



Product Safety Assessment *Myclobutanil*

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Names

- CAS No. 88671-89-0
- Myclobutanil
- Myclobutanil, technical
- α -Butyl- α -(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile
- 2-(4-Chlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl) hexanenitrile
- EAGLE[®] 20EW Fungicide
- EAGLE WSP Turf and Ornamental Fungicide
- EAGLE 0.39% Granular Turf Fungicide
- MASALON[®] Fungicide
- MYCLOSS[®] Xtra Fungicide
- NOVA[®] 40W Agricultural Fungicide
- RALLY[®] 200EW Fungicide
- RALLY 40WSP Fungicide
- SYSTHANE[®] 125 Fungicide
- SYSTHANE 200EW Fungicide
- SYSTHANE 10WP Fungicide
- SYSTHANE 400WP Fungicide

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Product Overview

- Myclobutanil is the common name for the active ingredient in several fungicide products registered to Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company. Its mode of action is inhibition of the enzyme C14 demethylase which is involved in the synthesis of ergosterol, a component of fungal cellular membranes.¹ For further details, see the relevant [Product Label](#) and [Product Description](#).
- Myclobutanil technical is a light yellow solid with a sulfur-like odor. It can be formulated into liquid emulsion, powder, or granular fungicides.² For further details, see the relevant [Product Label](#) and [Product Description](#).
- Myclobutanil is used to control a broad spectrum of diseases in many perennial and annual crops, turf varieties, landscape ornamental plants, fruit trees, and vines.^{3,4} For further details, see the relevant [Product Label](#) and [Product Uses](#).
- Those working in manufacturing or formulation of fungicides or who apply fungicides or reenter treated areas could be exposed to myclobutanil. Workers can minimize the potential for exposure by carefully following handling procedures and label directions and wearing the proper protective equipment. Consumers could be exposed to residues in certain foods.^{5,6} For further details, see the relevant [Product Label](#) and [Exposure Potential](#).
- Eye contact with myclobutanil may cause moderate irritation. Brief skin contact is essentially nonirritating and is unlikely to result in absorption of harmful amounts or an allergic response.⁷ For further details, see [Health Information](#) or the [Safety Data Sheet](#).

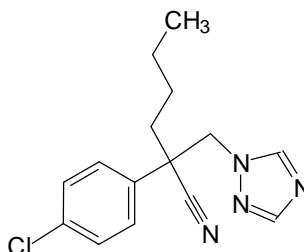
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- Myclobutanil has low mobility in soil and, since it biodegrades slowly, may be persistent in soil under aerobic conditions. If released to water, it would adsorb to suspended solids and sediment. It would be removed by biological wastewater-treatment facilities as biosolids. The potential for bioconcentration is low. Myclobutanil is highly toxic to aquatic organisms on an acute basis.^{8,9} For further details, see the relevant [Product Label](#) and [Environmental Information](#).
- Myclobutanil is thermally stable at recommended storage and normal use conditions. Avoid exposure to elevated temperatures, which can cause this material to decompose, or with strong oxidizers.¹⁰ For further details, see the relevant [Product Label](#) and [Physical Hazard Information](#).

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Manufacture of Product

Process – Myclobutanil is produced using proprietary processes and materials. The chemical structure is shown below:



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Product Description¹¹

Myclobutanil technical is a light yellow solid with a sulfur-like odor. Myclobutanil is the common name for the active ingredient in several fungicide products registered to Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company. Its mode of action is inhibiting the synthesis of ergosterol, a component of fungal cell membranes. It can be formulated into liquid emulsion, powder, or granular fungicides. Myclobutanil formulations are marketed and sold in Australia, Canada, India, New Zealand, South Africa, the European Union, the United States, and other countries under a variety of trade names, including EAGLE[®] fungicide, MASALON[®] fungicide, MYCLOSS[®] fungicide, NOVA[®] agricultural fungicide, RALLY[®] fungicide, and SYSTHANE[®] fungicide.

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Product Uses & Regulatory Information^{12,13}

Myclobutanil is used to control a diverse range of economically important plant pathogens including powdery mildews, dollar spot, summer patch, brown patch, rusts, and scab in a range of crops including established turf grasses, landscape ornamentals, greenhouse and nursery ornamentals, apple trees, stone fruit trees, almonds, strawberries, vegetables, soybeans and grape vines.

Myclobutanil products are registered and authorized for use in all countries in which they are sold, including, but not limited to: Australia, Canada, India, New Zealand, South Africa, the European Union and the United States.

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Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of myclobutanil. 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](#).

