SAFETY DATA SHEET

Updated on 31/12/2024

1. Material Identification

Product Name : Fenvalerate
Catalog Number : io-2387
CAS Number : 51630-58-1
Identified uses : Laboratory chemicals, manufacture of chemical compounds
Company : Ionz

>> R&D Use only

2. Hazards Identification

GHS Classification:

Flammable liquid (category 2)
Acute toxicity, oral (Category 3)
Acute toxicity, dermal (Category 3)
Acute toxicity, inhalation (Category 3)
Specific target organ toxicity, single exposure (Category 1)

Note

>> Pictograms displayed are for 97.2% (175 of 180) of reports that indicate hazard statements. This chemical does not meet GHS hazard criteria for 2.8% (5 of 180) of reports.

Pictogram(s)

GHS Hazard Statements

>> H301 (88.9%): Toxic if swallowed [Danger Acute toxicity, oral]

>> H315 (36.7%): Causes skin irritation [Warning Skin corrosion/irritation]

>> H319 (85%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]

>> H335 (85%): May cause respiratory irritation [Warning Specific target organ toxicity, single exposure; Respiratory tract irritation]

>> H400 (95.6%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (95.6%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P261, P264, P264+P265, P270, P271, P273, P280, P301+P316, P302+P352, P304+P340, P305+P351+P338, P319, P321, P330, P332+P317, P337+P317, P362+P364, P391, P403+P233, P405, and P501

Health Hazards:

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> TOXIC and/or CORROSIVE; inhalation, ingestion or skin contact with material may cause severe injury or death. Contact with molten substance may cause severe burns to skin and eyes. Avoid any skin contact. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause environmental contamination. (ERG, 2024)

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.). Corrosives in contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. For electric vehicles or equipment, ERG Guide 147 (lithium ion or sodium ion batteries) or ERG Guide 138 (sodium batteries) should also be consulted. (ERG, 2024)

>> Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.

3. Composition/Information On Ingredients

Chemical name : Fenvalerate
CAS Number : 51630-58-1
Molecular Formula : C25H22ClNO3
Molecular Weight : 419.9000 g/mol

4. First Aid Measures

First Aid:

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> Refer to the "General First Aid" section. Specific First Aid: For corrosives, in case of contact, immediately flush skin or eyes with running water for at least 30 minutes. Additional flushing may be required. (ERG, 2024)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Refer for medical attention.

Skin First Aid

>> Remove contaminated clothes. Rinse and then wash skin with water and soap.

Eye First Aid

>> First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Ingestion First Aid

>> Rinse mouth. Refer for medical attention .

5. Fire Fighting Measures

>> Gives off irritating or toxic fumes (or gases) in a fire.

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> SMALL FIRE: Dry chemical, CO2 or water spray.

>> LARGE FIRE: Dry chemical, CO2, alcohol-resistant foam or water spray. If it can be done safely, move undamaged containers away from the area around the fire. Dike runoff from fire control for later disposal.

>> FIRE INVOLVING TANKS, RAIL TANK CARS OR HIGHWAY TANKS: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks in direct contact with flames. (ERG, 2024)

>> Use water, foam, carbon dioxide, powder.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.

>> SPILL: Increase the immediate precautionary measure distance, in the downwind direction, as necessary.

>> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

7. Handling And Storage

Safe Storage:

>> Store in an area without drain or sewer access. Keep in a well-ventilated room. Separated from strong oxidants, strong bases and food and feedstuffs.

Storage Conditions:

>> Store in an area without drain or sewer access. Keep in a well-ventilated room. Separated from strong oxidants, strong bases, food and feedstuffs

8. Exposure Control/ Personal Protection

Inhalation Risk:

>> No indication can be given about the rate at which a harmful concentration of this substance in the air is reached on evaporation at 20 °C.

Effects of Short Term Exposure:

>> The substance is irritating to the eyes, skin and respiratory tract. The substance may cause effects on the nervous system.

Effects of Long Term Exposure:

>> Repeated or prolonged contact may cause skin sensitization.

Acceptable Daily Intakes:

An estimate of the amount of a chemical in food or drinking water that can be consumed daily over a lifetime without presenting an appreciable risk to health. It is usually expressed as milligrams of the substance per kilogram of body weight per day and applies to chemicals such as food additives, pesticide residues and veterinary drugs.

>> FAO/WHO ADI: 0.02 mg/kg

Fire Prevention

>> NO open flames.

Exposure Prevention

>> PREVENT GENERATION OF MISTS! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!

Inhalation Prevention

>> Use ventilation, local exhaust or breathing protection.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

>> Wear safety goggles or eye protection in combination with breathing protection.

Ingestion Prevention

>> Do not eat, drink, or smoke during work. Wash hands before eating.

