ionz

SAFETY DATA SHEET

Updated on 20/07/2024

1. Material Identification

Product Name : Sodium arsenite
Catalog Number : io-2992
CAS Number : 7784-46-5
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)

Pictogram(s)

GHS Hazard Statements

>> H300+H310 (28.47%): Fatal if swallowed or in contact with skin [Danger Acute toxicity, oral; acute toxicity, dermal]

>> H300 (66.42%): Fatal if swallowed [Danger Acute toxicity, oral]

>> H301+H311+H331 (16.06%): Toxic if swallowed, in contact with skin or if inhaled [Danger Acute toxicity, oral; acute toxicity, dermal; acute toxicity, inhalation]

>> H301+H311 (14.6%): Toxic if swallowed or in contact with skin [Danger Acute toxicity, oral; acute toxicity, dermal]

>> H301 (71.53%): Toxic if swallowed [Danger Acute toxicity, oral]

>> H310 (67.15%): Fatal in contact with skin [Danger Acute toxicity, dermal]

>> H311 (54.01%): Toxic in contact with skin [Danger Acute toxicity, dermal]

>> H331 (100%): Toxic if inhaled [Danger Acute toxicity, inhalation]

>> H350 (98.54%): May cause cancer [Danger Carcinogenicity]

>> H400 (84.67%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (98.54%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P261, P262, P264, P270, P271, P273, P280, P301+P316, P302+P352, P304+P340, P316, P318, P321, P330, P361+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)

ERG 2024, Guide 151 (Sodium arsenite, solid)

>> Highly toxic, may be fatal if inhaled, ingested or absorbed through skin.

>> 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, Guide 154 (Sodium arsenite, aqueous solution)

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>> Runoff from fire control or dilution water may be corrosive and/or toxic and cause environmental contamination.

>> 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)

ERG 2024, Guide 151 (Sodium arsenite, solid)

>> Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

>> Containers may explode when heated.

>> Runoff may pollute waterways.

ERG 2024, Guide 154 (Sodium arsenite, aqueous solution)

>> 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, GUIDE 147 (lithium ion or sodium ion batteries) or GUIDE 138 (sodium batteries) should also be consulted.

>> Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.

3. Composition/Information On Ingredients

Chemical name : Sodium arsenite
CAS Number : 7784-46-5
Molecular Formula : AsNaO2
Molecular Weight : 129.9100 g/mol

4. First Aid Measures

First Aid:

>> EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

>> SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. IMMEDIATELY call a hospital or poison control center even if no symptoms (such as redness or irritation) develop. IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.

>> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.

>> INGESTION: Some heavy metals are VERY TOXIC POISONS, especially if their salts are very soluble in water (e.g., lead, chromium, mercury, bismuth, osmium, and arsenic). IMMEDIATELY call a hospital or poison control center and locate activated charcoal, egg whites, or milk in case the medical advisor recommends administering one of them. Also locate Ipecac syrup or a glass of salt water in case the medical advisor recommends inducing vomiting. Usually, this is NOT RECOMMENDED outside of a physician's care. If advice from a physician is not readily available and the victim is conscious and not convulsing, give the victim a glass of activated charcoal slurry in water or, if this is not available, a glass of milk, or beaten egg whites and IMMEDIATELY transport victim to a hospital. If the victim is convulsing or unconscious, do not give anything by mouth, assure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital.

>> OTHER: Since this chemical is a known or suspected carcinogen you should contact a physician for advice regarding the possible long term health effects and potential recommendation for medical monitoring. Recommendations from the physician will depend upon the specific compound, its chemical, physical and toxicity properties, the exposure level, length of exposure, and the route of exposure. (NTP, 1992)

ERG 2024, Guide 151 (Sodium arsenite, solid)

>> General First Aid:

>> Call 911 or emergency medical service.

>> Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and avoid contamination.

>> Move victim to fresh air if it can be done safely.

>> Administer oxygen if breathing is difficult.