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Exposure Potential^{14,15,16}

Myclobutanil is used in the formulation of fungicides. Based on the uses for myclobutanil, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in facilities that manufacture or formulate myclobutanil or products containing myclobutanil. Those working with myclobutanil could be exposed during maintenance, sampling, testing, or other procedures. Each facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit exposure. Applicators could be exposed while applying this product. 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 myclobutanil** – Consumers could be exposed to trace amounts of myclobutanil through ingestion of residues in fruit or drinking water. To ensure product safety with regard to human health, the United States Environmental Protection Agency (EPA) performs comprehensive risk-assessment calculations using conservative estimates of fungicide concentrations in drinking water, food, and nonfood sources. The EPA has determined that there is reasonable certainty that no harm to any population subgroup will result from aggregate exposure to myclobutanil when considering dietary exposure from food and water.¹⁷ 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. Myclobutanil is nonvolatile. It has low mobility in soil and, since it biodegrades slowly, will remain there under aerobic conditions. If released to water, it would adsorb to suspended solids and sediment. It would be removed by biological wastewater-treatment facilities as biosolids. The potential for bioconcentration is low. Myclobutanil is highly toxic to aquatic organisms on an acute basis. Consult the relevant [Safety Data Sheet](#) or [Product Label](#) for 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 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 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**. In Europe, Middle East & Africa countries call **31-115-694-982** (Netherlands). More information is available at www.dowagro.com/company/contact/index.htm. For emergencies in other countries, 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 commercial package.

For more information, see the [Product Label](#) or [Safety Data Sheet](#).

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Health Information^{18,19}

Health information for myclobutanil is summarized on the relevant [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 products may also contain minor components or additives that have additional health risks. An overview of health information for myclobutanil technical appears below.

Laboratory testing – Myclobutanil has been comprehensively evaluated under regulatory frameworks used for registration and approval of fungicides in the United States, the European Union, Canada, Australia, New Zealand, India, Republic of South Africa, and a number of other countries. These regulatory frameworks require laboratory testing for potential acute, short-term, and long-term health effects. These tests help scientists and regulators determine how chemicals might affect humans, domestic animals, or wildlife in case of exposure. Fungicide products used according to label directions are unlikely to cause toxic effects. The amount of fungicide to which people and pets may be exposed is very low compared to that used in laboratory testing.

Eye contact – Contact may cause moderate eye irritation and slight corneal injury.

Skin contact – Brief contact is essentially nonirritating. Prolonged contact is unlikely to result in absorption of harmful amounts.

Inhalation – Prolonged excessive exposure to mist may cause irritation to the upper respiratory tract (nose and throat).

Ingestion – This material has low toxicity if swallowed. Swallowing small amounts incidental to normal handling operations is not likely to cause injury; however, swallowing larger amounts may cause injury.

Repeated exposure – In animal testing, effects have been reported on the adrenal gland, kidney, liver, testes, and thyroid.

Birth defects/developmental effects – In animal testing, this material has been toxic to the fetus at doses that are nontoxic to the mother.

Reproductive effects – In animal testing, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

For more information, see the [Product Label](#) or [Safety Data Sheet](#).

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Environmental Information^{20,21}

Myclobutanil is nonvolatile and has low mobility in soil. If released into a soil environment, it would remain in soil. If released into water, it would adsorb to suspended solids or sediment. Myclobutanil is not readily biodegradable, but will biodegrade slowly under environmental conditions. It would be removed by biological wastewater-treatment facilities as biosolids. Myclobutanil has a low bioconcentration potential (tendency to accumulate in the food chain).

Myclobutanil is highly toxic to aquatic organisms on an acute basis (LC/EC₅₀ between 0.1 and 1 mg/L in the most sensitive species tested). Myclobutanil is practically nontoxic to birds on a dietary basis (LC₅₀>5000ppm), but is slightly toxic to birds on an acute basis (LD₅₀ between 501 and 2000 mg/kg).

For more information, see the [Product Label](#) or [Safety Data Sheet](#).

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Physical Hazard Information²²

Myclobutanil is stable under recommended storage and normal use conditions, but can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure build-up in closed systems. Decomposition products depend on temperature, air supply, and the presence of other materials, but can include carbon monoxide, carbon dioxide, hydrogen chloride, hydrogen cyanide, and nitrogen oxides. Avoid contact with strong oxidizers. Consult the [Product Label](#) for specific use and storage information.

For more information, see the [Product Label](#) or [Safety Data Sheet](#).

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Additional Information

- Safety Data Sheets and Product Labels (www.dowagro.com/products/label/index.htm)
- Contact Us (www.dowagro.com/company/contact/index.htm)
- *EAGLE[®] 20EW Specialty Fungicide Infosheet*, Dow AgroSciences LLC, March 2006 (http://msdssearch.dow.com/PublishedLiteratureDAS/dh_004e/0901b8038004e8c7.pdf?filepath=turf/pdfs/noreg/010-60414.pdf&fromPage=GetDoc)
- *EAGLE[®] 20EW Specialty Fungicide Product Review*, Dow AgroSciences LLC, June 2005 (http://msdssearch.dow.com/PublishedLiteratureDAS/dh_005e/0901b8038005e421.pdf?filepath=turf/pdfs/noreg/010-60320.pdf&fromPage=GetDoc)
- Dow AgroSciences web site: U.S. Agriculture: RALLY[®] 40WSP Fungicide (www.dowagro.com/usag/prod/073.htm)
- Dow AgroSciences web site: Turf & Ornamental: Fungicides: EAGLE[®] 20EW Specialty Fungicide (www.dowagro.com/turf/products/fungicides/eagle_20ew.htm)
- *Decision Document E93-01: Myclobutanil*, Information Division, Plant Industry Directorate, Agriculture Canada, June 15, 1993 (<http://publications.gc.ca/collections/Collection/H93-013-4-93-01E.pdf>)
- "Myclobutanil; CASRN 88671-89-0," Hazardous Substance Data Bank, National Library of Medicine TOXNET system, accessed August 3, 2012 (<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb:@term+@na+MYCLOBUTANIL>)

