



Getting Toxic Chemicals Off The Menu

A School Guide To Safer Cereals



CEH

CENTER for
ENVIRONMENTAL
HEALTH



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About CEH

The Center for Environmental Health (CEH) is a nonprofit organization committed to protecting people from toxic chemicals by working with communities, consumers, government, and the private sector to demand and support business practices that are safe for public health and the environment. CEH assists large purchasers from government, education, healthcare, and private businesses to prefer healthier products and leverages their buying power to move the market towards safer products.

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National Office

2201 Broadway
Suite 302
Oakland, CA 94612

T: (510) 655-3900
F: (510) 655-9100

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Executive Summary

Recent testing by CEH and others have shown that pesticide residues are cropping up in everyday food products, including mainstream cereal brands. The purpose of this report is to alert K-12 schools and other purchasers to concerning levels of the cancer-causing chemical glyphosate, found in oat-based breakfast foods that are being served in cafeterias across the country.

CEH tested products that schools typically feature on their breakfast menus and found that nearly 70 percent of the oat-based breakfast foods tested contain concerning levels of glyphosate. Items found to contain the highest levels of the toxic herbicide include Quaker Maple Brown Sugar Instant Oatmeal and Quaker Old-Fashioned Oats. CEH did not find glyphosate residues in any of the certified organic cereals we tested.

The report details short-, medium- and long-term ways to avoid glyphosate exposure through food. CEH recommends school purchasers select organic alternatives whenever possible, and urges schools to request more organic options at comparable and accessible price points. CEH also offers various resources for putting pressure on elected officials and agency regulators to better protect public and environmental health from the adverse effects of chemicals like glyphosate in food. In addition, CEH suggests that schools serving a breakfast product that has not been tested yet contact us about the possibility of submitting a sample.



How This Report is Organized

Section 1: How Glyphosate Harms Our Kids and Society

We begin by introducing this report's primary chemical of concern, glyphosate (the main ingredient in the pesticide *Roundup*), explaining how glyphosate ends up in oat-based breakfast bars and cereals, and why glyphosate is so harmful to human and environmental health, especially kids and workers.

Section 2: The Most Prevalent Pesticide on Earth

Next we provide a brief history of glyphosate use and *Roundup*. Please refer to Appendix A for a more detailed history.

Section 3: What We Found

This section lists which oat-based breakfast bars and cereals served in schools were tested for glyphosate residues, and the results of that testing.

Section 4: What to Avoid and How

Here we provide support and suggestions to schools wanting to get this toxic chemical off their menu. This section includes short-, medium- and long-term solutions for schools, including purchasing organic cereals, using their buying power to motivate manufacturers and distributors to remove this dangerous pesticide from product catalogs, and helping to ban glyphosate nationwide.

Section 5: Conclusion

In our concluding section, we summarize this report's findings and recommendations. Schools can play a central part in making our shared environment healthier for everyone, beginning with safer breakfasts for kids.

Appendices

These supplementary sections offer additional details and resources. Appendix A describes the health and environmental harms of glyphosate. Appendix B describes our study design, including CEH's testing methods.

Endnotes

Section 1: How Glyphosate Harms Our Kids and Society

Introduction

Recent testing by CEH and others has shown that pesticide residues are cropping up in everyday food products, including mainstream cereal brands. This report, “GETTING TOXIC CHEMICALS OFF THE MENU: A SCHOOL GUIDE TO SAFER CEREALS” is designed to help schools understand the health threat posed by the cancer-causing chemical glyphosate, the potential for toxic contamination of cereals, and support them in making safer choices for their students.

CEH’s goal is to equip schools with the tools they need to help shift the market away from glyphosate-contaminated, oat-based breakfast foods commonly sold to schools and other institutional purchasers. This document contains valuable information and recommendations for K-12 school administration, procurement and nutrition staff to help make that shift.

