SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Hydroquinone
Catalog Number : io-2518
CAS Number : 123-31-9
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 > 99.9% (2463 of 2464) of reports that indicate hazard statements. This chemical does not meet GHS hazard criteria for < 0.1% (1 of 2464) of reports.

Pictogram(s)

GHS Hazard Statements

>> H302+H312 (17.9%): Harmful if swallowed or in contact with skin [Warning Acute toxicity, oral; acute toxicity, dermal]

>> H302 (99.7%): Harmful if swallowed [Warning Acute toxicity, oral]

>> H312 (17.9%): Harmful in contact with skin [Warning Acute toxicity, dermal]

>> H317 (> 99.9%): May cause an allergic skin reaction [Warning Sensitization, Skin]

>> H318 (99.9%): Causes serious eye damage [Danger Serious eye damage/eye irritation]

>> H341 (99.9%): Suspected of causing genetic defects [Warning Germ cell mutagenicity]

>> H351 (> 99.9%): Suspected of causing cancer [Warning Carcinogenicity]

>> H400 (> 99.9%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (20.7%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P261, P264, P264+P265, P270, P272, P273, P280, P301+P317, P302+P352, P305+P354+P338, P317, P318, P321, P330, P333+P317, P362+P364, P391, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

>> 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

NFPA Fire Rating

>> 1 - Materials that must be preheated before ignition can occur. Materials require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur.

NFPA Instability Rating

>> 0 - Materials that in themselves are normally stable, even under fire conditions.

Health Hazards:

>> This material is very toxic; the probable oral lethal dose for humans is 50-500 mg/kg, or between 1 teaspoon and 1 ounce for a 150 lb. person. It is irritating but not corrosive. Fatal human doses have ranged from 5-12 grams, but 300-500 mg have been ingested daily for 3-5 months without ill effects. Death is apparently initiated by respiratory failure or anoxia. (EPA, 1998)

>> Dust cloud may explode if ignited in an enclosed area. It can react with oxidizing materials and is rapidly oxidized in the presence of alkaline materials. Oxidizes in air. (EPA, 1998)

>> Combustible. Finely dispersed particles form explosive mixtures in air.

3. Composition/Information On Ingredients

Chemical name : Hydroquinone
CAS Number : 123-31-9
Molecular Formula : C6H6O2
Molecular Weight : 110.1100 g/mol

4. First Aid Measures

First Aid:

>> Signs and Symptoms of Acute Hydroquinone Exposure: Signs and symptoms of acute exposure to hydroquinone may be severe and include dyspnea (shortness of breath), a sense of suffocation, increased respiratory rate, and respiratory failure. Pallor (paleness of the skin), cyanosis (blue tint to skin and mucous membranes), and cardiovascular collapse may occur. Neurologic effects include headache, tinnitus (ringing in the ears), dizziness, delirium, muscle twitching, tremor, and convulsions. Nausea, vomiting, and the production of green to brown-green urine may also occur. Hydroquinone may be irritating and corrosive to the skin, eyes, and mucous membranes. Jaundice (yellow tint to skin) may be noticed.

>> Emergency Life-Support Procedures: Acute exposure to hydroquinone may require decontamination and life support for the victims. Emergency personnel should wear protective clothing appropriate to the type and degree of contamination. Air-purifying or supplied-air respiratory equipment should also be worn, as necessary. Rescue vehicles should carry supplies such as plastic sheeting and disposable plastic bags to assist in preventing spread of contamination.

>> Inhalation Exposure:

>> 1. Move victims to fresh air. Emergency personnel should avoid self-exposure to hydroquinone.

>> 2. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.

>> 3. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.

>> 4. Transport to a health care facility.

>> Dermal/Eye Exposure:

>> 1. Remove victims from exposure. Emergency personnel should avoid self- exposure to hydroquinone.

>> 3. Remove contaminated clothing as soon as possible.

>> 4. If eye exposure has occurred, eyes must be flushed with lukewarm water for at least 15 minutes.

>> 5. Wash exposed skin areas twice with soap and water.

>> 6. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.

>> 7. Transport to a health care facility.

>> Ingestion Exposure:

>> 1. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen.

