

1. Material Identification

Product Name : 2,4-Diaminoanisole

Catalog Number : io-2109

CAS Number : 615-05-4

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

>> H302 (100%): Harmful if swallowed [Warning Acute toxicity, oral]

>> H341 (100%): Suspected of causing genetic defects [Warning Germ cell mutagenicity]

>> H350 (100%): May cause cancer [Danger Carcinogenicity]

>> H411 (100%): Toxic to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P264, P270, P273, P280, P301+P317, P318, P330, P391, P405, and P501

Health Hazards:

>> Excerpt from NIOSH Pocket Guide for 2,4-Diaminoanisole (and its salts):

>> Exposure Routes: Inhalation, skin absorption, ingestion, skin and/or eye contact

>> Symptoms: In Animals: irritation skin; thyroid, liver changes; teratogenic effects; [potential occupational carcinogen]

>> Target Organs: Skin, thyroid, liver, reproductive system

>> Cancer Site: [in animals: thyroid, liver, skin & lymphatic sys tumors] (NIOSH, 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.

3. Composition/Information On Ingredients

Chemical name : 2,4-Diaminoanisole

CAS Number : 615-05-4

Molecular Formula : C7H10N2O

Molecular Weight : 138.1700 g/mol

4. First Aid Measures

First Aid:

- >> Excerpt from NIOSH Pocket Guide for 2,4-Diaminoanisole (and its salts):
- >> Eye: IRRIGATE IMMEDIATELY – If this chemical contacts the eyes, immediately wash (irrigate) the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately.
- >> Skin: SOAP WASH IMMEDIATELY – If this chemical contacts the skin, immediately wash the contaminated skin with soap and water. If this chemical penetrates the clothing, immediately remove the clothing, wash the skin with soap and water, and get medical attention promptly.
- >> Breathing: RESPIRATORY SUPPORT – If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.
- >> Swallow: MEDICAL ATTENTION IMMEDIATELY – If this chemical has been swallowed, get medical attention immediately. (NIOSH, 2024)

First Aid Measures

Inhalation First Aid

- >> Fresh air, rest.

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

- >> 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 spray, powder, foam, carbon dioxide.

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: chemical protection suit including self-contained breathing apparatus. Sweep spilled substance into sealable containers. Do NOT let this chemical enter the environment.

7. Handling And Storage

Safe Storage:

- >> Separated from strong oxidants. Well closed.

Storage Conditions:

- >> Separated from strong oxidants Well closed.

8. Exposure Control/ Personal Protection

- >> Ca Minimize occupational exposure (especially skin exposures) See Appendix A
- >> none

MAK (Maximale Arbeitsplatz Konzentration)

- >> skin absorption (H); carcinogen category: 2

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 Long Term Exposure:

- >> This substance is possibly carcinogenic to humans.

Fire Prevention

- >> NO open flames.

Exposure Prevention

- >> See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE. AVOID ALL CONTACT!

Inhalation Prevention

- >> Use local exhaust or breathing protection.

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.

9. Physical And Chemical Properties

Molecular Weight:

>> 138.17

Exact Mass:

>> 138.079312947

Physical Description:

>> 2,4-diaminoanisole appears as colorless needles. Primarily used (along with salts such as 2,4-diaminoanisole sulfate) as a component of hair & fur dye formulations. (NIOSH, 2024)

>> COLOURLESS SOLID IN VARIOUS FORMS.

Color/Form:

>> Needles from ether

Melting Point:

>> 153 °F (NIOSH, 2024)

>> 68 °C

Solubility:

>> Soluble in alcohol, hot ether; slightly soluble in DMSO

>> Solubility in water: miscible

Vapor Density:

>> Relative vapor density (air = 1): 4.77

Vapor Pressure:

>> 0.04 [mmHg]

Decomposition:

>> The substance decomposes on heating producing toxic fumes including nitrogen oxides.

10. Stability And Reactivity

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

11. Toxicological Information

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).

>> Evaluation: There is inadequate evidence in humans for the carcinogenicity of 2,4-diaminoanisole. There is sufficient evidence in experimental animals for the carcinogenicity of 2,4-diaminoanisole. Overall evaluation: 2,4-Diaminoanisole is possibly carcinogenic to humans (Group 2B). /2,4-Diaminoanisole and its salts/

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

>> 2,4-Diaminoanisole

IARC Carcinogenic Classes

>> Group 2B: Possibly carcinogenic to humans

IARC Monographs

>> Volume Sup 7: Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1 to 42, 1987; 440 pages; ISBN 92-832-1411-0 (out of print)

>> Volume 79: (2001) Some Thyrotropic Agents

Exposure Routes:

>> The substance can be absorbed into the body through the skin and by ingestion.

>> inhalation, skin absorption, ingestion, skin and/or eye contact

Skin Exposure

>> MAY BE ABSORBED!

>> In Animals: irritation skin; thyroid, liver changes; teratogenic effects; [potential occupational carcinogen]

Target Organs:

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

>> Skin, thyroid, liver, reproductive system

Cancer Sites:

The site in which cancer develops due to exposure to this compound. Cancers are casually referred to based on their primary sites (e.g., skin, lung, breasts, prostate, colon and rectum).

>> [in animals: thyroid, liver, skin & lymphatic sys tumors]

Adverse Effects:

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

>> IARC Carcinogen – Class 3: Chemicals are not classifiable by the International Agency for Research on Cancer.

Interactions:

>> The mutagenicity of aromatic amines, as measured by the Salmonella/microsome assay, was inactivated by ozone treatment.

