Fosthiazate

sc-228230

Material Safety Data Sheet

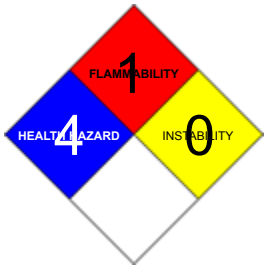
Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Fosthiazate

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C9-H18-N-O3-P-S2, "phosphonothioic acid, (2-oxo-3-thiazolidinyl)-, ", "O-ethyl S-(1-methylpropyl) ester", ASC-66824, "S-sec-butyl O-ethyl (2-oxo-1, 3-thiazolidine-3-yl)phosphonothioate", "O-ethyl S-(1-methylpropyl) (2-oxo-3-thiazolidinyl)phosphonothionate", IKI-1145, Nemathorin, nematocide

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	1		
Toxicity	3		
Body Contact	3		
Reactivity	1		
Chronic	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Harmful in contact with skin.
Risk of serious damage to eyes.
May cause SENSITISATION by skin contact.
Toxic by inhalation and if swallowed.
Toxic danger of very serious irreversible effects through inhalation and if swallowed.
Harmful possible risk of irreversible effects through inhalation and if swallowed.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
■ There is strong evidence to suggest that this material can cause, if swallowed once, serious, irreversible damage of organs.
■ Ingestion may produce nausea, vomiting, depressed appetite, abdominal cramps,and diarrhea.
■ Symptoms may be nausea, headache, giddiness, blurred vision, contractionof pupils, vomiting.
■ Thiophosphates (phosphothioate esters) do not generally produce the same degree of cholinesterase inhibition associated with other organophosphates. They may however react with a range of compounds to produce such inhibitors. Ingestion of large quantities may produce severe abdominal pains, thirst, acidaemia, difficult breathing, convulsions, collapse, shock and even death. Organophosphates may suppress the immune system in some animal species.

EYE

■ If applied to the eyes, this material causes severe eye damage.
■ Direct eye contact can produce tears, eyelid twitches, pupil contraction, loss of focus, and blurred or dimmed vision. Dilation of the pupils occasionally occurs.

SKIN

■ Skin contact with the material may be harmful; systemic effects may resultfollowing absorption.
■ The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives .
■ There may be sweating and muscle twitches at site of contact. Reaction may bedelayed by hours.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects; these may be fatal.
■ There is strong evidence to suggest that this material can cause, if inhaled once, serious, irreversible damage of organs.
■ The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of vapors, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
■ Poisoning due to cholinesterase inhibitors causes symptoms such as increased blood flow to the nose, watery discharge, chest discomfort, shortness of breath and wheezing. Other symptoms include increased production of tears, nausea and vomiting, diarrhea, stomach pain, involuntary passing of urine and stools, chest pain, breathing difficulty, low blood pressure, irregular heartbeat, loss of reflexes, twitching, visual disturbances, altered pupil size, convulsions, lung congestion, coma and heart failure.

CHRONIC HEALTH EFFECTS

■ Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Repeated or prolonged exposures to cholinesterase inhibitors produce symptoms similar to acute effects. In addition workers exposed repeatedly to these substances may exhibit impaired memory and loss of concentration, severe depression and acute psychosis, irritability, confusion, apathy, emotional liability, speech difficulties, headache, spatial disorientation, delayed reaction times, sleepwalking, drowsiness or insomnia.

BE AWARE Repeated minor exposures with only mild symptoms may have serious cumulative poisoning effect.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
Fosthiazate	98886-44-3	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

If swallowed

- Contact a Poisons Information Center or a doctor at once.
- If swallowed, activated charcoal may be advised.

EYE

If this product comes in contact with the eyes

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

If product comes in contact with skin

- Contact a Poisons Information Center or a doctor.
- DO NOT allow clothing wet with product to remain in contact with skin, strip all contaminated clothing including boots.

INHALED

- If spray mist, vapor are inhaled, remove from contaminated area.
- Contact a Poisons Information Center or a doctor at once.

NOTES TO PHYSICIAN

■

- Most organophosphate compounds are rapidly well absorbed from the skin, conjunctiva, gastro-intestinal tract and lungs.
- They are detoxified by Cytochrome P450-mediated monoxygenases in the liver but some metabolites are more toxic than parent compounds.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	42.003 x 10-4 Pa
Upper Explosive Limit (%)	Not available
Specific Gravity (water=1)	1.24
Lower Explosive Limit (%)	Not available

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible.
- Slight fire hazard when exposed to heat or flame.