9. Physical And Chemical Properties

Molecular Weight:

>> 419.9

Exact Mass:

>> 419.1288213

Physical Description:

>> Fenvalerate appears as a clear viscious yellow liquid with a mild odor. Used as broad spectrum insecticide.

>> YELLOW OR BROWN VISCOUS LIQUID.

Color/Form:

>> Clear yellow viscous liquid

Odor:

>> Mild odor

Boiling Point:

>> Decomposes

Melting Point:

>> 39.5 - 53.7 °C

Solubility:

>> Solubility at 20 °C (g/L): acetone >450; chloroform >450; methanol >450; hexane 77

>> Solubility in water: none

Density:

>> 1.17 at 23 °C/4 °C

>> Relative density (water = 1): 1.2

Vapor Pressure:

>> 1.5X10-9 mm Hg at 25 °C

>> Vapor pressure at 20 °C: negligible

LogP:

>> log Kow = 6.20

>> 4.4/6.2

Stability/Shelf Life:

>> More stable in acidic solution than in alkaline solution.

Decomposition:

>> When heated to decomposition it emits toxic fumes of /hydrogen chloride, nitrogen oxides and hydrogen cyanide/.

Corrosivity:

The ability of a chemical to damage or destroy other substances when it comes into contact.

>> Non-corrosive to metals.

Ionization Efficiency:

The ratio of the number of ions formed to the number of electrons or photons used in an ionization process.

Ionization mode

>> Positive

logIE

>> 1.32

pH

>> 2.7

Instrument

>> Agilent XCT

Ion source

>> Electrospray ionization

Additive

>> formic acid (5.3nM)

Organic modifier

>> MeCN (80%)

Reference

>> DOI:10.1038/s41598-020-62573-z

Refractive Index:

>> Index of refraction: 1.5533 at 20 °C/D

10. Stability And Reactivity

>> Insoluble in water. Rapidly hydrolyzed by alkaline solution.

11. Toxicological Information

Toxicity Summary:

>> Both type I and type II pyrethroids exert their effect by prolonging the open phase of the sodium channel gates when a nerve cell is excited. They appear to bind to the membrane lipid phase in the immediate vicinity of the sodium channel, thus modifying the channel kinetics. This blocks the closing of the sodium gates in the nerves, and thus prolongs the return of the membrane potential to its resting state. The repetitive (sensory, motor) neuronal discharge and a prolonged negative afterpotential produces effects quite similar to those produced by DDT, leading to hyperactivity of the nervous system which can result in paralysis and/or death. Other mechanisms of action of pyrethroids include antagonism of gamma-aminobutyric acid (GABA)-mediated inhibition, modulation of nicotinic cholinergic transmission, enhancement of noradrenaline release, and actions on calcium ions. They also inhibit calium channels and Ca2+, Mg2+-ATPase. (T10, T18, L857)

RAIS Toxicity Values:

This section provides the Chemical toxicity information from the Risk Assessment Information System.

Oral Chronic Reference Dose (RfDoc) (mg/kg-day)

>> 0.025

Oral Chronic Reference Dose Reference

>> IRIS Current

Evidence for Carcinogenicity:

Evidence that this chemical does or may cause cancer. The information here is collected from various sources by the Hazardous Substances Data Bank (HSDB).

>> Cancer Classification: Group E Evidence of Non-carcinogenicity for Humans

Carcinogen Classification:

This section provides the International Agency for Research on Cancer (IARC) Carcinogenic Classification and related monograph links. In the IARC Carcinogenic classification, chemicals are categorized into four groups: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), and Group 3 (not classifiable as to its carcinogenicity to humans).

IARC Carcinogenic Agent

>> Fenvalerate

IARC Carcinogenic Classes

>> Group 3: Not classifiable as to its carcinogenicity to humans

IARC Monographs

>> Volume 53: (1991) Occupational Exposures in Insecticide Application, and Some Pesticides

>> 3, not classifiable as to its carcinogenicity to humans. (L135)

Health Effects:

>> Pyrethroid effects typically include rapid onset of aggressive behavior and increased sensitivity to external stimuli, followed by fine tremor, prostration with coarse whole body tremor, elevated body temperature, coma, and death. Paresthesia, severe corneal damage, hypotension and tachycardia, associated with anaphylaxis, can also occur following pyrethriod poisoning. (L857)

Exposure Routes:

>> The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

>> Oral (L96) ; inhalation (L96) ; dermal (L96)

Inhalation Exposure

>> Burning sensation. Cough. Dizziness. Headache. Nausea.

Skin Exposure

>> Redness. Burning sensation. Numbness. Tingling sensation. Itching.

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

>> Abdominal pain. Nausea. Vomiting. Dizziness. Headache. Convulsions.

