Glyphosate
Testing Results

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Interpreting Glyphosate Levels in Food

High levels of glyphosate have been found in popular cereals and other foods, both in the home and in restaurants. Why does this matter? What effect does glyphosate have on us? What is the threat and what is the safe threshold for consumption?

Glyphosate is the main ingredient in Roundup, which is the most popular herbicide in the world. It is a defoliant, which means it destroys vegetation. There are also other glyphosate-based herbicides other than Roundup, though we will use the term Roundup here to refer to them all.

Although glyphosate is the main poison in herbicide formulations, it is not the only dangerous ingredient. In fact, Roundup can be 125 times more toxic than glyphosate alone. But the residue tests are designed to identify are for glyphosate alone. In some cases they also identify AMPA, which is a toxic chemical that results as glyphosate gets broken down.

When Roundup is sprayed onto crops, glyphosate enters the plant. While some is broken down or exuded through the roots, significant residues remain. Because it's on the inside, it can't be washed off.

Glyphosate is Sprayed on Most GMOs

More than 80% of genetically modified crops are "Roundup Ready." They aren't destroyed when farmers spray Roundup right over the whole field to kill the weeds. The six Roundup Ready crops are corn, soybeans, cotton (used in cottonseed oil), canola, sugar beets (used exclusively for sugar), and alfalfa. May of the derivatives of these crops are found throughout our food supply, especially in processed foods. The majority of feed consumed by most livestock in the US is from Roundup Ready crops.

Glyphosate is Used Just Before Harvest on Non-GMO crops

Non-GMO crops such as grains and beans are being sprayed with Roundup SHORTLY BEFORE harvest to kill the plants and dry it down. This lets the farmer harvest earlier — for example, in shorter growing seasons, to take advantage of higher commodity prices, or to rent harvesting equipment when it is available.

The crop is harvested promptly, before the herbicide has a chance to break down much. Significant residue can remain on the grain and get into the food supply

Roundup is also used in orchards, vineyards, and to kill weeds where a variety of fruits and vegetables are grown. And farmers will spray significant amounts to "chem fallow" or "burn down" a field. This means they will use it after the crops are harvested to kill all the weeds.

Even Tiny Amounts of Glyphosate Can Cause Harm

Research studies have shown that glyphosate residue on food may have damaging effects on health. Animal studies have shown:

- 0.1 Parts Per Billion (PPB) alters the gene function of over 400 genes in the liver and kidney of rats and causes non-alcoholic fatty liver disease..
- 10 PPB shows toxic effects on the liver of fish.
- 700 PPB causes alterations of kidneys and liver in rats.

Peer-reviewed research indicates that glyphosate is a:

- Chelator—it binds with minerals making them unusable by the body.
- Antibiotic—it preferentially kills beneficial gut bacteria, rather than pathogenic forms.
- Endocrine disruptor—at medium and doses, it can disrupt hormones, including the sex hormone balance
- Mitochondrial toxin—potentially damaging the energy source of our cells
- Teratogen—leading to birth defects
- Probable Human Carcinogen—classified by the World Health Organization's top cancer committee

There are Many Opinions as to How Much is Safe?

- Glyphosate safe levels in food and water are the subject of much debate — and insufficient research.
- The US Environmental Protection Agency (EPA) established the acceptable daily intake (ADI) of glyphosate at 1.75 mg per kilogram of body weight per day. For a 154 lb adult, this would be 123.83 mcg of glyphosate. They have been widely criticized for allowing far too much glyphosate in the American diet. For example, compared to the amount of glyphosate added to the drinking water that caused non-alcoholic fatty liver disease in rats, the EPA allows humans to consume 437,500 times more!
- The ADI in Europe is 0.3 mcg per kilogram of body weight per day–one-sixth of the U.S. ADI
- California's Office of Environmental Health Hazard Assessment decided that residents should ingest no more than 1.1 micrograms of glyphosate residue per day. A single serving of Cheerios contains 28 times this level.
- The Environmental Working Group (EWG) set a benchmark of glyphosate intake for a child at 0.01 mcg per day. This is 1/100th of California's limits and 1/7000th of the EPA's number.

EWG's level is still above the amount that caused non-alcoholic fatty liver disease (NAFLD) in rats. But should we try to use the level of glyphosate in the NAFLD rat study as the basis for determining safe levels in humans (on a per body weight basis)? No one really knows.

It's true that according to the National Institutes of Health, between 30%-40% of the US population suffers from NAFLD. Recent research also showed that of those suffering from NAFLD or it's more advanced stage NASH, the people suffering from NASH had higher levels of glyphosate in their urine compared to those with NAFLD. Although this information is suggestive that exposure to glyphosate may be driving the disease, the evidence is not conclusive.

