
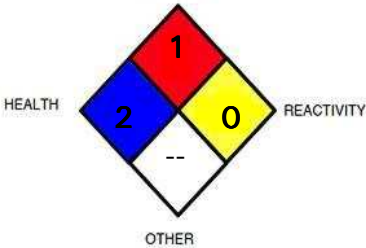




MATERIAL SAFETY DATA SHEET

Section 1: Product & Company Identification	
Product Name:	Enniatin Complex, Fursarium sp
Product #:	E-2032
Synonyms:	N/A
Supplier:	A.G. Scientific, Inc. 6450 Lusk Blvd E102 San Diego CA 92121 Tele# + 858-452-9925 Fax# + 858-452-9926
Emergency Tele#:	Chemtrec, Tele# in USA 1-800-424-9300, International 1-703-527-3887

Section 2: Composition / Information on Ingredients					
Component	CAS#	EC #	%	Classification	R Phrases
Enniatins	11113-62-5		> 98		
enniatin A	2503-13-1				
enniatin A ₁	4530-21-6				
enniatin B	917-13-5				
enniatin B ₁	19914-20-6				
enniatin C	19893-23-3				
enniatin E	144470-22-4				
enniatin F	144446-20-8				

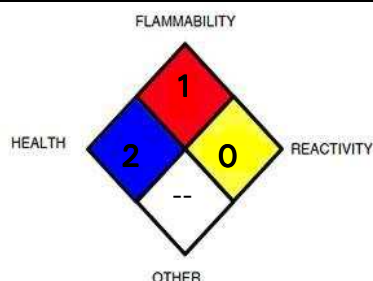
Section 3: Hazards Identification	
Symbols	
HMIS Classification	<p style="text-align: center;">FLAMMABILITY</p>  <p style="text-align: center;">OTHER</p>

A.G. Scientific, Inc.

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San Diego, CA 92121



NFPA Classification



Section 4: First Aid Measures

General Overview:	Avoid contact, wear suitable protective clothing, gloves and eye/face protection.
Inhalation:	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing give artificial respiration, seek medical attention.
Skin:	Wash immediately with water for 15 minutes. Remove contaminated clothing. Wash contaminated clothing before reuse. Seek medical attention if symptoms appear.
Eyes:	In case of contact, immediately flush eyes or skin with copious amounts of water for at least 15 minutes. Remove contacts. Assure adequate flushing of the eyes by separating the eyelids with fingers.
Ingestion:	If swallowed, wash out mouth with water provided person is conscious. DO NOT induce vomiting. Seek medical attention if symptoms appear. Loosen tight clothing like collar, tie, belt or waistband.
<i>See section 11 for more detailed information on health effects & symptoms</i>	

SECTION 5: Fire Fighting Measures

Flammability of the product:	May be combustible at high temperatures.
Extinguishing Media:	Dry Chemical Powder for SMALL FIRES and carbon dioxide or water spray, fog or foam for LARGE FIRES. Do not use water jet.
Hazardous thermal (de)composition products:	Carbon oxides (CO, CO ₂), nitrogen oxides (NO, NO ₂)
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus (SCBA) and protective clothing to prevent contact with skin and eyes. Be sure to use an approved/certified respirator or equivalent.
Flash Point:	N/A

Section 6: Accidental Release Measures

Personal Precautions:	Use Personal Protection Equipment. Splash goggles. Full suit. Boots. Gloves. Avoid dust formation.
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 SAN DIEGO, CA 92121







Environmental Precautions:	Do not let product enter drains.
Methods for Clean-up:	Sweep up & shovel into suitable disposal container. Ventilate area and wash spill site after material pickup is complete.

SECTION 7: Handling & Storage

Storage:	Store at -20°C. For long term storage, store at -20°C. Keep container tightly closed and in a well ventilated area. Toxic. Protect from light.
Handling:	Use only in area provided with appropriate exhaust ventilation. Keep away from heat and source of ignition. Empty containers pose a fire risk, evaporate residue under fume hood. Ground all equipment containing material. Do not breathe dust.

