromatic amino acids. No protein synthesis means there is no metabolic work possible, a quick death for the plant, or the fungi or the bacteria.

Animals do not make their own aromatic amino acids since

they lack the shikimate pathway with the EPSPS metalloprotein. Because of its presumed mode of killing plants, glyphosate was pronounced innocuous to humans and registered as such in 1974 in the USA. Glyphosate has no acute toxicity, and at the time of registration in the U.S., and even since, nobody has bothered to check for chronic effects beyond three months.

Considering the chemical properties of this pollution one would expect long-term chronic effects, very similar to rickets, scurvy or beri beri, for lack of micronutrients. The industry-sponsored feeding studies proving the safety of GMOs do not include testing for the safety of glyphosate. None of them bother to mention the residue levels of glyphosate in the feed. Meanwhile, a fast-growing series of independent studies in various countries published in the last five years have ascertained the impact of glyphosate on various cellular enzymes and organs of animals and human cells.

RR crops

The first RoundUp Ready crops to be commercialized were soy and corn, released in 1996. Since then, a handful of RR crops have been adopted enthusiastically by farmers, particularly in North and South America. Today close to 500 million acres of soy and corn, and cotton, canola and sugar beet, are engineered to be

sprayed with RoundUp. About 40 percent of all RR crops are grown in the USA, most of the rest are grown in Brazil, Argentina, Canada and a few other countries.

RR crops are now sprayed with close to two billion pounds of glyphosate every year, and so much of that finds its way into processed food and feed that the U.S. Environmental Protection Agency (EPA) had to raise the legal residue limits last year to accommodate a new reality.

Suppresses the microbiome

Glyphosate is a powerful and broad-spectrum antibiotic. The mode of kill is again alleged to be very selective. The glyphosate molecule impairs the functioning of the shikimate pathway in bacteria the same way it does in plants. Only one enzyme is affected in a pathway that animals do not possess. The antibiotic patent describes its effectiveness to kill bacteria at one part per million (ppm) and this was confirmed last year in Germany.

At this point I usually spend a minute or two explaining why a low-level antibiotic diet for the rest of your life is not a good idea. I describe the recent interest of the medical field in a large joint research project involving many universities to decipher the huge community of thousands of species of bacteria that call us home. The Human Microbiome project is the equivalent of the Human Genome project in its scope.

We are vastly outnumbered, roughly 10 to one—one hundred trillion bacterial cells call our lower intestine

home. They are forever sending signaling molecules to each other and to all human organs, particularly the brain. All animals depend on their symbiosis with these bacteria, and humans are no exception. They are the teachers of our immune system, they make many neurotransmitters for our brain, and have a strong connection to the heart and the whole digestive tract. They literally feed us all kinds of molecules that we require—we call them essential, like vitamins. They digest and recycle most of our food. Most human organs rely on molecular signals from the microbiome for normal functioning. As goes the microbiome, so does its human shell.

A recent review of the medical literature on celiac and other diseases shows the link to imbalances of the microbiome that are fully explained by the antibiotic properties of glyphosate. And the same authors published another review of the impact of glyphosate on the CYP enzymes and the microbiome. Samsel and Seneff have suggested that glyphosate's suppression of CYP enzymes and its antibiotic effect on the human microbiome are involved in the etiology of many chronic degenerative and inflammatory diseases that have grown to epidemic proportions since 1996, since the advent of the RoundUp Ready technology.

High residue limits

We lack any official data on residues of glyphosate in food

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OSTEOARTHRITIS (OA)

Osteoarthritis arthritis is a degenerative joint disease that typically affects overweight weight men in their 40s and 50s. The cartilage, or cushioning, between joints is slowly lost so that the bones are rubbing against each other. This is painful and can lead to disability if not managed properly.

PSORIASIS

Psoriasis is a chronic autoimmune condition characterized by rapid overproduction of skin cells. Millions of people in North America are diagnosed with this non-contagious skin disorder. Managing stress, eating a diet low in fat and protein, and high in nutrients and clean drinking water are all ways to address the underlying issues of this condition.

Gluten-Free Claims

Assuming gluten - a protein found in grains - can greatly improve psoriasis. If you are eliminating gluten from the diet, you should avoid all varieties of wheat including spelt, farro, triticale, durum wheat, and kamut. Barley, rye, and rice are not gluten-free. Buckwheat, millet, quinoa, rice, sorghum, amaranth, and rice. Oats are naturally gluten-free but are often contaminated during growing or processing. Test them and gauge the reaction.

