Product Safety Assessment

Haloxyfop-P Methyl Ester

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Names
• CAS No. 72619-32-0
• Haloxyfop
• Haloxyfop methyl ester
• GALLANT® super herbicide
• GALLANT 10 EC herbicide
• GALLANT NF herbicide
• GALLANT R herbicide
• GALLANT ultra herbicide
• GALANT® herbicides
• 2-[4-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]oxyphenoxy]propanoic acid

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Product Overview
• Haloxyfop-P methyl ester is the common name for the resolved active isomer of 2-[4-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]oxyphenoxy]propanoic acid, methyl ester, the active ingredient in several herbicides registered to Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company. For further details, see Product Description.
• Haloxyfop-P methyl ester is a white crystalline solid, but is normally formulated as an emulsifiable concentrate. The formulated products are yellow-to-brown liquids marketed primarily under the tradenames VERDICT® herbicides and GALLANT® herbicides.¹² For further details, see Product Description.
• Haloxyfop-P methyl ester is an herbicide used for selective control of grass weeds in crop and non-crop situations.³ For further details, see the relevant Product Label and Product Uses.
• Workers could be exposed to the material during manufacturing or formulating operations or during herbicide application in the field. Consumers could be exposed to Haloxyfop-P methyl ester when using it or following applications of the product at nurseries, orchards, or other areas. Consumers could possibly be exposed to traces of Haloxyfop-P methyl ester by consumption of residues in food. For further details, see Exposure Potential.
• Eye contact with concentrated herbicide formulation may result in moderate irritation with corneal injury. Prolonged or repeated skin contact may cause irritation, drying or flaking, or even a burn. Prolonged skin contact is not likely to result in absorption of harmful amounts.

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No adverse effects are anticipated from a single inhalation exposure. For further details, see Health Information or the Safety Data Sheet.

- The bioconcentration potential (tendency to accumulate in the food chain) for Haloxyfop methyl ester is low to moderate. It is expected to degrade under environmental conditions and if released in the environment would not persist. Haloxyfop-P methyl ester is highly toxic to aquatic organisms on an acute basis and slightly toxic to birds on an acute basis. For further details, see Environmental Information or the relevant Product Label.
- Haloxyfop methyl ester herbicide formulations are stable under normal storage and use conditions. Avoid contact with strong oxidizers. Consult the Product Label for specific use and storage information. For further details, see Physical Hazard Information.

Manufacture of Product

- Manufacture – Dow AgroSciences manufactures Haloxyfop at facilities in Drusenheim, France and formulates products in several facilities around the world.
- Process – Haloxyfop is produced using a complex and proprietary process. The structures of Haloxyfop and Haloxyfop-P methyl ester are shown below.

![Chemical Structures](image)

Product Description

Haloxyfop-P methyl ester is the common name for \((\text{R})\)-2-[4-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]oxyphenoxy]propanoic acid, the active ingredient in several herbicides manufactured by Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company. Haloxyfop-P methyl ester is a white crystalline solid, but is normally formulated as a water-dispersible, emulsifiable concentrate. The formulated products are yellow-to-brown liquids that contain 10 to 48% active ingredient, with the balance petroleum solvents and stabilizers. Haloxyfop-P methyl ester herbicide formulations are sold primarily under the tradenames VERDICT® herbicides and GALLANT® herbicides. Several other tradenames are also in use in different parts of the world.

VERDICT herbicides are formulations of Haloxyfop-P methyl ester dissolved in diethylene glycol monoethyl ether solvent. This summary is written primarily for the active ingredient, Haloxyfop-P methyl ester. For more detailed information on diethylene glycol monoethyl ether, please consult Diethylene Glycol Monoethyl Ether PSA.

Product Uses and Regulatory Information

Haloxyfop-P methyl ester is a post-emergent, systemic herbicide, meaning it disrupts the internal growth processes of established weeds resulting in plant death 2 to 3 weeks following application. The active ingredient is usually applied by spray as a single application of Haloxyfop-P methyl ester at rates between 35 and 108 grams of active ingredient per hectare per growing season. It is readily absorbed into the plant through the leaves. Haloxyfop-P methyl ester is a highly selective graminicide which has no effect on broadleaf crops, while providing excellent control of annual and perennial grasses, such as, but not limited to: wild oat (Avena fatua), quackgrass.
Haloxyfop-P methyl ester products are registered for use in many countries including Argentina, Australia, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, New Zealand, South Africa and Turkey. Approval for the active substance was gained in the European Union in 2010, with national product authorizations anticipated in 2012 or 2013.

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of Haloxyfop-P methyl ester. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant country-specific Product Label, Safety Data Sheet, or Contact Us.

Exposure Potential

Haloxyfop-P methyl ester is used in the formulation of commercial and residential herbicides. Based on the uses for Haloxyfop-P methyl ester, the public could potentially be exposed through:

- **Workplace exposure** – Exposure could occur in facilities that manufacture or formulate Haloxyfop-P methyl ester. Those working with these products in these operations could be exposed during maintenance, sampling, testing, or other procedures. Each facility has a thorough training program for employees and appropriate work processes and safety equipment in place to limit unnecessary exposure. Agricultural workers, roadside-maintenance workers, and others using this product could be exposed while applying herbicide in the field. Applicators are expected to follow label precautions, including wearing personal protective equipment that is appropriate to the application method. See Health Information and Product Label.