SECTION 8: Exposure controls / Personal Protection

Respiratory Protection:	 <p>Wear appropriate government (NIOSH/MSHA) approved respirator. Do not breathe vapor.</p>
Skin and Body:	  <p>Chemical-resistant gloves and lab coat/other protective clothing. Avoid prolonged or repeated exposure. Wash thoroughly after handling.</p>
Eyes:	 <p>Safety goggles.</p>
Ventilation/Engineering Measures:	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

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Hygiene:	Wash hands after handling compound and before eating, smoking, using lavatory and at the end of the day.
Other:	Contains no substances with occupational exposure limit values.

SECTION 9: Physical and Chemical Properties

Appearance & Odor:	Solid (powder)
Color:	White to off-white
Formula:	$C_{39}H_{64}N_4O_{16}$ (for n = 10)
Molecular Wt.	639.8 g/mole
Melting Pt.	N/A
Boiling Pt.	N/A
Density:	N/A
Vapor Pressure:	N/A
Evaporation Rate:	N/A
Vapor Density:	N/A
Water Solubility:	Not soluble in water. Soluble in ethanol, methanol, DMF or DMSO
Flash Point:	N/A
Autoignition Temp:	N/A

SECTION 10: Stability and Reactivity

Stability:	Stable
Hazardous decomposition products:	Hazardous decomposition products formed under fire conditions.
Materials to Avoid:	Strong oxidizing agents
Conditions to avoid:	N/A

SECTION 11: Toxicological Information

RTECS#:	N/A
ACUTE Toxicity:	LD ₅₀ : N/A
CHRONIC Toxicity:	N/A
Chronic Exposure: Carcinogen: Mutagen: Teratogen: Reproductive:	IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as probable, potential human carcinogen by ACGIH. NTP: No component of this product present at levels greater than or equal to 0.1% is identified as known or, anticipated human carcinogen by NTP. OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as known or, potential human carcinogen by OSHA. EPA: No classification on carcinogenic data is available from EPA





SECTION 12: Ecological Information

Ecotoxicity:	N/A
Mobility:	N/A
Persistence and degradability:	N/A
Bioaccumulative potential:	N/A
Other adverse effects:	N/A
Corrosivity Characteristic:	N/A
General Notes:	Do not allow undiluted product or large quantities of it to reach groundwater , water course or sewer system. Do not allow materials to be released into the environment without proper government permits.

SECTION 13: Disposal Considerations

Residue Waste or Unused product:	<i>Only professional staff trained in such techniques must undertake waste disposal. Observe all appropriate federal, provincial or state and local regulations.</i>
Contaminated Packaging:	Do not re-use empty containers. Dispose of as unused product.



SECTION 14: Transportation Information

UN ID#:	UN3462
ADR / RID (LAND):	 Identification number: UN3462 Hazard Class: 6.1 Packaging Group: II Proper shipping name: TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS) Label: 6
DOT regulations:	 Hazard Class: 6.1 Identification number: UN3462 Packaging Group: II Proper shipping name: TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS) Label: 6


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IMDG/IMO (SEA): Identification number: Hazard Class: Packaging Group: Proper shipping name: Label: Marine pollutant:	 UN3462 6.1 II TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS) 6 No
IATA/DGR (AIR): IATA Class: UN/ID Number: Label: Packaging Group: Proper shipping name:	 6.1 UN3462 6 II TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS)
Special Provisions:	N/A

SECTION 15: Regulatory Information


EU Regulations:	UN3462 TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S (TUNICAMYCIN) PKG GROUP II
SYMBOLS:	 6.1 TOXIC
Risk Phrases:	N/A
Safety Phrases:	N/A
US Regulations:	TSCA. No products were found. California Proposition 65: No products were found.
HCS Classification:	N/A
U.S. Federal Regulations:	TSCA: No products were found. SARA 302/304/311/312 extremely hazardous substances: No products were found SARA 302/304 emergency planning and notification: No products were found. SARA 302/304/311/312 hazardous chemicals: No products were found. SARA 311/312 MSDS distribution-chemical inventory-hazard identification: No products were found. SARA 313 toxic chemicals notification and release reporting: No products were found.