>> Following oral exposure, severe fine tremor, marked reflex hyperexcitability, sympathetic activation can occur. Nausea, vomiting and abdominal pain commonly occur and develop following ingestion. Sudden bronchospasm, swelling of oral and laryngeal mucous membranes, and anaphylactoid reactions have been reported after inhalation. Hypersensitivity reactions characterized by pneumonitis, cough, dyspnea, wheezing, chest pain, irritability to sound and touch, and bronchospasm may occur too. Dermatitis is the main effect of a dermal exposure fenvalerate. (T36)

Target Organs:

Organs that are affected by exposure to this chemical. Information in this section reflects human data unless otherwise noted.

>> Nervous

Adverse Effects:

An adverse effect is an undesired harmful effect resulting from a medical treatment or other intervention.

>> Neurotoxin - Other CNS neurotoxin

>> Occupational hepatotoxin - Secondary hepatotoxins: the potential for toxic effect in the occupational setting is based on cases of poisoning by human ingestion or animal experimentation.

>> Skin Sensitizer - An agent that can induce an allergic reaction in the skin.

Toxicity Data:

>> LD50: 70.2 mg/kg (Oral, Rat) (T13) LD50: 2500 mg/kg (Dermal, Rabbit) (T13) LD50: 340 mg/kg (Intraperitoneal, Rat) (T92) LD50: 65 mg/kg (Intravenous, Mouse) (T92) LC50: >101 g/m3 over 4 hours (Inhalation, Rat) (T93)

Treatment:

Treatment when exposed to toxin

>> Following oral exposure, the treatment is symptomatic and supportive and includes monitoring for the development of hypersensitivity reactions with respiratory distress. Provide adequate airway management when needed. Gastric decontamination is usually not required unless the pyrethrin product is combined with a hydrocarbon. Following inhalation exposure, move patient to fresh air. monitor for respiratory distress. If cough or difficulty breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. Administer oxygen and assist ventilation as required. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. In case of eye exposure, irrigate exposed eyes with copious amounts of room temperature water for at least 15 minutes. If irritation, pain, swelling, lacrimation, or photophobia persist, the patient should be seen in a health care facility. If the contamination occurs through dermal exposure, Remove contaminated clothing and wash exposed area thoroughly with soap and water. A physician may need to examine the area if irritation or pain persists. Vitamin E topical application is highly effective in relieving parenthesis. (L363)

Interactions:

>> Fenvalerate, a widely used pesticide, was administered orally to goats at a dose rate of 15 mg/kg body weight, daily for 270 days. After 90 days of dosing, the animals, together with appropriate controls, were vaccinated with Brucella abortus strain 19. The fenvalerate reduced both the humoral and cell-mediated immune responses, as assessed by the standard tube agglutination test and delayed hypersensitivity test, respectively.

Antidote and Emergency Treatment:

>> In an antidotal study, phenobarbital, pentobarbital, and diphenylhydantoin were found to be effective in relieving the acute signs of intoxication in the rat. Intraperitoneal injection of phenobarbital (50 mg/kg) prevented tremor, diphenylhydantoin (100 mg/kg) by the same route reduced the toxic reaction, and pentobarbital (35 mg/kg intraperitoneally) removed the tremor reaction completely within 30 min. The combination of diphenylhydantoin with either of the barbiturates was effective in reducing the onset and severity of tremors whereas various other agents d-tubocurarine, atropine, meprobamate, diazepam, biperiden, and trimethadione) were ineffective ... .

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ A study of human volunteers who were exposed to fenvalerate applied to the ear lobe reported that paresthesia (ie, numbness combined with irritating abnormal sensation) could be experienced in severe cases. The threshold application appeared to be less than 10 ug/sq cm. All reports agree that the sensation appears after a latent period of about 30 min and persists for 0.5-24 hr, depending on severity.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ ... When /skin and eye irritation/ experiments were carried out using pure (non-formulated) fenvalerate, there was no irritation /in rabbits/ ... . Skin sensitization by pure fenvalerate (95%) has been evaluated using the Landsteiner-Draize method on guinea-pigs. No sensitization was detected ... .

