Safety Data Sheet

According to the UN GHS revision 8

Creation Date: August 12, 2024
Revision Date: August 12, 2024

1. IDENTIFICATION

1.1 GHS Product identifier

Product name: Methotrexate

Catalog Number: T1485

CAS Number: 59-05-2

1.2 Other means of identification

Other names: -

1.3 Recommended use of the chemical and restrictions on use

Identified uses:

1.4 Supplier's details

Company: Targetmol Chemicals Inc.

Uses advised against: 36 Washington Street,Wellesley Hills, Massachusetts 02481 USA

Tel/Fax: (781) 999-4286

1.5 Emergency phone number

Emergency phone number: 781-999-4286

Service hours: Monday to Friday, 9am-5pm (Standard timezone:UTC/GMT -5hours).

2. HAZARD IDENTIFICATION

2.1 Classification of the substance or mixture

Acute toxicity - Category 3, Oral
Skin irritation, Category 2
Eye irritation, Category 2
Reproductive toxicity, Category 1B

2.2 GHS label elements, including precautionary statements

Pictogram(s):

Signal word: Danger

Hazard statement(s):

H301 Toxic if swallowed
H315 Causes skin irritation
H319 Causes serious eye irritation
H360 May damage fertility or the unborn child

Precautionary statement(s):

Prevention:

P264 Wash ... thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P203 Obtain, read and follow all safety instructions before use.

Response:

P301+P316 IF SWALLOWED: Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.

P302+P352 IF ON SKIN: Wash with plenty of water/...
P332+P317 If skin irritation occurs: Get medical help.
P362+P364 Take off contaminated clothing and wash it before reuse.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P318 IF exposed or concerned, get medical advice.

Storage: P405 Store locked up.

Disposal: P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not resultin classification

no data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number
Methotrexate	-	59-05-2	200-413-8

4. FIRST-AID MEASURES

4.1 Description of necessary first-aid measures

General advice

no data available

If inhaled

Move the victim into fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and consult a doctor immediately. Do not use mouth to mouth resuscitation if the victim ingested or inhaled the chemical.

Following skin contact

Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a doctor.

Following eye contact

Rinse with pure water for at least 15 minutes. Consult a doctor.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

4.2 Most important symptoms/effects, acute and delayed

Leucovorin is indicated to diminish the toxicity and counteract the effect of inadvertently administered overdosages of methotrexate. Leucovorin administration should begin as promptly as possible. As the time interval between methotrexate administration and leucovorin initiation increases, the effectiveness of leucovorin in counteracting toxicity decreases. Monitoring of the serum methotrexate concentration is essential in determining the optimal dose and duration of treatment with leucovorin.

4.3 Indication of immediate medical attention and special treatment needed, if necessary

SYMPTOMS: Symptoms of exposure to this compound include renal damage, leukopenia, headache, drowsiness, blurred vision, aphasia and hemiparesis. In addition, it causes developmental abnormalities of the craniofacial area and the musculoskeletal system, carcinogenic effects, leukemia, lymphoma effects including Hodgkin's disease, thrombocytopenia, bone marrow changes, other blood changes, cerebral spinal fluid effects, eye effects, blood pressure lowering, cough, dyspnea, fibrosis (pneumoconiosis), cyanosis, gastrointestinal effects, fatty liver degeneration and other liver changes, hepatitis, impaired liver function tests, skin tumors, fever, effects on inflammation or mediation of inflammation. Other symptoms include hemorrhagic enteritis, dermatitis, interstitial pneumonitis, neurotoxicity, nephrotoxicity, defective oogenesis o spermatogenesis, teratogenesis, hepatic dysfunction, progressive weight loss, depression, swelling and cytoplasmic vacuolization of the mucosal cells of the intestinal epithelium, desquamation of epithelial cells, extrusion of plasma into the lumen of the bowel, leukocytic infiltration of the submucosa, disturbance in the maturation of erythrocytes, rapid pathological alteration in myelopoiesis, diminution in content of lymphoid cells in lymphatic tissue and interference with embryogenesis. Interference with cellular reproduction, embryotoxicity, abortion, fetal defects, fertility impairment, menstrual dysfunction, hematopoiesis suppression, acute and chronic hepatotoxicity, nonspecific pneumonitis, chemical arachnoiditis manifested by headache, back pain and nuchal rigidity, paresis manifested by paraplegia, leukoencephalopathy manifested by confusion, irritability, somnolence, ataxia, dementia and convulsions, ulcerative stomatitis, nausea, alopecia, ecchymosis, telangiectasia, acne, furunculosis,

vomiting, diarrhea, gastrointestinal ulceration and bleeding, azotemia, cystitis, hematuria, vaginal discharge, arthralgia, myalgia, metabolic changes, precipitating diabetes, osteoporotic effects, abdominal distress, malaise, undue fatigue, chills, dizziness, reduce resistance to infection, erythematous rash, pruritus, urticaria, gingivitis, photosensitivity, pigmentary changes, pharyngitis, anorexia, hematemesis, melena, transient oligospermia and sudden death may also result. In children it can cause pulmonary tract damage by ingestion, and blood dyscrasia intravenously. It may also cause lung changes, uro-genital toxicity and conjunctivitis. It may also cause septicemia and bleeding from various sites, mucositis, cerebral and cerebellar calcification, bone pain, fractures, aseptic necrosis of the head of the femur and shortness of breath. Granulocytopenia, hypoplasia of all elements of bone marrow and anemia may also occur. It may cause congenital malformation in the fetus and alter genetic material. Ulceration of the mouth, megaloblastic anemia, hypogammaglobulinemia, kidney damage, pulmonary reactions, progressive intellectual impairment, coma and pyrexia may also occur. ACUTE/CHRONIC HAZARDS: This compound can cause eye irritation. It may be absorbed through the skin and may be fatal if inhaled, swallowed or absorbed through the skin. It is readily absorbed through the gastrointestinal tract. When heated to decomposition it emits toxic fumes of carbon monoxide, carbon dioxide and nitrogen oxides. (NTP, 1992)