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or in water in Canada—no epidemiological studies of any kind have ever been done. All we have are the legal maximum residue limits now allowed by the EPA in RoundUp Ready foods: human cereal 30 ppm, animal grain 100 ppm, soybean 120 ppm, and everything else in between.

Here an inquisitive mind will ask why there is such a high residue limit for cereal when none of the grains are engineered to be sprayed with RoundUp. This is when you learn that RoundUp is sprayed on many non-engineered crops with the intent to kill them right before harvest. This is done to mature and dry the crops quickly to make them easier and cheaper to harvest. The RoundUp herbicide has now become a desiccant.

There is direct toxicity to animal cells because glyphosate binds to metals indiscriminately, and not just in plant cells. It binds to metals in solution and to metal co-factors at the centre of metalloproteins anywhere. For example, glyphosate binds to the iron atom at the centre of a large family of protein enzymes called CYP. There are 57 different CYP enzymes in the human body and approximately 20,000 in animals, plants, bacteria and fungi. The CYP enzymes are oxidizers, the first line of digestion and detoxification of most substrates. David Nelson wrote in a review of the CYP enzymes: “The CYP enzymes of humans are essential for our normal physiology and failure of some of these enzymes results in serious illnesses.”

Links to chronic illness

Nancy Swanson has made public her statistical analyses of the US Centre for Disease Control’s statistics about the health status of America when placed next to the statistics of the U.S. Department of Agriculture about the spread of RoundUp Ready soy and

corn. Her correlation analyses show very high coefficient values suggesting strong links between glyphosate residues in RoundUp Ready food and chronic illnesses.

Medical and chemical reviews and peer-reviewed studies have explained the mode of action of glyphosate and its impact on many metalloproteins. Human cell studies have shown acute toxicity and animal studies have shown chronic toxicity. Glyphosate bioaccumulates in the plants and in any animal that eat the plants. Glyphosate accumulates in the lungs, the heart, kidneys, intestine, liver, spleen, muscles and bones, and chronically ill people have higher residues in their urine than healthy people.

To conclude this presentation of the nutritional status of glyphosate modified organisms, I would say that crops sprayed with RoundUp, whether they are RoundUp Ready or not, contain residues of glyphosate, that foods made from RoundUp Ready soy and corn and sugar and canola are depleted of the minerals that are bound to the glyphosate molecules. Foods made from crops containing residues of glyphosate are by

definition depleted of minerals and toxic.

Minister, your reassuring words have been quoted widely. “Currently, there is no ... scientific evidence that says genetically modified foods are unhealthy. It is impossible for us to mandate a label, because our labels have to be based on evidence that it is an unhealthy product for Canadians.” I hope you have found here the scientific evidence you require to act and that you join over 60 governments in the world who have found this evidence compelling enough in the past few years to legislate some form of protection, from labelling to banning RoundUp Ready crops and the herbicide RoundUp. 🌱

Dr. Thierry Vrain wrote this letter on October 27, 2014. He is a retired soil biologist and genetic engineer who spent his whole research career with the Department of Agriculture in Canada. He was the head of a research group of 40 professionals in biotechnology, the vice president and president of national and international associations of soil biologists, and an associate editor of several scientific journals in Europe and in the USA.

Let’s Create a Demand for a Glyphosate Lab in Canada

Tony Mitra is on a mission to get a lab to test for glyphosate in Canada—and he needs your help. An engineer, Tony knows that glyphosate is the poison ingredient in Montanto’s RoundUp and that exposure to it is linked to the rise of various chronic diseases in North America.

While currently a few Canadian labs offer glyphosate testing in water and

soil, there are no labs in this country that will test for traces of glyphosate in the foods we buy and in the urine, blood or breast milk of humans. “Labs are commercial ventures,” Tony notes on his website www.tonu.org. “They will provide a service only if there is sufficient demand.”

Therefore, he is appealing to Canadians to create a demand. To do this, you are encouraged to ask your doctor,

hospital or clinic to test for glyphosate in your urine, blood, or breast milk for nursing mothers, as well as brands of foods your family uses, such as milk, bread or meat. The goal is to generate a demand that labs will respond to by offering this service.

On Tony’s website you’ll find sample letters you can use to request a glyphosate test. For more information, visit www.tonu.org.