>> If victim is not breathing:

>> DO NOT perform mouth-to-mouth resuscitation; the victim may have ingestedor inhaled the substance.

>> If equipped and pulse detected, wash face and mouth, then give artificial respiration using a proper respiratory medical device (bag-valve mask, pocket mask equipped with a one-way valve or other device).

>> If no pulse detected or no respiratory medical device available, provide continuouscompressions. Conduct a pulse check every two minutes or monitor for any signs of spontaneous respirations.

>> Remove and isolate contaminated clothing and shoes.

>> For minor skin contact, avoid spreading material on unaffected skin.

>> In case of contact with substance, remove immediately by flushing skin or eyes with running water for at least 20 minutes.

>> For severe burns, immediate medical attention is required.

>> Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.

>> Keep victim calm and warm.

>> Keep victim under observation.

>> For further assistance, contact your local Poison Control Center.

>> Note: Basic Life Support (BLS) and Advanced Life Support (ALS) should be done by trained professionals.

>> In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the "ERAP" section.

ERG 2024, Guide 154 (Sodium arsenite, aqueous solution)

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>> Keep victim calm and warm.

>> Keep victim under observation.

>> For further assistance, contact your local Poison Control Center.

>> Note: Basic Life Support (BLS) and Advanced Life Support (ALS) should be done by trained professionals.

>> 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.

>> In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the "ERAP" section.

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. Refer for medical attention .

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. Give a slurry of activated charcoal in water to drink. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention .

5. Fire Fighting Measures

>> 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)

>> In case of fire in the surroundings, use appropriate extinguishing media.

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)

Evacuation: ERG 2024, Guide 151 (Sodium arsenite, solid)

>> 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

>> For non-highlighted materials: 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.

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Spillage Disposal:

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

>> Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Vacuum spilled material with specialist equipment. Sweep spilled substance into covered sealable, plastic containers. Carefully collect remainder. Then store and dispose of according to local regulations.

Accidental Release Measures

Public Safety: ERG 2024, Guide 151 (Sodium arsenite, solid)

>> CALL 911. Then call emergency response telephone number on shipping paper. If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

>> Keep unauthorized personnel away.

>> Stay upwind, uphill and/or upstream.

Spill or Leak: ERG 2024, Guide 151 (Sodium arsenite, solid)

>> Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

>> Stop leak if you can do it without risk.

>> Prevent entry into waterways, sewers, basements or confined areas.

>> Cover with plastic sheet to prevent spreading.

>> Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

>> DO NOT GET WATER INSIDE CONTAINERS.

>> For solids, prevent dust cloud and avoid inhalation of dust.

Public Safety: ERG 2024, Guide 154 (Sodium arsenite, aqueous solution)

>> CALL 911. Then call emergency response telephone number on shipping paper. If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

>> Keep unauthorized personnel away.

>> Stay upwind, uphill and/or upstream.

>> Ventilate closed spaces before entering, but only if properly trained and equipped.

Spill or Leak: ERG 2024, Guide 154 (Sodium arsenite, aqueous solution)

>> ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.

>> Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

>> Stop leak if you can do it without risk.

>> Prevent entry into waterways, sewers, basements or confined areas.

>> Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

>> DO NOT GET WATER INSIDE CONTAINERS.

7. Handling And Storage

Safe Storage:

>> Store in an area without drain or sewer access. Well closed. Dry. Separated from acids, strong oxidants and food and feedstuffs.

Storage Conditions:

>> STORAGE: CONTAINERS MUST BE AIR-TIGHT.

8. Exposure Control/ Personal Protection

>> 0.01 [mg/m3], as As

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>> (as As): 0.01 mg/m

EU-OEL

>> (inhalable fraction): 0.01 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> skin absorption (H); carcinogen category: 1; germ cell mutagen group: 3A.

Emergency Response: ERG 2024, Guide 151 (Sodium arsenite, solid)

>> Small Fire

>> Dry chemical, CO2 or water spray.

>> Large Fire

>> Water spray, fog or regular foam.

