

Glyphosate



Environmental



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About Markel's Risk Solution Services team

Risk Solution Services provides technical insight related to existing and potential insured risk at Markel. The team partners with our customers, claims, and underwriters to educate on both current and future risk trends and supports our clients with a comprehensive offering of risk management solutions.

We do this by engaging with clients, underwriting, and claims teams.

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Glyphosate in the news

Recently, glyphosate has become one of the most discussed and controversial agricultural chemicals. A California jury in August 2018 held Monsanto's Roundup and Ranger Pro herbicides which contain glyphosate as a major ingredient contributed to a school groundskeeper's lymphoma and issued a decision in favor of the plaintiff groundskeeper and against Monsanto for a combined \$289 million in compensatory and punitive damages. Monsanto has historically denied any links between its herbicides and cancer. However, already in 2016 testing for residues of glyphosate turned up high levels in honey originating from Iowa. The 2016 testing added to mounting concerns about glyphosate, its use, applications and possible links to cancer. The FDA began glyphosate residue testing in some foods in early 2016 and late 2015 after the International Agency for Research on Cancer (IARC) classified glyphosate as a probable human carcinogen in March 2015.

Until the Monsanto case the most prominent cases revolved around honey. The Organic Consumers Association and Beyond Pesticides, a not-for-profit group, had filed suit in November 2016 against Sioux Honey Association Cooperative, a large group of bee keepers who produce Sue Bee Honey. The suit was filed pursuant to the FDA false, misleading, and deceptive advertising and labeling requirements. In late September 2016 another lawsuit seeking class action status was filed against Sioux Honey Association in US District Court for the Eastern District of New York. Also in early 2016 Quaker Oats was sued regarding glyphosate residues in oatmeal, including several types of infant oat cereal.

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“Probably carcinogenic”

The International Agency for Research on Cancer (IARC), the hazard assessment arm of the World Health Organization (WHO), in their report issued in 2015 classified glyphosate as a “2a: probably carcinogenic” substance associated with the risk of developing non-Hodgkin’s lymphoma. The WHO designation has resulted in increased concern and scrutiny over glyphosate’s safety. Numerous agencies, including: the US EPA, the European Chemicals Agency (ECHA), the German Federal Institute for Risk Assessment, and the European Food Safety Authority have conducted reviews. Many of the reviews have conflicting or inconsistent opposing views as to the scientific evidence supporting classification of glyphosate as a carcinogen.



However, due to its listing by IARC, the State of California Office of Environmental Health Hazard Assessment added glyphosate to the list of chemicals known to the state to cause cancer for purposes of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986. The designation has also increased the number of legal cases against manufacturers of glyphosate and glyphosate-incorporating products.

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What is glyphosate?

Glyphosate (N-(phosphonomethyl)glycine), CAS No. 1071-83-6) is a broad-spectrum, non-selective herbicide. It is generally applied to the leaves of plants to kill both unwanted broadleaf plants and grasses. Glyphosate prevents plants from making certain proteins necessary for plant growth. Wilting and death of the unwanted plants usually occurs in 7 to 10 days. In addition, the sodium salt form of glyphosate is used to regulate plant growth and ripen fruit.

Glyphosate was first registered for use in the US in 1974 and is one of the most widely-used herbicides in the US. According to the US Environmental Protection Agency (US EPA), on average, almost 200 million pounds of glyphosate are applied annually to agricultural crops. Application is highest on soybeans, with annual average applications of 100 million pounds applied in the US alone. The crops with the highest average percent crop treated with glyphosate is soybeans, followed by oranges, almonds, cotton, grapefruit, and pistachios.

Due to the volume used and broad applications, glyphosate is found in the environment, food products, and drinking water. The US EPA has established food tolerances and a federal drinking water standard (maximum contaminant level) for glyphosate. Glyphosate is periodically reviewed by a number of international agencies as part of its pesticide renewal process, and glyphosate has generally been identified as having low toxicity to humans, fish, and wildlife relative to many other pesticides. However, some products containing glyphosate may be toxic due to other ingredients. Glyphosate may affect fish and wildlife indirectly because killing the plants alters the animals' habitat.

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Environmental releases and application

Off-target drift. Environmental releases of glyphosate would be expected to primarily occur during glyphosate application. Off-target drift of glyphosate during application reduces product efficacy, can damage nearby crops that are economically or aesthetically important, can hurt wildlife, and may contaminate water supplies. Drift can also deposit illegal residues on eatable crops, especially organic-grown crops or processed crops that are checked for contaminants.



Chemical run-off. Into the environment is also of concern; as glyphosate binds to soil, soil erosion should be minimized. Glyphosate can also enter the environment through direct aquatic application.

Pre- and post-emergence applications. Glyphosate is registered in the US for pre- and post-emergence application to a variety of fruit, vegetable, and field crops. Post-emergent applications are either soil-directed, though over-the-top applications are permitted for genetically modified crops. Harvest-aid (desiccant) applications are also registered for a number of cereal grain, legume, vegetable, non-grass animal feed, and oilseed crops. Glyphosate is also registered for application to turf (including golf courses and residential lawns) and for aquatic application.

Other chemicals relevant to the glyphosate discussion include the following salts that dissociate to free glyphosate (listed below by CAS number and name):

- 38641-94-0 (Glyphosate - isopropyl amine salt)
- 40465-66-5 (monoammonium salt)
- 69254-40-6 (diammonium salt)
- 34494-03-6 (Glyphosate - sodium)
- 81591-81-3 (Glyphosate -trimesium)

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Glyphosate attributes and applications

Glyphosate is the active ingredient in many products, including Roundup®. In solid form it is an odorless, white powder or colorless, crystalline (sand-like) solid. Commercial products are sold in liquid, solid, and ready-to-use formulations, and are typically applied using ground and aerial equipment. Small hand-held sprayers may also be utilized. Glyphosate is used in many applications:

- Fruit, vegetable, and other food crops
- Ornamental plantings, lawns and turf, greenhouses, aquatic areas (including surface waters used for potable purposes), forest plantings, and roadside rights-of-way for total vegetation control
- Glyphosate-resistant (transgenic) crop varieties such as canola, corn, cotton, soybeans, sugar beets, and wheat.

Glyphosate binds to soil and can persist in soil for up to six (6) months depending on the climate and the type of soil it is in. Leaching into groundwater is somewhat inhibited as it binds to soil; however, glyphosate can enter surface water through erosion, and be taken up by vegetables after soil is treated with it.



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