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	<p>Clean Water Act (CWA) 307: No products were found. Clean Water Act (CWA) 311: No products were found. Clean Air Act (CAA) 112 accidental release prevention: No products were found. Clean Air Act (CAA) 112 regulated flammable substances: No products were found. Clean Air Act (CAA) 112 regulated toxic substances: No products were found.</p>
<p>WHMIS (Canada):</p>	

SECTION 16: Other Information

LIABILITY STATEMENT: *The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. A.G. Scientific shall not be held liable for any damages resulting from handling or from contact with the above product. A.G. Scientific products are for research purposes only. Not for human use or consumption.*



MATERIAL SAFETY DATA SHEET

Section 1: Product & Company Identification	
Product Name:	Enniatin Complex, Fursarium sp
Product #:	E-2032
Synonyms:	N/A
Supplier:	A.G. Scientific, Inc. 6450 Lusk Blvd E102 San Diego CA 92121 Tele# + 858-452-9925 Fax# + 858-452-9926
Emergency Tele#:	Chemtrec, Tele# in USA 1-800-424-9300, International 1-703-527-3887

Section 2: Composition / Information on Ingredients					
Component	CAS#	EC #	%	Classification	R Phrases
Enniatins	11113-62-5		> 98		
enniatin A	2503-13-1				
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enniatin C	19893-23-3				
enniatin E	144470-22-4				
enniatin F	144446-20-8				

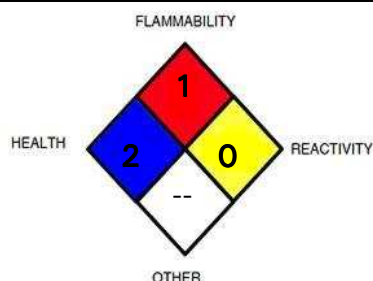
Section 3: Hazards Identification	
Symbols	
HMIS Classification	<p style="text-align: center;">FLAMMABILITY</p> <p style="text-align: center;">HEALTH REACTIVITY</p> <p style="text-align: center;">OTHER</p>

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San Diego, CA 92121



NFPA Classification



Section 4: First Aid Measures

General Overview:	Avoid contact, wear suitable protective clothing, gloves and eye/face protection.
Inhalation:	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing give artificial respiration, seek medical attention.
Skin:	Wash immediately with water for 15 minutes. Remove contaminated clothing. Wash contaminated clothing before reuse. Seek medical attention if symptoms appear.
Eyes:	In case of contact, immediately flush eyes or skin with copious amounts of water for at least 15 minutes. Remove contacts. Assure adequate flushing of the eyes by separating the eyelids with fingers.
Ingestion:	If swallowed, wash out mouth with water provided person is conscious. DO NOT induce vomiting. Seek medical attention if symptoms appear. Loosen tight clothing like collar, tie, belt or waistband.
<i>See section 11 for more detailed information on health effects & symptoms</i>	

SECTION 5: Fire Fighting Measures

Flammability of the product:	May be combustible at high temperatures.
Extinguishing Media:	Dry Chemical Powder for SMALL FIRES and carbon dioxide or water spray, fog or foam for LARGE FIRES. Do not use water jet.
Hazardous thermal (de)composition products:	Carbon oxides (CO, CO ₂), nitrogen oxides (NO, NO ₂)
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus (SCBA) and protective clothing to prevent contact with skin and eyes. Be sure to use an approved/certified respirator or equivalent.
Flash Point:	N/A

Section 6: Accidental Release Measures

Personal Precautions:	Use Personal Protection Equipment. Splash goggles. Full suit. Boots. Gloves. Avoid dust formation.
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Environmental Precautions:	Do not let product enter drains.
Methods for Clean-up:	Sweep up & shovel into suitable disposal container. Ventilate area and wash spill site after material pickup is complete.

SECTION 7: Handling & Storage

Storage:	Store at -20°C. For long term storage, store at -20°C. Keep container tightly closed and in a well ventilated area. Toxic. Protect from light.
Handling:	Use only in area provided with appropriate exhaust ventilation. Keep away from heat and source of ignition. Empty containers pose a fire risk, evaporate residue under fume hood. Ground all equipment containing material. Do not breathe dust.

SECTION 8: Exposure controls / Personal Protection

Respiratory Protection:	 <p>Wear appropriate government (NIOSH/MSHA) approved respirator. Do not breathe vapor.</p>
Skin and Body:	  <p>Chemical-resistant gloves and lab coat/other protective clothing. Avoid prolonged or repeated exposure. Wash thoroughly after handling.</p>
Eyes:	 <p>Safety goggles.</p>
Ventilation/Engineering Measures:	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

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Other:	Contains no substances with occupational exposure limit values.

