Safety Data Sheet

1 Chemical Product and Company Identification
Identification of the product
Product Code: Uricase
Supplier
Name: TOYOBOR CO., LTD.
Address: 2-8, Dojimahama 2-chome Kita-ku, Osaka 530-8230, Japan
Department: Biotechnology Overseas Sales and Marketing Department
Phone: +81-6-6348-3843
Fax: +81-6-6348-3833
Recommended use and restrictions on use: diagnostic product

2 Hazard Identification
Important hazards
Adverse effects on human health: Harmful if Boric acid or Sodium tetraborate are swallowed.
Lethal dose (Boric acid): Adult 10g, Child 5g

GHS classification
Physical hazards
Health hazards
- Acute toxicity: Oral Category 5
- Acute toxicity: Dermal
- Acute toxicity: Inhalation (Gas, Vapour)
- Acute toxicity: Inhalation (Dust, Mist)
- Skin corrosion/irritation Category 2
- Serious eye damage/Eye irritation Category 2
- Sensitization: Respiratory
- Sensitization: Skin
- Germ cell mutagenicity
- Carcinogenicity
- Toxic to reproduction
- Specific target organ toxicity (Single exposure) Category 1 (nervous system, gastrointestinal tract, respiratory organ, kidneys)
- Specific target organ toxicity (Repeated exposure) Category 1 (nervous system, gastrointestinal tract, respiratory organ, kidneys)
- Aspiration hazard
- Environmental hazards
- Acute hazards to the aquatic environment
- Long-term hazards to the aquatic environment
- Hazard to the ozone layer
- Classification not possible

GHS Label Elements
Symbol/Pictograms
Signal word: Danger
Hazard statements:
- May be harmful if swallowed.
- May cause skin irritation.
- May cause serious eye irritation.
- May damage fertility or the unborn child.
- Cause damage to nervous system, gastrointestinal tract, respiratory organ and kidneys.
- Cause damage to nervous system, gastrointestinal tract, respiratory organ, kidneys through prolonged or repeated exposure.
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Precautionary statements

Wash hands thoroughly after handling.

Response

Get medical advice/attention if you feel unwell.

Storage

Store locked up.

Disposal
Dispose of contents/container in accordance with local/regional/national/international/regulation.

Important symptoms (Boric acid) Symptoms of vomit, diarrhea, collapse, erythema may appear after 2-3 hours later and die after 3-5 days later from ingestion.

3 Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Substance/Mixture</th>
<th>Mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Nature</td>
<td>Uricase</td>
</tr>
<tr>
<td>Chemical Specifity</td>
<td>Freeze and drying powder including enzyme</td>
</tr>
<tr>
<td>Concentration or concentration range</td>
<td>ca. 81 %(W/W)</td>
</tr>
<tr>
<td>Main components</td>
<td>CAS #</td>
</tr>
<tr>
<td>Uricase</td>
<td>9002-12-4</td>
</tr>
<tr>
<td>Boric acid</td>
<td>10043-35-3</td>
</tr>
<tr>
<td>Sodium tetraborate</td>
<td>1303-96-4</td>
</tr>
<tr>
<td>Polyethylene Glycol-p-octylphenyl Ether (Triton X-100)</td>
<td>9002-93-1</td>
</tr>
</tbody>
</table>

Ingredients Contributing to the Hazard

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Boric acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical formula</td>
<td>H₃BO₃</td>
</tr>
<tr>
<td>CAS #</td>
<td>10043-35-3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Sodium tetraborate decahydrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical formula</td>
<td>Na₃B₄O₇·10H₂O</td>
</tr>
<tr>
<td>CAS #</td>
<td>1303-96-4</td>
</tr>
</tbody>
</table>

| Boron content of this product | ca. 6 %(W/W) |

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Polyethylene Glycol-p-octylphenyl Ether (Triton X-100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical formula</td>
<td>Not specified</td>
</tr>
<tr>
<td>CAS #</td>
<td>9002-93-1</td>
</tr>
</tbody>
</table>
4 First Aid Measures

Inhalation
Remove to fresh air. Consult a physician when unpleasantness occurs.

Skin Contact
Wash off with plenty of water. Consult a physician when inflammation on the skin occurs.

Eye Contact
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Ingestion
Rinse mouth. Swill plentiful amount of water or milk for immediate vomiting. Consult a physician.

Most important symptoms/effects, acute and delayed.
Inhalation: cough, pant, pharyngeal pain, nosebleed.
Skin: dry skin.
Eye: redness, pain
Ingestion: stomachache, derangement, diarrhea, headache, nausea, vomit, lassitude, cramp.

5 Fire Fighting Measures

Specific extinguishing methods
Water spray, dry chemical powder, or carbon dioxide etc.

Precautions for fire-fighters
Firefighter should work from the windward side.

6 Accidental Release Measures

Personal Precautions, protective equipment and emergency procedure.
Wear protective gear to avoid eye/skin contact and inhalation. Do not work at leeward.

Environmental Precautions
High concentrated waste fluid should not be directly discharged into rivers.

Methods and materials for containment and cleaning up.
Take up under vacuum using dust collecting filter, wash residual spill with copious amounts of water. Use cloth, paper or anything similar to soak up the solution leaking out of the container.
(Waste water should be treated with activated sludge or adsorbed with activated carbon etc.)

