

Setting the Record Straight on the Safety of Glyphosate-Based Herbicides

A recent jury verdict in California State Court in the case of Dewayne Johnson has increased the public conversation about the safety of glyphosate-based herbicides. Bayer takes the safety of our agricultural products, medicines and devices, and the well-being of the people who use them, very seriously. In this piece, we will address important facts and misconceptions regarding the safety of glyphosate-based herbicides.

Farmers and growers have been using glyphosate safely and effectively for more than 40 years. These products are essential tools in helping them manage weeds and deliver crops to markets around the world. Glyphosate-based herbicides enable farmers to adopt practices such as “no till” and “conservation tillage,” which reduce soil erosion and carbon emissions.

Like any pesticide, glyphosate-based products are subject to extensive scientific study and oversight by regulators in every country in which they are used. The full body of science on glyphosate, including more than 800 studies by the company and independent researchers, support its safe use. Moreover, regulatory authorities, including the U.S. Environmental Protection Agency (EPA), European Chemical Agency (ECHA) and the European Food Safety Authority (EFSA), also have concluded that these products are safe when used as directed and that glyphosate is not carcinogenic.

The *Johnson* verdict in California does not change this extensive science or the conclusions of regulators in the U.S. and around the world. The Company has challenged this verdict and is confident that science ultimately will prevail in this case.

Myth: Glyphosate causes cancer, including Non-Hodgkin lymphoma, and is responsible for Mr. Johnson’s cancer.

Fact: Glyphosate-based herbicides have a 40-year history of safe use. Regulators around the world, including the U.S. EPA, the European Food Safety Authority, the European Chemicals Agency, and many more, have found that glyphosate-based products are safe when used as directed and that glyphosate is not carcinogenic. The largest epidemiology study ever conducted on glyphosate-based herbicides, the 2018 publication of the U.S. Agricultural Health Study in the *Journal of the National Cancer Institute* – which followed over 50,000 licensed pesticide applicators, farm workers and their spouses for more than 20 years – found no link between glyphosate-based herbicides and Non-Hodgkin lymphoma. We have deep sympathy for Mr. Johnson and his family, but glyphosate-based herbicides did not cause his cancer. The verdict in this case is at odds with the full body of science, and we have challenged it.

Myth: The World Health Organization (WHO) says that glyphosate causes cancer.

Fact: Four separate WHO programs have evaluated glyphosate. Along with regulatory authorities around the world, three of the WHO programs (the Joint FAO/WHO Meeting on Pesticide Residues, the International Programme on Chemical Safety and the Guidelines for Drinking-Water Quality) have determined that glyphosate is not carcinogenic. The sole outlier is the International Agency for Research on Cancer, which in 2015 issued an opinion that glyphosate is a “probable carcinogen.” The IARC opinion is inconsistent with 40 years of scientific research on glyphosate and the conclusions of the U.S. EPA, the European Food Safety Authority and other regulators around the world.

Myth: Monsanto was found “guilty” of concealing health risks associated with glyphosate.

Fact: This was a jury verdict in a civil matter involving a question of liability (not guilt or innocence), and Bayer has challenged the jury’s verdict. Glyphosate-based products have a 40-year history of safe use. Glyphosate-based herbicides are safe when used as directed, and Monsanto is not responsible for Mr. Johnson’s cancer. The largest epidemiology study ever conducted on glyphosate-based herbicides, the 2018 publication of the U.S. Agricultural Health Study in the *Journal of the National Cancer Institute* – which followed over 50,000 licensed pesticide applicators, farm workers and their spouses for more than 20 years – found no link between glyphosate-based herbicides and Non-Hodgkin lymphoma. The jury verdict in this case is at odds with the full body of glyphosate science.

Myth: The verdict in the Johnson case is a final “ruling” from a Court.

Fact: This was a verdict reached by a jury, which is only the first step in the legal process. It does not represent a final ruling from a Court. We have filed post-trial motions and will appeal, if necessary, to contest the verdict.

Myth: The use of crop protection products, such as glyphosate, is not conducive with sustainable agriculture.

Fact: Crop protection products, such as glyphosate-based herbicides, are an integral part of modern, sustainable farming. Weeds and other pests are among the toughest challenges farmers face every season. Farmers around the world count on glyphosate to help control their weeds safely and effectively. Glyphosate-based herbicides have also contributed to the widespread adoption of “no till” and “conservation tillage” practices, which reduce erosion and carbon emissions. Regulators such as the U.S. EPA set strict standards for how all pesticides are used to ensure that they pose no unreasonable risk to human health or the environment. Information about regulators’ reviews of glyphosate are available on their respective websites, and we encourage anyone with questions about pesticides to speak with a farming organization, such as COPA-COGECA or the U.S. National Association of Wheat Growers, to understand why these tools are so important for agriculture.

Myth: Questions have been raised for many years about the safety of glyphosate.

Fact: Glyphosate-based herbicides have a 40-year history of safe use. For decades, regulators have evaluated the safety profile of glyphosate and consistently determined that glyphosate-based products are safe when used as directed and that glyphosate is not carcinogenic. Further, Monsanto is one of many different manufacturers of glyphosate-based herbicides, and much of the science supporting the safety of glyphosate was generated by companies other than Monsanto. This includes **six out of seven complete regulatory data sets** that were developed and are owned by other companies.

The legal challenges to the safety of glyphosate largely arose following the 2015 IARC opinion, when plaintiff attorneys in the U.S. began using it as the basis for advertisements to recruit plaintiffs to bring cases against Monsanto.

Myth: Monsanto paid bloggers and other online activists to discredit scientists.

Fact: This allegation is simply false. Like all companies, we take the safety of our products and our reputation very seriously. Our focus is on scientific accuracy. We want to ensure that everyone – from regulators to customers to consumers – has accurate and balanced information to make decisions about our products.

