



BAYER CROP SCIENCE

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TRANSPORTATION EMERGENCY

CALL CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

NON-TRANSPORTATION

BAYER EMERGENCY PHONE...: (800) 414-0244
BAYER INFORMATION PHONE.: (800) 842-8020

1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME.....: BAYER ADVANCED GARDEN 2-in-1 Systemic Rose & Flower Care RTU Granules
PRODUCT CODE.....: 41003
CHEMICAL FAMILY.....: Organophosphorous Insecticide
CHEMICAL NAME.....: O,O-Diethyl S-(2-(ethylthio)ethyl) phosphorodithioate
SYNONYMS.....: Disulfoton
FORMULA.....: C8 H19 O2 P S3
PRODUCT USE.....: Consumer Insecticide

2. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER EXPOSURE LIMITS CONCENTRATION (%)

\*\*\*\*\* HAZARDOUS INGREDIENTS \*\*\*\*\*

DI-SYSTON (disulfoton)
298-04-4 OSHA : .10 mg/m3 TWA (skin) 1%
ACGIH: .10 mg/m3 TWA
Fertilizer 12-18-6
OSHA : Not Established 98-99 %
ACGIH: Not Established

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3. HAZARDS IDENTIFICATION:  
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\* EMERGENCY OVERVIEW \*  
\* \*  
\* WARNING! Color: Dark gray; Form: Solid; Granules; Odor: \*  
\* Bitter bubble gum; Organophosphate Insecticide - \*  
\* Cholinesterase Inhibitor; May be fatal if swallowed. \*  
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POTENTIAL HEALTH EFFECTS:

ROUTE(S) OF ENTRY.....: Inhalation; Skin Contact; Skin Absorption;  
Eye Contact; Ingestion

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE EFFECTS OF EXPOSURE.....: Exposure during the labeled use of this product is expected to be minimal. Consumers should refer to the packaging label for proper handling procedures. However, sufficient exposure to disulfoton, the active ingredient in this product, may result in systemic intoxication due to inhibition of the enzyme cholinesterase. The sequence of development of systemic effects varies with the route of entry, and the onset of symptoms may be delayed up to 12 hours. First symptoms of poisoning may be nausea, increased salivation, lacrimation, blurred vision and constricted pupils. Other symptoms of systemic poisoning include vomiting, diarrhea, abdominal cramping, dizziness and sweating. After inhalation, respiratory symptoms like tightness of chest, wheezing, and laryngeal spasms, may be pronounced at first. If the poisoning is severe, then symptoms of convulsions, low blood pressure, cardiac irregularities, loss of reflexes and coma may occur. In extreme cases, death may occur due to a combination of factors such as respiratory arrest, paralysis of respiratory muscles or intense bronchoconstrictions. Complete symptomatic recovery from sublethal poisoning usually occurs within one week once the source of exposure is completely removed. The fertilizer contained in this product may cause eye, skin or mucous membrane irritation. Ingestion may cause nausea.

CHRONIC EFFECTS OF EXPOSURE...: Cholinesterase inhibition sometimes persists for 2-6 weeks, thus repeated exposure to small amounts of this material may result in an unexpected cholinesterase depression causing symptoms such as malaise, weakness, and anorexia that resemble other illnesses such as influenza. Exposure to a concentration that would not have produced symptoms in a person that was not previously exposed may produce severe symptoms of cholinesterase inhibition in a previously exposed person.

CARCINOGENICITY.....: This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS

AGGRAVATED BY EXPOSURE.....: No specific medical conditions are known which

3. HAZARDS IDENTIFICATION (Continued)

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may be aggravated by exposure to the active ingredient in this product. However, any disease, medication or prior exposure which reduces normal cholinesterase activity may increase susceptibility to the toxic effects of the active ingredient. Pre-existing respiratory disease may be aggravated by sufficient exposure to the fertilizer component.  
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4. FIRST AID MEASURES:

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FIRST AID FOR EYES.....: Hold eyelids open and flush with plenty of water for 15 minutes. Seek medical attention immediately.

FIRST AID FOR SKIN.....: Remove contaminated clothing. Wash skin with soap and water. Get medical attention if irritation develops or persists.

FIRST AID FOR INHALATION: If a person is overcome by excessive exposures to aerosols of this material, remove to fresh air or uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention as soon as possible.

FIRST AID FOR INGESTION.: If ingestion is suspected, call a physician or poison control center. If medical assistance cannot be given immediately, drink large quantities of water. DO NOT induce vomiting. Seek medical attention. Avoid alcohol. Do not attempt to give anything by mouth to an unconscious or convulsing person.