>> 2. IMMEDIATELY give the victims water or milk: children up to 1 year old, 125 mL (4 oz or 1/2 cup); children 1 to 12 years old, 200 mL (6 oz or 3/4 cup); adults, 250 mL (8 oz or 1 cup). Water or milk should be given only if victims are conscious and alert.

>> 4. Vomiting may be induced with syrup of Ipecac. If elapsed time since ingestion of hydroquinone is unknown or suspected to be greater than 30 minutes, do not induce vomiting and proceed to Step

>> 5.Ipecac should not be administered to children under 6 months of age.Warning: Ingestion of hydroquinone may result in sudden onset of seizures or loss of consciousness. Syrup of Ipecac should be administered only if victims are alert, have an active gag-reflex, and show no signs of impending seizure or coma. If ANY uncertainty exists, proceed to Step

>> 5.The following dosages of Ipecac are recommended: children up to 1 year old, 10 mL (1/3 oz); children 1 to 12 years old, 15 mL (1/2 oz); adults, 30 mL (1 oz). Ambulate (walk) the victims and give large quantities of water. If vomiting has not occurred after 15 minutes, Ipecac may be readministered. Continue to ambulate and give water to the victims. If vomiting has not occurred within 15 minutes after second administration of Ipecac, administer activated charcoal.

>> 5. Activated charcoal may be administered if victims are conscious and alert. Use 15 to 30 g (1/2 to 1 oz) for children, 50 to 100 g (1-3/4 to 3-1/2 oz) for adults, with 125 to 250 mL (1/2 to 1 cup) of water.

>> 6. Promote excretion by administering a saline cathartic or sorbitol to conscious and alert victims. Children require 15 to 30 g (1/2 to 1 oz) of cathartic; 50 to 100 g (1-3/4 to 3-1/2 oz) is recommended for adults.

>> 7. Transport to a health care facility. (EPA, 1998)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Artificial respiration may be needed. 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. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention .

5. Fire Fighting Measures

>> Special hazards arising from the substance or mixture: Carbon oxides

>> Wear self-contained (positive pressure if available) breathing apparatus and full protective clothing.

>> For small fires use dry chemical, carbon dioxide, water spray or foam. Move container from fire area if you can do so without risk. This compound is a slight fire or explosion hazard. (EPA, 1998)

>> 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 171 [Substances (Low to Moderate Hazard)]:

>> 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: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered sealable containers. Carefully collect remainder. Then store and dispose of according to local regulations.

7. Handling And Storage

Safe Storage:

>> Separated from strong bases and food and feedstuffs.

Storage Conditions:

>> Keep well closed and protected from light.

8. Exposure Control/ Personal Protection

REL-C (Ceiling)

>> 2 mg/m³ [15 minutes]

>> C 2 mg/m3 [15-minute]

>> 2.0 [mg/m3]

PEL-TWA (8-Hour Time Weighted Average)

>> 2 mg/m³

>> 1.0 [mg/m3]

>> 1 mg/m

TLV-TWA (Time Weighted Average)

>> 1 mg/m³ [2007]

MAK (Maximale Arbeitsplatz Konzentration)

>> skin absorption (H); sensitization of skin (SH); carcinogen category: 2; germ cell mutagen group: 3A

Inhalation Risk:

>> A harmful contamination of the air will not or will only very slowly be reached on evaporation of this substance at 20 °C.

Effects of Short Term Exposure:

>> The substance is severely irritating to the eyes. The substance is irritating to the skin and respiratory tract.

Effects of Long Term Exposure:

>> Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the eyes and skin. This may result in discolouration of the conjunctiva and cornea and skin depigmentation. This substance is possibly carcinogenic to humans.

Fire Prevention

>> NO open flames. Closed system, dust explosion-proof electrical equipment and lighting. Prevent deposition of dust.

Exposure Prevention

>> PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!

Inhalation Prevention

>> Use local exhaust or breathing protection.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

>> Wear safety goggles.

Ingestion Prevention

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

9. Physical And Chemical Properties

Molecular Weight:

>> 110.11

Exact Mass:

>> 110.036779430

Physical Description:

>> Hydroquinone appears as light colored crystals or solutions. May irritate the skin, eyes and mucous membranes. Mildly toxic by ingestion or skin absorption.

>> COLOURLESS CRYSTALS.