Glyphosate is Especially Harmful to the Health of Children, Workers and the Environment

In 2015, the World Health Organization’s International Agency for Research on Cancer (IARC) categorized glyphosate, the main¹ ingredient in *Roundup*, as a “probable human carcinogen.”² Peer-reviewed scientific studies have also shown glyphosate to be an endocrine-disrupting chemical (EDC).³ EDCs are particularly alarming for three key reasons. One, they interfere with the body’s hormonal signals and processes in ways that can cause cancer, diabetes, strokes, and reproductive problems.⁴ Even more alarming is that EDCs can cause health issues that are passed on to future generations. The third key reason EDC exposure is so worrisome is that many of these chemicals appear to be most harmful in low, long-term exposures, the kind of dose one would be exposed to by eating foods containing trace amounts of glyphosate. Infants and children are especially vulnerable to EDC exposure as they are coming into contact with these chemicals precisely when their growing bodies are undergoing fundamental developmental processes mediated by hormones.⁵

The extensive spraying of glyphosate-containing herbicides, especially after development of seeds genetically engineered to be tolerant to pesticides, such as Monsanto’s *Roundup Ready* brand, has drenched much of the planet’s soil, air, water, plants, and animals with this cancer-causing and endocrine-disrupting pesticide.⁶ Recent biomonitoring studies have detected glyphosate in the urine samples of 70-93 percent of the U.S. population.^{7,8} Furthermore, groundskeepers and farmworkers who must apply glyphosate directly are unfairly exposed to the highest amounts of this harmful chemical.^{9,10} Please see Appendix A for more information on glyphosate’s history and the special dangers it presents to children, workers and the environment.

Section 2: The Most Prevalent Pesticide on Earth



The cancer-causing chemical glyphosate is unfortunately also the most widely used pesticide on Earth.¹¹ This is because of two main reasons: glyphosate has been misleadingly marketed as safe since the 1970s, and chemical corporations have developed genetically modified seeds that are resistant to glyphosate, so that more and more of this pesticide can be sprayed without damaging crops.^{12,13} Glyphosate applications are also rising because weeds are developing resistance to the chemical. For oats specifically, later applications in the crop's life cycle, to dry the oats for easier harvesting, has resulted in higher and more frequent findings of glyphosate residues on foods containing oats.¹⁴ Please see Appendix A for more details.

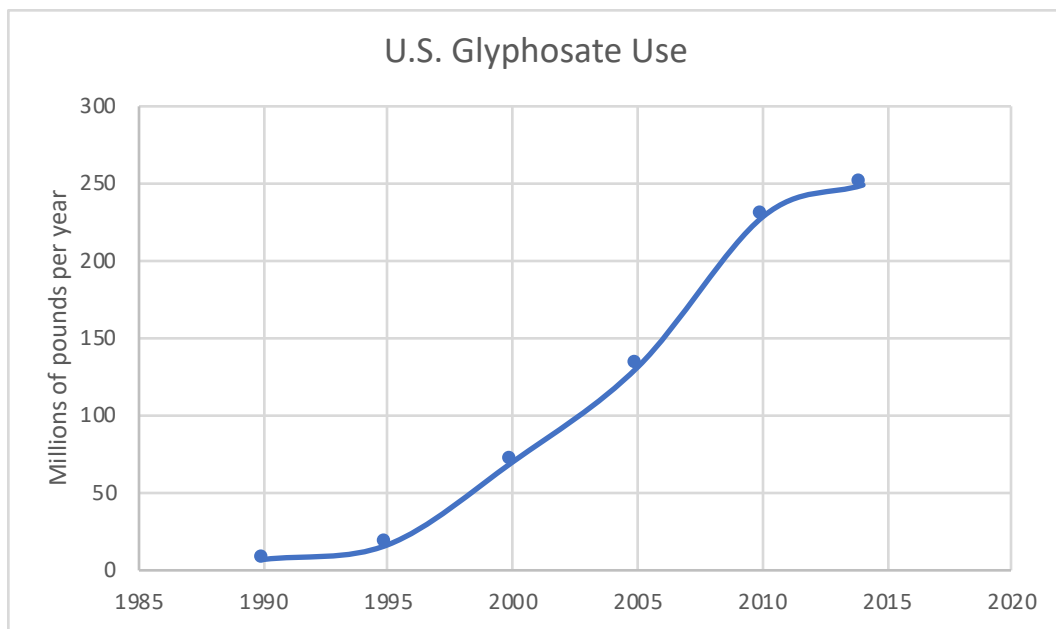


Figure 1: Pounds of glyphosate applied in the United States, 1990-2014; source data from Benbrook, 2016.

