

# 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** 4,4'-methylenebis[2-chloroaniline]

### 1.2 Other means of identification

**Product number** -  
**Other names** bisamine; 4,4'-Methylenebis(2-Chloroaniline); curalinm

### 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

Acute toxicity - Category 4, Oral  
Carcinogenicity, Category 1B  
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1  
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

### 2.2 GHS label elements, including precautionary statements

**Pictogram(s)**



**Signal word** Danger  
**Hazard statement(s)** H302 Harmful if swallowed  
H350 May cause cancer  
H410 Very toxic to aquatic life with long lasting effects

**Precautionary statement(s)**

<b>Prevention</b>	P264 Wash ... thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P203 Obtain, read and follow all safety instructions before use. P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/... P273 Avoid release to the environment.
<b>Response</b>	P301+P317 IF SWALLOWED: Get medical help. P330 Rinse mouth. P318 IF exposed or concerned, get medical advice. P391 Collect spillage.
<b>Storage</b>	P405 Store locked up.
<b>Disposal</b>	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
4,4'-methylenebis[2-chloroaniline]	4,4'-methylenebis[2-chloroaniline]	101-14-4	202-918-9	100%

---

**SECTION 4: First-aid measures****4.1 Description of necessary first-aid measures****If inhaled**

Fresh air, rest.

**Following skin contact**

Remove contaminated clothes. Rinse and then wash skin with water and soap.

**Following eye contact**

Rinse with plenty of water (remove contact lenses if easily possible).

**Following ingestion**

Rinse mouth. Refer for medical attention .

**4.2 Most important symptoms/effects, acute and delayed**

Exposure Routes: inhalation, skin absorption, ingestion, skin and/or eye contact  
Symptoms: Hematuria (blood in the urine), cyanosis, nausea, methemoglobinemia, kidney irritation; [potential occupational carcinogen] Target Organs: Liver, blood, kidneys (NIOSH, 2016)

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

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 if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on the 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. Poisons A and B

---

**SECTION 5: Fire-fighting measures****5.1 Suitable extinguishing media**

In case of fire in the surroundings: all extinguishing agents allowed.

## 5.2 Specific hazards arising from the chemical

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

## 5.3 Special protective actions for fire-fighters

Use water spray, dry powder, carbon dioxide.

---

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Personal protection: complete protective clothing including self-contained breathing apparatus. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations. Do NOT let this chemical enter the environment.

### 6.2 Environmental precautions

Personal protection: complete protective clothing including self-contained breathing apparatus. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations. Do NOT let this chemical enter the environment.

### 6.3 Methods and materials for containment and cleaning up

PRECAUTIONS FOR "CARCINOGENS": A high-efficiency particulate arrestor (HEPA) or charcoal filters can be used to minimize amt of carcinogen in exhausted air ventilated safety cabinets, lab hoods, glove boxes or animal rooms ... Filter housing that is designed so that used filters can be transferred into plastic bag without contaminating maintenance staff is avail commercially. Filters should be placed in plastic bags immediately after removal ... The plastic bag should be sealed immediately ... The sealed bag should be labelled properly ... Waste liquids ... should be placed or collected in proper containers for disposal. The lid should be secured & the bottles properly labelled. Once filled, bottles should be placed in plastic bag, so that outer surface ... is not contaminated ... The plastic bag should also be sealed & labelled. ... Broken glassware ... should be decontaminated by solvent extraction, by chemical destruction, or in specially designed incinerators. Chemical Carcinogens

---

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

NO open flames. 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

See Chemical Dangers. Well closed. Store in an area without drain or sewer access. Provision to contain effluent from fire extinguishing. PRECAUTIONS FOR "CARCINOGENS": Storage site should be as close as practical to lab in which carcinogens are to be used, so that only small quantities required for ... expt need to be carried. Carcinogens should be kept in only one section of cupboard, an explosion-proof refrigerator or freezer (depending on chemico-physical properties ...) that bears appropriate label. An inventory ... should be kept, showing quantity of carcinogen & date it was acquired ... Facilities for dispensing ... should be contiguous to storage area. Chemical Carcinogens

---

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure limit values

TLV: 0.01 ppm as TWA; (skin); A2 (suspected human carcinogen); BEI issued. MAK: skin absorption (H); carcinogen category: 2

**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 safety goggles or face shield.

**Skin protection**

Protective gloves. Protective clothing.

