

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: **8379**
Version: **2.0 en**
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Version: (1)

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

| | |
|---------------------------------|--|
| Identification of the substance | Putrescin ≥99 %, for biochemistry |
| Article number | 8379 |
| EC number | 203-782-3 |
| CAS number | 110-60-1 |

1.2 Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------|---|
| Relevant identified uses: | Laboratory chemical Laboratory and analytical use |
| Uses advised against: | Do not use for squirting or spraying. Do not use for products which come into direct contact with the skin. Do not use for products which come into contact with foodstuffs. Do not use for private purposes (household). |

1.3 Details of the supplier of the safety data sheet

Carl Roth GmbH + Co KG
Schoemperlenstr. 3-5
D-76185 Karlsruhe
Germany

Telephone:+49 (0) 721 - 56 06 0
Telefax: +49 (0) 721 - 56 06 149
e-mail: sicherheit@carlroth.de
Website: www.carlroth.de

Competent person responsible for the safety data sheet: :Department Health, Safety and Environment

e-mail (competent person): **sicherheit@carlroth.de**

1.4 Emergency telephone number

| Name | Street | Postal code/city | Telephone | Website |
|---|-----------|----------------------|--------------|---------|
| National Poisons Information Service City Hospital | Dudley Rd | B187QH Birmingham | 844 892 0111 | |

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification acc. to GHS

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin $\geq 99\%$, for biochemistry

article number: 8379

| Section | Hazard class | Cat-egory | Hazard class and category | Hazard statement |
|---------|--|-----------|---------------------------|------------------|
| 2.6 | Flammable liquid | 3 | Flam. Liq. 3 | H226 |
| 2.16 | Substance or mixture corrosive to metals | 1 | Met. Corr. 1 | H290 |
| 3.10 | Acute toxicity (oral) | 4 | Acute Tox. 4 | H302 |
| 3.1D | Acute toxicity (dermal) | 3 | Acute Tox. 3 | H311 |
| 3.1I | Acute toxicity (inhal.) | 2 | Acute Tox. 2 | H330 |
| 3.2 | Skin corrosion/irritation | 1B | Skin Corr. 1B | H314 |

For full text of abbreviations: see SECTION 16

The most important adverse physicochemical, human health and environmental effects

Skin corrosion produces an irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis. The product is combustible and can be ignited by potential ignition sources.

2.2 Label elements

Labelling

Signal word

Danger

Pictograms

GHS02, GHS05,
GHS06



Hazard statements

| | |
|------|---|
| H226 | Flammable liquid and vapour |
| H290 | May be corrosive to metals |
| H302 | Harmful if swallowed |
| H311 | Toxic in contact with skin |
| H314 | Causes severe skin burns and eye damage |
| H330 | Fatal if inhaled |

Precautionary statements

Precautionary statements - prevention

| | |
|------|---|
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking |
| P260 | Do not breathe gas/mist/vapours/spray |
| P280 | Wear protective gloves/eye protection/face protection |

Precautionary statements - response

| | |
|----------------|---|
| P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing |
| P310 | Immediately call a POISON CENTER/doctor |

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: 8379

2.3 Other hazards

Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

| | |
|-------------------|---|
| Name of substance | Putrescin |
| Molecular formula | C ₄ H ₁₂ N ₂ |
| Molar mass | 88,15 g/mol |
| CAS No | 110-60-1 |
| EC No | 203-782-3 |

| Substance, Specific Conc. Limits, M-factors, ATE | | | |
|--|-----------|---------------------------------------|--------------------------------------|
| Specific Conc. Limits | M-Factors | ATE | Exposure route |
| - | - | 740 mg/kg 300 mg/kg 0,5 mg/l/4h | oral dermal inhalation: vapour |

SECTION 4: First aid measures

4.1 Description of first aid measures



General notes

Take off immediately all contaminated clothing. Self-protection of the first aider.

Following inhalation

Call a physician immediately. If breathing is irregular or stopped, administer artificial respiration.