Food and Drug Administration's (FDA) most recently released residue monitoring report found glyphosate in over 60 percent of the corn and soy samples tested.^{15,16} The US Environmental Protection Agency (EPA) still reports that these levels are safe for human consumption, but their regulatory guidelines are based on outdated science and methods.^{17,18,19} Please see Appendix A for more detailed information about the data gaps in government agencies' decisions to determine "safe" levels of endocrine-disrupting chemicals.

Section 3: What We Found

CEH's findings, supplemented by testing of relevant products by the Environmental Working Group (EWG), are listed in Table 1, organized by category of breakfast food. Table 1 is available on our website as well and will continue to be updated in 2019 as we test additional products.

The amount of glyphosate detected in each product tested is noted below in parts per billion (ppb). As described in Section 1, extensive scientific research on EDCs shows that they can generate health harms even with low-level exposures. (Please refer to Appendix A for more detail.) Here we use the health-protective standard proposed by the Environmental Working Group—160 ppb—to evaluate our results.²⁰ This standard adds an additional margin of safety for children's health, since their developing bodies are the most vulnerable to hormonal changes.

Overall, almost 70 percent of the K-12 oat-based breakfast products tested were contaminated with glyphosate at levels above this health-protective standard of 160 ppb. It is important to note that we expect all products to vary in glyphosate contamination if tested multiple times, so these results are only meant as a guide. Products with lower results in this table could have higher results if additional samples were tested.



“Overall, almost 70 percent of the K-12 oat-based breakfast products tested were contaminated with glyphosate at levels above this health-protective standard of 160 ppb.”

Table 1. Glyphosate Residues Found in K-12 Breakfast Foods Containing Oats in Parts Per Billion (ppb)

Non-Organic Cereals

Description	Brand	Organization Testing	Lab Results (Highest to Lowest)
Breakfast Bars			
Fruity Cheerios Cereal Bar	General Mills	CEH	329
Gatorade Oatmeal Raisin Fuel Bar	Gatorade	CEH	200
Appleways Oatmeal Bar	Appleways	CEH	140
KIND Oats & Honey with Toasted Coconut	KIND	EWG	120, ND*
Cinnamon Toast Crunch Cereal Bar	General Mills	CEH	93
Cold Cereals			
Honey Nut Cheerios 1 oz Bowls	Cheerios	CEH	851
Cheerios Toasted Whole Grain Oat Cereal	Cheerios	EWG	490, 470
Barbara's Multigrain Spoonfuls, Original, Cereal	Barbara's	EWG	340, 300
Apple Cinnamon Cheerios 1 oz bowl	Cheerios	CEH	304
Multi Grain Cheerios 1 oz Bowl	Cheerios	CEH	172
Marshmallow Mateys 1 oz Bowl	Malt O Meal	CEH	87
Granolas			
Cinnamon Granola	Malt O Meal	CEH	594
Rockin'ola Strawberry Flavored Cereal Clusters	Rockin'ola	CEH	405
Nature Valley Protein Oats 'n Honey	Nature Valley	EWG	220, 170
Low Fat Granola with Raisins	Kellogg's	CEH	92
Granola Bars			
Oats N Honey Crunchy Granola Bar	Nature Valley	CEH	473
Quaker Chewy Chocolate Chip Granola Bar	Quaker	EWG	160, 120
Hot Cereals			
Quaker Old Fashioned Oats	Quaker	EWG	1300, 1100, 390
Quaker Maple & Brown Sugar Instant Oatmeal	Quaker	CEH	1083

*ND = none detected

Section 4: What to Avoid and How

Fortunately, there are short-, medium- and long-term ways to avoid glyphosate exposure through food. In the short-term, we have provided a list of comparable organic cereal alternatives, below. Because the organic designation is an official, federally-certified process, purchasers and consumers can be sure that organic crops have not been sprayed with pesticides containing glyphosate.²¹ Products simply labeled “natural,” by comparison, are not based on any federal guidelines or certification processes; this term is often employed as a marketing tool.

This section also contains guidelines for school purchasers interested in sending CEH their cereals for testing, and recommendations for how schools might communicate their concerns to suppliers and share procurement resources among other interested schools; see “Medium-Term Solution,” below.

For long-term solutions, CEH offers various resources for putting pressure on elected officials and agency regulators to better protect public and environmental health from the adverse effects of EDCs in food.

