



National Primary Drinking Water Regulations

Glyphosate

CHEMICAL/ PHYSICAL PROPERTIES

CAS NUMBER: 1071-83-6

COLOR/ FORM/ODOR:
Odorless white crystals

M.P.: 230° C B.P.: N/A

VAPOR PRESSURE: Negligible

OCTANOL/WATER PARTITION (Kow): N/A

DENSITY/SPEC. GRAV.: 0.5g/ml at 15° C

SOLUBILITY: 12 g/L of water at 25° C;
Soluble in water

SOIL SORPTION COEFFICIENT:
Strong, reversible adsorption

ODOR/TASTE THRESHOLDS: N/A

HENRY'S LAW COEFFICIENT: N/A

BIOCONCENTRATION FACTOR:

BCF <1 in fish; not expected to bioconcentrate in aquatic organisms.

TRADE NAMES/SYNONYMS:

N-(phosphonomethyl) glycine; Gialka;
Roundup; Sting; Rodeo; Spasor;
Muster; Tumbleweed; Sonic; Glifonox;
Glycel; Rondo

DRINKING WATER STANDARDS

MCLG: 0.7 mg/L

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HAL(child): 1- to 10- day: 20 mg/L
Longer-term: 1 mg/L

HEALTH EFFECTS SUMMARY

Acute: EPA has found glyphosate to potentially cause the following health effects from acute exposures at levels above the MCL: congestion of the lungs; increased breathing rate.

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day, upto a ten-day exposure to 20 mg/L or up to a 7-year exposure to 1 mg/L.

Chronic: Glyphosate has the potential to cause the following health effects from long-term exposures at levels above the MCL: kidney damage, reproductive effects.

Cancer: There is inadequate evidence to state whether or not glyphosate has the potential to cause cancer from a lifetime exposure in drinking water.

USAGE PATTERNS

Glyphosate is a non-selective herbicide registered for use on many food and non-food crops as well as non-crop areas where total vegetation control is desired. When applied at lower rates, it serves as a plant growth regulator. The most common uses include control of broadleaf weeds and grasses in : hay/pasture, soy-

beans, field corn; ornamentals, lawns, turf, forest plantings, greenhouses, rights-of-way.

Glyphosate is among the most widely used pesticides by volume. In 1986, an estimated 6,308,000 pounds of glyphosate was used in the United States. Usage in 1990 was estimated to be 11,595,000 pounds. It ranked eleventh among conventional pesticides in the US during 1990-91. In recent years, 13 to 20 million acres were treated with 18.7 million lbs. annually. Glyphosate is generally sold as the isopropylamine salt and applied as a liquid foliar spray.

RELEASE PATTERNS

Glyphosate is released to the environment in its use as a herbicide for controlling woody and herbaceous weeds on forestry, right-of-way, cropped and non-cropped sites. These sites may be around water and in wetlands.

It may also be released to the environment during its manufacture, formulation, transport, storage, disposal and cleanup, and from spills. Since glyphosate is not a listed chemical in the Toxics Release Inventory, data on releases during its manufacture and handling are not available.

ENVIRONMENTAL FATE

Glyphosate is most often applied as a spray of the isopropylamine salt and is removed from the atmosphere by gravitational settling. After glyphosate is applied to forests, fields, and other land by spraying, it is strongly adsorbed to soil, remains in the upper soil layers, and has a low propensity for leaching. Iron and aluminum clays and organic matter adsorbed more glyphosate than

sodium and calcium clays and was readily bound to kaolinite, illite, bentonite, charcoal and muck but not to ethyl cellulose.

Glyphosate readily and completely biodegrades in soil even under low temperature conditions. Its average half-life in soil is about 60 days. Biodegradation in foliage and litter is somewhat faster. In field studies, residues are often found the following year.

Glyphosate may enter aquatic systems through accidental spraying, spray drift, or surface runoff. It dissipates rapidly from the water column as a result of adsorption and possibly biodegradation. The half-life in water is a few days. Sediment is the primary sink for glyphosate. After spraying, glyphosate levels in sediment rise and then decline to low levels in a few months. Due to its ionic state in water, glyphosate would not be expected to volatilize from water or soil.

Based on its water solubility, glyphosate is not expected to bioconcentrate in aquatic organisms. It is minimally retained and rapidly eliminated in fish, birds, and mammals. The BCF of glyphosate in fish following a 10-14 day exposure period was 0.2 to 0.3.

Occupational workers and home gardeners may be exposed to glyphosate by inhalation and dermal contact during spraying, mixing, and cleanup. They may also be exposed by touching soil and plants to which glyphosate was applied. Occupational exposure may also occur during glyphosate's manufacture, transport storage, and disposal.

OTHER REGULATORY INFORMATION

MONITORING:

FOR GROUND/SURFACE WATER SOURCES:

INITIAL FREQUENCY- 4 quarterly samples every 3 years

REPEAT FREQUENCY- If no detections during initial round:

2 quarterly per year if serving >3300 persons;

1 sample per 3 years for smaller systems

TRIGGERS - Return to Initial Freq. if detect at > 0.006 mg/L

ANALYSIS:

REFERENCE SOURCE	METHOD NUMBERS
EPA 600/4-88-039	547
Standard Methods	6651

TREATMENT:

BEST AVAILABLE TECHNOLOGIES

Granular Activated Charcoal

FOR ADDITIONAL INFORMATION:

- EPA can provide further regulatory and other general information:
- EPA Safe Drinking Water Hotline - 800/426-4791

- Other sources of toxicological and environmental fate data include:
- Toxic Substance Control Act Information Line - 202/554-1404
- Toxics Release Inventory, National Library of Medicine - 301/496-6531
- Agency for Toxic Substances and Disease Registry - 404/639-6000
- ???National Pesticide Hotline - 800/858-7378