>> If it can be done safely, move undamaged containers away from the area around the fire.

>> Dike runoff from fire control for later disposal.

>> Avoid aiming straight or solid streams directly onto the product.

>> 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.

>> For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Emergency Response: ERG 2024, Guide 154 (Sodium arsenite, aqueous solution)

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>> 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.

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>> 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.

Inhalation Risk:

>> A harmful concentration of airborne particles can be reached quickly when dispersed.

Effects of Short Term Exposure:

>> The substance is irritating to the eyes, skin and respiratory tract. The substance may cause effects on the cardiovascular system, nervous system, gastrointestinal tract and kidneys. This may result in severe gastroenteritis, loss of fluids and electrolytes, kidney impairment, cardiac disorders, collapse and shock. Exposure could cause death. The effects may be delayed. Medical observation is indicated.

Effects of Long Term Exposure:

>> Repeated or prolonged contact with skin may cause dermatitis and pigmentation disorders. The substance may have effects on the peripheral nervous system, cardiovascular system, bone marrow, kidneys, liver and mucous membranes. This may result in neuropathy, cardiovascular disorders, lesions of blood cells, kidney impairment, cirrhosis and perforation of the nasal septum. This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

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.

>> WHO= 0.002 mg/kg /Inorganic arsenic cmpd, as As; from table/

Exposure Prevention

>> PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN! IN ALL CASES CONSULT A DOCTOR!

Inhalation Prevention

>> Use closed system or ventilation.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

>> Wear face shield or eye protection in combination with breathing protection.

Ingestion Prevention

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

Exposure Control and Personal Protection

Protective Clothing: ERG 2024, Guide 151 (Sodium arsenite, solid)

>> Wear positive pressure self-contained breathing apparatus (SCBA).

>> Wear chemical protective clothing that is specifically recommended by the manufacturer when there is NO RISK OF FIRE.

>> Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.

Protective Clothing: ERG 2024, Guide 154 (Sodium arsenite, aqueous solution)

>> Wear positive pressure self-contained breathing apparatus (SCBA).

>> Wear chemical protective clothing that is specifically recommended by the manufacturer when there is NO RISK OF FIRE.

>> Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.

Exposure Summary

>> Biological Exposure Indices (BEI) [ACGIH] - Inorganic arsenic plus methylated metabolites in urine = 35 ug As/L; end of workweek;

9. Physical And Chemical Properties

Molecular Weight:

>> 129.910

Exact Mass:

>> 129.901193

Physical Description:

>> Sodium arsenite, aqueous solution appears as an aqueous solution of a solid. Toxic by ingestion, inhalation or skin absorption. Used as an antiseptic, in insecticides and herbicides, to preserve hides and in making dyes.

>> WHITE OR GREY HYGROSCOPIC POWDER.

Color/Form:

>> White or grayish-white powder

Taste:

The sensation of flavor perceived in the mouth and throat on contact with a substance.

>> SALTY TASTE

Melting Point:

>> 615 °C

Solubility:

>> Very soluble (NTP, 1992)

>> Solubility in water: very good

Density:

>> 1.87 at 68 °F (NTP, 1992) - Denser than water; will sink

>> 1.87 g/cm³

Stability/Shelf Life:

>> SLOWLY CONVERTED IN SOLN TO ARSENATES BY ATMOSPHERIC OXYGEN; IN DRY STATE DECOMP BY ATMOSPHERIC CO2. /ARSENITES OF ALKALI METALS/

Decomposition:

>> When heated to decomposition it emits toxic fumes of /arsenic and disodium oxide/.

10. Stability And Reactivity

>> No rapid reaction with air. No rapid reaction with water.