Short-Term Solution: Purchase Organic Breakfast Bars and Cereals

CEH did not find glyphosate residues in any of the certified organic cereals tested thus far, and will continue to test more organic options as time and resources allow. Table 2, below, lists our testing results of organic products as of this report’s publication. CEH is prioritizing testing of the cereal products we know to be served in schools and will continue to update this list in 2019.

In the absence of test results, purchasers can feel confident that certified organic cereals are unlikely to contain glyphosate, as glyphosate-containing pesticides are not approved for use on organic crops. The USDA organic label demonstrates that the product has been third-party certified to meet strict standards that avoid synthetic pesticides. The benefits of purchasing and consuming certified organic

Table 2. Organic Oat-Based Breakfast Bars and Cereals Tested

Organic Cereals

Name	Brand	Glyphosate Residues
Breakfast Bars		
Iced Oatmeal Cookie Z Bar	Clif Kid	None Detected
Cold Cereals		
Nature’s Path O’s	Nature’s Path	None Detected
Honey Nut O’s	Cascadian Farm	None Detected



foods extend far beyond the individual eater. According to the Food and Agriculture Organization of the United Nations, organic agriculture offers long term sustainability, improved soil structure and function, less water pollution, increased diversity of plants and animals, reduced use of nonrenewable farm inputs, and increased soil carbon storage.²²

Please check the CEH website or sign up to receive updates at www.ceh.org as we continue to test cereals and other food products in 2019. As we are prioritizing K-12 schools and other facilities that serve young children, we would like to hear from you about what additional information or tools would be useful for your school. If you have any questions about our project, would like your cafeteria foods tested, or are interested in sharing procurement resources with other interested purchasers, please contact Sue Chiang at sue@ceh.org.

Medium-Term Solution: Use Your Buying Power to Shift the K-12 Market

As schools, you can use your purchasing power to obtain healthier products and in doing so help move the entire market toward safer options. Companies want and need to meet the demands of their customers. Many companies have reported that, outside of regulatory changes, the single largest driver of change within their company is the voice of their customers. In numerous instances purchasers' preferences have moved the market much faster and farther than government regulation or legislation. Below are three steps purchasers can take to move the market toward safer cereals.

1. Contact CEH about submitting your school's cereals for testing

If you are serving a breakfast product that has not been tested yet, please contact us about the possibility of submitting a sample. CEH is currently prioritizing facilities serving young children, such as K-12 school districts and child care centers.

Product test results can be very helpful as you engage in discussions with your suppliers about safer cereals. Having your products tested also contributes to the growing body of knowledge about which cereals do and do not contain traces of glyphosate, thereby making it easier for purchasers to identify healthier options.

2. Contact your suppliers with your concerns

Your suppliers are valuable partners. It is important that you let them know about your concerns and preferences for safer, glyphosate-free cereals. CEH is developing a sample letter that you can send to your suppliers. If your school prefers to meet with suppliers, this letter can be used for talking points during your meeting and/or sent ahead of time. Consider partnering with other institutions

that purchase from the same supplier to submit similar or joint requests. A unified request for safer and affordable options from numerous and varied customers will send a powerful message to suppliers that will help increase availability and lower the price of organic and glyphosate-free cereals. Purchasers can play an important role in ensuring safer cereal options overall by requesting information from suppliers about their efforts to offer safer cereals at an affordable price. Please [contact CEH](#) if you have procurement strategies and resources to share or are interested in collaborating with other purchasers.

3. Purchase certified organic cereals

Given the high levels of glyphosate found in conventionally-grown oat-based cereals and breakfast bars, we urge schools to purchase organic alternatives instead. Use CEH's testing results as a guide to the glyphosate contamination levels that could be expected in breakfast foods your school may currently offer. As mentioned above, a unified request from multiple purchasers will help shift suppliers toward safer cereals; this increase in demand will also help drive prices down. However, when organic alternatives are still too expensive, school purchasers might also consider offering fewer, slightly more costly organic varieties, rather than lots of less costly but glyphosate-contaminated cereals. Another option would be to identify other menu changes that could bring overall costs down, thereby allowing for the price difference of organic cereals. Even occasional purchases of organic products support the growth of organic farming and bring economies of scale to these products.