Following skin contact

After contact with skin, wash immediately with plenty of water. Immediate medical treatment required because corrosive injuries that are not treated are hard to cure.

Following eye contact

In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes hold- ing eyelids apart and consult an ophthalmologist. Protect uninjured eye.

Following ingestion

Rinse mouth immediately and drink plenty of water. Rinse mouth with water (only if the person is conscious). Call a physician immediately. If swallowed danger of perforation of the esophagus and the stomach (strong corrosive effects). Call a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Corrosion, Vomiting, Risk of blindness, Gastric perforation, Cough

4.3 Indication of any immediate medical attention and special treatment needed

none

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin $\geq 99\%$, for biochemistry

article number: 8379

SECTION 5: Firefighting measures

5.1 Extinguishing media



Suitable extinguishing media

co-ordinate firefighting measures to the fire surroundings
water, foam, alcohol resistant foam, dry extinguishing powder, ABC-powder

Unsuitable extinguishing media

water jet

5.2 Special hazards arising from the substance or mixture

Combustible. In case of insufficient ventilation and/or in use, may form flammable/explosive vapour-air mixture. Solvent vapours are heavier than air and may spread along floors. Places which are not ventilated, e.g. unventilated below ground level areas such as trenches, conduits and shafts, are particularly prone to the presence of flammable substances or mixtures. Vapours may form explosive mixtures with air.

Hazardous combustion products

In case of fire may be liberated: Nitrogen oxides (NO_x), Carbon monoxide (CO), Carbon dioxide (CO₂)

5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus. Wear full chemical protective clothing.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures



For non-emergency personnel

Use personal protective equipment as required. Avoid contact with skin, eyes and clothes. Do not breathe dust. Avoidance of ignition sources.

6.2 Environmental precautions

Keep away from drains, surface and ground water. Danger of explosion.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains. Take up mechanically.

Advice on how to clean up a spill

Take up mechanically. Control of dust.

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin $\geq 99\%$, for biochemistry

article number: 8379

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provision of sufficient ventilation. Use extractor hood (laboratory). Handle and open container with care. Avoid dust formation. Clear contaminated areas thoroughly.

Measures to prevent fire as well as aerosol and dust generation



Keep away from sources of ignition - No smoking.

Take precautionary measures against static discharge.

Advice on general occupational hygiene

Thorough skin-cleansing after handling the product. When using do not smoke.

7.2 Conditions for safe storage, including any incompatibilities

Store in a dry place.

Incompatible substances or mixtures

Observe hints for combined storage.

Consideration of other advice:

Store locked up.

Ventilation requirements

Keep any substance that emits harmful vapours or gases in a place that allows these to be permanently extracted. Use local and general ventilation.

Specific designs for storage rooms or vessels

Recommended storage temperature: 15 – 25 °C

7.3 Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

This information is not available.

Human health values

| Relevant DNELs and other threshold levels | | | | |
|---|-----------------------|------------------------------------|-------------------|----------------------------|
| Endpoint | Threshold level | Protection goal, route of exposure | Used in | Exposure time |
| DNEL | 7,3 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| DNEL | 7,3 mg/m ³ | human, inhalatory | worker (industry) | acute - systemic effects |
| DNEL | 7,3 mg/m ³ | human, inhalatory | worker (industry) | chronic - local effects |

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin $\geq 99\%$, for biochemistry

article number: 8379

| Relevant DNELs and other threshold levels | | | | |
|---|-----------------------|------------------------------------|-------------------|-----------------------|
| Endpoint | Threshold level | Protection goal, route of exposure | Used in | Exposure time |
| DNEL | 7,3 mg/m ³ | human, inhalatory | worker (industry) | acute - local effects |

Environmental values

| Relevant PNECs and other threshold levels | | | | |
|---|-----------------|-----------------------|------------------------------|------------------------------|
| End-point | Threshold level | Organism | Environmental compartment | Exposure time |
| PNEC | 0,73 mg/l | aquatic organisms | freshwater | short-term (single instance) |
| PNEC | 0,073 mg/l | aquatic organisms | marine water | short-term (single instance) |
| PNEC | 3,25 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |
| PNEC | 0,648 mg/kg | aquatic organisms | freshwater sediment | short-term (single instance) |
| PNEC | 0,148 mg/kg | terrestrial organisms | soil | short-term (single instance) |

8.2 Exposure controls

Individual protection measures (personal protective equipment)

Eye/face protection



Use safety goggle with side protection. Wear face protection.