Myth: Monsanto stopped a laboratory called TNO from running an additional experiment because Monsanto was afraid of a negative outcome.

Fact: This allegation is false. As investigators reported, the one specific TNO study referenced here was flawed. TNO acknowledged these flaws in its report and said it was not suitable for regulatory submission.

Myth: Monsanto suppressed scientific evidence that showed a possible connection between glyphosate and cancer.

Fact: As a company in a highly regulated industry, our focus is on conducting the robust studies that are needed to secure regulatory approval to place products on the market that are both safe and effective. Sound science is at the heart of everything we do. We firmly believe in our mission to provide tools to help farmers grow their crops more sustainably, safely and effectively. With regard to glyphosate, Monsanto conducted more studies than required on multiple aspects of safety (genotoxicity, dermal absorption, immune toxicity, acute toxicity and other factors); in addition, Monsanto developed just one of the seven total regulatory data sets behind glyphosate, meaning that there are other manufacturers of glyphosate that have produced hundreds of additional studies that support the conclusion that glyphosate-based herbicides are safe when used as directed and that glyphosate is not carcinogenic. Regulatory authorities have access to all this data.

Myth: Monsanto orchestrated a campaign to pressure a journal into retracting an unfavorable report on glyphosate?

Fact: The 2012 paper in question by Gilles-Eric Seralini had serious flaws in its analysis, and multiple members of the scientific community, including Monsanto scientists, raised legitimate concerns with the editor of the journal of *Food and Chemical Toxicology*. Ultimately, the decision to retract the paper in 2013 was made by the journal alone. Regulatory authorities, including the European Food Safety Authority (which took into account independent assessments of the paper conducted by EU Member State organizations in Belgium, Denmark, France, Germany, Italy and the Netherlands) – and even IARC – agreed that this was a poor publication.

Myth: Monsanto scientists “ghostwrote” safety studies on glyphosate.

Fact: This allegation is false. Plaintiff lawyers have cherry-picked isolated emails out of more than 15 million pages of documents produced during discovery to attempt to distort the scientific record and Monsanto’s role. The emails highlighted by plaintiffs related to secondary literature review articles sponsored by Monsanto, not original studies or science. The company’s sponsorship is appropriately disclosed in each article. Moreover, consistent with the testimony of Monsanto scientists, the authors of these review articles have denied any allegation of ghostwriting.

Myth: This jury verdict could jeopardize registrations of glyphosate-based products.

Fact: This jury’s decision does not change the rigorous scientific research and data that supports the safety of glyphosate-based products. Nothing about this verdict changes the science or the registration status of any products. Numerous regulatory agencies, including the U.S. Environmental Protection Agency (EPA), reviewed this issue after the IARC designation – on which much of Mr. Johnson’s case was based – and concluded that glyphosate-based products are safe when used as directed and that glyphosate is not carcinogenic .

Myth: There is a “smoking-gun” email from a Monsanto scientist that said she cannot say that Roundup does not cause cancer.

Fact: This is false. The full text of the email, other documents and all testimony make clear that Monsanto did not believe or suspect that Roundup or glyphosate causes cancer.

We believe that the extensive body of more than 800 studies, 40 years of real world-experience and the conclusions of regulators around the world (including in the U.S., Canada, Australia, New Zealand, Korea, Japan, and the E.U.) confirm that glyphosate-based herbicides are safe when used as directed and that glyphosate is not carcinogenic.

One of these studies is the U.S. Agricultural Health Study published in 2018 in the *Journal of the National Cancer Institute*, which followed more than 50,000 licensed pesticide applicators and farm workers and their spouses for more than 20 years and found no connection between glyphosate-based herbicides and cancer. Importantly, this study focused on the formulated product and not just glyphosate.

Myth: Monsanto ignored the advice of Dr. Parry to conduct additional studies on glyphosate-based formulations.

Fact: This is false. Monsanto conducted additional studies as suggested by Dr. Parry. Following this additional analysis, Dr. Parry then fully agreed with Monsanto that the genotoxic effects he had questioned were artificial and not relevant to real world-conditions. The results of Monsanto’s additional studies were published in the *Journal of Agricultural and Food Chemistry*. This is consistent with the findings of experts at regulatory authorities around the world who conclude glyphosate and glyphosate-based formulations are not mutagenic or genotoxic.

Myth: Glyphosate-based formulations have not been evaluated for carcinogenicity.

Fact: Extensive data shows that glyphosate-based formulations are not carcinogenic. The deep body of science on glyphosate-based herbicides includes the largest and most recent epidemiologic study – the 2018 independent National Cancer Institute long-term study that followed more than 50,000 licensed pesticide applicators and farm workers and their spouses – which found no connection between glyphosate-based herbicides and cancer. Additionally, in its 2017 Evaluation of Carcinogenic Potential, the EPA examined more than 100 studies the agency considered relevant, including 23 epidemiology studies which examine real world use of glyphosate-based formulations.

Myth: Bayer isn’t confident in the science behind the safety of glyphosate.

Fact: Bayer’s acquisition of Monsanto is based on one principle: that by combining our respective scientific expertise in chemistry and genetics, we can create new solutions that will help farmers around the world grow their crops more sustainably.

Bayer has an unwavering commitment to sound science and to transparency, and we are leading the industry in making additional information about the safety and benefits of our products more easily accessible to stakeholders. We are committed to the highest principles of scientific integrity and excellence, and we will continue to use our expertise to develop safe and effective tools that help farmers produce crops more sustainably.

Glyphosate is one important element of our portfolio, and it has been transformative for agriculture around the world. Glyphosate-based herbicides have a 40-year history of safe and effective use, and we will continue to defend this invaluable tool for our customers.