Product Safety Assessment

Diclosulam

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Names
• CAS No. 145701-21-9
• Diclosulam
• Diclosulam technical
• [1,2,4]Triazolo[1,5-c]pyrimidine-2-sulfonamide, N-(2,6-dichlorophenyl)-5-ethoxy-7-fluoro
• N-(2,6-dichlorophenyl)-5-ethoxy-7-fluoro[1,2,4]triazolo[1,5-c]pyrimidine-2-sulfonamide

Although much of the information in this document supports the registration and sale of diclosulam in the United States of America, diclosulam-based products are also registered and sold in Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay. For further details consult the country-specific Product Label, Safety Data Sheet, or Contact Us.

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Product Overview

• Diclosulam is the common name for the active ingredient in STRONGARM® herbicide, SPIDER® herbicide, and COACT® herbicide marketed by Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company.¹ For further details, see Product Description.
• Diclosulam technical is an off-white powder with no significant odor.² For further details, see Product Description.
• Diclosulam-based products are primarily used for control of annual and certain perennial broadleaf weeds when applied as soil, foliar, or burndown treatments in crops such as sugar cane, peanuts and soybeans, as well as forestry applications.³ For further details, see the country-specific Product Label, Product Uses, or Contact Us.
• Those working in manufacturing, packaging, or distribution operations could be exposed to diclosulam. Applicators may be exposed to diclosulam during field application. Workers using diclosulam-based products must wear proper protective equipment and follow label instructions carefully.⁵ For further details, see the country-specific Product Label, Product Uses, or Contact Us.
• Contact with diclosulam may cause moderate eye irritation. Brief contact is essentially nonirritating to the skin.⁶ For further details, see Health Information or the Safety Data Sheet.
• Diclosulam technical is very highly toxic to aquatic organisms on an acute basis. It is practically nontoxic to birds, mammals, insects, earthworms, fish and aquatic invertebrates. Diclosulam has moderate water solubility. When used appropriately, diclosulam and end-products that contain the chemical are not expected to adversely affect the environment or

¹ Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow
leach into groundwater. For further details, see Environmental Information or Product Label.

- Diclosulam technical is stable under recommended storage conditions. Avoid temperatures above 210°C (410°F). Thermal decomposition products depend upon temperature, air supply and the presence of other materials. Consult the Product Label for specific use and storage information. For further details, see Physical Hazard Information.

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Manufacture of Product

Diclosulam is produced by The Dow Chemical Company in Midland, Michigan, USA. The chemical structure of diclosulam is shown below.

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Product Description

Diclosulam is the common name for N-(2,6-dichlorophenyl)-5-ethoxy-7-fluoro[1,2,4]triazolo[1,5-c]pyrimidine-2-sulfonamide. It is the active ingredient in a series of commercial-grade herbicides formulated and sold by Dow AgroSciences LLC, along with other companies around the globe. Diclosulam is an off-white, odorless powder. Its mode of action is to inhibit the synthesis of certain enzymes needed to synthesize plant amino acids.

Dow AgroSciences sells formulated herbicide containing diclosulam under several trade names around the world. Some examples of these formulations are listed in the table below.

<table>
<thead>
<tr>
<th>Trademark</th>
<th>Active</th>
<th>Type</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPIDER® 840 WG</td>
<td>diclosulam, 840 g</td>
<td>WG</td>
<td>Brazil</td>
</tr>
<tr>
<td>SPIDER®</td>
<td>diclosulam, 840 g</td>
<td>WG</td>
<td>Argentina, Bolivia, Paraguay</td>
</tr>
<tr>
<td>COACT® herbicide</td>
<td>diclosulam, 840 g</td>
<td>WG</td>
<td>Brazil</td>
</tr>
<tr>
<td>STRONGARM®</td>
<td>diclosulam, 840 g</td>
<td>WG</td>
<td>United States</td>
</tr>
</tbody>
</table>

Most diclosulam formulations are water dispersible granules.

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Product Uses and Regulatory Information

Diclosulam products are registered in Argentina, Bolivia, Brazil, Chile, Paraguay, the United States and Uruguay for use by farmers to control annual and certain perennial broadleaf weeds. These products can be applied as soil, foliar, or burndown treatments in crops such as sugar cane, peanuts and soybeans and in forestry applications.

As an active ingredient, diclosulam has activity both when soil-applied or postemergence. Diclosulam can be soil-applied in any tillage system, since it does not require incorporation. The
herbicide is a highly active, low-dose compound. Its longevity in the soil makes diclosulam ideal for control of broadleaf weeds in soybeans and peanuts.

As a soil-applied treatment, diclosulam can be preplant surface applied, preplant incorporated, or applied preemergence. When used in a mixture with a grass herbicide, the combination provides broad-spectrum weed control. When applied as a postemergence treatment, diclosulam can be applied following an incorporated or preemergence grass treatment or following a post-grass treatment or tank-mixed with certain post-grass products. Post-applied treatments of diclosulam employ lower rates than soil-applied treatments.

As an active ingredient, diclosulam has activity both soil-applied and post-applied and is used in both the peanut and soybean markets. However, specific registrations and local marketing plans will dictate which use patterns are used in each region. Always consult the product label. For further details, consult the country-specific Safety Data Sheet, Product Label, or Contact Us.

Regulations also exist that govern the manufacture, sale, transportation, and/or disposal of diclosulam-based products. These regulations may vary by city, state, country, or geographic region. For further details, consult the country-specific Safety Data Sheet, Product Label, or Contact Us.