Skin protection



• hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. Check leak-tightness/impermeability prior to use. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves. The times are approximate values from measurements at 22 °C and permanent contact. Increased temperatures due to heated substances, body heat etc. and a reduction of the effective layer thickness by stretching can lead to a considerable reduction of the breakthrough time. If in doubt, contact manufacturer. At an approx. 1.5 times larger / smaller layer thickness, the respective breakthrough time is doubled / halved. The data apply only to the pure substance. When transferred to substance mixtures, they may only be considered as a guide.

• type of material

Butyl caoutchouc (butyl rubber)

• material thickness

0,7mm

• breakthrough times of the glove material

>480 minutes (permeation: level 6)

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin $\geq 99\%$, for biochemistry

article number: 8379

• other protection measures

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

Respiratory protection



Respiratory protection necessary at: Dust formation. Particulate filter device (EN 143). P3 (filters at least 99,95 % of airborne particles, colour code: White).

Environmental exposure controls

Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|--|--|
| Physical state | solid |
| Colour | colourless - white |
| Odour | pungent |
| Melting point/freezing point | 28 °C (ECHA) |
| Boiling point or initial boiling point and boiling range | 158 – 159 °C at 1.013 hPa (ECHA) |
| Flammability | flammable liquid in accordance with GHS criteria |
| Lower and upper explosion limit | 0,7 vol% (LEL) - 11,2 vol% (UEL) |
| Flash point | 45 °C at 1.013 hPa (ECHA) |
| Auto-ignition temperature | not determined |
| Decomposition temperature | not relevant |
| pH (value) | not applicable |
| Kinematic viscosity | 2,184 mm ² /s at 25 °C not relevant |
| Dynamic viscosity | 1,915 mPa s at 25 °C |
| <u>Solubility(ies)</u> | |
| Water solubility | 1.000 g/l (TOXNET) |
| <u>Partition coefficient</u> | |
| Partition coefficient n-octanol/water (log value): | -0,84 (25 °C) (ECHA) |
| Vapour pressure | 4,36 hPa at 25 °C |
| <u>Density and/or relative density</u> | |
| Density | 0,877 g/cm ³ at 25 °C (ECHA) |
| Relative vapour density | information on this property is not available |

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: 8379

Particle characteristics No data available.

Other safety parameters

Oxidising properties none

9.2 Other information

Information with regard to physical hazard classes:

Corrosive to metals category 1: corrosive to metals

Other safety characteristics:

Surface tension 0,033 N/m (40 °C) (ECHA)

SECTION 10: Stability and reactivity

10.1 Reactivity

It's a reactive substance. Risk of ignition. Substance or mixture corrosive to metals. The product in the delivered form is not dust explosion capable; the enrichment of fine dust however leads to the danger of dust explosion.

If heated

Risk of ignition.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

Violent reaction with: strong oxidiser, Aldehydes, Ketone, Nitrate, Phenols, Acid chlorides, inorganic, Acids

10.4 Conditions to avoid

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Protect from moisture.

10.5 Incompatible materials

different metals

10.6 Hazardous decomposition products

Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Classification acc. to GHS

Acute toxicity

Harmful if swallowed. Toxic in contact with skin. Fatal if inhaled.

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: 8379

| Acute toxicity | | | | | |
|----------------|----------|-----------|---------|--------|--------|
| Exposure route | Endpoint | Value | Species | Method | Source |
| oral | LD50 | 740 mg/kg | rat | | ECHA |

Skin corrosion/irritation

Causes severe skin burns and eye damage.