SECTION 9: Physical and Chemical Properties

Appearance & Odor:	Solid (powder)
Color:	White to off-white
Formula:	$C_{39}H_{64}N_4O_{16}$ (for n = 10)
Molecular Wt.	639.8 g/mole
Melting Pt.	N/A
Boiling Pt.	N/A
Density:	N/A
Vapor Pressure:	N/A
Evaporation Rate:	N/A
Vapor Density:	N/A
Water Solubility:	Not soluble in water. Soluble in ethanol, methanol, DMF or DMSO
Flash Point:	N/A
Autoignition Temp:	N/A

SECTION 10: Stability and Reactivity

Stability:	Stable
Hazardous decomposition products:	Hazardous decomposition products formed under fire conditions.
Materials to Avoid:	Strong oxidizing agents
Conditions to avoid:	N/A

SECTION 11: Toxicological Information

RTECS#:	N/A
ACUTE Toxicity:	LD ₅₀ : N/A
CHRONIC Toxicity:	N/A
Chronic Exposure: Carcinogen: Mutagen: Teratogen: Reproductive:	IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as probable, potential human carcinogen by ACGIH. NTP: No component of this product present at levels greater than or equal to 0.1% is identified as known or, anticipated human carcinogen by NTP. OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as known or, potential human carcinogen by OSHA. EPA: No classification on carcinogenic data is available from EPA





SECTION 12: Ecological Information

Ecotoxicity:	N/A
Mobility:	N/A
Persistence and degradability:	N/A
Bioaccumulative potential:	N/A
Other adverse effects:	N/A
Corrosivity Characteristic:	N/A
General Notes:	Do not allow undiluted product or large quantities of it to reach groundwater , water course or sewer system. Do not allow materials to be released into the environment without proper government permits.

SECTION 13: Disposal Considerations

Residue Waste or Unused product:	<i>Only professional staff trained in such techniques must undertake waste disposal. Observe all appropriate federal, provincial or state and local regulations.</i>
Contaminated Packaging:	Do not re-use empty containers. Dispose of as unused product.



SECTION 14: Transportation Information

UN ID#:	UN3462
ADR / RID (LAND):	 Identification number: UN3462 Hazard Class: 6.1 Packaging Group: II Proper shipping name: TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS) Label: 6
DOT regulations:	 Hazard Class: 6.1 Identification number: UN3462 Packaging Group: II Proper shipping name: TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS) Label: 6


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IMDG/IMO (SEA): Identification number: Hazard Class: Packaging Group: Proper shipping name: Label: Marine pollutant:	 UN3462 6.1 II TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS) 6 No
IATA/DGR (AIR): IATA Class: UN/ID Number: Label: Packaging Group: Proper shipping name:	 6.1 UN3462 6 II TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS ENNIATINS)
Special Provisions:	N/A

SECTION 15: Regulatory Information

EU Regulations:	UN3462 TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S (TUNICAMYCIN) PKG GROUP II
SYMBOLS:	 6.1 TOXIC
Risk Phrases:	N/A
Safety Phrases:	N/A
US Regulations:	TSCA. No products were found. California Proposition 65: No products were found.
HCS Classification:	N/A
U.S. Federal Regulations:	TSCA: No products were found. SARA 302/304/311/312 extremely hazardous substances: No products were found SARA 302/304 emergency planning and notification: No products were found. SARA 302/304/311/312 hazardous chemicals: No products were found. SARA 311/312 MSDS distribution-chemical inventory-hazard identification: No products were found. SARA 313 toxic chemicals notification and release reporting: No products were found.

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	Clean Water Act (CWA) 307: No products were found. Clean Water Act (CWA) 311: No products were found. Clean Air Act (CAA) 112 accidental release prevention: No products were found. Clean Air Act (CAA) 112 regulated flammable substances: No products were found. Clean Air Act (CAA) 112 regulated toxic substances: No products were found.
WHMIS (Canada):	A black and white skull and crossbones hazard symbol, indicating a highly toxic substance.

SECTION 16: Other Information

LIABILITY STATEMENT: *The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. A.G. Scientific shall not be held liable for any damages resulting from handling or from contact with the above product. A.G. Scientific products are for research purposes only. Not for human use or consumption.*