

MATERIAL SAFETY DATA SHEET

BRIGADIER® INSECTICIDE



MSDS Ref. No.: F18-71-5
Date Approved: 07/26/2007
Revision No.: 1

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the EC directive, 2001/58/EC and other regulatory requirements. The information contained herein is for the concentrate as packaged, unless otherwise noted.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BRIGADIER® INSECTICIDE
PRODUCT CODE: 6369
ACTIVE INGREDIENT(S): Bifenthrin*; Imidacloprid**
CHEMICAL FAMILY: Pyrethroid*; Chloronicotinyl**
MOLECULAR FORMULA: $C_{23}H_{22}ClF_3O_2^*$; $C_9H_{10}ClN_5O_2^{**}$
SYNONYMS: FMC 54800; (2-methyl[1,1'-biphenyl]-3-yl)methyl 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate; IUPAC: 2-methylbiphenyl-3-ylmethyl (Z)-(1RS)-cis-3-(2-chloro-3,3,3-trifluoroprop-1-enyl)-2,2-dimethylcyclopropanecarboxylate*; 1-((6-chloro-3-pyridinyl)methyl)-N-nitro-2-imidazolidinimine**

ADDITIONAL SYNONYM(s): Bifenthrin / Imidacloprid F6550 SC

MANUFACTURER

FMC CORPORATION
Agricultural Products Group
1735 Market Street
Philadelphia, PA 19103
(800) 321-1362 (General Information)
msdsinfo@fmc.com (Email - General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 331-3148 (FMC - U.S.A. & Canada)
(716) 735-3765 (FMC - Reverse charges)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A. & Canada)
(703) 527-3887 (CHEMTREC - All Other Countries)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- White to tan liquid with a mild odor.
- Slightly combustible. May support combustion at elevated temperatures.

- Thermal decomposition and burning may form toxic by-products.
- For large exposures or fire, wear personal protective equipment.
- Highly toxic to fish and aquatic organisms. Keep out of drains and water courses.
- Highly toxic if swallowed.

POTENTIAL HEALTH EFFECTS: Effects from overexposure may result from either swallowing, inhaling or coming into contact with the eyes or skin. Symptoms of overexposure include tremors, convulsions, decreased activity and piloerection. Contact with bifenthrin may occasionally produce skin sensations such as rashes, numbing, burning or tingling. These skin sensations are reversible and usually subside within 12 hours.

MEDICAL CONDITIONS AGGRAVATED: Persons with pre-existing eye or skin conditions may be more sensitive to glycerin.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt. %	EC No.	EC Class
Bifenthrin	82657-04-3	11.3	None	R25-20-43-50/53; S1/2-23-24-37-38-45-29
Imidacloprid	138261-41-3	11.3	None	Not classified
Glycerin	56-81-5	6	200-289-5	Not classified
Surfactant Blend		<4	None	Not classified
Xanthan gum	11138-66-2	<0.2	234-394-2	Not classified

4. FIRST AID MEASURES

EYES: Flush with plenty of water. Get medical attention if irritation occurs and persists.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Drink plenty of water. Never give anything by mouth to an unconscious person. If any discomfort persists, obtain medical attention.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has high oral and, low dermal and inhalation toxicity. It is non-irritating to the eyes, and slightly irritating and non-sensitizing to the skin. Reversible skin sensations (paresthesia) may occur and ordinary skin salves have been found useful in

reducing discomfort. Treatment is otherwise controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Foam, CO₂ or dry chemical. Soft stream water fog only if necessary. Contain all runoff.

FIRE / EXPLOSION HAZARDS: Slightly combustible. This material may support combustion at elevated temperatures.

FIRE FIGHTING PROCEDURES: Isolate fire area. Evacuate downwind. Wear full protective clothing and self-contained breathing apparatus. Do not breathe smoke, gases or vapors generated.

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Isolate and post spill area. Wear protective clothing and personal protective equipment as prescribed in Section 8, "Exposure Controls/Personal Protection". Keep unprotected persons and animals out of the area.

Keep material out of streams and sewers. Large spills should be covered to prevent dispersal. For dry material, use a wet sweeping compound or water to prevent the formation of dust. If water is used, prevent runoff or dispersion of excess liquid by diking and absorbing with a non-combustible absorbent such as clay, sand or soil. Vacuum, shovel or pump waste into a drum and label contents for disposal.

To clean and neutralize contaminated area, scrub area with a solution of detergent (e.g. commercial product such as SuperSoap™, Tide®, Spic and Span®, or other high pH detergent) and water. Let solution sit for 5 minutes. Use a stiff brush to scrub affected area. Repeat if necessary to remove visible staining. Additional decontamination can be made by applying bleach (Clorox® or equivalent) to affected area.

