

### What is glyphosate?

Glyphosate is an herbicide. It is applied to the leaves of plants to kill both broadleaf plants and grasses. The sodium salt form of glyphosate is used to regulate plant growth and ripen specific crops.

Glyphosate was first registered for use in the U.S. in 1974. Glyphosate is one of the most widely used herbicides in the United States. People apply it in agriculture and forestry, on lawns and gardens, and for weeds in industrial areas. Some products containing glyphosate control aquatic plants.



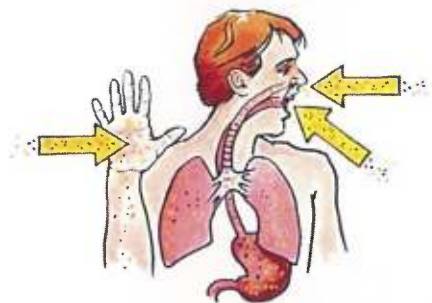
### What are some products that contain glyphosate?

Glyphosate comes in many forms, including an acid and several salts. These can be either solids or an amber-colored liquid. There are over 750 products containing glyphosate for sale in the U.S.

Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 800-222-1222. If you wish to discuss a pesticide problem, please call 800-858-7378.

### How does glyphosate work?

Glyphosate is a non-selective herbicide, meaning it will kill most plants. It prevents the plants from making certain proteins that are needed for plant growth. Glyphosate stops a specific enzyme pathway, the shikimic acid pathway. The shikimic acid pathway is necessary for plants and some microorganisms.



### How might I be exposed to glyphosate?

You can be exposed to glyphosate if you get it on your skin, in your eyes or breathe it in when you are using it. You might swallow some glyphosate if you eat or smoke after applying it without washing your hands first. You may also be exposed if you touch plants that are still wet with spray. Glyphosate isn't likely to vaporize after it is sprayed.

NPIC General Fact Sheets are designed to provide scientific information to the general public. This document is intended to promote informed decision-making. Please refer to the Technical Fact Sheet for more information.

### What are some signs and symptoms from a brief exposure to glyphosate?

Pure glyphosate is low in toxicity, but products usually contain other ingredients that help the glyphosate get into the plants. The other ingredients in the product can make the product more toxic. Products containing glyphosate may cause eye or skin irritation. People who breathed in spray mist from products containing glyphosate felt irritation in their nose and throat. Swallowing products with glyphosate can cause increased saliva, burns in the mouth and throat, nausea, vomiting, and diarrhea. Fatalities have been reported in cases of intentional ingestion.

Pets may be at risk if they touch or eat plants that are still wet with spray from products containing glyphosate. Animals exposed to products with glyphosate may drool, vomit, have diarrhea, lose their appetite, or seem sleepy.

### What happens to glyphosate when it enters the body?

In humans, glyphosate does not easily pass through the skin. Glyphosate that is absorbed or ingested will pass through the body relatively quickly. The vast majority of glyphosate leaves the body in urine and feces without being changed into another chemical.



### Is glyphosate likely to contribute to the development of cancer?

Animal and human studies were evaluated by regulatory agencies in the USA, Canada, Japan, Australia, and the European Union, as well as the Joint Meeting on Pesticide Residues of the United Nations and World Health Organization (WHO). These agencies looked at cancer rates in humans and studies where laboratory animals were fed high doses of glyphosate. Based on these studies, they determined that glyphosate is not likely to be carcinogenic. However, a committee of scientists working for the International Agency for Research on Cancer of the WHO evaluated fewer studies and reported that glyphosate is probably carcinogenic.

### Has anyone studied non-cancer effects from long-term exposure to glyphosate?

Long-term feeding studies in animals were assessed by the US Environmental Protection Agency (EPA) and other regulatory authorities. Based on these evaluations, they found there is no evidence glyphosate is toxic to the nervous or immune systems. They also found it is not a developmental or reproductive toxin.

### Are children more sensitive to glyphosate than adults?

As required by the Food Quality Protection Act, the EPA has determined that children are not more sensitive to glyphosate as compared to the general population.

### What happens to glyphosate in the environment?

Glyphosate binds tightly to soil. It can persist in soil for up to 6 months depending on the climate and the type of soil it is in. Glyphosate is broken down by bacteria in the soil.

Glyphosate is not likely to get into groundwater because it binds tightly to soil. In one study, half the glyphosate in dead leaves broke down in 8 or 9 days. Another study found that some glyphosate was taken up by carrots and lettuce after the soil was treated with it.

### Can glyphosate affect birds, fish, or other wildlife?

Pure glyphosate is low in toxicity to fish and wildlife, but some products containing glyphosate may be toxic because of the other ingredients in them. Glyphosate may affect fish and wildlife indirectly because killing the plants alters the animals' habitat.



### Where can I get more information?

For more detailed information about glyphosate references please visit [npic.orst.edu/factsheets/glyphorefs.html](http://npic.orst.edu/factsheets/glyphorefs.html) or call the National Pesticide Information Center, Monday - Friday, between 8:00am - 12:00pm Pacific Time (11:00am - 3:00pm Eastern Time) at 800-858-7378 or visit us on the web at [npic.orst.edu](http://npic.orst.edu). NPIC provides objective, science-based answers to questions about pesticides.

**Date Reviewed: 2010; limited revisions made: March 2019**

Please cite as: Henderson, A. M.; Gervais, J. A.; Luukinen, B.; Buhl, K.; Stone, D.; Cross, A.; Jenkins, J. 2010. *Glyphosate General Fact Sheet*; National Pesticide Information Center, Oregon State University Extension Services. <http://npic.orst.edu/factsheets/glyphogen.html>.

NPIC is a cooperative agreement between Oregon State University and the U.S. Environmental Protection Agency (U.S. EPA, cooperative agreement # X8-83458501). The information in this publication does not in any way replace or supercede the restrictions, precautions, directions, or other information on the pesticide label or any other regulatory requirements, nor does it necessarily reflect the position of the U.S. EPA.