**Respiratory protection**

Use local exhaust or breathing protection.

**Thermal hazards**

no data available

---

**SECTION 9: Physical and chemical properties and safety characteristics**

<b>Physical state</b>	Solid. Granules.
<b>Colour</b>	Light yellow.
<b>Odour</b>	Faint, amine-like odor
<b>Melting point/freezing point</b>	101.3 °C. Remarks: Atmospheric pressure not mentioned in the report, test substance reacted/decomposed from ca 370 degr C onwards.
<b>Boiling point or initial boiling point and boiling range</b>	202-214°C/0.3mmHg(lit.)
<b>Flammability</b>	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.
<b>Lower and upper explosion limit/flammability limit</b>	no data available
<b>Flash point</b>	113°C
<b>Auto-ignition temperature</b>	no data available
<b>Decomposition temperature</b>	202°C
<b>pH</b>	Weak base
<b>Kinematic viscosity</b>	no data available
<b>Solubility</b>	less than 1 mg/mL at 77° F (NTP, 1992)
<b>Partition coefficient n-octanol/water</b>	log Pow = 2.5. Temperature:25 °C. Remarks:Test substance.;log Pow = 3.73. Temperature:25 °C. Remarks:Impurity 1.
<b>Vapour pressure</b>	< 0.001 Pa. Temperature:20 °C. Remarks:The weight loss of the test substance at 110°C, 120°C, 130°C and 140°C was lower than the weight loss of hexachlorobenzene at the same temperatures.
<b>Density and/or relative density</b>	1 440 kg/m³. Temperature:20 °C.
<b>Relative vapour density</b>	no data available
<b>Particle characteristics</b>	no data available

---

**SECTION 10: Stability and reactivity****10.1 Reactivity**

NIOSH considers 4,4'-methylenebis(2-chloroaniline) to be a potential occupational carcinogen.

Decomposes above 200°C . This produces toxic and corrosive fumes including hydrogen chloride and nitrogen oxides. The substance is a weak base. Reacts with strong acids, strong bases and alkaline earth metals.

## 10.2 Chemical stability

no data available

## 10.3 Possibility of hazardous reactions

Combustible. 4,4'-METHYLENEBIS(2-CHLOROANILINE) is a weak base. Undergoes an exothermic and self-sustaining decomposition reaction when exposed to heat above 392°F, In a closed container, the pressure buildup can be rapid enough to cause an explosion.

## 10.4 Conditions to avoid

no data available

## 10.5 Incompatible materials

Chemically-active metals (e.g., potassium, sodium, magnesium, zinc).

## 10.6 Hazardous decomposition products

This substance decomposes on heating above 200 deg C or on burning.

---

# SECTION 11: Toxicological information

### Acute toxicity

- Oral: approximate LD50 - rat (female) - 2 000 mg/kg bw.
- Inhalation: no data available
- Dermal: LD50 - rat (male/female) - > 2 000 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

There is strong mechanistic evidence indicating that the carcinogenicity of 4,4'-methylenebis(2-chlorobenzeneamine) involves a genotoxic mechanism of action that includes metabolic activation, formation of DNA adducts, and induction of mutagenic and clastogenic effects in humans. Metabolic activation to DNA-reactive intermediates occurs by multiple pathways including N-oxidation in the liver, O-acetylation in the bladder, and peroxidative activation in the mammary gland and other organs. 4,4'-Methylenebis(2-chlorobenzeneamine) is carcinogenic to humans (Group 1).

### Reproductive toxicity

No information is available on the reproductive or developmental effects of MBOCA in humans or animals.

### STOT-single exposure

The substance may cause effects on the blood.

### STOT-repeated exposure

This substance is carcinogenic to humans.

### Aspiration hazard

A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

---

## SECTION 12: Ecological information

### 12.1 Toxicity

- Toxicity to fish: LC50 - *Oryzias latipes* - 0.606 mg/L - 96 h.
- Toxicity to daphnia and other aquatic invertebrates: EC50 - *Daphnia magna* - 0.916 mg/L - 48 h.
- Toxicity to algae: ErC50 both for 24-48 h and for 48-72 h - *Pseudokirchneriella subcapitata* (previous names: *Raphidocelis subcapitata*, *Selenastrum capricornutum*) - > 1.89 mg/L - 72 h.
- Toxicity to microorganisms: EC50 - activated sludge of a predominantly domestic sewage - > 100 mg/L - 3 h. Remarks: Respiration rate.