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Fires involving this material can be controlled using a dry chemical, carbon dioxide or Halon extinguisher. A water spray may also be used. (NTP, 1992)

5.2 Specific hazards arising from the chemical

Flash point data for this chemical are not available; however, it is probably combustible. (NTP, 1992)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing mist, gas or vapours.Avoid contacting with skin and eye. Use personal protective equipment.Wear chemical impermeable gloves. Ensure adequate ventilation.Remove all sources of ignition. Evacuate personnel to safe areas.Keep people away from and upwind of spill/leak.

6.2 Environmental precautions

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Methotrexate sodium tablets should be protected from light and stored in well-closed containers at 15-30 deg C. Methotrexate sodium injection and powder for injection should be protected from light and stored at 15-30 deg C. Methotrexate sodium

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

Skin protection

Wear fire/flame resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

Thermal hazards

no data available

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	PHYSICAL DESCRIPTION: Odorless yellow to orange-brown crystalline powder. (NTP, 1992) It is a chemotherapy drug that interferes with DNA and RNA synthesis.
Color	Orange-brown, crystalline powder
Odour	no data available
Melting point/ freezing point	3°C(lit.)
Boilingpoint or initial boiling point and boiling range	170°C(lit.)
Flammability	no data available
Lower and upper explosion limit/flammability limit	no data available
Flash point	43°C(lit.)
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	DMSO: 45 mg/mL (99.02 mM), Ethanol: < 1 mg/mL (insoluble or slightly soluble),
N-octanol-water partition coefficient	no data available
Vapour pressure	2.1X10-19 mm Hg at 25 deg C /Estimated/
Density and/ or relative density	1.536 g/cm3
Relative vapour density	no data available
Particle characteristics	no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

This chemical is sensitive to hydrolysis, oxidation and light. Insoluble in water.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

METHOTREXATE decomposes in very acidic or alkaline conditions. This chemical is incompatible with strong oxidizing agents and strong acids. (NTP, 1992)

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

no data available

10.6 Hazardous decomposition products

When heated to decomposition it emits toxic fumes including /nitrogen oxides/.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral: LD50 Rat oral 180 +/- 45 mg/kg body weight
Inhalation: no data available
Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Classification of carcinogenicity: 1) evidence in humans: Inadequate data; 2) evidence in animals: Inadequate data. Overall summary evaluation of carcinogenic risk to humans is Group 3: The agent is not classifiable as to its carcinogenicity to humans. From table

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish: no data available
Toxicity to daphnia and other aquatic invertebrates: no data available
Toxicity to algae: no data available
Toxicity to microorganisms: no data available

12.2 Persistence and degradability

AEROBIC: An OECD confirmatory test was carried out in a laboratory-scale treatment plant, using a sludge inoculum from the municipal sewage plant in Bochum-Olbachtal, Germany(1). The test was run for 10 days, flow rate of 1 L/hr, and a retention time of 3 hrs. Methotrexate, at concentrations of 10 and 20 mg/L, at both concns, the compound reached a rate of 95% biodegradation after approximately 8 days, with a maximum rate of 98% biodegradation measured at 10 days; however, the biodegradation process resulted in the formation of 7-hydroxymethotrexate which is toxic and persistent(1). When presented as a mixture including cyclophosphamide (150 mg/L), cytarabine (12.5 mg/L), and 5-fluorouracil (5.0 mg/L), methotrexate (4.0 mg/L) exhibited a similar biodegradation rate(1).

12.3 Bioaccumulative potential

An estimated BCF of 3.2 was calculated for methotrexate(SRC), using a log Kow of -1.85(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC), provided the compound is not altered physically or chemically once released into the environment(SRP).

12.4 Mobility in soil

The Koc of methotrexate is estimated as 1(SRC), using a log Kow of -1.85(1) and a regression-derived equation(2). According to a classification scheme(3), this estimated Koc value suggests that methotrexate is expected to have very high mobility in soil. The pKa of the carboxylic acid moiety of methotrexate is 4.70(4), indicating that this compound will primarily exist in anion form in the environment and anions generally do not adsorb more strongly to organic carbon and clay than their neutral counterparts(5). However, aromatic amines are expected to bind strongly to humus or organic matter in soils due to the high reactivity of the aromatic amino group(6,7), suggesting that mobility may be much lower in some soils(SRC).

12.5 Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

14. TRANSPORT INFORMATION

14.1 UN Number

no data available

14.2 UN Proper Shipping Name

no data available

14.3 Transport hazard class(es)

no data available

14.4 Packing group, if applicable

no data available

14.5 Environmental hazards

no data available

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations specific for the product in question

European Inventory of Existing Commercial Chemical Substances (EINECS)	Listed.
EC Inventory	Listed.
United States Toxic Substances Control Act (TSCA) Inventory	Listed.
China Catalog of Hazardous chemicals 2015	Not Listed.
New Zealand Inventory of Chemicals (NZIoC)	Listed.

Philippines Inventory of Chemicals and Chemical Substances (PICCS)	Not Listed.
Vietnam National Chemical Inventory	Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)	Not Listed.
Korea Existing Chemicals List (KECL)	Listed.

16. OTHER INFORMATION

Information on revision

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Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

no data available