Color/Form:

>> White crystals

Odor:

>> Odorless

Taste:

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

>> A slightly bitter taste in aqueous solutions

Boiling Point:

>> 545 to 549 °F at 760 mmHg (EPA, 1998)

>> 287 °C

Melting Point:

>> 338 to 340 °F (EPA, 1998)

>> 172 °C

Flash Point:

>> 329 °F (EPA, 1998)

>> 165 °C

Solubility:

>> 10 to 50 mg/mL at 68 °F (NTP, 1992)

>> Solubility in water, g/100ml at 15 °C: 5.9

Density:

>> 1.332 at 59 °F (EPA, 1998) - Denser than water; will sink

>> Relative density (water = 1): 1.3

Vapor Density:

>> 3.81 (EPA, 1998) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 3.8

Vapor Pressure:

>> 4 mmHg at 302 °F (EPA, 1998)

>> Vapor pressure, Pa at 20 °C: 0.12

LogP:

>> 0.59

Stability/Shelf Life:

>> Its solution becomes brown in air due to oxidation.

Autoignition Temperature:

>> 960 °F (USCG, 1999)

>> 515 °C

Heat of Combustion:

>> -2.74X10+3 kJ/mol

Ionization Potential:

>> 7.95 eV

Ionization Efficiency:

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

Ionization mode

>> Negative

logIE

>> -2.45

pH

>> 10.5

Instrument

>> Agilent 6495

Ion source

>> JetStream

Additive

>> ammonia (10nM)

Organic modifier

>> MeCN (80%)

Reference

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

Refractive Index:

>> Index of refraction = 1.632 at 25 °C

Dissociation Constants:

>> pKa = 10.85 at 25 °C

Collision Cross Section:

Collision cross section (CCS) represents the effective area for the interaction between an individual ion and the neutral gas through which it is traveling (e.g., in ion mobility spectrometry (IMS) experiments). It quantifies the probability of a collision taking place between two or more particles.

>> 128.79 Å² [M+H]+ [CCS Type: DT; Method: stepped-field]

>> 119.07 Å² [M-H]- [CCS Type: DT; Method: stepped-field]

10. Stability And Reactivity

>> Darkens on exposure to air and light. Miscible in water. Solutions become brown in air due to oxidation. Oxidation is very rapid in the presence of alkali.

CSL No

>> CSL00016

Reactants/Reagents

>> ACROLEIN + HYDROQUINONE

Warning Message

>> Warning - This reagent combination was observed internally to build significant pressure, resulting in the failure of a sealed tube apparatus. Please consider using a solvent such as Xylenes or running the reaction at lower temperature.

GHS Category

>> Gas Under Pressure

Functional Group

>> ALDEHYDE

Reference Source

>> User-Reported

Modified Date

>> 7/8/18

Create Date

>> 2/13/17

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION AND USE: Hydroquinone (HQ) is an aromatic compound in the form of light tan to gray crystals. It is a high-volume commodity chemical used as a reducing agent, antioxidant, polymerization inhibitor, chemical stabilizer, chemical intermediate, and photographic reducer and developer. It is also used in skin lighteners, in cosmetics, hair dye, glue, and a medication to treat dyschromias. HUMAN EXPOSURE: A great deal of research has been conducted with HQ because it is a metabolite of benzene. In workers engaged in the manufacture, HQ dust oxidizes to brown benzoquinone. This material causes pigmentation of the eye and, in some cases, permanent corneal damage. There are reported cases of keratitis and discoloration of the conjunctiva among men exposed to concentrations ranging from 10 to 30 mg of vapor or dust of HQ per cubic meter of air. Ingestion of 1 g by an adult has caused dizziness, sense of suffocation, increased rate of respiration, vomiting, pallor, muscular twitching, headache, dyspnea, cyanosis and collapse and eventually death due to respiratory failure. Upon ingestion urine is green or brownish-green in color and continues to darken on standing. Five hundred forty-four (544) crewmen aboard a large USA Navy vessel developed GI disease characterized by acute onset of nausea, vomiting, abdominal cramps, and diarrhea which was found to be due to hydroquinone contamination of the chilled water system by automatic photo developing machines on the ship. HQ is only weakly positive in in vivo chromosomal assays when expected human exposure routes are used. Chromosomal effects are increased significantly when parenteral or in vitro assays are used. Hydroquinone impairs several leukocyte cell functions, which alter the immune response. It evokes pro-inflammatory properties in endothelial cells that are triggered by the enhancement of NF-kappaB nuclear translocation-dependent gene transcription. Parenteral administration of HQ is associated with changes in several hematopoietic and immunologic endpoints. This toxicity is more severe when combined with parenteral administration of phenol. It is likely that oxidation of HQ within the bone marrow compartment to the semiquinone or p-benzoquinone (BQ), followed by covalent macromolecular binding, and is critical to these effects. Bone marrow and hematologic effects are generally not characteristic of HQ exposures in animal studies employing routes of exposure other than parenteral. Enhanced Ras signaling increases both hydroquinone-mediated growth inhibition in yeast and genotoxicity in mammalian hematopoietic suggesting that HQ toxicity is modulated by Ras signaling and individuals with abnormal Ras signaling could be more vulnerable to developing myeloid diseases after exposure. Hydroquinone also increases proliferation of CFU-GM progenitor cells in mice with Nf1 null bone marrow relative to WT, the same cell type associated with benzene-associated leukemia. It is confirmed animal carcinogen with unknown relevance to humans. ANIMAL STUDIES: In cancer bioassays, HQ has reproducibly produced renal adenomas in male rats. The mechanism of tumorigenesis is unclear but probably involves a species-, strain-, and sex-specific interaction between renal tubule toxicity and an interaction with the chronic progressive nephropathy that is characteristic of aged male rats. Mouse liver tumors (adenomas) and mononuclear cell