11. Toxicological Information

Toxicity Summary:

>> Arsenic and its metabolites disrupt ATP production through several mechanisms. At the level of the citric acid cycle, arsenic inhibits pyruvate dehydrogenase and by competing with phosphate it uncouples oxidative phosphorylation, thus inhibiting energy-linked reduction of NAD+, mitochondrial respiration, and ATP synthesis. Hydrogen peroxide production is also increased, which might form reactive oxygen species and oxidative stress. Arsenic's carginogenicity is influenced by the arsenical binding of tubulin, which results in aneuploidy, polyploidy and mitotic arrests. The binding of other arsenic protein targets may also cause altered DNA repair enzyme activity, altered DNA methylation patterns and cell proliferation. (T1, A17)

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).

>> Classification of carcinogenicity: 1) evidence in humans: sufficient; 2) evidence in animals: limited. Overall summary evaluation of carcinogenic risk to humans is Group 1: Carcinogenic to humans. NOTE: This evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals within the group. /Arsenic and arsenic compounds/

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).

>> 1, carcinogenic to humans. (L135)

Health Effects:

>> Arsenic poisoning can lead to death from multi-system organ failure, probably from necrotic cell death, not apoptosis. Arsenic is also a known carcinogen, especially in skin, liver, bladder and lung cancers. (T1, L20)

Exposure Routes:

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

>> Oral (L2) ; inhalation (L2) ; dermal (L2)

Inhalation Exposure

>> Cough. Headache. Laboured breathing. Sore throat. See Ingestion.

Skin Exposure

>> MAY BE ABSORBED! Redness. Pain.

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

>> Abdominal pain. Burning sensation in the throat and chest. Vomiting. Diarrhoea. Dizziness. Headache. Shock or collapse.

>> Exposure to lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels.

Adverse Effects:

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

>> Neurotoxin - Sensorimotor

>> 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.

>> Aplastic anemia - The presence of increased methemoglobin in the blood; the compound is classified as primary toxic effect.

>> Reproductive Toxin - A chemical that is toxic to the reproductive system, including defects in the progeny and injury to male or female reproductive function. Reproductive toxicity includes developmental effects. See Guidelines for Reproductive Toxicity Risk Assessment.

>> IARC Carcinogen - Class 1: International Agency for Research on Cancer classifies chemicals as established human carcinogens.

>> NTP Carcinogen - Known to be a human carcinogen.

>> ACGIH Carcinogen - Confirmed Human.

Toxicity Data:

>> LD50: 41 mg/kg (Oral, Rat) (T14) LD50: 150 mg/kg (Dermal, Rat) (T14) LD50: 1170 ug/kg (Intraperitoneal, Mouse) (T14) LD50: 14 mg/kg (Intramuscular Mouse) (T14) LD50: 7600 ug/kg (Intravenous, Rabbit) (T14)

Minimum Risk Level:

The minimal risk level (MRL) is an estimate of the amount of a chemical a person can eat, drink, or breathe each day without a detectable risk to health

>> Acute Oral: 0.005 mg/kg/day (L134) Chronic Oral: 0.0003 mg/kg/day (L134) Chronic Inhalation: 0.01 mg/m3 (L134)

Treatment:

Treatment when exposed to toxin

>> Arsenic poisoning can be treated by chelation therapy, using chelating agents such as dimercaprol, EDTA or DMSA. Charcoal tablets may also be used for less severe cases. In addition, maintaining a diet high in sulfur helps eliminate arsenic from the body. (L20)

Interactions:

>> ... /THE/ PROTECTIVE EFFECT OF ARSENIC AGAINST SELENIUM POISONING /WAS FOUND WHEN/ SODIUM ARSENITE (5 PPM) IN DRINKING WATER REDUCED LIVER DAMAGE IN RATS ON DIET CONTAINING SELENIUM @ 15 PPM IN SELENIFEROUS WHEAT. ... SODIUM ARSENITE ... MOST EFFECTIVE IN ENHANCING BILIARY EXCRETION OF SELENIUM ... .

