

Safety Data Sheet

1 Chemical Product and Company Identification

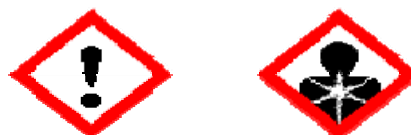
Identification of the product	Ascorbate oxidase
Product Code	ASO-311
Supplier	
Name	TOYOBO CO., LTD.
Address	Osaka Umeda Twin Towers South, 1-13-1 Umeda Kita-ku, Osaka 530-0001, Japan
Department	Biotechnology Overseas Sales and Marketing Department
Phone	+81-6-6348-3846
Fax	+81-6-6348-3833
Recommended use and restrictions on use	diagnostic product

2 Hazard Identification

Important hazards	This product might be harmful if swallowed, because it contains boric acid and sodium tetraborate.
Hazards and Effect for human health	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)	Not applicable
Acute toxicity : Inhalation (Dust,Mist)	-
Skin corrosion/irritation	Category 2
Serious eye damage/Eye irritation	Category 2A
Sensitization : Respiratory	-
Sensitization : Skin	-
Germ cell mutagenicity	-
Carcinogenicity	-
Toxic to reproduction	Category 1B
Specific target organ toxicity (Single exposure)	Category 1(nervous system, gastrointestinal tract, respiratory organs, kidneys)
Specific target organ toxicity (Repeated)	Category 1(nervous system, respiratory organ, kidneys) Category 2(testis)
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, respiratory organ, kidneys through prolonged or repeated exposure.

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Precautionary statements	May cause damage to testis through prolonged or repeated exposure.
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection. Do not breathe dust/fume. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
Response	Get medical advice/attentions if you feel unwell. If ON SKIN: Wash with plenty of water/soap. Take off contaminated clothing and wash it before use. If skin irritation occurs: Get medical advice/attention. If in eye: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. If exposed or concerned: Get medical attention/advice.
Storage	Store locked up. Store in a well-ventilated place. Keep container tightly closed.
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 3-5days later from ingestion.

3 Composition/Information on Ingredients

Substance/Mixture	Mixture
Chemical Nature	Ascorbate oxidase
Chemical specificity	Freeze and drying powder including enzyme
Concentration or concentration range	ca. 17 % (W/W)
Cas #	9029-44-1
Ingredients Contributing to the Hazard	
Common Chemical name	Boric acid
Chemical formula	H ₃ BO ₃
Cas #	10043-35-3
Common Chemical name	Sodium tetraborate decahydrate
Chemical formula	Na ₂ B ₄ O ₇ · 10H ₂ O
CAS#	1303-96-4
Boron content of this product	ca. 19 % (W/W)

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.

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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.

Protection for first-aiders

Wear protective equipments depending on the situation.

Notes to an attending physician

Rest and medical observation are necessary.

5 Fire Fighting Measures

Extinguishing media

This product is not flammable. Use extinguishing agent suitable for type of surrounding fire.

Specific hazards

No information available.

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)

7 Handling and Storage

Handling

Technical Measures

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

Precautions

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

Storage

Technical Measures

Keep sealed container in freezer.

Incompatible substances and mixtures

None specified.

Storage Conditions

Store under -20°C to avoid deactivating.

Packaging Materials

Use the initial container of the product.

8 Exposure Controls/Personal Protection

Engineering controls

Provide shower and eye washing apparatus nearby.

Occupational exposure limit, biological limit

ACGIH TLV(2004)

(Borate compounds, inorganic) TWA 2mg/m³, STEL 6mg/m³

OSHA

Not established.

NIOSH

Borates, tetra, sodium salts, pentahydrate REL:1mg/m³ TWA

Personal Protective Equipment

Respiratory Protection

Protecting mask

Hand Protection

Protecting gloves

Eye Protection

Safety goggles

Skin and Body Protection

Long sleeve working wear

9 Physical and Chemical Properties

Physical State, form and color

Powder / Light blue

Odour

No odour

pH

ca. pH 8.0 (1% W/V)

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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 condition	
Conditions to avoid	Prolonged storage under higher temperature than room temperature and high humidity.
Materials to avoid	Oxidizing agent
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	Rubefaction /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)	LD ₅₀ 4450mg/kg (Category 5) (EHC204) 3493mg/kg, 4500mg/kg, 4980mg/kg, 5660mg/kg, 6080mg/kg (ECETOC TR63) 6000mg/kg
Acute Toxicity (Dermal)	LD ₅₀ > 10000mg/kg (HSDB) (Category 4)
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
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

12 Ecological Information

Acute hazards to the aquatic environment	Boric acid: Fish (Rainbow Trout)
Persistence /Degradability	Protein and other organic ingredients are biodegradable and does not remain on the environment for long.

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13 Disposal Considerations

Residues

A pollution container and packing

Dispose of in accordance with all applicable local and Wash with copious amounts of water and waste conforming to local regulations depending on the type of the material

14 Transport Information

International regulations

IMO information

Not applicable

IATA information

Not applicable

Domestic regulations

Rail and road transportation information

Not applicable

Marine transportation information

Not applicable

Aviation transportation information

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°C.

15 Regulatory Information

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

A following components of this product are included in SVHC (Candidate list of authorization).

Common Chemical name

Boric acid

Chemical formula

 H_3BO_3

CAS#

10043-35-3

Common Chemical name

Sodium tetraborate decahydrate

Chemical formula

 $Na_2B_4O_7 \cdot 10H_2O$

CAS#

1303-96-4

Boron content of this product

ca. 11 % (W/W)

16 Other Information

Notice

The information shall not be taken as being all inclusive and is to be used only 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,TOYOBO makes no warranty and assumes no liability whatsoever in connection with any use of this information.