

Glyphosate & Pesticide Toxicity Testing

The EnviroScience ecotoxicity laboratory provides water, soil, and food product monitoring services for herbicides and pesticides.

Pesticides refer to any toxic substance applied to the environment to eradicate unwanted organisms. They include herbicides, insecticides, and fungicides. Recently, concerns are growing over the widespread application of pesticides since:

- They can leach into groundwater.
- They are showing a presence in food products.
- They can persist in the environment for decades.
- They can potentially accumulate in soils, sediments, and organisms.

The toxicity and environmental impact of most pesticides are well documented; however, the effects of others are still raising questions either from conflicting available information and/or pending reliable long-term studies.

Glyphosate & Other Herbicide Testing Via ELISA



Glyphosate testing is conducted via the ELISA (enzyme linked immunosorbent assay) method, which utilizes an antibody specific for glyphosate. EnviroScience biologists provide comprehensive monitoring plans and rapid turnaround, with most samples being completed within 2 business days.

Contact our lab at (800) 940-4025 or fill out the contact form below for a quote from our specialists.

In addition to glyphosate, EnviroScience can test for the following pesticides:

- Alachlor (agricultural herbicide)
- Atrazine (agricultural herbicide)
- Azoxystrobin (agricultural fungicide)
- Clothianidin/Imidacloprid (agricultural insecticides)
- DDE/DDT (banned agricultural insecticide)
- Fluridone (aquatic herbicide)

- Metolachlor (agricultural herbicide)
- Organophosphates/Carbamate (agricultural insecticides)
- Pyraclostrobin (agricultural fungicide)
- Trifluralin (agricultural herbicide)
- Other herbicide testing may be granted upon request

Why Perform Glyphosate & Other Testing?

An example of glyphosate toxicity testing use is for the strict purity standards in German beers. In Germany, governmental controls exist to ensure that no harmful substances contaminate the beer production process. Recently, several environmental groups (including the Munich Environmental Institute) reported that they have found unacceptable amounts of glyphosate in many popular European beers.¹ Some breweries are now planning to take extra steps to ensure their beers comply with purity standards.

Glyphosate: Food Safety & Water Quality Concerns

Recent health concerns have been raised over the effects of exposure to chemical ingredients found in herbicides. Glyphosate is the active ingredient used in many broad-spectrum herbicides and algaecides, such as Roundup. The use of glyphosate-based herbicides has increased significantly since the late 1970s, and it is currently the most widely used herbicide. The common uses are for agriculture crop application, home and garden application, and industrial application for weed clearing. Initial industry toxicity tests suggested that the level of glyphosate used in crops is neither genotoxic or carcinogenic to humans. However, later

toxicity tests posed different findings.²

In March 2015, the World Health Organization (WHO) raised concerns worldwide when its International Agency for Research on Cancer (IARC) published a statement saying that glyphosate is “probably carcinogenic to humans.” This conclusion was in part based on the IARC’s own study conducted in 2015.³ The WHO then launched a “full re-evaluation” of glyphosate and some other pesticides such as malathion and diazinon⁴. After WHO’s announcement, several other large regulatory authorities started to perform their own investigations as well.

Later in May 2016, WHO and experts from the U.N.’s Food and Agriculture Organization announced that glyphosate is “unlikely to pose a carcinogenic risk to humans” who are exposed through food; a statement that contradicts the IARC’s previous 2015 study. The 2016 study is based on the acceptable daily intake of “up to 1 milligram of glyphosate for every kilogram of body weight.”⁵ Since this new development, activists have shown great concern over the contradicting information. For example, in an attempt to keep the European Commission from relicensing glyphosate, the European Green Party (Green MEPs) tested the urine of 48 of its members and found that urine tests had glyphosate levels that were on average 17 times higher than the recommended safe limit⁶.

The European Commission extended the sales license for only 18 months after some of its members voiced concerns. In the meantime, the European Agency for Chemical Product is working on a new assessment on health impacts that should come out by the end of 2017⁷.

Atrazine: Health & Environmental Concerns

Another herbicide raising public and environmental health concerns is the widely used agricultural weed killer atrazine, which has been found in surface and ground water. A recent ecological risk assessment published by the USEPA in 2016 classifies atrazine as “moderately to slightly toxic to fish on an acute basis.” In addition, the report also describes adverse chronic effects to fish and aquatic phase amphibians, including, but not limited to, changes in reproductive physiology, behavior, kidney function, growth, and enzyme activity.⁸ Another recent study found atrazine to be highly toxic to carp, resulting in hypoactivity⁹. Farm groups are concerned that laws and regulations on the use of atrazine might tighten due to these recent findings. Many farmers consider atrazine one of the most effective herbicides, and few alternatives exist. The USEPA has yet to announce any plans or changes as of June 2016.¹⁰

Like glyphosate, the toxicity of atrazine can be tested using the ELISA method. Contact our specialists today for a quote.

[1] Copley, Caroline. “German Beer Purity in Question after Environment Group Finds Weed-killer Traces.” Reuters. Thomson Reuters, 25 Feb. 2016. Web. 17 May 2016.

[2] Myers, John Peterson, et al. “Concerns over use of glyphosate-based herbicides and risks associated with exposures: a consensus statement.” *Environmental Health* 15.1 (2016): 1.

[3] Fritschi, L., et al. “Carcinogenicity of tetrachlorvinphos, parathion, malathion, diazinon, and glyphosate.” *Red* 114 (2015).

[4] Pesticide Residues in Food 2015; REPORT 2015 Joint FAO/WHO Meeting on Pesticide Residues. Rep. no. ISSN 0259-2517. World Health Organization; Food and Agriculture Organizations of the United Nations, 2015. Web. 17 May 2016. <<http://www.fao.org/3/a-i5186e.pdf>>.

[5] Kelland, Kate. “U.N. Experts Find Weed Killer Glyphosate Unlikely to Cause Cancer.” Reuters. Thomson Reuters, 16 May 2016. Web. 17 May 2016.

[6] Cato, Molly. “Green Party MEPs Prove a Point with Glyphosate in Urine Test Results.” *The Ecologist*. 16 May 2016. Web. 17 May 2016.

[7] Steinhauser, Gabriele. “European Commission Extends Sale of Glyphosate.” *WSJ*. N.p., 29 June 2016. Web. 21

July 2016.

[8] Farruggia, Frank T., Colleen M. Rossmeisl, James A. Hetrick, and Melanie Biscoe. *Refined Ecological Risk Assessment for Atrazine*. Publication no. 20460. Environmental Risk Branch III; Environmental Fate and Effects Division; Office of Pesticide Programs. U.S. Environmental Protection Agency, 12 Apr. 2016. Web. 10 June 2016.

[9] Xing, Houjuan, et al. "Acute and subchronic toxic effects of atrazine and chlorpyrifos on common carp (*Cyprinus carpio* L.): Immunotoxicity assessments." *Fish & shellfish immunology* 45.2 (2015): 327-333.

[10] Rice, Alice. "AG Professional." EPA's Atrazine Report Could Lead to 'De Facto Ban' AG Professional, 10 June 2016. Web. 10 June 2016.

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