What is conclusive is that it would be wise to reduce exposure wherever we can.

Unfortunately, the huge amount of glyphosate used results in contamination of our environment. One study in Mississippi found 75% contamination in rain and air samples. This means that even in fields where no glyphosate has ever been applied, some small residue may accumulate in the food. This means that achieving zero exposure is likely impossible for nearly everyone, as long as this chemical remains legal and widely used.

Translating Measurements

"Parts per billion" describes the concentration of a contaminant. Breakfast cereal is composed of simple sugars, complex carbohydrates, proteins, etc. If the cereal is contaminated by an herbicide such as glyphosate, tests measure the weight of the herbicide in the sample. These numbers are expressed as a ration. For example, "3 parts per billion" means that we found 3 parts of the herbicide per billion parts of the total mass of the cereal.

While "parts per billion" is by weight, we measure serving sizes by the cup. The serving size on the package of most breakfast cereals is about half a cup to a third of a cup. Granola is denser and heavier. Therefore, granola has a smaller portion size of about a quarter or third of a cup.

The amount of glyphosate in a serving will depend on the parts per billion and how much of the food you eat. For example, Original Cheerios has 1125.3 PPB (parts per billion) of glyphosate per kilogram of cereal. This means that 1.1253 micrograms of the glyphosate per kilogram of the cereal. A serving of Cheerios is ½ cup, which weighs 28 grams. Therefore, a serving of Cheerios has 31.5084 micrograms of glyphosate. A recommended Cheerios serving for a 20-lb toddler is 16 grams, which would contain 16 mcg of glyphosate.

What's the Magic Number?

If you eat 60 grams of foods containing glyphosate, would you reach the EWG limit? If the food has 18 or 160 PPB or more of the herbicide, you would! Sixty grams is about 3 servings of Original Cheerios. This product is so high in glyphosate, you would meet the daily limit if you ate a few pieces.

Honey Nut Cheerios Cereal had 670.2 PPB. A 3/4 cup serving weighs 28 grams. Thus, one serving contains about 18.8 mcg of glyphosate — eighteen times the 1.1 mcg limit.

Kellogg's Cracklin' Oat Bran oat cereal has a serving size of 3/4 cup or 49 grams. This is denser food and a large serving, so let's pour about 25 grams of cereal. At 185.0 PPB of glyphosate, a half serving has about 4 mcg of glyphosate. Still too much!

Safer? *Wheaties* (3/4 cup is 27 grams; 31.2 PPB = 0.84 mg glyphosate). That's only 0.26 mcg less than the limit for the day. So if this is the only glyphosate product you eat that day, you might be under the limit.

Throughout the day, you eat a variety of foods. For example, a bowl of Wheaties at breakfast (0.84 mcg), a pouch of single-serving Cheez-Its with lunch (1 mcg), and half of a Kellogg's Strawberry Nutri Grain Soft Baked Breakfast Bar mid-afternoon (1 mcg). All these foods add up to almost three times the EWG limit.

Given that glyphosate is so high in certain brands and types of foods, you should avoid anything with more than a trace amount of glyphosate.

"Natural," "Clean Food," and "Superior Quality"

Restaurant eating can be a quick, easy way to fill a belly and quality time with a loved one. It can also be misleading.

A recent study conducted by *GMO Free USA* revealed a huge disparity in the advertising of popular restaurants and the results of testing for glyphosate residue and aminomethylphosphonic acid (AMPA), a breakdown product of glyphosate. Food samples were taken from 15 restaurant chains and were selected from fast-casual restaurant chains that report having clean or natural foods. There were a total of 44 samples tested by ISO-accredited labs. These samples included items that were likely to contain trace glyphosate, such as oat-based and whole-grain breads, as well as products that were not commonly thought to have been contaminated.

The results were startling. Some of the highest levels of glyphosate were found in whole grain bagels from a company that spends lots of marketing dollars on being "100% clean." Three pizza chains were sampled and all tested positive. More surprising, the results of the sampling of a popular brand of unsweetened ice tea tested positive.

Foods with no glyphosate detected included beef, chicken, egg, and sweet potato.

How Much Glyphosate Is in My Food?

By allowing so much glyphosate in our food, the federal government is supporting industry profits. However, human health is taking a back seat.

We've included a searchable chart below. You can select the product you are curious about and find the amount of glyphosate contained within the product. As you can see from the charts on the {following} pages glyphosates affect food products from crackers to ice cream.

https://responsibletechnology.org/glyphosate