Absorb wash-liquid as noted above, remove visibly contaminated soil and place into recovery / disposal container (plastic, open-top steel drum or equivalent). Place all clean-up material in a container, seal and dispose of in accordance with the method outlined in Section 13 "Disposal Considerations" below.

For further information on spill clean-up, waste disposal, or return of salvaged product, call the FMC Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

7. HANDLING AND STORAGE

HANDLING AND STORAGE: Store in a cool, dry, well-ventilated place. Do not use or store near heat, open flame or hot surfaces. Store in original containers only. Keep out of reach of children and animals. Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Glycerin	10 mg/m ³	15 mg/m ³ (total dust)	
Xanthan gum		15 mg/m ³ (8-hour TWA) (total dust) 5 mg/m ³ (8-hour TWA) (respirable)	

ENGINEERING CONTROLS: Use local exhaust at all process locations where vapor or mist may be emitted. Ventilate all transport vehicles prior to unloading.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: For splash, mist or spray exposure, wear chemical protective goggles or a face shield with safety glasses.

RESPIRATORY: For splash, mist or spray exposures wear, as a minimum, a properly fitted half-face or full-face air-purifying respirator which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization). Respirator use and selection must be based on airborne concentrations.

PROTECTIVE CLOTHING: Depending upon concentrations encountered, wear coveralls or long-sleeved uniform and head covering. For larger exposures as in the case of spills, wear full body cover barrier suit, such as a rubber rain suit. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this products concentrate. Do not reuse them. Leather items -such as shoes, belts and watchbands - that become contaminated should also be removed and destroyed. Launder all work clothing before reuse (separately from household laundry).

GLOVES: Wear chemical resistant, waterproof gloves. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

WORK HYGIENIC PRACTICES: Clean water should be available for washing in case of eye or skin contamination. Wash skin prior to eating, drinking, chewing gum, or using tobacco. Shower at the end of the workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Mild
APPEARANCE:	White to tan liquid
DENSITY / WEIGHT PER VOLUME:	9.04 lb/gal (1100 g/L)
FLASH POINT:	> 100 °C (> 212 °F) estimated
MOLECULAR WEIGHT:	422.9 (bifenthrin) 255.7 (imidacloprid)
pH:	7.0
SOLUBILITY IN WATER:	Disperses

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat and fire.
STABILITY:	Stable
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Strong bases, acids and oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide, carbon dioxide, hydrogen chloride and hydrogen fluoride.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Non-irritating (rabbit)

SKIN EFFECTS: Slightly irritating (rabbit)

DERMAL LD₅₀: > 5,000 mg/kg (rabbit)

ORAL LD₅₀: 175 mg/kg (rat)

INHALATION LC₅₀: > 2.32 mg/l (4 h) (rat)

SENSITIZATION: (Skin) Non-sensitizing (guinea pig)

ACUTE EFFECTS FROM OVEREXPOSURE: This product has high oral and, low dermal and inhalation toxicity. It is non-irritating to the eyes, and slightly irritating and non-sensitizing to the skin. Large doses of this product ingested by laboratory animals produced signs of toxicity including tremors, convulsions, decreased activity and piloerection.

Bifenthrin does not cause acute delayed neurotoxicity. Experience to date indicates that contact with bifenthrin may occasionally produce skin sensations such as rashes, numbing, burning or tingling. These sensations are reversible and usually subside within 12 hours.

Glycerin is nontoxic after ingestion, except with very large doses, when it can cause headache, dizziness, nausea, vomiting, thirst, diarrhea and confusion. Glycerin had no systemic effects in humans after skin application. If it comes in direct contact with the eye, glycerin can cause stinging, burning sensations, tearing, and redness, but no injury. Severe dehydration, cardiac arrhythmias, and hyperosmolar nonketotic coma have been reported and may be fatal.

Prolonged contact with dry xanthan gum powder may cause drying or chapping of the skin. Excessive inhalation of dust may be annoying and can mechanically impede respiration; due to the hygroscopic properties of the gums, they can form a paste or gel in the airway.

CHRONIC EFFECTS FROM OVEREXPOSURE: No data available for the formulation. In studies with laboratory animals, bifenthrin did not cause reproductive toxicity or teratogenicity. Tremors were associated with repeated exposure of laboratory animals to bifenthrin. In lifetime feeding studies conducted with laboratory animals, a slight increase in the incidence of urinary bladder tumors at the highest dose in male mice was considered to be an equivocal response, not evidence of a clear compound-related effect. The overall absence of genotoxicity has been demonstrated in mutagenicity tests with bifenthrin.