NOTE TO PHYSICIAN.....: This product contains the organophosphorus insecticide disulfoton, a cholinesterase inhibitor. Cholinesterase inhibition results in stimulation of the central nervous system, the parasympathetic nervous system and the somatic motor nerves. If symptoms of organophosphate poisoning are present, the administration of atropine sulfate is indicated. Administer atropine sulfate in large, therapeutic doses. In mild cases, start treatment by giving 1-2 mg of atropine intravenously every 15 minutes until signs of atropinization appear (dry mouth, flushing, and dilated pupils if pupils were originally pinpoint). In severe cases, start treatment by giving 2-4 mg intravenously every 5-10 minutes until fully atropinized. Dosages for children should be appropriately reduced. 2-PAM is also antidotal and may be used in conjunction with atropine. Do not give morphine. Watch for pulmonary edema which may develop in serious cases of poisoning even after 24 hours. At first sign of pulmonary edema, place patient in oxygen tent and treat symptomatically.

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5. FIRE FIGHTING MEASURES:  
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FLASH POINT.....: Not applicable

EXTINGUISHING MEDIA.....: Water; Carbon Dioxide; Dry Chemical; Foam

5. FIRE FIGHTING MEASURES (Continued)

SPECIAL FIRE FIGHTING PROCEDURES: Keep out of smoke; cool exposed containers with water spray. Fight fire from upwind position. Use self-contained breathing equipment. Contain runoff by diking to prevent entry into sewers or waterways. Equipment or materials involved in pesticide fires may become contaminated.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES.....: Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid breathing dusts and skin contact. Avoid generating dust (a fine water spray mist, plastic film cover, or floor sweeping compound may be used if necessary). Wear proper protective equipment. Carefully sweep up spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with detergent and bleach solution. Repeat. Rinse with water. Use dry absorbent material such as clay granules to absorb and collect wash solution for proper disposal. Contaminated soil may have to be removed and disposed. Do not allow material to enter streams, sewers, or other waterways or contact vegetation.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): None/30 day avg. not to exceed 100 F (38 C)  
SHELF LIFE.....: Time/Temperature dependent. Specific information available upon request.  
SPECIAL SENSITIVITY.....: Not established  
HANDLING/STORAGE PRECAUTIONS: Do not allow product to contaminate material which is intended for use or consumption by humans or animals.

8. PERSONAL PROTECTION:

REQUIRED WORK/HYGIENE PROCEDURES...: Exposure during the labeled use of this product is expected to be minimal. Consumers should refer to the packaging label for proper handling procedures. However, if exposure to this product is possible while handling large quantities such as in subsequent manufacturing, transportation spills or other emergencies, the following personal protection is recommended.  
EYE PROTECTION REQUIREMENTS.....: Goggles  
SKIN PROTECTION REQUIREMENTS.....: Long sleeves and trousers  
HAND PROTECTION REQUIREMENTS.....: Chemical-resistant gloves such as latex or nitrile.  
VENTILATION REQUIREMENTS.....: Maintain exposure levels below applicable

8. PERSONAL PROTECTION (Continued)

limits through the use of general and local exhaust ventilation.  
RESPIRATOR REQUIREMENTS.....: If needed, based on the conditions of use, wear a NIOSH-approved organic vapor respirator with particulate pre-filter.  
MEDICAL SURVEILLANCE.....: Plasma and/or red blood cell cholinesterase activity can be used to detect excessive absorption of DI-SYSTON (disulfoton). It is preferable to establish a pre-exposure baseline value for best comparisons. Contact Bayer Corp., Agriculture Division, for additional information. If significant cholinesterase depression occurs, no further exposure should be allowed until cholinesterase values return to normal.  
ADDITIONAL PROTECTIVE MEASURES.....: Clean water should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of the product. Follow all label instructions. Launder clothing separately after use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM.....: Solid  
APPEARANCE.....: Granules  
COLOR.....: Dark gray  
ODOR.....: Bitter bubble gum  
MOLECULAR WEIGHT.....: 274.4 (for disulfoton)  
BOILING POINT.....: Not applicable  
MELTING/FREEZING POINT....: Not applicable  
SOLUBILITY IN WATER .....: 15 ppm (for disulfoton)  
SPECIFIC GRAVITY .....: Not applicable  
BULK DENSITY.....: 62-70 lb./cu.ft. (typical)  
VAPOR PRESSURE .....:  $1.7 \times 10^{-5}$  mm Hg @ 20 C (for disulfoton)

