

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.0
Creation Date: July 15, 2019
Revision Date: July 15, 2019

SECTION 1: Identification

1.1 GHS Product identifier

Product name Formic acid

1.2 Other means of identification

Product number -
Other names formic; Myrmicyl; Formira

1.3 Recommended use of the chemical and restrictions on use

Identified uses Industrial and scientific research use.
Uses advised against no data available

1.4 Supplier's details

Company Shanghai Baishun Biotechnology Co., Ltd
Address No. 26, Lane 918, Lianye Road, Zhelin Town, Fengxian District, Shanghai, 201400, China
Telephone +86-21-37581181

1.5 Emergency phone number

Emergency phone number +86-21-37581181
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

Skin corrosion, Sub-category 1A

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word Danger
Hazard statement(s) H314 Causes severe skin burns and eye damage
Precautionary statement(s)
Prevention P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash ... thoroughly after handling.

Response	<p>P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...</p> <p>P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.</p> <p>P363 Wash contaminated clothing before reuse.</p> <p>P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.</p> <p>P316 Get emergency medical help immediately.</p> <p>P321 Specific treatment (see ... on this label).</p> <p>P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p>
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 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
Formic acid	Formic acid	64-18-6	200-579-1	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

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

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

Liquid causes skin and eye burns. Vapors are irritating and painful to breath. Vapor exposure may cause nausea and vomiting. (USCG, 1999)

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

Hemodialysis accelerates both the elimination of both methanol and formic acid and also assists in correction of metabolic acidosis. Experimental data suggests that the administration of folic acid may be of benefit by hastening the metabolism of formic acid to carbon dioxide. Prompt ... /treatment/ can probably decr the morbidity and mortality /associated with this form/ of poisoning.

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

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

5.2 Specific hazards arising from the chemical

Special Hazards of Combustion Products: Toxic vapor generated in fires (USCG, 1999)

5.3 Special protective actions for fire-fighters

Use water spray, powder, alcohol-resistant foam, 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

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Cautiously neutralize spilled liquid with weak alkaline solution such as disodium carbonate. Then wash away with plenty of water.

6.2 Environmental precautions

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Cautiously neutralize spilled liquid with weak alkaline solution such as disodium carbonate. Then wash away with plenty of water.

6.3 Methods and materials for containment and cleaning up

Spill or leak procedures: Use water spray to cool and disperse vapors and protect personnel. Control runoff and isolate discharged material for proper disposal. Neutralize spill and washings with soda ash or lime.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames. Above 69°C use a closed system and ventilation. 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

Separated from strong oxidants, strong bases, strong acids and food and feedstuffs. Well closed. Keep in a well-ventilated room. 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

TLV: 5 ppm as TWA; 10 ppm as STEL. MAK: 9.5 mg/m³, 5 ppm; peak limitation category: I(2); pregnancy risk group: C. EU-OEL: 9 mg/m³, 5 ppm as TWA

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. Syrup.
Colour	Not reported.
Odour	Pungent, penetrating odor
Melting point/freezing point	$\geq 449.85^{\circ}\text{C}$. Remarks:No atmospheric pressure was recorded for this endpoint.
Boiling point or initial boiling point and boiling range	105°C .
Flammability	Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F . (90% solution)
Lower and upper explosion limit/flammability limit	Lower flammable limit: 18% by volume; Upper flammable limit: 57% by volume
Flash point	69 (pure substance flash point 45°C)
Auto-ignition temperature	1004°F
Decomposition temperature	no data available
pH	2.5. Remarks:Stoichiometric loading of base equivalent to HEDP-1 Na.;4.6. Remarks:Stoichiometric loading of base equivalent to HEDP-2 Na.;10.4. Remarks:Stoichiometric loading of base equivalent to HEDP-3 Na.
Kinematic viscosity	1.607 mPas at 25°C
Solubility	Miscible with water
Partition coefficient n-octanol/water	$\log \text{Pow} = -3.5$. Remarks:No other information is given.
Vapour pressure	0 Pa. Temperature: 25°C . Remarks:Modified Grain method.
Density and/or relative density	1 450 - 1 490 kg/m^3 . Temperature:20.
Relative vapour density	1.03 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes on heating and on contact with strong acids. This produces carbon monoxide. The substance is a medium strong acid. Reacts violently with oxidants. Reacts violently with strong bases. This generates fire and explosion hazard. Attacks many plastics and metals.