Long-Term Solution: Advocate for Better Regulation of Glyphosate and Other EDCs

Policy-level actions are the most equity-oriented solution given that they are widely beneficial, helping all food service operations provide safer meals regardless of budget. Organic options, which tend to be more expensive, should be available to all purchasers. Check out the CEH website to learn more about national efforts to reduce everyone's exposure to glyphosate and other EDCs: ceh.org/campaigns/endocrine-disrupting-chemicals/.

"CEH did not find glyphosate residues in any of the certified organic cereals tested thus far... purchasers can feel confident that certified organic cereals are unlikely to contain glyphosate."

Section 5: Conclusion

The presence of glyphosate in breakfast cereals is especially concerning given that children are the primary consumers of these items—Quaker Oats and Cheerios are commonly consumed by infants and toddlers. Glyphosate has been classified as a probable human carcinogen and is increasingly recognized as an endocrine-disrupting chemical (EDC), meaning it can be harmful even at low doses. Being in critical developmental stages, children are most vulnerable to the hormone-interfering effects of glyphosate and other EDCs.

Thankfully, switching to organic, glyphosate-free cereals in the short-term, and advocating for stronger chemical regulation in the long-term, is beneficial to all eaters, including people who are exposed to the highest levels of pesticides because of their work.²³ Organic foods are safer to eat and safer to grow, and help make our shared environment more clean and fair for everyone.

CEH acknowledges that organic foods can be out-of-reach for individuals and institutions alike, and believes access to safe food should not be a privilege. Large, institutional purchases such as those from schools can be enormously helpful in driving prices down.

Glyphosate residues show up not only in food, but also in water, soil, and air.²⁴ By switching to organic and glyphosate-free cereals, schools can both reduce children's exposure to harmful EDCs and contribute to a cleaner, safer environment for all.

“By switching to organic and glyphosate-free cereals, schools can both reduce children’s exposure to harmful EDCs and contribute to a cleaner, safer environment for all.”



Appendix A:

Health and Environmental Harms of Glyphosate

History and Harmful Effects

The most widely-used pesticide on Earth is a cancer-causing chemical called glyphosate, the main²⁵ ingredient in *Roundup*. Monsanto Corporation introduced this chemical product to U.S. and international markets in the early 1970s. Global use spiked after Monsanto's subsequent development of *Roundup Ready* seeds in the mid-1990s, seeds which are genetically engineered to be herbicide-tolerant (GE-HT) to this specific herbicide formulation.²⁶ While glyphosate-containing herbicides were marketed as safe for humans, scientists and advocates have since revealed that Monsanto suppressed and otherwise manipulated scientific data and publications that demonstrated this toxicant is in fact harmful to human and other animal and plant life.²⁷ Weeds in GE-HT crops sprayed with glyphosate-containing herbicides, particularly soy and corn, have also grown increasingly resistant to the toxicant,²⁸ resulting in farmers having to spray greater amounts in order to tackle "super weeds,"²⁹ creating a vicious cycle which leaves ever more glyphosate residues on our food, soil, air, water, and bodies.

Glyphosate shows up in several foods both because this herbicide is so widely deployed generally, and because some farmers use *Roundup* and other glyphosate-containing herbicides as a way to dry cereal crops immediately before harvest.³⁰ Monsanto has marketed this additional use of glyphosate, and agricultural extension specialists have recommended this method, as a further "advantage" for farmers using this toxic chemical.^{31,32}

The World Health Organization's International Agency for Research on Cancer (IARC) categorized glyphosate as a "probable human carcinogen" in 2015.³³ Before and since this classification, peer-reviewed scientific studies have demonstrated glyphosate to be an endocrine-disrupting chemical (EDC) as well.³⁴ Many EDCs are harmful in low doses, counter to the common assumption that the more of a toxic chemical you consume the worse its effects are, because of their hormone-mimicking properties. One only needs to be exposed to a small amount of these chemicals to trigger an endocrine system response; the timing of exposure is perhaps most critical and our current regulatory system does not adequately address this newer category of chemicals.³⁵ People are especially vulnerable to EDCs during key developmental stages, such as before birth, early childhood and puberty, because these are the times when the body is changing rapidly.^{36,37} Infants and children are coming into contact with these chemicals precisely when their growing bodies are developing. Furthermore, the physiological changes caused by EDCs may be inherited and may not show up for several generations, meaning that children exposed today are unknowingly and unavoidably putting their own future families at risk for numerous health problems.