10. STABILITY AND REACTIVITY:

STABILITY.....: This is a stable material.  
HAZARDOUS POLYMERIZATION...: Will not occur.  
INCOMPATIBILITIES.....: Strong oxidizing agents, bases and strong mineral acids.  
INSTABILITY CONDITIONS.....: Sustained temperatures above 100 F (38 C)  
DECOMPOSITION PRODUCTS.....: For Disulfoton: Proposed under extreme conditions (e.g. fire): SO<sub>2</sub>, H<sub>3</sub>PO<sub>4</sub>, CO, C<sub>2</sub>H<sub>5</sub>SH, diethyl disulfide

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11. TOXICOLOGICAL INFORMATION:  
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Acute toxicity studies have not been performed on this product as formulated. The acute toxicity data provided is from a similar systemic rose and flower care formulation containing a similar amount of the active ingredient, disulfoton. The remaining non-acute information is on technical grade disulfoton.

ACUTE TOXICITY

ORAL LD50.....: Male Rat: 1411 mg/kg; Female Rat: 347 mg/kg

DERMAL LD50.....: Male and Female Rabbit: >2000 mg/kg

INHALATION LC50....: 4 HR Exposure to Dust: Male Rat: 3.59 mg/L (actual);  
Female: 1.16 mg/L (actual); 1 HR Exposure to Dust (extrapolated from 4 HR  
LC50): Male Rat: 14.36 mg/L (actual); Female Rat: 4.64 mg/L (actual)

EYE EFFECTS.....: Rabbit: Moderate irritation to the iris and/or  
conjunctiva was observed with all irritation clearing within 7 days  
post-treatment.

SKIN EFFECTS.....: Rabbit: Minimal erythema and/or edema was observed  
with all irritation clearing within 48 hours post-treatment.

SENSITIZATION.....: Guinea Pig: Not a dermal sensitizer.

SUBCHRONIC TOXICITY...: In a 13 week inhalation study, rats were exposed to  
disulfoton for 6 hr./day, 5 days/week at mean analytical concentrations of  
0.018, 0.16 or 1.4 mg/m<sup>3</sup>. At the highest concentration, compound-related  
effects included cholinesterase inhibition and an increased incidence of  
inflammation of the nasal turbinates. The no-observed-effect-level (NOEL) was  
0.16 mg/m<sup>3</sup>. In dermal toxicity studies, disulfoton was administered to the  
back of rabbits for 6 hr./day, 5 days/week for 3 weeks at levels ranging from  
0.4 up to 6.5 mg/kg. Cholinergic symptoms including muscle spasms, tremors,  
salivation, and difficult breathing were observed in rabbits at 3.0 mg/kg and  
greater. Mortality also occurred at these levels. The NOEL for these studies  
was 0.8 mg/kg based on cholinesterase inhibition.

CHRONIC TOXICITY.....: In a 1 year study, dogs were administered disulfoton at  
dietary concentrations of 0.5, 4 or 12 ppm. The only significant effects  
observed in the study were the inhibition of cholinesterase activities. The  
NOEL was 0.5 ppm on the basis of cholinesterase inhibition. Disulfoton was  
administered to rats at dietary concentrations of 1, 4 or 16 ppm for 2 years.  
Effects observed at the high dose included decreased food consumption,  
decreased body weight gain, cholinesterase inhibition, eye effects and  
increased mortality. The NOEL for systemic effects was 4 ppm. In a  
subsequent 6 month study in which rats were administered disulfoton at dietary  
concentrations of 0.25, 0.5 or 1.0 ppm, the overall NOEL for cholinesterase  
inhibition was 0.5 ppm.

CARCINOGENICITY.....: Disulfoton was investigated for carcinogenicity in  
chronic feeding studies using rats and mice. There was no evidence of a  
carcinogenic effect in either species at dose levels up to and including 16  
ppm, the highest dose tested.

MUTAGENICITY.....: A number of mutagenicity studies have been conducted on  
disulfoton. Three in vitro studies showed disulfoton to be a potential  
mutagen, however, these results were not substantiated in in vivo testing.

11. TOXICOLOGICAL INFORMATION (Continued)

DEVELOPMENTAL TOXICITY: In a developmental toxicity study, rats were administered disulfoton during gestation at oral doses of 0.1, 0.3 or 1.0 mg/kg/day. Maternal cholinesterase inhibition occurred at 0.3 mg/kg and greater. At the maternally toxic dose of 1.0 mg/kg, there was an increased incidence of incomplete ossification of the sternebrae in fetuses. The NOELs for maternal and developmental toxicity were 0.1 and 0.3 mg/kg/day, respectively. Teratogenic effects were not found at any of the levels tested. Rabbits were administered disulfoton during gestation at oral doses of 0.3, 1.0 or 3.0 mg/kg/day. Due to severe toxic responses and deaths at 3.0 mg/kg, this dose was lowered to 2.0 and later for most animals again to 1.5 mg/kg/day. The NOEL for maternal toxicity was 1.0 mg/kg/day. There was no evidence of disulfoton causing a teratogenic or an embryotoxic effect up to the highest dose tested.