Combustion products include carbon dioxide (CO_2), nitrogen oxides (NOx), phosphorus oxides (POx), sulfur oxides (SOx), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

FIRE INCOMPATIBILITY

Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

Slippery when spilt.

- Remove all ignition sources.
- Clean up all spills immediately.

MAJOR SPILLS

Chemical Class organophosphates

For release onto land recommended sorbents listed in order of priority.

SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
LAND SPILL - SMALL				
cross-linked polymer - particulate	1	shovel	shovel	R, W, SS
cross-linked polymer - pillow	1	throw	pitchfork	R, DGC, RT
wood fiber - pillow	1	throw	pitchfork	R,P, DGC, RT
foamed glass - pillow	2	shovel	shovel	R, W, P, DGC
sorbent clay - particulate	2	shovel	shovel	R, I, P
wood fibre - particulate	3	shovel	shovel	R,W, P, DGC
LAND SPILL - MEDIUM				
cross-linked polymer -particulate	1	blower	skiploader	R, W, SS
sorbent clay - particulate	2	blower	skiploader	R, I, P
polypropylene - particulate	2	blower	skiploader	R, SS, DGC
expanded mineral - particulate	3	blower	skiploader	R,I, W, P, DGC
wood fiber- particulate	3	blower	skiploader	R, W, P, DGC
polypropylene - mat	3	throw	skiploader	DGC, RT

Legend

DGC Not effective where ground cover is dense
R; Not reusable
I Not incinerable
P Effectiveness reduced when rainy
RTNot effective where terrain is rugged
SS Not for use within environmentally sensitive sites
W Effectiveness reduced when windy

Reference Sorbents for Liquid Hazardous Substance Cleanup and Control;

R.W Melvold et al Pollution Technology Review No. 150 Noyes Data Corporation 1988.
Slippery when spilt.

- DO NOT touch the spill material
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

- DO NOT use unlined steel containers
- Lined metal can, Lined metal pail/drum
- Plastic pail

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

May corrode iron, steel, brass.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

• fosthiazate CAS98886-44-3

PERSONAL PROTECTION




RESPIRATOR

•Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

NOTE The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

- Overalls.
- Eyewash unit.
- Ensure that there is a supply of atropine tablets on hand
- Ensure all employees have been informed of symptoms of organophosphorus or carbamate poisoning and that the use of atropine in first aid is understood .

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.
If inhalation risk exists, wear SAA approved respirator with organic-vapour or pesticide cartridge.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Does not mix with water.
Sinks in water.
Toxic or noxious vapours/gas.

State	Liquid	Molecular Weight	283.35
Melting Range (°F)	Not available	Viscosity	Not Available
Boiling Range (°F)	388(0.5 mm Hg)	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	Not available	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapor Pressure (mmHg)	42.003 x 10-4 Pa
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	1.24
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	Not available.
Volatile Component (%vol)	Not available.	Evaporation Rate	Not available

APPEARANCE

Liquid; does not mix well with water (9.85 g/l, 20C).

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

¦ A number of phosphate and thiophosphate esters are of limited thermal stability and undergo highly exothermic self-accelerating decomposition reactions which may be catalyzed by impurities. The potential hazards can be reduced by appropriate thermal control measures.

- Alkyl esters of thiophosphates are often temperature sensitive and decompose if overheated. Thermal decomposition products include highly toxic and odiferous hydrogen sulfide and extremely odorous alkyl

mercaptans. Both species can be detected at extremely low concentrations and vapors may travel long distances.

- Low temperature storage may produce crystallization from solution.

Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

fosthiazate

TOXICITY AND IRRITATION

FOSTHIAZATE

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50 57 mg/kg	Nil Reported
Inhalation (rat) LC50 558 mg/m³	
Dermal (rat) LD50 861 mg/kg	
Oral (mouse) LD50 91 mg/kg	

Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.

For fosthiazate

An acute oral study produced an LD50 of 51 mg/kg for females and 73 mg/kg for males indicating fosthiazate is moderately toxic to mammals.