10.2 Chemical stability

May deteriorate in normal storage and cause hazard.

10.3 Possibility of hazardous reactions

Combustible liquid when wxposed to heat or flame .FORMIC ACID reacts exothmerically with all bases, both organic (for example, the amines) and inorganic. Reacts with active metals to form gaseous hydrogen and a metal salt. Reacts with cyanide salts to generate gaseous hydrogen cyanide. Reacts with diazo compounds, dithiocarbamates, isocyanates,

mercaptans, nitrides, and sulfides to generate flammable or toxic gases. Reacts with sulfites, nitrites, thiosulfates (to give H₂S and SO₃), dithionites (SO₂), to generate flammable and/or toxic gases and heat. Reacts with carbonates and bicarbonates to generate carbon dioxide but still heat. Can be oxidized by strong oxidizing agents and reduced by strong reducing agents. These reactions generate heat. May initiate polymerization reactions or catalyze other chemical reactions. A mixture with furfuryl alcohol exploded [Chem. Eng. News 18:72(1940)].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Aluminium/ ... reduces the acid (itself a reductant) with incandescence.

10.6 Hazardous decomposition products

The substance decomposes on heating and on contact with strong acids (sulfuric acid) producing carbon monoxide.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD₅₀ - rat (male/female) - 3 130 mg/kg bw. Remarks: 1878 mg/kg bw active acid.
- Inhalation: LC₅₀ Mouse inhalation 6200 mg/cu m /15 min
- Dermal: LD₅₀ - rabbit (male/female) - > 10 000 mg/kg bw.

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 very corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation of the vapour may cause lung oedema. See Notes. The substance may cause effects on the energy metabolism. This may result in acidosis.

STOT-repeated exposure

no data available

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*) - 195 mg/L - 96 h.
- Toxicity to daphnia and other aquatic invertebrates: EC50 - *Daphnia magna* - 527 mg/L - 48 h.
- Toxicity to algae: EC50 - *Pseudokirchneriella subcapitata* (previous names: *Raphidocelis subcapitata*, *Selenastrum capricornutum*) - 7.23 mg/L - 96 h.
- Toxicity to microorganisms: EC0 - *Pseudomonas putida* - > 1 000 mg/L.

12.2 Persistence and degradability

AEROBIC: Formic acid biodegrades readily in screening tests(1-9). Specific results include: 4.3 and 38.8% of theoretical BOD after 5 and 10 days using a sewage inoculum(1); 43.7-77.6% of theoretical BOD after 5 days with a sewage inoculum(2); 70% of theoretical BOD in 24 hours using activated sludge(3); 66% of theoretical BOD in 12 hours using an activated sludge inoculum(4); 39.9% of theoretical BOD in 24 hours with activated sludge(5); 48 and 51% of theoretical BOD after 5 days with unacclimated and acclimated sewage inoculum, respectively(6); and 40.5 and 51.7% of theoretical BOD after 5 days with sewage inocula in fresh water and synthetic seawater, respectively(7). Microorganisms are present in the air that can degrade formate in rainwater(8). Formic acid, present at 100 mg/L, reached 110% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(9).

12.3 Bioaccumulative potential

An estimated BCF of 3 was calculated in fish for formic acid(SRC), using a log Kow of -0.54(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

The Koc of formic acid is estimated as 1(SRC), using a log Kow of -0.54(1) and a regression-derived equation(2). According to a classification scheme(3), this estimated Koc value suggests that formic acid is expected to have very high mobility in soil. The pKa of formic acid is 3.75(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).

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: UN3412 (For reference only, please check.)

IMDG: UN3412 (For reference only, please check.)

IATA: UN3412 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: FORMIC ACID with not less than 10% but not not less than 10% but not
IMDG: FORMIC ACID with not less than 10% but not
IATA: FORMIC ACID with not less than 10% but not

more than 85% acid by mass (For reference only, please check.) more than 85% acid by mass (For reference only, please check.) more than 85% 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
Formic acid	Formic acid	64-18-6	200-579-1
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

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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

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered. The odour warning when the exposure limit value is exceeded is insufficient.

Any questions regarding this SDS, Please send your inquiry to sds@xixisys.com

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