leukemia (female rat) have also been reported following HQ exposure, but their significance is uncertain. Various tumor initiation/promotion assays with HQ have shown generally negative results. In two-year studies in rats of each sex given hydroquinone in deionized water by gavage, nearly all male rats and most female rats in all vehicle control and dosed groups had nephropathy. The severity of this disease was judged to be greater in high dose male rats. The data on the effect of HQ on development are conflicting, with several studies reporting minimal to no treatment -related effects on duration of gestation, mean litter size, fetal viability, or lactation index in rats fed diets containing HQ. However, one study reports that female rats fed 0.5 g of hydroquinone in their diet during pregnancy had higher rates of fetal resorption than controls (100% versus 41% of the dams), and a greater number of the total implantations were resorbed (27% versus 11%). HQ was not mutagenic in Salmonella typhimurium strains TA98, TA100, TA1535, or TA1537 with or without exogenous metabolic activation. It induced trifluorothymidine resistance in mouse L5178Y/TK lymphoma cells in the presence or absence of metabolic activation, and induced sister chromatid exchanges in Chinese hamster ovary cells both with or without exogenous metabolic activation and caused chromosomal aberrations in the presence of activation. HQ also induced aneuploidy in yeast by delaying the cell cycle at the G2/M transition.

EPA Provisional Peer-Reviewed Toxicity Values:

This section provides the EPA Provisional Peer-Reviewed Toxicity Values (PPRTVs) and links of related assessment documents.

Chemical Substance

>> Hydroquinone

Reference Dose (RfD), Chronic

>> 4 x 10^-2 mg/kg-day

Reference Dose (RfD), Subchronic

>> 4 x 10^-1 mg/kg-day

PPRTV Assessment

>> PDF Document

Weight-Of-Evidence (WOE)

>> Likely to be carcinogenic to humans

Last Revision

>> 2009

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 hydroquinone. There is limited evidence in experimental animals for the carcinogenicity of hydroquinone. Overall evaluation: Hydroquinone is not classifiable as to its carcinogenicity to humans (Group 3).

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

>> Hydroquinone

IARC Carcinogenic Classes

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

IARC Monographs

>> Volume 15: (1977) Some Fumigants, the Herbicides 2,4-D and 2,4,5-T, Chlorinated Dibenzodioxins and Miscellaneous Industrial Chemicals

>> 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 71: (1999) Re-evaluation of Some Organic Chemicals, Hydrazine and Hydrogen Peroxide (Part 1, Part 2, Part 3)

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

Effects During Pregnancy and Lactation:

Drug effects during pregnancy and lactation.

