

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.2
Creation Date: July 15, 2019
Revision Date: August 08, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Tetrodotoxin

1.2 Other means of identification

Product number LCHM700902-AW
Other names -

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.
Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.
Address 3/F, Building B, No. 179 BASIGO, Guangpu Rd East, Huangpu Dist, Guangzhou
Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175
Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Flammable liquids, Category 3
Skin corrosion, Sub-category 1A

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H226 Flammable liquid and vapour
H314 Causes severe skin burns and eye damage

Precautionary statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof [electrical/ventilating/lighting/...] equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash ... thoroughly after handling.

Response	P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower]. P370+P378 In case of fire: Use ... to extinguish. P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P363 Wash contaminated clothing before reuse. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P316 Get emergency medical help immediately. P321 Specific treatment (see ... on this label). P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Storage	P403+P235 Store in a well-ventilated place. Keep cool. 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 result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Acetic acid	Acetic acid	64-19-7	200-580-7	100%
Water	-	7732-18-5	-	-

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer immediately for medical attention.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap. Rinse skin with plenty of water or shower for at least 15 minutes. Refer immediately for medical attention.

Following eye contact

Rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. If within a few minutes after ingestion, one small glass of water may be given to drink. Refer immediately for medical attention.

4.2 Most important symptoms/effects, acute and delayed

Breathing of vapors causes coughing, chest pain, and irritation of nose and throat; may cause nausea and vomiting. Contact with skin and eye causes burns. (USCG, 1999)
 Excerpt from ERG Guide 153 [Substances - Toxic and/or Corrosive (Combustible)]: TOXIC; 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. Effects of contact or inhalation may be delayed. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution. (ERG, 2016)
 Excerpt from ERG Guide 132 [Flammable Liquids - Corrosive]: May cause toxic effects if inhaled or ingested/swallowed. Contact with substance may cause severe burns to skin and eyes. Fire will produce irritating, corrosive and/or toxic gases. Vapors may cause dizziness or suffocation. Runoff from fire control or dilution water may cause pollution. (ERG, 2016)

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

Garlic contains many sulfhydryl compounds that act as antioxidants. However, the role of nitric oxide (NO) in inflammation is controversial. The aim of the present study is to investigate the possible protective effect of garlic against acetic acid-induced ulcerative colitis in rats, as well as the probable modulatory effect of L-arginine (NO precursor) on garlic activity. Intra-rectal inoculation of rats with 4% acetic acid for 3 consecutive days caused a significant increase in the colon weight and marked decrease in the colon length. In addition, acetic acid induced a significant increase in serum levels of nitrate as well as colonic tissue content of malondialdehyde (MDA). Moreover, colonic tissue contents of glutathione (GSH), superoxide dismutase (SOD) and catalase (CAT) were markedly reduced. On the other hand, pre-treatment of rats with garlic (0.25 g/kgbw, orally) for 4 consecutive weeks and 3 days during induction of colitis significantly reduced the increase in the colon weight induced by acetic acid and ameliorated alterations in oxidant and antioxidant parameters. Interestingly, oral co-administration of garlic (0.25 g/kgbw) and L-arginine (625 mg/kgbw) for the same period of garlic administration mitigated the changes in both colon weight and length induced by acetic acid and increased garlic effect on colon tissue contents of MDA and GSH. In conclusion, L-arginine can augment the protective effect of garlic against ulcerative colitis; an effect that might be mainly attributed to its NO donating property resulting in enhancement of garlic antioxidant effect...

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Use water spray, dry chemical, "alcohol resistant" foam, or carbon dioxide. Use water to keep fire-exposed containers cool.

5.2 Specific hazards arising from the chemical

Special Hazards of Combustion Products: Irritating vapor generated when heated. (USCG, 1999)

Excerpt from ERG Guide 153 [Substances - Toxic and/or Corrosive (Combustible)]: Combustible material: may burn but does not ignite readily. When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Runoff may pollute waterways. Substance may be transported in a molten form. (ERG, 2016)

Excerpt from ERG Guide 132 [Flammable Liquids - Corrosive]: Flammable/combustible material. May be ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Many liquids are lighter than water. (ERG, 2016)

5.3 Special protective actions for fire-fighters

Use powder, alcohol-resistant foam, water spray, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Remove all ignition sources. Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Cautiously neutralize spilled liquid with sodium carbonate only under the responsibility of an expert.