Exposure Potential

Diclosulam is used in the production of commercial herbicides. Based on uses for diclosulam, the public could be exposed through:

- **Workplace exposure** – Exposure can occur in a facility that manufactures or formulates diclosulam. Those working with diclosulam in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Each manufacturing and formulating facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit unnecessary exposure. Agricultural workers could be exposed to diclosulam during field application. Wearing proper protective equipment and following label instructions will reduce the potential for exposure. See Health Information and Product Label.
- **Consumer exposure to products containing diclosulam** – Consumers could be exposed to trace amounts of diclosulam through ingestion of residues in soybean or peanut products or drinking water. Consumer exposure to diclosulam is expected to be minimal. Diclosulam is not available for home use. Diclosulam use is restricted in some field situations, based on soil type and proximity to ground or surface water. See Health Information.
- **Environmental releases** – For small spills, wear appropriate protective clothing and eye protection to minimize the potential for skin and eye contact. Absorb spills with sand, sawdust, Zorball, or dirt and shovel material into an open drum. Wash exposed body areas thoroughly after handling. Please consult the country-specific Safety Data Sheet or Product Label for more information about protective equipment and procedures. See Environmental, Health, and Physical Hazard Information.
- **Large release** – Industrial releases are infrequent and generally contained. If a large release does occur, evacuate the area immediately and stay upwind. Personnel engaged in clean-up of spills must wear appropriate protective equipment. Consult the country-specific 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 country-specific Product Label and Safety Data Sheet for specific firefighting measures. 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 United States, call 800-992-5994.
In Brazil, call Rede Nacional de Centros de informação e Assistência Toxicológica RENACIAT - ANVISA/MS at 0800-7710032, or Dow DowAgroSciences Franco da Rocha at (55) (11) 4449-1600.


In Chile call Convenio CITUC/AFIPA at (2) 635 3800, or CITUC QUIMICO at (2) 247 3600. For emergencies in countries not listed, go to www.dowagro.com/company/contact/index.htm for additional information.

Health Information

Laboratory testing – Diclosulam 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 overexposure. Herbicide products used according to label directions are unlikely to cause toxic effects. The amount of herbicide to which people and pets may be exposed is very low compared to those used in laboratory testing.

Health information for formulated diclosulam products is summarized on the 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. Formulated products may contain solvents, minor components, or additives that have additional health risks. The Safety Data Sheets are the preferred source for specific health information. An overview of health information for diclosulam technical product appears below.

Eye contact – Contact may cause moderate eye irritation. Corneal injury is unlikely. Solid or dust may cause irritation or corneal injury due to mechanical action.

Skin contact – Brief contact is essentially nonirritating to skin. Prolonged contact is essentially non-irritating to skin.

Inhalation – No adverse effects are anticipated from any single exposure to dust.

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

Repeated Exposure – In animals, effects have been reported in the liver, kidney and bone marrow.

Cancer and Birth Defect Information – Diclosulam did not cause cancer in laboratory animals and was negative in genetic toxicity studies (in vitro and in vivo). It did not interfere with reproduction in laboratory animals or cause birth defects, or other effects in the fetus, even at doses which caused toxic effects in the mother.

For more information, see the country-specific Product Label, Safety Data Sheet, or Contact Us.
Environmental Information\textsuperscript{18,19,20}

Diclosulam technical is very highly toxic to aquatic organisms on an acute basis. It is practically nontoxic to birds, mammals, insects, earthworms, fish and aquatic invertebrates on an acute basis.

Once in the soil, diclosulam herbicide is either free in the soil solution or absorbed to soil. Diclosulam that absorbs to soil will not leach out and is not available for plant uptake or microbial breakdown. Diclosulam has moderate water solubility. When used appropriately, diclosulam and end-products that contain the chemical are not expected to adversely affect the environment or leach into groundwater. As with any herbicide, good management practices should always be used to reduce the likelihood of unintentional ground- or surface-water contamination.

For more information, see the country-specific Product Label, Safety Data Sheet, or Contact Us.

Physical Hazard Information\textsuperscript{21}

Diclosulam technical is stable under recommended storage conditions. Avoid temperatures above 210°C (410°F). Diclosulam decomposes above its melting temperature. Thermal decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to carbon monoxide, carbon dioxide, hydrogen chloride, hydrogen fluoride, nitrogen oxides, and sulfur oxides.

Avoid contact with strong oxidizers.

Consult the Product Label for specific use and storage information. For more information, see the country-specific Product Label, Safety Data Sheet, or Contact Us.

Additional Information

- Safety Data Sheets and Product Labels (www.dowagro.com/products_LABEL/index.htm)
- Contact Us (www.dowagro.com/company/contact/index.htm)
- STRONGARM\textsuperscript{®} Herbicide Specimen Label, Dow AgroSciences LLC, Label code: D02-044-007, Revised July 23, 2010 (http://www.cdms.net/idat/id3M2015.pdf)

For more business information about diclosulam products, visit the Dow AgroSciences LLC web site at www.dowagro.com.

References

1 STRONGARM\textsuperscript{®} Specimen Label, Dow AgroSciences LLC, Revised July 23, 2010, page 1.
4 STRONGARM\textsuperscript{®} Specimen Label, Dow AgroSciences LLC, Revised July 23, 2010, page 2.

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NOTICES:

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