Serious eye damage/eye irritation

Causes serious eye damage.

Respiratory or skin sensitisation

Shall not be classified as a respiratory or skin sensitiser.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

Symptoms related to the physical, chemical and toxicological characteristics

• If swallowed

If swallowed danger of perforation of the esophagus and the stomach (strong corrosive effects)

• If in eyes

causes burns, Causes serious eye damage, risk of blindness

• If inhaled

cough, Dyspnoea

• If on skin

causes severe burns, causes poorly healing wounds

• Other information

none

11.2 Endocrine disrupting properties

Not listed.

11.3 Information on other hazards

There is no additional information.

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin $\geq 99\%$, for biochemistry

article number: 8379

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

| Aquatic toxicity (acute) | | | | |
|--------------------------|----------|---------|--------|---------------|
| Endpoint | Value | Species | Source | Exposure time |
| LC50 | 730 mg/l | fish | ECHA | 96 h |
| EC50 | 6 mg/l | algae | ECHA | 96 h |

Biodegradation

The substance is readily biodegradable.

12.2 Process of degradability

Theoretical Oxygen Demand with nitrification: 2,768 mg/mg

Theoretical Oxygen Demand: 1,996 mg/mg

Theoretical Carbon Dioxide: 1,997 mg/mg

| Process of degradability | | |
|---------------------------|------------------|------|
| Process | Degradation rate | Time |
| carbon dioxide generation | $\geq 89\%$ | 28 d |

12.3 Bioaccumulative potential

Does not significantly accumulate in organisms.

| | |
|---------------------------|----------------------|
| n-octanol/water (log KOW) | -0,84 (25 °C) (ECHA) |
|---------------------------|----------------------|

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Data are not available.

12.6 Endocrine disrupting properties

Not listed.

12.7 Other adverse effects

Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods



This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: **8379**

Sewage disposal-relevant information

Do not empty into drains.

Waste treatment of containers/packagings

It is a dangerous waste; only packagings which are approved (e.g. acc. to ADR) may be used.

13.2 Relevant provisions relating to waste

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process. Waste catalogue ordinance (Germany).

13.3 Remarks

Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1 UN number or ID number

| | |
|-----------|---------|
| ADRRID | UN 3286 |
| IMDG-Code | UN 3286 |
| ICAO-TI | UN 3286 |

14.2 UN proper shipping name

| | |
|----------------|--|
| ADRRID | FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. |
| IMDG-Code | FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. |
| ICAO-TI | Flammable liquid, toxic, corrosive, n.o.s. |
| Technical name | Putrescin |

14.3 Transport hazard class(es)

| | |
|-----------|----------------|
| ADRRID | 3 (6.1) (8) |
| IMDG-Code | 3 (6.1) (8) |
| ICAO-TI | 3 (6.1) (8) |

14.4 Packing group

| | |
|-----------|----|
| ADRRID | II |
| IMDG-Code | II |
| ICAO-TI | II |

14.5 Environmental hazards

non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Special precautions for user

Provisions for dangerous goods (ADR) should be complied within the premises.

14.7 Maritime transport in bulk according to IMO instruments

The cargo is not intended to be carried in bulk.

14.8 Information for each of the UN Model Regulations

Safety data sheet


acc. to Regulation (EC) No. 1907/2006 (REACH)




Putrescin ≥99 %, for biochemistry

article number: 8379


Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN) - Additional information

| | |
|---|---|
| Proper shipping name | FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. |
| Particulars in the transport document | UN3286, FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S., (Putrescin), 3 (6.1+8), II, (D/E) |
| Classification code | FTC |
| Danger label(s) | 3+6.1+8 |
|  | |
| Special provisions (SP) | 274, 802(ADN) |
| Excepted quantities (EQ) | E2 |
| Limited quantities (LQ) | 1 L |
| Transport category (TC) | 2 |
| Tunnel restriction code (TRC) | D/E |
| Hazard identification No | 368 |
| Emergency Action Code | 3WE |