>> ◉ Summary of Use during Lactation

>> Topical hydroquinone has not been studied during breastfeeding. Although hydroquinone is not contraindicated during breastfeeding, some experts feel that long-term use of hydroquinone is difficult to justify in a nursing mother.[1] If hydroquinone is used, ensure that the infant's skin does not come into direct contact with the areas of maternal skin that have been treated and the infant does not ingest the product from the mother's skin.

>> ◉ Effects in Breastfed Infants

>> Relevant published information was not found as of the revision date.

>> ◉ Effects on Lactation and Breastmilk

Exposure Routes:

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

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

Inhalation Exposure

>> Cough. Laboured breathing.

Skin Exposure

>> Redness.

Eye Exposure

>> Redness. Pain. Blurred vision.

Ingestion Exposure

>> Dizziness. Headache. Nausea. Shortness of breath. Convulsions. Vomiting. Ringing in the ears.

>> irritation eyes: conjunctivitis; keratitis (inflammation of the cornea); central nervous system excitement; colored urine, nausea, dizziness, suffocation, rapid breath; muscle twitching, delirium; collapse; skin irritation, sensitization, dermatitis

Target Organs:

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

>> Eyes, skin, respiratory system, central nervous system

Adverse Effects:

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

>> Methemoglobinemia - The presence of increased methemoglobin in the blood; the compound is classified as secondary toxic effect

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

>> ACGIH Carcinogen - Confirmed Animal.

Interactions:

>> Possible interactions between hydroquinone and phenol, two known benzene metabolites, in inducing micronuclei in mouse bone marrow cells were investigated. Hydroquinone and phenol administered alone gave weak and negative results, at the doses tested. However, simultaneous administration of both compounds caused a considerable increase in the induction of micronuclei as well as an increase in bone marrow toxicity. Using 3 different statistical methods, it was shown that the observed joint effect was significantly higher than additive interaction, and was close to multiplicative interaction. These findings bring further support to the hypothesis that the toxic and genotoxic effects of benzene are produced by several metabolites acting synergistically.

Antidote and Emergency Treatment:

>> /SRP:/ Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Aniline and related compounds/

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ When human subjects ingested 300-500 mg hydroquinone in 3 divided doses with meals daily for 3-5 months, no abnormal results were noted in percent hemoglobin, hematocrit, red blood cell count, differential white blood cell count, sedimentation rate, platelet count, coagulation time, and icteric index in blood samples and no abnormal levels were noted in urinary albumin, reducing sugars, white and red cell counts, casts, and urobilinogen (Carlson and Brewer, 1953). The authors suggested that the lack of toxic response may have been due to

the division of dose throughout the day at meals, which may have decreased peak blood levels.[DHHS/NTP: Nomination Profile Hydroquinone

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Uptake and turnover of the sc administration hydroquinone was quite rapid in most tissues and organs of Carassius auratus. It showed no specific affinity for melanosomes, although it induced cytopathologic alteration in these pigment cells. Only the melanosome-containing pigment cells present at the time of treatment were destroyed.

Non-Human Toxicity Values:

>> LD50 Rat oral 320 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.

>> Fourteen-Day: Fourteen-day gavage studies were conducted by administering hydroquinone in corn oil to rats at doses ranging from 63 to 1,000 mg/kg body weight and to mice at doses ranging from 31 to 500 mg/kg. All rats receiving 1,000 mg/kg and 1/5 male and 4/5 female rats receiving 500 mg/kg died before the end of the 14 days. Compound-related clinical signs in rats included tremors lasting up to 30 minutes after each dosing at 500 and 1,000 mg/kg. In the 14-day gavage studies with mice, 4/5 male mice and 5/5 female mice receiving 500 mg/kg and 3/5 males receiving 250 mg/kg died before the end of the studies. Tremors followed by convulsions were seen at 250 and 500 mg/kg.

TSCA Test Submissions:

Under the Toxic Substances Control Act (TSCA), EPA has broad authority to issue regulations designed to require manufacturers (including importers) or processors to test chemical substances and mixtures for health and environmental effects. This section provides information on test reports submitted for this chemical under TSCA.

