Product Safety Assessment

Cloransulam-methyl

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Names
- CAS No. 147150-35-4
- N-(2-carboxymethyl-6-chlorophenyl)-5-ethoxy-7-fluoro-(1,2,4)-triazolo[1,5c]-pyrimidine-2-sulfonamide
- Cloransulam-methyl
- FIRSTRATE® herbicide
- FRONTROW® co-pack herbicide
- SONIC® herbicide
- PACTO® herbicide

Much of the information in this document relates to the registration and sale of cloransulam-methyl in the United States of America. For details applicable to the country of interest, consult the relevant Product Label, Safety Data Sheet or Contact Us.

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Product Overview

- Cloransulam-methyl is the common name for the active ingredient in several broadleaf herbicides registered to Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company. Its mode of action is to inhibit the production of certain amino acids, thereby interrupting meristem cell growth in susceptible weeds. For further details, see Product Description.
- Cloransulam-methyl is an off-white powder with a minty odor that is typically formulated as water-dispersible granules in premeasured water-soluble packets. For further details, see Product Description.
- Cloransulam-methyl can be applied pre-plant, pre-emergence, and post-emergence for broadleaf weed control in soybeans. For further details, see the relevant Product Label and Product Uses.
- Those working in manufacturing, formulation, distribution operations, or during field application of these products could be exposed. Workers can minimize the potential for exposure by carefully following workplace procedures and label directions and wearing the proper protective equipment. Exposure resulting from ingestion of agricultural products treated with cloransulam-methyl has been estimated to be at an acceptable level for consumers. For further details, see the relevant Product Label and Exposure Potential.
- Eye contact may cause slight, temporary irritation. Prolonged skin contact is essentially nonirritating and unlikely to result in absorption of harmful amounts. No adverse effects are anticipated from a single inhalation exposure to product dust. Very low toxicity if swallowed. For further details, see Health Information or the Safety Data Sheet.
Microbial degradation is the primary route of cloransulam-methyl dissipation. The rate of degradation is dependent on soil type (i.e., amount of organic content), moisture content, and the exposure to sunlight. Cloransulam-methyl is practically nontoxic to fish, birds, earthworms, and honeybees on an acute basis. It is very highly toxic to certain aquatic plants. Cloransulam-methyl is not likely to accumulate in the food chain (has low bioconcentration potential).7,8 For further details, see the relevant Product Label and Environmental Information.

Cloransulam-methyl formulations are stable under normal use and storage conditions. Under fire conditions, oxides of nitrogen and halogen derivatives may be formed.9 Consult the Product Label for specific use and storage information. For further details, see Physical Hazard Information.

Manufacture of Product

- Manufacture – Cloransulam-methyl is produced using a complex and proprietary series of reaction and purification steps. The chemical structure of cloransulam-methyl is shown below:

![Chemical Structure of Cloransulam-methyl]

Product Description10,11

Cloransulam-methyl is the common name for N-(2-carboxymethyl-6-chlorophenyl)-5-ethoxy-7-fluoro-(1,2,4)-triazolo[1,5c]-pyrimidine-2-sulfonamide, the active ingredient in several herbicides registered to Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company. This product is a highly active low-dose technology compound. Its mode of action is to inhibit an enzyme that plants must have to synthesize amino acids for growth. Cloransulam-methyl is an off-white powder with a minty odor that is typically formulated as water-dispersible granules in premeasured water-soluble packets. Formulated cloransulam-methyl products contain about 84% active ingredient, with the balance inert ingredients. Cloransulam-methyl formulations are marketed under the trade names FIRSTRATE® herbicide, FRONTROW® co-pack herbicide, SONIC® herbicide, and PACTO® herbicide.

Product Uses and Regulatory Information12,13

The principal use for cloransulam-methyl herbicide is for soil-applied and postemergence control of broadleaf weeds in soybeans. It is readily absorbed by broadleaf weeds via roots, shoots, and foliage. Registration has been approved in the United States, Argentina, Bolivia, Brazil, Paraguay, and Canada.

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of products containing cloransulam-methyl. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Product Label, Safety Data Sheet, or Contact Us.
Exposure Potential\textsuperscript{14}

Cloransulam-methyl is used in the production of commercial herbicides. Based on the uses for cloransulam-methyl, the public could potentially be exposed through:

- **Workplace exposure** – Exposure could occur in facilities that manufacture or formulate cloransulam-methyl. Those working with cloransulam-methyl in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Each facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit exposure. Agricultural workers could be exposed while applying this product 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 cloransulam-methyl** – Consumers could be exposed to trace amounts of cloransulam-methyl through ingestion of residues in soybean products or drinking water. To ensure pesticide safety with regard to human health, the United States Environmental Protection Agency (EPA) performs comprehensive risk-assessment calculations using conservative estimates of pesticide concentrations in drinking water, food, and nonfood sources. Risk-assessment calculations for cloransulam-methyl were performed for long-term exposures from soybeans and drinking water. Based on these assessments, the EPA concluded “there appears to be no aggregate risk concern associated with the use of cloransulam-methyl on soybeans.”\textsuperscript{15} See Health Information and Product Label.