Subchronic dermal toxicity study with imidacloprid at the limit dose, showed no local or systemic effects. In a 4 week inhalation study, rats exposed to imidacloprid dust showed signs of decreased body weight gains, decreased heart and thymus weights, increased liver weights, and induction of the hepatic mixed-function oxidases. In chronic imidacloprid dietary studies in dogs and rats, observed effects at the high doses included decrease food consumption, increased liver weights, elevated serum chemistries, incidences and alterations to the thyroids. There is no evidence of carcinogenicity, genotoxicity, mutagenicity or teratogenic effects of imidacloprid. In an acute oral imidacloprid neurotoxicity study using rats, the NOEL for motor and locomotor activity was 42 mg/kg for males. In a subsequent study the NOEL for females was 20 mg/kg. All clinical signs and neurobehavioral effects were ascribed to acute cholinergic toxicity, with complete recovery within 7 days. In a 13-week neurotoxicity screening study, imidacloprid caused neurobehavioral changes in males at the high dose (3027 ppm). There were no correlative micropathologic findings in muscle or neural tissues in any of the animals. The NOEL for imidacloprid neurotoxicity was 3027 ppm.

When given to rats at a concentration of 5% in the drinking water for six months, glycerin caused calcification in the renal tubules. In another rat drinking water study, it increased urinary levels of oxalic acid. Glycerin was not mutagenic in the Ames Salmonella microsome assay. Glycerin was reported to induce chromosome aberrations in rat bone marrow and sperm cells, but an occupational cytogenetics study found no significant increase in chromosome aberrations. Glycerin did not cause birth defects in mice or rabbits. It is metabolized more rapidly in pregnant rats, than it is in non-pregnant rats. It was transferred to the rat fetus, but not appreciably to the mouse fetus. Rats given high levels of glycerin in the diet (30-60%) had slower reproduction, but this was probably because of caloric imbalance rather than a specific effect of glycerin. Glycerin suppressed sperm production in rats when injected directly into the testes. When given orally to male rats at a dose of 100 mg/kg, it had no effect on fertility.

Long-term feeding studies, with xanthan gum, showed no adverse effects up to 1,000 mg/kg/day in rats and dogs. In a 3-generation reproduction study, there were no adverse effects at up to 500 mg/kg/day in rats.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: No data available for the formulation.

Bifenthrin has moderate stability in the soil under aerobic conditions (half-life range from 65 - 125 days depending on soil type) and is stable at a wide range of pH values. Bifenthrin has a high Log Pow (6.6), a high affinity for organic matter, and is not mobile in soil. Therefore, there is little potential for movement into ground water. There is the potential for bifenthrin to bioconcentrate (BCF <2,000).

ECOTOXICOLOGICAL INFORMATION: No data available for the formulation.

Bifenthrin is highly toxic to fish and aquatic arthropods and LC₅₀ values range from 0.0038 to 17.8 µg/L. In general, the aquatic arthropods are the most sensitive species. Care should be taken to avoid contamination of the aquatic environment. Bifenthrin had no effect on mollusks at its limit of water solubility. Bifenthrin is only slightly toxic to both waterfowl and upland game birds (LD₅₀ values range from 1,800 mg/kg to >2,150 mg/kg).

Imidacloprid is highly toxic to aquatic invertebrates.

96-hour LC₅₀ = 237 mg/L at 21°C (Golden orfe)

96-hour LC₅₀ = 280 mg/L at 24°C (Carp)

96-hour LC₅₀ = 211 mg/L at 15.4°C (Rainbow trout)

In a 21-day test (at 15°C) with rainbow trout the lowest observed effect concentration (LOEC) was determined to be 61.5 mg/L. The no observed effect concentration (NOEC) was 28.5 mg/L.

48-hour EC₅₀ = 85 mg/L at 20°C (Daphnia magna)

In a reproduction test with Daphnia magna, the NOEC was 1.8 mg/L. First effects were observed at 3.5 mg/L.

98-hour EC₅₀ > 10 mg/L at 23°C (Green algae)

LD₅₀ = 31 mg/kg/bw (Japanese quail)

LD₅₀ = 152 mg/kg/bw (Bobwhite quail)

LD₅₀ = 283 mg/kg/bw (Mallard duck)

LC₅₀ >4797 mg/kg (5-day feeding test) (Mallard duck)

LC₅₀ = 2189 mg/kg (5-day feeding test) (Bobwhite quail)

LC₅₀ = 392 mg/kg (5-day feeding test) (Japanese quail)

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Open dumping or burning of this material or its packaging is prohibited.