Antidote and Emergency Treatment:

>> Exptl Therapy: Meso-dimercaptosuccinic acid, 2,3-dimercapto-1-propanesulfonic acid, sodium salt, and n-(2,3-dimercaptopropyl)-phthalamidic acid, are water soluble analogs of 2,3-dimercapto-1-propanol. The relative effectiveness or therapeutic index of these dimercapto compounds in protecting mice from the lethal effect of an LD99 of sodium arsenite is meso-dimercaptosuccinic acid greater than 2,3-dimercapto-1-propanesulfonic acid, sodium salt greater than n-(2,3-dimercaptopropyl)-phthalamidic acid greater than 2,3-dimercapto-1-propanol in the magnitude of 42:14:4:1, respectively. 2,3-Dimercapto-1-propanesulfonic acid, sodium salt, n-(2,3-dimercapto-1- propanesulfonic acid, sodium salt, or Meso-demercaptosuccinic acid will mobilize tissue arsenic. 2,3-Dimercapto-1-propanol however, increases the arsenic content of the brain of rabbits injected with sodium arsenite. These results raise the question as to the appropriateness of 2,3-dimercapto-1-propanol as the treatment for systemic arsenic poisoning. Either meso-dimercaptosuccinic acid or 2,3-dimercapto-1-propanesulfonic acid, sodium salt, when given sc or orally, will protect rabbits against the lethal systemic effects of sc administered lewisite. 2,3-Dimercapto-1-propanesulfonic acid, sodium salt and meso-dimercaptosuccinic acid, have promise as prophylactics for the prevention of the vesicant action of lewisite. The sodium arsenite inhibition of the pyruvate dehydrogenase complex can be prevented and reversed in vitro or in vivo by 2,3-dimercapto-1-propanesulfonic acid, sodium salt, meso-dimercaptosuccinic acid, n-(2,3-dimercaptopropyl)-phthalamidic acid or 2,3-dimercapto-1-propanol. Of them all, 2,3-dimercapto-1-propanesulfonic acid, sodium salt is most potent and 2,3-dimercapto-1-propanol appears to be the least potent. The usefulness of all these dimercapto compounds would be enhanced by a careful study of their metabolism and biotransformation. These dimercapto compounds are in a great many respects orphan drugs.

Human Toxicity Excerpts:

>> A 29 yr old man was found unresponsive a few min after self injecting undetermined amounts of potassium cyanide & sodium arsenite iv in a suicide attempt. Treatment with the Lilly Cyanide Antidote kit rapidly resolved the initial coma, despite a whole blood cyanide level of 4.4 ug/ml. A 12 hr urine arsenic collection begun on admission showed 10,065 ug arsenic/12 hr. The patient received im BAL initially, which was followed by two 10-day courses of oral D-penicillamine. Complications included upper gi tract bleeding requiring transfusion, transient elevations of liver function tests, self limited complaints of decreased vision with conjunctival hyperemia & photophobia, & an abscess at the injection site. Although specific antidote therapy completely resolved the cyanide toxicity, early & prolonged arsenic chelation did not prevent a mild sensory peripheral neuropathy from developing with onset about 17 days after self injection.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ ... Sodium arsenite was administered orally /to Wistar rats/ at doses of 6.3 mg/kg, 10.5 mg/kg, and 12.6 mg/kg bw on the basis of a lethal dose 50% (LD50) /(41 mg/kg)/for 24 hr. After administration of arsenites, liver and brain were analyzed for various parameters of oxidative stress, histopathological changes, and caspase-3 activity. Glutathione levels were decreased significantly in the liver at all doses. In liver the following biochemical changes were observed, a significant lipid peroxidation and cytochrome-P450 induction along with significant decrease in catalase and superoxide dismutase was observed at 10.5 mg/kg and 12.6 mg/kg. The activity of glutathione peroxidase was increased significantly at all doses. In brain, no significant change was observed at 6.3

mg/kg. However, a significant increase in lipid peroxidation and glutathione peroxidase activity along with significant decrease in the activity of glutathione, catalase, and superoxide dismutase was observed at 10.5 mg/kg and 12.6 mg/kg. The activity of glutathione-S-transferase was decreased significantly in both liver and brain at 10.5 and 12.6 mg/kg. No significant alteration in the activity of glucose-6-phosphate dehydrogenase and glutathione reductase was observed in either liver or brain at any dose. Dose-dependent histopathological changes, observed in both liver and brain, are also described. A significant increase in caspase-3 activity was observed at all doses in liver and at 10.5 and 12.6 mg/kg in brain. Sodium arsenite caused DNA cleavage into fragments and manifested as "DNA laddering", a hallmark of apoptosis.