- **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. Cloransulam-methyl breaks down in soil by microbial degradation. If released to the environment, it would not persist and would be removed by wastewater-treatment facilities. If a spill occurs outdoors, cover the spilled pouches with moisture-proof material to prevent degradation of water-soluble pouches. Sweep up with care so as not to generate airborne product dust, which may be a potential explosion hazard. Do not vacuum. Avoid the use of water for cleanup. If FIRSTRATE\textsuperscript{®} herbicide is dispersed in water, use absorbent material to contain the spill then sweep up absorbed material and store in a suitable container. 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. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Consult the Product Label and Safety Data Sheet for specific firefighting measures. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Use water fog, carbon-dioxide (CO\textsubscript{2}) or dry-chemical extinguishers, or foam to fight the fire. Contain firewater for future disposal. Toxic and irritating gases and fumes can be formed in a fire. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

- **Emergency response information** – In the case of an emergency such as poisoning, product spillage, or fire associated with a Dow AgroSciences product in the U.S. call 800-992-5994. (More information is available at www.dowagro.com/company/contact/index.htm.) For emergencies outside the U.S., use the phone number listed on the Safety Data Sheet for the appropriate country. In some countries, the Emergency Response number is also provided on the artwork of the commercial package.
Health Information\textsuperscript{16,17}

Laboratory testing – Cloransulam-methyl has been evaluated by comprehensive regulatory schemes used to register products in the U.S. and in geographies where the product is used. These schemes require laboratory testing for potential short-term (acute) and long-term (chronic) health effects. These tests help scientists determine how chemicals might affect humans, domestic animals, or wildlife in cases of potential overexposure. Pesticide products used according to label directions are unlikely to cause toxic effects.

Health information for products containing cloransulam-methyl is summarized on the relevant product Safety Data Sheets. It is important to note that health risks associated with individual products may vary based on their formulation or intended use. Formulated products may contain solvents, minor components, or additives that have additional health risks. The Safety Data Sheet is the preferred source for specific health information. An overview of health information for technical cloransulam-methyl (the unformulated active ingredient) appears below.

\textbf{Eye contact} – Contact may cause slight, temporary irritation. Corneal injury is unlikely.

\textbf{Skin contact} – Prolonged contact is essentially nonirritating and unlikely to result in absorption of harmful amounts.

\textbf{Inhalation} – No adverse effects are anticipated from a single inhalation exposure to product dust.

\textbf{Ingestion} – Very low toxicity if swallowed. Harmful effects are not anticipated from swallowing small amounts.

\textbf{Repeated exposure} – In laboratory testing, effects have been reported on the kidneys, liver, testes, and thyroid.

\textbf{Cancer information} – Cloransulam-methyl did not cause cancer in laboratory testing. This product contains a low level (0.5\%) of dichloromethane, a confirmed animal carcinogen.

\textbf{Developmental, reproductive, and genetic information} – In laboratory testing, cloransulam-methyl did not cause birth defects or other effects even at doses that caused toxic effects in the mother. This material did not interfere with reproduction. \textit{In vitro} and genetic toxicity studies were negative.

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

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Environmental Information\textsuperscript{18,19}

Although it cannot be considered readily biodegradable, cloransulam-methyl is broken down in soil and water by microbial degradation and exposure to sunlight. If released to the environment, it would not persist and would be subject to removal by common wastewater-treatment facilities. Cloransulam-methyl has a low bioconcentration potential (tendency to accumulate in the food chain) and high soil mobility. The potential for groundwater contamination by cloransulam-methyl is considered to be low because of its low use rates, short soil half-life, rapid anaerobic degradation in groundwater, and rapid degradation in surface water exposed to sunlight (half-life <30 minutes).

Cloransulam-methyl can be highly toxic to certain aquatic plants and algae on an acute (single, high dose) basis. It is practically nontoxic to birds, fish, honeybees, small mammals, earthworms, and aquatic vertebrates on an acute basis.

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

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Physical Hazard Information

Cloransulam-methyl formulations are stable under normal use and storage conditions. Under fire conditions, oxides of nitrogen and halogen derivatives may be formed. Water-soluble packets can become brittle if stored at temperatures below 0°C (32°F). 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/label/index.htm)
- Contact Us (www.dowagro.com/company/contact/index.htm)
- FIRSTRATE® Herbicide Specimen Label, Dow AgroSciences LLC, Label code: D02-34-015, Revised January 20, 2011 (http://www.cdms.net/idat/id24M017.pdf)
- FIRSTRATE® Herbicide Fact Sheet: Pre-plant, pre-emergence, and post-emergence broadleaf control in soybeans, Dow AgroSciences LLC, Form No. 010-56473 (http://msdssearch.dow.com/PublishedLiteratureDAS/dh_0038/0901b80380038a79.pdf?filepath=usag/pdfs/noreg/010-56473.pdf&fromPage=GetDoc)

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

References

4. FIRSTRATE® Herbicide Fact Sheet: Pre-plant, pre-emergence, and post-emergence broadleaf control in soybeans, Dow AgroSciences LLC, Form No. 010-56473, page 1.

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12 “Cloransulam-methyl Level 1: Active Ingredient Module,” Technology Transfer Resource Guide, Dow AgroSciences LLC.
13 FIRSTRATE® Herbicide Fact Sheet: Pre-plant, pre-emergence, and post-emergence broadleaf control in soybeans, Dow AgroSciences LLC, Form No. 010-56473, page 1.
16 Cloransulam-methyl Technical Material Safety Data Sheet, Dow AgroSciences LLC, April 4, 2011, pages 1–2 and 5.

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NOTICES:

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

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