Antidote and Emergency Treatment:

>> Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for pulmonary edema and treat if necessary Monitor for shock and treat if necessary Anticipate seizures and treat if necessary For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with 0.9% saline (NS) during transport Do not use emetics. For ingestion, rinse mouth and administer 5 mg/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal Cover skin burns with dry sterile dressings after decontamination /Organic bases/Amines and related compounds/

Human Toxicity Excerpts:

>> /OTHER TOXICITY INFORMATION/ ... Carcinogenicity in man ... not been established.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Significant increases were noted in the incidence and numbers of preneoplastic lesions, focal hyperplasia, adenomas and carcinomas of the thyroid gland following 19 weeks administration of 2,4-diaminoanisole sulfate in the diet after pretreatment with N-bis(2-hydroxypropyl)nitrosamine. Brown pigment was noted within follicular epithelial cells in nontumorous regions, but not in the tumors themselves. /2,4-Diaminoanisole sulfate/

Non-Human Toxicity Values:

>> LD50 Rat ip 116 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.

- >> A bioassay of technical grade 2,4-diaminoanisol sulfate for possible carcinogenicity was conducted using Fischer 344 rats and B6C3F1 mice. 2,4-Diaminoanisol sulfate was administered in the feed, at either of two concentrations, to groups of 50 male and 50 female animals of each species. The time-weighted average dietary concentrations used in the chronic bioassay were 0.12% for the low dose rats and 0.5% for the high dose rats. The dietary concentrations used for low and high dose mice were 0.12 and 0.24%, respectively. After a 78 wk period of chemical administration, observation of the rats continued for an additional 29 wk and observation of the mice continued for an additional 19 wk. For each species, 49 or 50 animals of each sex were placed on test as controls. In high dose male and female rat groups, the proportion of animals having one or more of the following malignant follicular cell thyroid tumors: papillary adenocarcinomas, follicular cell carcinomas, papillary cystadenocarcinomas, or adenocarcinomas, was significantly greater than the proportion in corresponding control groups. For high dose male rats the proportion of animals having either a C cell adenoma or a C cell carcinoma was also significantly increased. The incidence of malignant tumors (squamous cell carcinomas, basal cell carcinomas, or sebaceous adenocarcinomas) of the skin and its associated glands were significantly increased among high dose rats of both sexes. Among high dose female mice, the combined incidence of thyroid follicular cell adenomas and carcinomas was significantly increased. Among high dose male mice, the incidence of thyroid follicular cell adenomas was significantly increased, but no follicular cell carcinomas were observed. Levels of Evidence of Carcinogenicity: Male Rats: Positive; Female Rats: Positive; Male Mice: Positive; Female Mice: Positive. /2,4-Diaminoanisol sulfate/

12. Ecological Information

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

- >> SEDIMENT; 2,4-Diaminoanisol was detected in sediment at 1 out of 12 sites along the Taihu Lake, China at a concentration of 7.95 mg/kg(1).

13. Disposal Considerations

Spillage Disposal

- >> Personal protection: chemical protection suit including self-contained breathing apparatus. Sweep spilled substance into sealable containers. Do NOT let this chemical enter the environment.

Disposal Methods

- >> Incineration: Pour or sift onto a thick layer of sand and sodium carbonate mixture (90-10). Mix and shovel into a heavy paper box with much paper packing. Burn in incinerator. Fire may be augmented by adding excelsior and scrap wood. Waste may be dissolved in flammable solvent (alcohol, benzene, etc) and sprayed into fire box of an incinerator with afterburner and scrubber.
- >> PRECAUTIONS FOR "CARCINOGENS": There is no universal method of disposal that has been proved satisfactory for all carcinogenic compounds & specific methods of chem destruction ... published have not been tested on all kinds of carcinogen-containing waste. ... summary of avail methods & recommendations ... /given/ must be treated as guide only. /Chemical Carcinogens/
- >> PRECAUTIONS FOR "CARCINOGENS": ... Incineration may be only feasible method for disposal of contaminated laboratory waste from biological expt. However, not all incinerators are suitable for this purpose. The most efficient type ... is probably the gas-fired type, in which a first-stage combustion with a less than stoichiometric air:fuel ratio is followed by a second stage with excess air. Some ... are designed to accept ... aqueous & organic-solvent solutions, otherwise it is necessary ... to absorb soln onto suitable combustible material, such as sawdust. Alternatively, chem destruction may be used, esp when small quantities ... are to be destroyed in laboratory. /Chemical Carcinogens/
- >> PRECAUTIONS FOR "CARCINOGENS": HEPA (high-efficiency particulate arrestor) filters ... can be disposed of by incineration. For spent charcoal filters, the adsorbed material can be stripped off at high temp & carcinogenic wastes generated by this treatment conducted to & burned in an incinerator. ... LIQUID WASTE: ... Disposal should be carried out by incineration at temp that ... ensure complete combustion. SOLID WASTE: Carcasses of lab animals, cage litter & misc solid wastes ... should be disposed of by incineration at temp high enough to ensure destruction of chem carcinogens or their metabolites. /Chemical Carcinogens/
- >> For more Disposal Methods (Complete) data for 2,4-DIAMINOANISOLE (6 total), please visit the HSDB record page.

14. Transport Information

DOT

2,4-Diaminoanisole

9

UN Pack Group: III

IATA

2,4-Diaminoanisole

9,

UN Pack Group: III

15. Regulatory Information

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: 1,3-Benzenediamine, 4-methoxy-

New Zealand EPA Inventory of Chemical Status

>> 1,3-Benzenediamine, 4-methoxy-: Does not have an individual approval but may be used as a component in a product covered by a group standard. It is not approved for use as a chemical in its own right.

16. Other Information

Other Safety Information

Chemical Assessment

>> IMAP assessments – 4-Methoxy-1,3-benzenediamine and its sulfate: Human health tier II assessment

"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."