Non-Human Toxicity Values:

>> LD50 Rat ip 13.39 mg/kg

National Toxicology Program Studies:

Reports from the National Toxicology Program, an interagency program supported by three government agencies (NIH, FDA, and CDC) within the Department of Health and Human Services. This program plays a critical role in generating, interpreting, and sharing toxicological information about chemicals of public health concerns.

>> ... Sodium arsenite was ... selected for immunotoxicity studies /using female B6C3f1 mice/. The purpose of the range-finding study was to determine the doses of sodium arsenite to be used in an immuntoxicology protocol. The range-finding studies were conducted in female B6C3F1mice. The animals were administered sodium arsenite as a pellet implanted subcutaneously. ... The pellets were prepared using 1, 3 and 6 mg/pellet as recommended by the producer to obtain the desired blood levels of 100, 300 and 600 ng/ml. These doses proved highly toxic and the pellets were then prepared at 0.01, 0.03 and 0.06 mg/pellet. Two studies were carried out in completing the range-finding protocol. The pellets were implanted on day 1 and the assay evaluations were performed on day 15. Dose levels of 0.01, 0.03 and 0.06 mg/pellet were used; however, the high dose of 0.06 mg/pellet resulted in the death of the mice. ... The results of the sodium arsenite range-finding studies demonstrate that, in the female B6C3F1 mouse, exposure to sodium arsenite, administered by a subcutaneous implanted pellet for a 14-day exposure at doses of 0.06 or greater, produced overt toxicity and death of the animals. Exposure to lower doses of sodium arsenite (0.01 and 0.03 mg/pellet) did not result in significant changes in body weight, change in body weight gain, erythrocyte number, hemoglobin, hematocrit, mean corpuscular hemoglobin concentration, reticulocytes or leukocyte number. A slight, but significant decrease was seen in the mean corpuscular volume and mean corpuscular hemoglobin. Exposure to lower doses of sodium arsenite (0.01 and 0.03 mg/pellet) did not result in significant changes in liver, spleen, thymus or kidney weight when the data were expressed as absolute weight (mg) or as percent body weight. A significant decrease was seen in the lung absolute weight (22.6%) but not in the percent body weight. ... Exposure to lower doses of sodium arsenite (0.01 and 0.03 mg/pellet) did not produce significant changes in the antibody-forming cell response to the T-dependent antigen, sheep erythrocytes, expressed as IgM AFC/10, while the IgM AFC/spleen did show a significant increase at 0.03 mg/pellet (49.2%). In the surface marker absolute values, no effects were observed in the number of B cells, T cells or CD8+ cells, but a significant decrease in the CD4+ cells (12.3%) was seen. Exposure to lower doses of sodium arsenite (0.01 and 0.03 mg/pellet) did not result in significant changes in the mixed leukocyte response (MLR) or natural killer (NK) cell activity. Based on the overall negative toxicological and immunological results of this range-finding study, the test article, sodium arsenite, will not be pursued as an expanded protocol.