Non-Human Toxicity Values:

>> LD50 Rat oral 451 mg/kg

Populations at Special Risk:

>> The allergenic properties of pyrethroids are marked in comparison with other pesticides. Many cases of contact dermatitis and respiratory allergy have been reported. Persons sensitive to ragweed pollen are particularly prone to such reactions. Preparations containing synthetic pyrethroids are less likely to cause allergic reactions than are the preparations made from pyrethrum powder. /Pyrethroids/

12. Ecological Information

Resident Soil (mg/kg)

>> 1.60e+03

Industrial Soil (mg/kg)

>> 2.10e+04

Tapwater (ug/L)

>> 5.00e+02

MCL (ug/L)

>> 7.00e+02

Risk-based SSL (mg/kg)

>> 3.20e+02

Chronic Oral Reference Dose (mg/kg-day)

>> 2.50e-02

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Fraction of Contaminant Absorbed Dermally from Soil

>> 0.1

ICSC Environmental Data:

>> The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment. Special attention should be given to bees. This substance does enter the environment under normal use. Great care, however, should be taken to avoid any additional release, for example through inappropriate disposal.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SOIL: Fenvalerate was tested for in 5 random sites in Hunrat Al-Sahn in the Jordan Valley, Jordan; it was found in one site, Ghor (pH 7.9, 65% sand, 17.5% silt, 17.5% clay), at a concentration of 0.47 ppm(1). Characteristics of the other 4 sites where Wadi Um-Rishrash (pH 8.1, 37.5% sand, 30.0% silt, 32.5% clay); Wadi Al-Dafali, both populated and un-populated by Bedouins (pH 7.9, 50.0% sand, 17.5% silt, 32.5% clay); and Wadi Al-Dafali near a water location (pH 7.8, 50.0% sand, 12.5% silt, 37.5% clay)(1).

Average Daily Intake:

The average amount of the compound taken into the body through eating, drinking, or breathing.

>> Based upon results of the US FDA's 1990 Total Diet Study, estimated human exposure to fenvalerate from food is as follows(1): 6-11 month old child: 0.0101 ug/kg/day; 14-16 yr old male: 0.0061 ug/kg/day; 60-65 yr old female: 0.0092 ug/kg/day(1).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Disposal Methods

>> SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational exposure or environmental contamination. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in soil or water; effects on animal, aquatic, and plant life; and conformance with environmental and public health regulations.

>> Incineration would be an effective disposal procedure where permitted. If an efficient incinerator is not available, the product should be mixed with large amounts of combustible material and contact with the smoke should be avoided. /Pyrethrin products/

>> Group II Containers: Non-combustible containers from organic or metallo-organic pesticides (except organic mercury, lead, cadmium, or arsenic compounds) must first be triple-rinsed. Containers that are in good condition may be returned to the manufacturer or formulator of the pesticide product, or to a drum reconditioner for reuse with the same type of pesticide product, if such reuse is legal under Department of Transportation regulations (eg 49 CFR 173.28). Containers that are not to be reused should be punctured ... and transported to a scrap metal facility for recycling, disposal or burial in a designated landfill. /Organic or metallo-organic pesticides/

>> Safe Disposal of Pesticides. The best way to dispose of small amounts of excess pesticides is to use them - apply them - according to the directions on the label. If you cannot use them, ask your neighbors whether they have a similar pest control problem and can use them. If all of the remaining pesticide cannot be properly used, check with your local solid waste management authority, environmental agency, or health department to find out whether your community has a household hazardous waste collection program or a similar program for getting rid of unwanted, leftover pesticides. These authorities can also inform you of any local requirements for pesticide waste disposal. /Residential uses/

>> Safe Disposal of Pesticides. An empty pesticide container can be as hazardous as a full one because of residues left inside. Never reuse such a container. When empty, a pesticide container should be rinsed carefully three times and the rinsewater thoroughly drained back onto the sprayer or the container previously used to mix the pesticide. Use the rinsewater as a pesticide, following label directions. Replace the cap or closure securely. Dispose of the container according to label instructions. Do not puncture or burn a pressurized container like an aerosol - it could explode. Do cut or puncture other empty pesticide containers made of metal or plastic to prevent someone from reusing them. Wrap the empty container and put it in the trash after you have rinsed it. /Residential uses/

14. Transport Information

DOT

Fenvalerate
6.1
UN Pack Group: III

IATA

Fenvalerate
6.1,
UN Pack Group: III

15. Regulatory Information

Regulatory Information

Status Regulation (EC)

>> 98/270/EC

New Zealand EPA Inventory of Chemical Status

>> Fenvalerate: HSNO Approval: HSR002851 Approved with controls

16. Other Information

Toxic Combustion Products:

Toxic products (e.g., gases and vapors) produced from the combustion of this chemical.

>> Hydrogen cyanide may be formed during thermal decomposition.

Other Safety Information

Chemical Assessment

>> IMAP assessments - Benzeneacetic acid, 4-chloro-.alpha.-(1-methylethyl)-, cyano(3-phenoxyphenyl)methyl ester: Human health tier I assessment

>> IMAP assessments - Benzeneacetic acid, 4-chloro-.alpha.-(1-methylethyl)-, cyano(3-phenoxyphenyl)methyl ester: Environment tier I assessment

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