6.2 Environmental precautions

Remove all ignition sources. Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Cautiously neutralize spilled liquid with sodium carbonate only under the responsibility of an expert.

6.3 Methods and materials for containment and cleaning up

Collect leaking liquid in sealable containers. Cautiously neutralize spilled liquid with sodium carbonate only under the responsibility of an expert. Wash away remainder with plenty of water (extra personal protection: chemical protection suit including self-contained breathing apparatus).

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames, NO sparks and NO smoking. Above 39°C use a closed system, ventilation and explosion-proof electrical equipment. 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

Fireproof. Separated from food and feedstuffs, strong oxidants, strong acids and strong bases. Store only in original container. Well closed. Keep in a well-ventilated room. Store in an area without drain or sewer access. Store in a dry, well-ventilated place. Separate from oxidizing materials and alkaline substances.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

EU-OEL: 25 mg/m³, 10 ppm as TWA; 50 mg/m³, 20 ppm as STEL. MAK: 25 mg/m³, 10 ppm; peak limitation category: I(2); pregnancy risk group: C. TLV: 10 ppm as TWA; 15 ppm as STEL

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 face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Liquid.
Colour	Colourless.
Odour	Pungent
Melting point/freezing point	16.64 °C. Remarks: At standard temperature and pressure.
Boiling point or initial boiling point and boiling range	117.9 °C. Atm. press.: 101.325 kPa. Remarks: At standard temperature and pressure.
Flammability	Class II Combustible Liquid: FLP. at or above 100°F and below 140°F.
Lower and upper explosion limit/flammability limit	Lower flammable limit: 4.0% by volume; Upper flammable limit: 19.9% by volume
Flash point	39 °C. Atm. press.: 101.3 kPa.
Auto-ignition temperature	463 °C.
Decomposition temperature	no data available
pH	2.4. Remarks: 1 M.; 2.9. Remarks: 0.1 M.; 3.4. Remarks: 0.01 M.
Kinematic viscosity	dynamic viscosity (in mPa s) = 1.056. Temperature: 25.0°C. Remarks: No further information provided.
Solubility	Miscible with water
Partition coefficient n-octanol/water	log Pow = -0.17. Temperature: 25 °C.
Vapour pressure	20.79 hPa. Temperature: 25 °C.
Density and/or relative density	1.04 g/cm ³ . Temperature: 25 °C.
Relative vapour density	2.07 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The substance is a weak acid. Reacts violently with strong oxidants. This generates fire and explosion hazard. Reacts violently with strong bases, strong acids and many other compounds. Attacks some forms of plastic, rubber and coatings.

10.2 Chemical stability

Stable under normal laboratory storage conditions.

10.3 Possibility of hazardous reactions

Moderate fire risk. Mixing acetic acid in equal molar portions with any of the following substances in a closed container caused the temperature and pressure to increase: 2-Aminoethanol, chlorosulfonic acid, ethylene diamine, ethyleneimine [NFPA 1991]. Acetic acid or acetic anhydride can explode with nitric acid if not kept cold. Potassium hydroxide residue in a catalyst pot reacted violently when acetic acid was added [MCA Case History 920. 1963]. During the production of terephthalic acid, n-xylene is oxidized in the presence of acetic acid. During these processes, detonating mixtures may be produced. Addition of a small amount of water may largely eliminate the risk of explosion [NFPA 491M. 1991. p. 7]. Acetaldehyde was put in drums previously pickled with acetic acid. The acid caused the acetaldehyde to polymerize and the drums got hot and vented [MCA Case History 1764. 1971]. A mixture of ammonium nitrate and acetic acid ignites when warmed, especially if concentrated [Von Schwartz 1918. p. 322]. Several laboratory explosions have been reported using acetic acid and phosphorus trichloride to form acetyl chloride. Poor heat control probably caused the formation of phosphine [J. Am. Chem. Soc. 60:488. 1938]. Acetic acid forms explosive mixtures with p-xylene and air [Shraer, B.I. 1970. Khim. Prom. 46(10):747-750.).