7 Handling and Storage

Handling
Wear protective gear to avoid eye/skin contact and inhalation.

Technical Measures
Do not drop the container to prevent the content popping out.

Precautions
Keep sealed container in freezer.

Storage
None specified.

Technical Measures
Store under -20°C to avoid deactivating.

Incompatible substances and mixtures
Use the initial container of the product.

Storage Conditions

Packaging Materials

8 Exposure Controls/Personal Protection

Engineering controls
Provide shower and eye washing apparatus nearby.

Occupational exposure limit, biological limit
(Boric acid) TLV-TWA 5mg/m³

Personal Protective Equipment
Protecting mask
Protecting gloves
Safety goggles
Long sleeve working wear
9 Physical and Chemical Properties

Physical State, form and color: Powder / White
Odour: No odour
pH: ca. pH 8.5 (1% W/V)
Flash Point: No information available.
Explosiveness: No information available.
Density: No information available.
Solubility: Freely soluble in water.

10 Stability and Reactivity

Stability: Stable at temperatures below -20°C. When left for long at room temperature, proteins might be degraded, which does not cause any hazardous reaction.

Possible hazard reactions at specific conditions: None specified.

Conditions to avoid: Prolonged storage under higher temperature than room temperature and high humidity.

Materials to avoid: May react with strong oxidizing compound.

Hazardous Decomposition Products: No information available.

11 Toxicological Information

(1) Boric acid

Acute Toxicity (Oral): Rat LD50 2660mg/kg
Skin corrosion/irritation: Moderate irritation (guinea pig, 24hr, 72hr)
Serious eye damage/irritation: Repeation /Pain
Sensitization: No data available
Germ cell mutagenicity: Absence of data on multi-generation mutagenicity tests and germ cell mutagenicity tests in vivo, and negative data on somatic cell mutagenicity tests in vivo (micronucleus tests)

Carcinogenicity: ACGIH (2005): Category A4
Toxic to reproduction: Adverse effects on reproduction of parental animals and development of pups at doses producing no parental toxicity.

Specific target organ toxicity (Single exposure): Human: Gastrointestinal tract effects such as nausea, vomiting, abdominal pain and diarrhea, and central nerve effects such as lethargy, headaches, fever, increased irritability and muscle convulsion. Irritation of the upper respiratory tract. Animal: cyanosis, tetany, spasm and shock-like symptoms at dosing levels within the guidance value ranges for Category 1.

Specific target organ toxicity (Repeated exposure): Human: oliguresis, anuria, and nephropathy including renal tubular necrosis.

(2) Sodium tetraborate

Acute Toxicity (Oral): LD₅₀ 4450mg/kg (Category 5)
Skin corrosion/irritation: May cause dermatitis (Category 2)
Serious eye damage/irritation: May cause strong eye irritation (Category 2A)
Toxic to reproduction: Affect spermatogenesis (Category 2). May damage fertility or the unborn child.

Specific target organ toxicity (Single exposure): This product causes damage to the nervous system, respiratory organ, kidneys. (Category 1)
Specific target organ toxicity (Repeated exposure): This product causes damage to the nervous system, respiratory organ, kidneys and testis, through prolonged or repeated exposure. (Category 2)

Aspiration hazard: Not classification
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12 Ecological Information

Acute hazards to the aquatic environment

Persistence/Degradability

Polyethylene Glycol-p-octylphenyl Ether (Triton X-100)
LC50/96hr = 3mg/L (bluegill)
This product is biodegradable and does not remain on the environment for long.
22% by BOD (National Institute of Technology and Evaluation, Japan)

13 Disposal Considerations

Residues
A pollution container and packing
Dispose of in accordance with all applicable local and national laws and regulations.
Wash with copious amounts of water and waste conforming to local regulations depending on the type of the material.

14 Transport Information

IMO information
IATA information
Not applicable
Not applicable

Domestic regulations
Rail and road transportation information
Marine transportation information
Aviation transportation information
Not applicable
Not applicable
Not applicable

Specific precautions transport measures and conditions
Avoid direct sunshine and check the container and loading to prevent leakage or turnover, fall and damage. Transport in accordance with regulations. Do not load with foods and feed. Keep at temperatures below -20℃.

15 Regulatory Information

Registration, Evaluation, Authorization and Restriction of Chemicals (EU)

Boric acid
Concentration or concentration range ca 14.8% (W/W)
Chemical formula H3BO3
CAS# 10043-35-3

Sodium tetraborate
Concentration or concentration range ca 2.7% (W/W)
Chemical formula Na2B4O7 · 10H2O
CAS# 1303-96-4

Polyethylene Glycol-p-octylphenyl Ether (Triton X-100)
Concentration or concentration range ca. 1.0% (W/W)
Chemical formula Not specified
CAS# 9002-93-1

A following component of this product is put on a list of Substances of Very High Concern (SVHC).

16 Other Information

Notice

The information shall not be taken as being all inclusive and is to be used only as a guide. All materials and mixtures may be present unknown hazards and should be used with caution. The SDS is subject to revision as new information becomes available. The information in this SDS, to the best of our knowledge, is accurate and correct. However, TOYOB0 makes no warranty and assumes no liability whatsoever in connection with any use of this information.