- **Consumer exposure to products containing Haloxyfop-P methyl ester** – Consumers could be exposed to traces of Haloxyfop-P methyl ester by consuming residues in food; however, when used appropriately, residues are not likely to be harmful. Amounts ingested incidentally during the handling or use of the product are not likely to be harmful. See Health Information.

- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil, ditches, sewers, waterways, or groundwater. Absorb small spills with a dry material such as sand, Zorball, sawdust, or dirt. Wash thoroughly after handling. Haloxyfop-P methyl ester is expected to degrade under environmental conditions and, if released in the environment, would be removed by normal wastewater-treatment processes. This material is highly toxic to aquatic organisms on an acute basis. This description provides a general overview; please consult the relevant Safety Data Sheet or Product Label for more information about protective equipment and procedures. See Environmental, Health, and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, dike the area to keep the material contained and out of waterways. Personnel engaged in clean up of spills must wear appropriate protective equipment. Consult the relevant Safety Data Sheet or Product Label for more detailed information about protective equipment and procedures.
**In case of fire** – Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective clothing. Use foam, carbon-dioxide, or dry-chemical extinguishers to fight the fire. Foam is preferred because uncontrolled water can spread possible contamination. Toxic and irritating gases may be formed in the fire. Follow emergency procedures carefully. Consult the Product Label and Safety Data Sheet for specific fire-fighting measures. See Environmental, Health, and Physical Hazard Information.

**Emergency Response Information** – In case of an emergency, such as poisoning, product spillage, or fire associated with a Dow AgroSciences product in the United States, call 800-992-5994 (more information is available at www.dowagro.com/company/contact/index.htm). For emergencies outside the U.S., access www.dowagro.com/products/ for a list of country sites or contact pages for relevant information.

**Health Information**

Health information for Haloxyfop-P methyl ester products is summarized on relevant country specific Safety Data Sheets. It is important to note that health risks associated with individual products may vary based on their formulation or intended use. The Safety Data Sheet is the preferred source for specific health information. These formulations may contain components or additives that have additional health risks. An overview of health information for Haloxyfop-P methyl ester technical product appears below.

**Eye contact** – Eye contact may result in moderate irritation with corneal injury. Vapor may cause eye irritation experienced as mild discomfort and redness.

**Skin contact** – Brief skin contact is essentially nonirritating. Prolonged or repeated skin contact may cause irritation, drying or flaking, or even a burn. Prolonged skin contact is not likely to result in absorption of harmful amounts.

**Inhalation** – No adverse effects are anticipated from a single exposure to vapor.

**Ingestion** – This material is classified as slightly hazardous based on an oral LD$_{50} > 300$ mg/kg for the active constituent. Swallowing small amounts incidental to normal handling operations is not likely to cause injury. However, swallowing large amounts may cause injury.

**Cancer and birth defect** – Haloxyfop-P methyl ester is not classified as a carcinogen or a reproductive toxin, and is not mutagenic.

For more information, see the relevant Product Label or Safety Data Sheet.

**Environmental Information**

Based on the product chemistry and environmental data, when used appropriately Haloxyfop-P methyl ester herbicide formulations are expected to have minimal environmental impact and not expected to leach into groundwater. The bioconcentration potential (tendency to accumulate in the food chain) for Haloxyfop-P methyl ester is low to moderate. Although not considered readily biodegradable or photodegradable, it does degrade in soil under environmental conditions and, if released in the environment, would not persist and would be removed by normal wastewater-treatment processes.
Haloxyfop-P methyl ester is highly toxic to aquatic organisms on an acute basis and slightly toxic to birds and honeybees on an acute basis.

For more information, see the relevant Product Label or Safety Data Sheet.

Physical Hazard Information

Haloxyfop-P methyl ester herbicide formulations are stable under normal use and storage conditions. Store the material in tightly closed original container. When not in use, store in a cool, dry, well-ventilated area out of direct sunlight. This product can be stored in an unheated building. Do not store with food, foodstuffs, fertilizers, and seeds.

Avoid contact with strong oxidizers. Some formulated products can be combustible because of the hydrocarbon solvents in the formulation. Under fire conditions oxides of nitrogen, hydrogen chloride, and hydrogen fluoride may be produced. Consult the Product Label for specific use and storage information.

For more information, see the relevant Product Label or Safety Data Sheet.

Additional Information

- Safety Data Sheets and Product Labels (www.dowagro.com/products/).
- Contact Us (www.dowagro.com/company/contact/index.htm).

For more business information about Haloxyfop-P methyl ester products, visit the Dow AgroSciences LLC website at www.dowagro.com/.

References


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“Maximize Cropping Yields,” Dow AgroSciences LLC, Form No. 012-00168, undated page 2.

11 GALLANT NF Herbicide Specimen Label, Dow AgroSciences LLC, UN Number 3082, February 2, 2007, page 1.

12 GALLANT Ultra Herbicide Specimen Label, Dow AgroSciences LLC, UN Number 3082, January 12, 2009, page 1.


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