Developmental/Reproductive toxicity In a 2-generation reproduction study, there is qualitative and quantitative evidence of increased susceptibility in offspring following pre- and post-natal exposure to fosthiazate since the effects on pups are considered to be severe and occurred at a lower dose than those on parental animals. This study yielded a reproductive NOAEL of 10 ppm (or 0.91 and 0.91 mg/kg/day for males and females respectively) and a LOAEL of 30 ppm (equivalent to 2.09 and 2.60 mg/kg/day males and females, respectively) based on decreased viability index, litter size and pup weight for the f1 generation.. Although the decrease in pup survival is severe, this could be attributed to exposure to higher levels of the chemical since the mortalities occurred during early lactation; and although cholinesterase activity was not measured in this study, cholinergic signs and cholinesterase inhibition were seen at comparable doses in other studies and thus could have been a cause for the pup mortality

Carcinogenicity Fosthiazate has been classified into the category “Not likely to be carcinogenic to humans.” This classification is based on the lack of evidence for carcinogenicity in mice and rats.

Mutagenicity. There is no concern for mutagenicity resulting from exposure to fosthiazate.

Dose-Response Assessment

Toxicological Endpoints Determination The primary target for fosthiazate appears to be the nervous system, with a secondary target, the adrenal system. Inhibition of plasma, red blood cell (RBC), and brain cholinesterase (ChE) activities was noted in the acute, subchronic and chronic toxicity studies. Evidence of neurological impairment included impaired grip strength in female rats in the acute and subchronic neurotoxicity studies; ataxia, hunched posture, gasping, and tremors in male mice in the carcinogenicity study and in male and female rats in the 21-day dermal toxicity study; and inhibition of brain ChE in the 13-week and 4-week rat feeding studies, subchronic neurotoxicity rat feeding study, and the 21-day dermal toxicity study.

The regulatory dose level for acute dietary risk assessment is the NOAEL of 0.4 mg/kg/day selected from the acute neurotoxicity study in adult rats . The regulatory dose level for chronic dietary risk assessment is the NOAEL of 0.05 mg/kg/day from the 2-year chronic/carcinogenicity toxicity study in rats . The short- and intermediate-term dermal endpoint is based on a 21-day dermal toxicity study in the rat . The NOAEL of 0.5 mg/kg/day in females is based on inhibition of plasma, RBC, and brain ChE, and absorption factor of 100% should be applied. The short term inhalation endpoint (NOAEL of 0.10 mg/kg/day) is based on plasma, RBC, and brain ChEI from the oral 4- week range finding study in rats . The intermediate term inhalation endpoint (NOAEL of 0.05 mg/kg/day) is based on plasma, RBC, and brain ChEI from the 90-day subchronic neurotoxicity study .

It can be assumed that doses used in a DNT study may be similar to those used in the reproductive toxicity study. ChEI has been shown to be the most sensitive endpoint for fosthiazate in adults; it can also be assumed that

ChEI may potentially be the most sensitive endpoint for pups.

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible. Special hazard may exist - specialist advicemay be required.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	6.1
Identification Numbers:	UN3018	PG:	III
Label Codes:	6.1	Special provisions:	IB3, N76, T7, TP2, TP28
Packaging: Exceptions:	153	Packaging: Non-bulk:	203
Packaging: Exceptions:	153	Quantity limitations: Passenger aircraft/rail:	60 L
Quantity Limitations: Cargo aircraft only:	220 L	Vessel stowage: Location:	A
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:
Organophosphorus pesticides, liquid, toxic
Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	3018	Packing Group:	III

Special provisions:	A3		
Cargo Only			
Packing Instructions:	663	Maximum Qty/Pack:	220 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	655	Maximum Qty/Pack:	60 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y642	Maximum Qty/Pack:	2 L

■ Air transport may be forbidden if this material is flammable, corrosive or toxic gases may be released under normal conditions of transport.

Shipping Name: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC *(CONTAINS FOSTHIAZATE)

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	3018	Packing Group:	III
EMS Number:	F-A,S-A	Special provisions:	61 223 274
Limited Quantities:	5 L	Marine Pollutant:	Yes

Shipping Name: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC(contains fosthiazate)

Section 15 - REGULATORY INFORMATION

fosthiazate (CAS: 98886-44-3) is found on the following regulatory lists;
"US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
■ Cumulative effects may result following exposure*.
* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Issue Date: Sep-28-2008
Print Date:Oct-27-2011