12. Ecological Information

ICSC Environmental Data:

>> The substance is toxic to aquatic organisms.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> LAKE LANSING WAS TREATED WITH SODIUM ARSENITE FOR CONTROL OF AQUATIC MACROPHYTES IN 1957. TWO 2.5 M SEDIMENT CORES FROM DEEP PORTIONS OF THE LAKE BASIN WERE ANALYZED FOR TOTAL ARSENIC IN 5 CM INCREMENTS. 17-20 UG/G DRY WEIGHT OCCURRED IN LOWER PORTIONS OF THE CORES, AND THIS WAS TAKEN AS BACKGROUND. BOTH CORES HAD MAXIMA OF 330-340 UG/G AT DEPTH INTERVAL 0.15-0.30 M. THESE PEAKS WERE TAKEN TO REPRESENT CONTAMINATION FROM WEED TREATMENT IN 1957. THE RATE OF DECREASE IN RECENTLY DEPOSITED SEDIMENTS PREDICTED THAT CONCENTRATIONS NEAR BACKGROUND WOULD EXIST IN SURFICIAL SEDIMENTS IN THE DEEP PORTIONS OF THE BASIN BY 1989.

13. Disposal Considerations

Spillage Disposal

>> Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Vacuum spilled material with specialist equipment. Sweep spilled substance into covered sealable, plastic containers. Carefully collect remainder. Then store and dispose of according to local regulations.

Disposal Methods

>> Storage: To convert the gas-cleaning residues obtained during the metallurgical processing of arsenic-containing ores into a portable and less water-soluble form, the metals are precipitated as hydroxides by using an excess of lime water and the arsenic is precipitated as calcium arsenate and calcium arsenite. This "arsenic sludge" is recycled, on the one hand, in order not to lose the valuable metals, and on the other, in order to reduce the problem of arsenic sludge disposal. Arsenic trioxide is removed from waste gases by means of electrostatic separators (efficiency 70-90%) or bag filters (efficiency up to 99%). Bag filters, however, require twice to three times as much energy as electrostatic separators. The following storage possibilities are available today for arsenic residues that cannot be recycled immediately or at all /hazardous waste landfill/.

>> Chemical Treatability of Arsenic; Concentration Process: Chemical Precipitation; Chemical Classification: Metal; Scale of Study: Pilot Scale; Type of Wastewater Used: Domestic Wastewater + Pure Compound; Results of Study: 5ppm @ 4gpm @ pH= 7.0. Iron system-90% reduction; low lime system-80% reduction; high lime system-76% reduction; (3 coagulant systems were used; Iron system used 45 ppm as Fe of Fe2(SO4)3 @ pH= 6.0. Low lime system used 20 ppm Fe of Fe2(SO4)3 and 260 ppm of CaO @ pH= 10.0. High lime system used 600 ppm of CaO @ pH= 11.5. Chemical coagulation was followed by multimedia filtration). /Arsenic cmpd/

>> Chemical Treatability of Arsenic; Concentration Process: Chemical Precipitation; Chemical Classification: Metal; Scale of Study: Full Scale Continuous Flow; Type of Wastewater Used: Domestic Wastewater; Results of Study: Effluent character (ppb): 2.5, 56% reduction with lime; 3.3, 24% reduction with lime; (lime dose of 350-400 ppm as calcium oxide @ pH= 11.3). /Arsenic cmpd/

14. Transport Information

DOT

Sodium arsenite
6.1
UN Pack Group: II
Reportable Quantity of 1 lb or 0

IATA

Sodium arsenite
6.1,
UN Pack Group: II

15. Regulatory Information

Federal Drinking Water Standards:

Federal drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> 10 ug/L /Arsenic/

Clean Water Act Requirements:

The Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under CWA, the U.S. Environmental Protection Agency (EPA) developed the Toxic Pollutant List (40 CFR Part 401.15) and the Priority Pollutant List (40 CFR Part 423, Appendix A). These lists are to be used by EPA and States to develop the Effluent Guidelines regulations and ensure water quality criteria and standards.

>> Sodium arsenite is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Arsenenous acid, sodium salt

REACH Restricted Substance

>> Restricted substance: Sodium dioxoarsenate

>> EC: 232-070-5

New Zealand EPA Inventory of Chemical Status

>> Sodium arsenite: HSNO Approval: HSR007126 Approved with controls

16. Other Information

Other Safety Information

Chemical Assessment

>> IMAP assessments - Trivalent arsenites: Human health tier II assessment

>> Evaluation - Water soluble arsenic compounds

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."