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) Additional information

| | |
|---|---------------|
| Classification code | FTC |
| Danger label(s) | 3+6.1+8 |
|  | |
| Special provisions (SP) | 274, 802(ADN) |
| Excepted quantities (EQ) | E2 |
| Limited quantities (LQ) | 1 L |
| Transport category (TC) | 2 |
| Hazard identification No | 368 |

International Maritime Dangerous Goods Code (IMDG) - Additional information

| | |
|---|---|
| Proper shipping name | FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. |
| Particulars in the shipper's declaration | UN3286, FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S., (Putrescin), 3 (6.1+8), II, 45°C c.c. |
| Marine pollutant | - |
| Danger label(s) | 3+6.1+8 |
|  | |
| Special provisions (SP) | 274 |
| Excepted quantities (EQ) | E2 |
| Limited quantities (LQ) | 1 L |

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: **8379**

| | |
|---|--|
| EmS | F-E, S-C |
| Stowage category | B |
| International Civil Aviation Organization (ICAO-IATA/DGR) - Additional information | |
| Proper shipping name | Flammable liquid, toxic, corrosive, n.o.s. |
| Particulars in the shipper's declaration | UN3286, Flammable liquid, toxic, corrosive, n.o.s., (Putrescin), 3 (6.1+8), II |
| Danger label(s) | 3+6.1+8 |
| | |
| Excepted quantities (EQ) | E2 |
| Limited quantities (LQ) | 0,5 L |

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant provisions of the European Union (EU)

Seveso Directive

| 2012/18/EU (Seveso III) | | | |
|-------------------------|---------------------------------------|---|-------|
| No | Dangerous substance/hazard categories | Qualifying quantity (tonnes) for the application of lower and upper-tier requirements | Notes |
| H2 | acute toxic (cat. 2 + cat. 3, inhal.) | 50 200 | 41) |

Notation

- 41) - Category 2, all exposure routes
- category 3, inhalation exposure route

Deco-Paint Directive

| | |
|-------------|------------------|
| VOC content | 100 % 877 g/l |
|-------------|------------------|

Industrial Emissions Directive (IED)

| | |
|-------------|---------|
| VOC content | 100 % |
| VOC content | 877 g/l |

Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

not listed

Regulation concerning the establishment of a European Pollutant Release and Transfer Register (PRTR)

not listed

Water Framework Directive (WFD)

not listed

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: 8379

Regulation on the marketing and use of explosives precursors

not listed

Regulation on drug precursors

not listed

Regulation on substances that deplete the ozone layer (ODS)

not listed

Regulation concerning the export and import of hazardous chemicals (PIC)

not listed

Regulation on persistent organic pollutants (POP)

not listed

National regulations(GB)

List of substances subject to authorisation (GB REACH, Annex 14) / SVHC - candidate list

not listed

Restrictions according to GB REACH, Annex 17

| Dangerous substances with restrictions (GB REACH, Annex 17) | | | |
|---|------------------------|--------|----|
| Name of substance | Name acc. to inventory | CAS No | No |
| Putrescin | flammable / pyrophoric | | 40 |

Other information

Directive 94/33/EC on the protection of young people at work. Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.

National inventories

| Country | Inventory | Status |
|---------|------------|---------------------|
| AU | AIIC | substance is listed |
| CA | NDSL | substance is listed |
| CN | IECSC | substance is listed |
| EU | ECSI | substance is listed |
| EU | REACH Reg. | substance is listed |
| JP | CSCL-ENCS | substance is listed |
| KR | KECI | substance is listed |
| MX | INSQ | substance is listed |
| NZ | NZIoC | substance is listed |
| PH | PICCS | substance is listed |
| TW | TCSI | substance is listed |
| US | TSCA | substance is listed |

Legend

| | |
|-----------|---|
| AIIC | Australian Inventory of Industrial Chemicals |
| CSCL-ENCS | List of Existing and New Chemical Substances (CSCL-ENCS) |
| ECSI | EC Substance Inventory (EINECS, ELINCS, NLP) |
| IECSC | Inventory of Existing Chemical Substances Produced or Imported in China |
| INSQ | National Inventory of Chemical Substances |