Regulatory Controversy

The US Environmental Protection Agency (EPA) re-assessed glyphosate in 2017, after the IARC's 2015 classification of glyphosate as a probable human carcinogen.^{38,39} While EPA concluded in 2018 that glyphosate does not pose a carcinogenic risk to humans, a 2017 consensus statement from environmental health scientists noted that most of the studies the EPA relied upon in its review did not consider glyphosate's endocrine-disrupting effects.⁴⁰ Notably, the state of California has kept glyphosate on its Proposition 65 list (of chemicals known to cause cancer) based on the IARC classification.^{41,42}

From the massive use of glyphosate-containing herbicides at national and global scales, down to the trace amounts of glyphosate residues found in children's breakfast foods, this endocrine-disrupting chemical (EDC) presents serious short- and long-term threats to public and environmental health. As noted above, both glyphosate alone and glyphosate-containing herbicide formulations have been shown to disrupt endocrine systems' hormonal signals and processes in potentially fatal and debilitating ways. In the words of the Endocrine Society, a professional group of expert researchers:

"... endocrine disruptors have effects on male and female reproduction, breast development and cancer, prostate cancer, neuroendocrinology, thyroid, metabolism and obesity, and cardiovascular endocrinology. Results from animal models, human clinical observations, and epidemiological studies converge to implicate EDCs as a significant concern to public health."⁴³

Appendix B:

Study Design and Testing Methods

Study Design

CEH distributed a web-based survey to institutional food service purchasers through existing contacts or referrals in different parts of the country. Our colleagues at the Campaign for Healthier Solutions and Just Transition Alliance provided a Spanish-language translation of this survey as well.⁴⁴ We prioritized school districts with high rates of participation in the National School Breakfast Program,⁴⁵ since low-income children are already disproportionately more exposed to toxic chemicals.⁴⁶ We also collaborated with our nonprofit allies working for healthier schools, to learn which oat-based breakfast cereals and bars are commonly served in school settings. In addition, CEH conducted internet searches for publicly available school menus, again focusing on those districts serving a larger proportion of low-income K-12 students. Lastly, we cross-checked survey responses against distributors and manufacturers' lists of products specifically marketed to school purchasers.⁴⁷ The oat-based breakfast cereals and bars selected for testing are a representative sample from all these methods of data collection. We will continue to collect information from schools and other institutional purchasers serving young children, regarding which oat-based breakfast bars and cereals they offer, in order to help shift the market toward safer and affordable organic alternatives.

Testing Methods

Anresco Laboratories provided analytical services to CEH. They use a protocol based on the following two testing methods, to ascertain glyphosate levels in foods:

"Residues are extracted from the test portion following water adjustment and the addition of acidified methanol. The mixture is centrifuged, filtered and directly analyzed by [liquid chromatography tandem mass spectrometry] LC-MS/MS. Various options for the simultaneous LC-MS/MS analysis of different combinations of pesticides are provided. Quantification is in most cases performed with the help of isotopically labeled analogues of the target analytes, which are used as internal standards (ILISs). So far available, these ILISs are added directly to the test portion at the beginning of the procedure to compensate for any factors having an influence on the recovery-rates such as volume-deviations, analyte losses during sample preparation as well as matrix-effects during measurement."⁴⁸

"The analytical samples were extracted with H₂O, purified with a strong anion-exchange solid-phase extraction (SPE) cartridge, and then analyzed by liquid chromatography tandem mass spectrometry (LC-MS/MS) with an anion-exchange high-performance liquid chromatography (HPLC) column. This method enabled a rapid and sensitive analysis [limit of quantification (LOQ) = 10 µg/kg] of the herbicides to be achieved."⁴⁹

Endnotes

- 1 Scientific studies are now finding that the various other “inactive” ingredients in glyphosate-containing herbicides, such as the perfluorinated chemicals PFOS and PFOA, which are used as surfactants, make the product even more harmful than glyphosate alone, increasing its endocrine-disrupting properties in particular. See Gasnier, Céline et al. 2009. “Glyphosate-Based Herbicides Are Toxic and Endocrine Disruptors in Human Cell Lines.” *Toxicology* 262(3):184–91.
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