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Incompatibilities: carbonates, hydroxides, many oxides, and phosphates.

10.6 Hazardous decomposition products

When heated to decomposition it emits irritating fumes.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 - rat (male/female) - 3 310 mg/kg bw. Remarks: Sodium salt of acetic acid.
- Inhalation: LC50 - rat - > 16 000 ppm.
- 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

no data available

Reproductive toxicity

no data available

STOT-single exposure

The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation may cause lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest.

STOT-repeated exposure

Repeated or prolonged contact with skin may cause dermatitis. Lungs may be affected by repeated or prolonged exposure to an aerosol of this substance. Risk of tooth erosion upon repeated or prolonged exposure to an aerosol of this substance.

Aspiration hazard

A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 - *Oncorhynchus mykiss* (previous name: *Salmo gairdneri*) - > 1 000 mg/L - 96 h.
- Toxicity to daphnia and other aquatic invertebrates: EC50 - *Daphnia magna* - > 1 000 mg/L - 48 h.
- Toxicity to algae: EC50 - *Skeletonema costatum* - > 1 000 mg/L - 72 h.
- Toxicity to microorganisms: NOEC - *Pseudomonas putida* - 1 150 mg/L - 16 h.

12.2 Persistence and degradability

Biological oxygen demand after 10 days at 20 deg C is: 82% biological oxidation in fresh water and 88% biological oxidation in sea water

12.3 Bioaccumulative potential

An estimated BCF of 3 was calculated in fish for acetic acid(SRC), using a log Kow of -0.17(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).

12.4 Mobility in soil

A log Koc of 0.00 (Koc = 1), which was derived from experimental measurements, has been reported for acetic acid(1,2). According to a classification scheme(3), this Koc value suggests that acetic acid is expected to have very high mobility in soil. No detectable sorption was measured for acetic acid using the OECD Guideline 106 method employing an acidic forest soil, pH 2.8, an agricultural soil, pH 6.7, and a lake sediment, pH 7.1(4). Adsorption of acetic acid to 3 nearshore marine sediments collected from three different locations resulted in Kd values of 0.65 (Koc = 228), 0.085 (Koc = 6.5) and 0.046 (Koc = 27) using clastic mud (3.5% organic carbon, pH 7.0), muddy sand (1.3% organic carbon, pH 7.7), and carbonate sand (0.17% organic carbon, pH 8.1), respectively(5). The pKa of acetic acid is 4.76(6), indicating that this compound will exist partially in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(7).

12.5 Other adverse effects

no data available

SECTION 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.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN2789 (For reference only, please check.) IMDG: UN2789 (For reference only, please check.) IATA: UN2789 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass (For reference only, please check.)

IMDG: ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass (For reference only, please check.)

IATA: ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 8 (For reference only, please check.) IMDG: 8 (For reference only, please check.) IATA: 8 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: II (For reference only, please check.) IMDG: II (For reference only, please check.) IATA: II (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

Chemical name	Common names and synonyms	CAS number	EC number
Acetic acid	Acetic acid	64-19-7	200-580-7
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			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019
Revision Date August 08, 2025

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

UN number 2789 is for acetic acid, glacial or acetic acid solution, more than 80% acid by mass. Other UN numbers: UN 2790 acetic acid



CATO Research Chemicals Inc.

3/F, Building B, No. 179 BASIGO, Guangpu Rd East, Huangpu Dist, Guangzhou

Web: www.cato-chem.com

Tel: +86-20-81960175 Fax: +86-20-81717260 E-mail: info@cato-chem.com

solution (10-80% acetic acid); UN hazard class 8, packing group II-III.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

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