If spilled material cannot be disposed of by use according to label instructions, an acceptable method of disposal is to incinerate in accordance with local, state and national environmental laws, rules, standards and regulations. However, because acceptable methods of disposal may vary by location and regulatory requirements may change, the appropriate agencies should be contacted prior to disposal.

EMPTY CONTAINER: Non-returnable containers that held this material should be cleaned, prior to disposal, by triple rinsing. Containers which held this material may be cleaned by being triple-

rinsed, and recycled, with the rinsate being incinerated. Do not cut or weld metal containers. Vapors that form may create an explosion hazard. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Pyrethroid pesticide, liquid, toxic
TECHNICAL NAME(S):	Bifenthrin
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN 3352
PACKING GROUP:	III
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	Pyrethroid pesticide, liquid, toxic (bifenthrin), UN3352

PACKAGING TYPE:	Bulk
PROPER SHIPPING NAME:	Pyrethroid pesticide, liquid, toxic
TECHNICAL NAME(S):	Bifenthrin
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN 3352
PACKING GROUP:	III
MARINE POLLUTANT:	Bifenthrin
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	3352

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Pyrethroid pesticide, liquid, toxic
TECHNICAL NAME(S):	Bifenthrin
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN 3352

PACKING GROUP:	III
MARINE POLLUTANT:	Bifenthrin
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	Pyrethroid pesticide, liquid, toxic (bifenthrin), UN3352 + Marine Pollutant
ADDITIONAL INFORMATION:	EmS Number: F-A, S-A

ADR - EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Pyrethroid pesticide, liquid, toxic
TECHNICAL NAME(S):	Bifenthrin
PRIMARY HAZARD CLASS / DIVISION:	6.1
CLASSIFICATION CODE:	T6
UN/NA NUMBER:	UN3352
PACKING GROUP:	III
HAZARD IDENTIFICATION NUMBER:	60
MARINE POLLUTANT:	Bifenthrin
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	UN3352 + Marine Pollutant

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Pyrethroid pesticide, liquid, toxic
TECHNICAL NAME(S):	Bifenthrin
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN3352
PACKING GROUP:	III
LABEL(S):	6.1
LIMITED QUANTITY:	Y611 / 2L

LIMITED QUANTITY: PASSENGER / CARGO: 611 / 60L

LIMITED QUANTITY: CARGO: 618 / 220L

ADDITIONAL INFORMATION:

Country of origin or destination regulations may require the addition of "Marine Pollutant" to the marks and shipping paper description.

Marks: Pyrethroid pesticide, liquid, toxic (bifenthrin), UN3352

Marine Pollutant: Bifenthrin

OTHER INFORMATION:

HARMONIZED SYSTEM

Import to the U.S.A.: 3808.91.2500

Export from the U.S.A.: 3808.91.0000

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Immediate, Delayed, Fire

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
This product contains the following ingredients subject to Section 313 reporting requirements:
Bifenthrin

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Not listed

FEDERAL INSECTICIDE FUNGICIDE RODENTICIDE ACT
U.S. EPA Signal Word: WARNING

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

Bifenthrin:

EC Symbols:	T	(Toxic)
	Xn	(Harmful)
	N	(Dangerous for the environment)
EC Risk Phrases:	R25	(Toxic if swallowed.)
	R20	(Harmful by inhalation.)
	R43	(May cause sensitization by skin contact.)
	R50/53	(Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.)
EC Safety Phrases:	S1/2	(Keep locked up and out of reach of children.)
	S23	(Do not breathe gas, fumes, vapor, or spray)
	S24	(Avoid contact with skin.)
	S37	(Wear suitable gloves.)
	S38	(In case of insufficient ventilation, wear suitable respiratory equipment.)
	S45	(In case of accident or if you feel unwell, seek medical advice immediately - show the label where possible.)
	S29	(Do not empty into drains.)

Notes For Preparation:

CLASSIFICATION: Mandatory labeling (self-classification) of hazardous substances: applicable

16. OTHER INFORMATION

REVISION SUMMARY:

New MSDS.

Brigadier and FMC - Trademarks of FMC Corporation

SuperSoap - Trademark of Weba Technologies, Inc.; Tide - Trademark of Proctor and Gamble; Spic and

Span: Trademark of The Spic and Span Company; Clorox - Trademark of The Clorox Company

© 2007 FMC Corporation. All Rights Reserved.

FMC Corporation believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable where such product is used in combination with any other materials or in any process. Use of this product is regulated by the U.S. Environmental Protection Agency (EPA). It is a violation of Federal law to use this product in a

manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of FMC Corporation, FMC Corporation expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.