

Comprehensive long-term toxicological studies repeated over the last 30 years have time and again demonstrated that glyphosate is unlikely to pose a cancer risk in humans. The U.S. EPA groups glyphosate in the lowest and most favorable category, E, indicating evidence of noncarcinogenicity for humans.

We have highlighted and included summaries from some key publications that demonstrate the safety of glyphosate when used according to label instructions. We have also included a list of many publications and documents publicly available that discuss human exposure to glyphosate; epidemiology and glyphosate, glyphosate and the lack of genotoxicity and carcinogenicity as well as many government and World Health Organization reviews of glyphosate.

NOTE: Corey – We’d like to have a sidebar, or perhaps a section at the top, to update regularly as new studies become available. Perhaps it’s simple as creating a sidebar, or perhaps it makes sense to develop a section that can be updated as needed. I’ll defer to your expertise on this matter. It’s important for this section to be near the top of the page.

Key Glyphosate Publications:

- **Greim, H., D. Saltmiras, V. Mostert, and C. Strupp. 2015. Evaluation of carcinogenic potential of the herbicide glyphosate, drawing on tumor incidence data from fourteen chronic/carcinogenicity rodent studies. *Crit. Rev. Toxicol.* In press**

Summary: A new scientific publication examining 14 separate cancer studies in rats and mice conducted over the last several decades concludes that there is no evidence that glyphosate, the active ingredient in Roundup branded herbicides, causes cancer. The article, in *Critical Reviews in Toxicology*, evaluated the data from these long-term studies to determine whether there were any patterns to suggest humans exposed to glyphosate would have any concern about developing cancer. Other scientifically relevant information such as expert regulator evaluations, human dietary exposures and epidemiological studies were also discussed. The clear and consistent view across more than 30 years of relevant information continues to support the first expert opinions from the 1980s, that glyphosate does not cause cancer.

- **Sorahan, T. (2015). Multiple Myeloma and Glyphosate Use: A Re-Analysis of US Agricultural Health Study (AHS) Data. *Int. J. Environ. Res. Public Health* <http://www.ncbi.nlm.nih.gov/pubmed/25635915>**

Summary: A new look at data from the US Agricultural Health Study (AHS) clarifies that there is no relationship between glyphosate use and the risk of multiple myeloma, a type of cancer. The article considered data collected from over 57,000 pesticide applicators to determine whether a relationship exists between multiple myeloma and glyphosate exposure. These results contradict the outcome of a previous analysis of AHS data that relied on a restricted data set to reach a different conclusion. This reanalysis of the full AHS data set for multiple myeloma is consistent with other epidemiological and laboratory research that demonstrated glyphosate does not cause cancer.

- **Kier, L. D. (2015). Review of Genotoxicity Biomonitoring Studies of Glyphosate-Based Formulations. Crit. Rev. Toxicol., in press**

Summary: A recent review examined several studies that alleged damage to the DNA in cells collected from people after self-reported exposures to glyphosate-based herbicides. The author concluded that there are no direct risks to human DNA under normal exposure conditions. These findings are consistent with an earlier review of an extensive number of laboratory studies that also demonstrated no direct effect on DNA. Taken together, these results confirm previous conclusions that glyphosate-based herbicides do not damage DNA in humans following real world exposures.

- **Kier, LD and DJ. Kirkland. 2013. Review of genotoxicity studies of glyphosate and glyphosate-based formulations. Critical Reviews in Toxicology. 43:283.**
<http://www.ncbi.nlm.nih.gov/pubmed/23480780>

Summary: A review of an extensive number of laboratory studies examining the potential for glyphosate and glyphosate-based herbicides to damage DNA concludes that these products do not damage DNA under normal exposure conditions. This review includes peer-reviewed publications and regulatory studies. The evaluation of the large amount of data available confirms that glyphosate is not genotoxic to humans and that glyphosate and glyphosate-based products do not damage DNA under normal exposures.

- **Mink, P., J. Mandel, B. Scurman, J. Lundin. 2012. Epidemiologic studies of glyphosate and cancer: A review. Regulatory Toxicology and Pharmacology. 63:3.**
<http://www.sciencedirect.com/science/article/pii/S0273230012000943>

Summary: A review of 21 epidemiological studies found no causal relationship between exposure to glyphosate and cancer in adults or children. This observation is consistent with conclusions from regulatory authorities that glyphosate is unlikely to pose a risk to human health based on previous toxicology studies.

- **Niemann, L., C. Sieke, R. Pfeil, R. Solecki. 2015. A critical review of glyphosate findings in human urine samples and comparison with the exposure of operators and consumers. Journal of Consumer Protection and Food Safety.**
<http://rd.springer.com/article/10.1007%2Fs00003-014-0927-3>

Summary: The German Federal Institute for Risk Assessment reviewed seven existing biomonitoring studies where trace amounts of glyphosate were found in human urine samples. The authors concluded that at the levels of glyphosate found, there is no concern for human health. After oral intake glyphosate is not metabolized significantly by humans and is rapidly excreted in urine. By measuring urine levels it is possible to calculate internal exposure levels. They concluded that realistic exposures are low and are well below the worst-case assumptions used by regulatory agencies.

Additional Glyphosate Publications:

Exposure

- Acquavella J.F., B. H. Alexander, J. S. Mandel, C. Gustin, B. Baker, P. Chapman, and M. Bleeke. 2004. Glyphosate biomonitoring for farmers and their families: Results from the Farm Family Exposure Study. *Environmental Health Perspectives* 112(3): 321-326. .
- EFSA European Food Safety Authority, 2014. The 2012 European Union Report on pesticide residues in food. *EFSA Journal* 2014;12(12):3942. <http://www.efsa.europa.eu/en/efsajournal/doc/3942.pdf>.
- Fact Sheet - Residual Traces of Pesticide Residues including Glyphosate Residues in Food on the European Market Extracted from the 2012 European Union Report on pesticide residues in food (2014).
- Lavy T, Cowell J, Steinmetz JR, Massey JH. 1992. Conifer seedling nursery exposure to glyphosate. *Arch Environ Contam Toxicol* 22:6-13.
- Jönsson J., R. Camm, and T.Hall. (2013) Removal and degradation of glyphosate in water treatment: a review. *Journal of Water Supply: Research and Technology—AQUA*, 62 (7): 395-408.
- Speth T.F. (1994) Glyphosate removal from drinking water. *Journal of Environmental Engineering* 119: 1139-1157.

Epidemiology

- Acquavella J, D. Farmer, and M. R. Cullen 1999. A case-control study of non-Hodgkin lymphoma and exposure to pesticides. *Cancer* 86:729-31.
- Acquavella, J., J. R. Cowell, M. R. Cullen, D. R. Farmer, and H. Pastides. 2001. Implications of glyphosate toxicology and human biomonitoring data for epidemiological research. *Journal of Agromedicine* 7(4): 7-27.
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Toxicology Studies

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Regulatory and Government Documents

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