REPRODUCTION.....: In a two-generation reproductive toxicity study, disulfoton was administered to rats at dietary concentrations of 0.5, 2 or 9 ppm. Reproductive and litter effects occurring in conjunction with severe maternal toxicity were observed at the high dose. These effects included cannibalism, decreased pup body weight, decreased litter size, decreased median number of implantations and effects on cholinesterase activities. The NOELs for parental and reproductive toxicity were 0.5 and 2 ppm, respectively.

NEUROTOXICITY .....: In an acute oral neurotoxicity study using rats, disulfoton was administered as a single dose to males at 0.24, 1.5 or 5.2 mg/kg and to females at 0.24, 0.76 or 1.5 mg/kg. Clinical observations and neurotoxicity evaluations were performed over a period of 15 days followed by a neurohistopathological examination. There was no evidence of neurotoxicity in either sex at any of the dose levels tested. In a supplemental cholinesterase activity study using rats, disulfoton was administered as a single oral dose to males at 0.25, 1.5 or 4.9 mg/kg and to females at 0.25, 0.77 or 1.5 mg/kg. The NOEL for cholinesterase inhibition was 0.25 mg/kg in both sexes. In a 13 week neurotoxicity screening study, disulfoton was administered to rats at dietary concentrations of 0.9, 3.8 and 14.5 ppm. There were behavioral and clinical biochemical evidence of cholinergic toxicity but no evidence of a neurotoxic effect in rats at dietary concentrations up to and including 14.5 ppm, the highest concentration tested. There was no evidence of acute delayed neurotoxicity in antidote protected hens treated with disulfoton at an oral dose exceeding the LD50 in hens.

12. ECOLOGICAL INFORMATION:

This pesticide is toxic to fish and wildlife. It is also toxic to bees when exposed to direct application. Bayer will provide a summary of specific data upon written request. As with any pesticide, this product should be used according to label directions and should be kept out of streams, lakes and other aquatic habitats of concern.

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13. DISPOSAL CONSIDERATIONS  
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WASTE DISPOSAL METHOD.....: Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, dispose of in a RCRA hazardous waste incinerator.

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14. TRANSPORTATION INFORMATION:  
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TECHNICAL SHIPPING NAME.....: Disulfoton 1%  
FREIGHT CLASS PACKAGE.....: Insecticides, NOI - NMFC 102120  
PRODUCT LABEL.....: Not Noted

DOT (DOMESTIC SURFACE)  
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HAZARD CLASS OR DIVISION .....: Non-Regulated

IMO / IMDG CODE (OCEAN)  
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HAZARD CLASS DIVISION NUMBER...: Non-Regulated

ICAO / IATA (AIR)  
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HAZARD CLASS DIVISION NUMBER...: Non-Regulated  
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15. REGULATORY INFORMATION:  
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OSHA STATUS.....: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA STATUS.....: This product is exempt from TSCA Regulation under FIFRA Section 3 (2)(B)(ii) when used as a pesticide.

CERCLA REPORTABLE QUANTITY..: 100 pounds of the formulation which contains 1 pound of Disulfoton.

SARA TITLE III:

SECTION 302 EXTREMELY

HAZARDOUS SUBSTANCES..: Disulfoton CAS #298-04-4 1%

SECTION 311/312

HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard

SECTION 313

TOXIC CHEMICALS.....: No components listed.

RCRA STATUS.....: When discarded in its purchased form, this product is a listed RCRA hazardous waste and



15. REGULATORY INFORMATION (Continued)

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should be managed as a hazardous waste. (40 CFR  
261.20-24) (PO39)

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16. OTHER INFORMATION:  
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NFPA 704M RATINGS:      Health      Flammability      Reactivity      Other  
                               2                     1                     1  
                               0=Insignificant    1=Slight    2=Moderate    3=High    4=Extreme

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer as a customer service.

REASON FOR ISSUE.....: Revise Product Name  
PREPARED BY.....: V. C. Standart  
APPROVED BY.....: D. C. Eberhart  
TITLE.....: Director Product Safety & Stewardship  
APPROVAL DATE.....: 12/14/2001  
SUPERSEDES DATE.....: 10/11/1999  
MSDS NUMBER.....: 37284

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Product Code: 41003  
Approval date: 12/14/2001

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