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: 8379

Legend

| | |
|------------|---|
| KECI | Korea Existing Chemicals Inventory |
| NDSL | Non-domestic Substances List (NDSL) |
| NZIoC | New Zealand Inventory of Chemicals |
| PICCS | Philippine Inventory of Chemicals and Chemical Substances (PICCS) |
| REACH Reg. | REACH registered substances |
| TCSI | Taiwan Chemical Substance Inventory |
| TSCA | Toxic Substance Control Act |

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Indication of changes (revised safety data sheet)

Alignment to regulation:

Restructuring: section 9, section 14

| Section | Former entry (text/value) | Actual entry (text/value) | Safety-relevant |
|---------|---|---|-----------------|
| 2.1 | | Classification acc. to GHS: change in the listing (table) | yes |
| 2.1 | | The most important adverse physicochemical, human health and environmental effects: Skin corrosion produces an irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis. The product is combustible and can be ignited by potential ignition sources. | yes |
| 2.2 | | Precautionary statements - prevention: change in the listing (table) | yes |
| 2.2 | Labelling of packages where the contents do not exceed 125 ml: Signal word: Danger | | yes |
| 2.2 | | Labelling of packages where the contents do not exceed 125 ml: change in the listing (table) | yes |
| 2.2 | | Labelling of packages where the contents do not exceed 125 ml: change in the listing (table) | yes |
| 2.2 | | Labelling of packages where the contents do not exceed 125 ml: change in the listing (table) | yes |
| 2.3 | Other hazards: There is no additional information. | Other hazards | yes |
| 2.3 | | Results of PBT and vPvB assessment: According to the results of its assessment, this substance is not a PBT or a vPvB. | yes |

Abbreviations and acronyms

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin ≥99 %, for biochemistry

article number: **8379**

| Abbr. | Descriptions of used abbreviations |
|-----------|---|
| ADN | Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways) |
| ADR | Accord relatif au transport international des marchandises dangereuses par route (Agreement concerning the International Carriage of Dangerous Goods by Road) |
| ATE | Acute Toxicity Estimate |
| CAS | Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances) |
| DGR | Dangerous Goods Regulations (see IATA/DGR) |
| DNEL | Derived No-Effect Level |
| EC50 | Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval |
| EC No | The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union) |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| ELINCS | European List of Notified Chemical Substances |
| EmS | Emergency Schedule |
| GB REACH | The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019, SI 2019/758 (as amended) |
| GHS | "Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations |
| IATA | International Air Transport Association |
| IATA/DGR | Dangerous Goods Regulations (DGR) for the air transport (IATA) |
| ICAO | International Civil Aviation Organization |
| ICAO-TI | Technical instructions for the safe transport of dangerous goods by air |
| IMDG | International Maritime Dangerous Goods Code |
| IMDG-Code | International Maritime Dangerous Goods Code |
| LC50 | Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval |
| LD50 | Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval |
| LEL | Lower explosion limit (LEL) |
| NLP | No-Longer Polymer |
| PBT | Persistent, Bioaccumulative and Toxic |
| PNEC | Predicted No-Effect Concentration |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals |
| RID | Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail) |
| UEL | Upper explosion limit (UEL) |
| VOC | Volatile Organic Compounds |
| vPvB | Very Persistent and very Bioaccumulative |

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



Putrescin $\geq 99\%$, for biochemistry

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Key literature references and sources for data

Agreement concerning the International Carriage of Dangerous Goods by Road (ADR). Regulations concerning the International Carriage of Dangerous Goods by Rail (RID). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

List of relevant phrases (code and full text as stated in section 2 and 3)

| Code | Text |
|------|--|
| H226 | Flammable liquid and vapour. |
| H290 | May be corrosive to metals. |
| H302 | Harmful if swallowed. |
| H311 | Toxic in contact with skin. |
| H314 | Causes severe skin burns and eye damage. |
| H330 | Fatal if inhaled. |

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.