For more business information about myclobutanil, visit the website for [Dow AgroSciences](http://www.dowagro.com/) at www.dowagro.com/.

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References

- ¹ *EAGLE[®] 20EW Specialty Fungicide Infosheet*, Dow AgroSciences LLC, March 2006, page 1.
- ² *Decision Document E93-01: Myclobutanil*, Information Division, Plant Industry Directorate, Agriculture Canada, June 15, 1993, page 2.
- ³ Dow AgroSciences web site: U.S. Agriculture: RALLY[®] 40WSP Fungicide. (www.dowagro.com/usag/prod/073.htm)
- ⁴ Dow AgroSciences web site: Turf & Ornamental: Fungicides: EAGLE[®] 20EW Specialty Fungicide. (www.dowagro.com/turf/products/fungicides/eagle_20ew.htm)
- ⁵ *EAGLE[®] 20EW Specimen Label*, Dow AgroSciences LLC, Revised September 21, 2011, page 1.
- ⁶ "Myclobutanil; CASRN 88671-89-0," Hazardous Substance Data Bank, National Library of Medicine TOXNET system, accessed August 3, 2012, Human Health Effects: Probable Routes of Human Exposure.
- ⁷ *Myclobutanil Technical Fungicide Material Safety Data Sheet*, Dow AgroSciences LLC, January 21, 2011, Hazards Identification and Toxicological Information.
- ⁸ *Myclobutanil Technical Fungicide Material Safety Data Sheet*, Dow AgroSciences LLC, January 21, 2011, Ecological Information.
- ⁹ *Decision Document E93-01: Myclobutanil*, Information Division, Plant Industry Directorate, Agriculture Canada, June 15, 1993, page 31.

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- ¹⁰ *Myclobutanil Technical Fungicide Material Safety Data Sheet*, Dow AgroSciences LLC, January 21, 2011, Stability and Reactivity.
- ¹¹ Dow AgroSciences web site: U.S. Agriculture: RALLY® 40WSP Fungicide. (www.dowagro.com/usag/prod/073.htm)
- ¹² Dow AgroSciences web site: Turf & Ornamental: Fungicides: Eagle® 20EW Specialty Fungicide. (www.dowagro.com/turf/products/fungicides/eagle_20ew.htm)
- ¹³ *EAGLE® 20EW Specimen Label*, Dow AgroSciences LLC, Revised September 21, 2011, page 1.
- ¹⁴ *Decision Document E93-01: Myclobutanil*, Information Division, Plant Industry Directorate, Agriculture Canada, June 15, 1993, page 31.
- ¹⁵ *Myclobutanil Technical Fungicide Material Safety Data Sheet*, Dow AgroSciences LLC, January 21, 2011, Hazards Identification, Fire Fighting Measures, Accidental Release Measures, Exposure Controls/Personal Protection, and Stability and Reactivity.
- ¹⁶ "Myclobutanil; CASRN 88671-89-0," Hazardous Substance Data Bank, National Library of Medicine TOXNET system, accessed August 3, 2012, Human Health Effects: Probable Routes of Human Exposure.
- ¹⁷ "Myclobutanil; CASRN 88671-89-0," Hazardous Substance Data Bank, National Library of Medicine TOXNET system, accessed August 3, 2012, Human Health Effects: Probable Routes of Human Exposure.
- ¹⁸ *Myclobutanil Technical Fungicide Material Safety Data Sheet*, Dow AgroSciences LLC, January 21, 2011, Hazards Identification and Toxicological Information.
- ¹⁹ "Myclobutanil; CASRN 88671-89-0," Hazardous Substance Data Bank, National Library of Medicine TOXNET system, accessed August 3, 2012, Human Health Effects: Probable Routes of Human Exposure.
- ²⁰ *Decision Document E93-01: Myclobutanil*, Information Division, Plant Industry Directorate, Agriculture Canada, June 15, 1993, page 31.
- ²¹ *Myclobutanil Technical Fungicide Material Safety Data Sheet*, Dow AgroSciences LLC, January 21, 2011, Ecological Information.
- ²² *Myclobutanil Technical Fungicide Material Safety Data Sheet*, Dow AgroSciences LLC, January 21, 2011, Stability and Reactivity.

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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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