>> Teratogenicity was evaluated in pregnant female Crl: COBS CD(SD)BR rats (30/group) orally exposed by gavage to hydroquinone at dose levels of 0, 30, 100 or 300 mg/kg on gestation days (GD) 6-15. Surviving rats were sacrificed on GD 20. Significant differences were observed between treated and control animals in the following: decreased combined and female mean fetal body weight (high-dose group). No significant differences were observed between treated and control animals in the following: maternal mortality, body weight and weight gain, histologic examinations of livers and kidneys of high-dose group animals (other groups not examined), liver and kidney weights, pregnancy rates, number of litters with resorptions, corpora lutea, implantation sites, viable fetuses, resorptions/dam, pre- and post-implantation losses, mean gravid uterine weights, fetal ratio, male mean fetal body weight, and external, and internal soft tissue and skeletal examinations of the fetuses.

Populations at Special Risk:

>> Glutathione S transferase (GST) gene polymorphism examined among north Indians and correlated with hydroquinone (HQ) genotoxicity to help in clinical prediction of susceptibility of HQ toxicity. Lymphocytes of individuals with/without GSTM1, GSTT1, and GSTP1 (ile/ile or val/val) were exposed to HQ (20, 40, or 80 uM) and examined chromosomal aberrations (CA) or cytokinesis-block micronucleus assays. Among north Indians the frequencies of GSTM1 (null), GSTT1 (null), and both null were found to be 41.1, 21.9, and 12.7%, whereas frequencies of GSTP1 with (ile/ile) or (ile/val), or (val/val) were 52, 42.1, or 5.9%, respectively. Individuals with null GSTM1, GSTT1, and GSTP1 (val/val) showed inhibition of mitotic index (MI) and significant ($p < 0.01$) induction of CA as compared to individuals with GSTM1, GSTT1, and GSTP1 (ile/ile). Micronucleus formation was found to be significant ($p < 0.05$ or 0.01) in both the genotypes. Results indicate that GSTM1, GSTT1 (null), and GSTP1 (val/val) are sensitive to HQ genotoxicity.

12. Ecological Information

Resident Soil (mg/kg)

>> 9.00e+00

Industrial Soil (mg/kg)

>> 3.80e+01

Tapwater (ug/L)

>> 1.30e+00

MCL (ug/L)

>> 5.00e+01

Risk-based SSL (mg/kg)

>> 8.70e-04

Oral Slope Factor (mg/kg-day)-1

>> 6.00e-02

Chronic Oral Reference Dose (mg/kg-day)

>> 4.00e-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.

Animal Concentrations:

Concentrations of this compound in animals.

>> Hydroquinone may play an important part in the defense mechanisms of a number of insects, including the bombadier beetle (Carabidae) and the earwig (Forficula auricularia)(1).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered sealable containers. Carefully collect remainder. 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 harm/injury/toxicity 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 and plant life; and conformance with environmental and public health regulations.

>> The following wastewater treatment technologies have been investigated for Hydroquinone: Concentration process: Reverse osmosis.

>> The following wastewater treatment technologies have been investigated for Hydroquinone: Concentration process: Activated carbon.

>> Hydroquinone is a waste chemical stream constituent which may be subjected to ultimate disposal by controlled incineration.

>> For more Disposal Methods (Complete) data for HYDROQUINONE (6 total), please visit the HSDB record page.

14. Transport Information

DOT

Hydroquinone
6.1

UN Pack Group: III
Reportable Quantity of 100 lb or 45

IATA

Hydroquinone
6.1,
UN Pack Group: III

15. Regulatory Information

TSCA Requirements:

This section provides information on requirements concerning this chemical under the Toxic Substances Control Act (TSCA) of 1976. TSCA provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics and pesticides.

>> Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. Hydroquinone is included on this list. Effective date 10/04/84; Sunset date: 10/04/94.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: 1,4-Benzenediol

REACH Registered Substance

>> Status: Active Update: 05-05-2023 https://echa.europa.eu/registration-dossier/-/registered-dossier/14417

>> Status: Active Update: 04-08-2018 https://echa.europa.eu/registration-dossier/-/registered-dossier/23249

>> Status: Active Update: 22-05-2013 https://echa.europa.eu/registration-dossier/-/registered-dossier/6231

New Zealand EPA Inventory of Chemical Status

>> Hydroquinone: HSNO Approval: HSR003003 Approved with controls

16. Other Information

Other Safety Information

Chemical Assessment

>> IMAP assessments - 1,4-Benzenediol: Human health tier II assessment

>> Evaluation - Hydroquinone and p-benzoquinone

"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."