### 12.2 Persistence and degradability

AEROBIC: 4,4'-methylenebis(2-chloroaniline), present at 100 mg/L, reached 0% of its theoretical BOD in 8 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(1). 4,4'-Methylenebis(2-chloroaniline) was not degraded after 6 weeks in a static system in which 2 mg/L of the compound was seeded with sludge, incubated for 7 days, and the process repeated using cultures from the original system(2). However, when the same investigators subjected the 4,4'-methylenebis(2-chloroaniline) containing water to a continuous feed activated sludge reactor, 96% of the chemical in the water was removed in 24 hours after 1 week of operation(2). Studies in pure cultures showed 4 major biodegradation products; two were identified as the N-monoacetyl, N,N'-diacetyl derivatives(3). 4,4'-Methylenebis(2-chloroaniline) is biodegraded to 4,4'-diamino-3,3'-dichlorobenzophenone in non-sterile soil(4). The rate of biodegradation in soil was not determined in part due to the irreversible binding of the chemical to the soil(4). The lack of metabolic conversion in sterile soil, as well as the higher extractable concentration present in sterile vs non-sterile soil indicate that biological degradation is occurring in the soil(4).

### 12.3 Bioaccumulative potential

BCFs of 130-398 and 114-232 were reported in carp (*Cyprinus carpio*) exposed for 8 weeks to 4,4'-methylenebis(2-chloroaniline) at 50 and 5 ppb, respectively(1). According to a classification scheme(2), these BCF ranges suggest bioconcentration in aquatic organisms is high(SRC).

### 12.4 Mobility in soil

Using a structure estimation method based on molecular connectivity indices(1), the Koc of 4,4'-methylenebis(2-chloroaniline) can be estimated to be 5700(SRC). According to a classification scheme(2), this estimated Koc value suggests that 4,4'-methylenebis(2-chloroaniline) is expected to be immobile in soil(SRC).

### 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: UN3077 (For reference only, please check.)

IMDG: UN3077 (For reference only, please check.)

IATA: UN3077 (For reference only, please check.)

### 14.2 UN Proper Shipping Name

ADR/RID:  
ENVIRONMENTALLY  
HAZARDOUS SUBSTANCE,  
SOLID, N.O.S. (For  
reference only, please check.)

IMDG:  
ENVIRONMENTALLY  
HAZARDOUS  
SUBSTANCE, SOLID,  
N.O.S. (For reference only,  
please check.)

IATA:  
ENVIRONMENTALLY  
HAZARDOUS  
SUBSTANCE, SOLID,  
N.O.S. (For reference only,  
please check.)

### 14.3 Transport hazard class(es)

ADR/RID: 9 (For reference only, please check.)

IMDG: 9 (For reference only, please check.)

IATA: 9 (For reference only, please check.)

### 14.4 Packing group, if applicable

ADR/RID: III (For reference only, please check.)

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

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

### 14.5 Environmental hazards

ADR/RID: Yes

IMDG: Yes

IATA: Yes

### 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
4,4'-methylenebis[2-chloroaniline]	4,4'-methylenebis[2-chloroaniline]	101-14-4	202-918-9
<b>European Inventory of Existing Commercial Chemical Substances (EINECS)</b>			Listed.
<b>EC Inventory</b>			Listed.
<b>United States Toxic Substances Control Act (TSCA) Inventory</b>			Listed.
<b>China Catalog of Hazardous chemicals 2015</b>			Listed.
<b>New Zealand Inventory of Chemicals (NZIoC)</b>			Listed.
<b>Philippines Inventory of Chemicals and Chemical Substances (PICCS)</b>			Listed.
<b>Vietnam National Chemical Inventory</b>			Listed.
<b>Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)</b>			Listed.
<b>Korea Existing Chemicals List (KECL)</b>			Listed.

---

## SECTION 16: Other information

### Information on revision

Creation Date July 15, 2019

Revision Date July 15, 2019

## 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](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

Depending on the degree of exposure, periodic medical examination is suggested. Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available. Do NOT take working clothes home.

**Any questions regarding this SDS, Please send your inquiry to [sds@xixisys.com](mailto:sds@xixisys.com)**

---

*Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.*