



MATERIAL SAFETY DATA SHEET

1-5

ITEM: TREHA™ (Trehalose)

IDENTIFICATION OF THE SUBSTANCE & COMPANY

Chemical Identity: α -D-glucopyranosyl α -D-glucopyranoside
CAS#: 99-20-7
Purity: not less than 98.0 %
Chemical Formula and/or
Structure: $C_{12}H_{22}O_{11} \bullet 2H_2O$

Company Name: Hayashibara Company Ltd.
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CRITERIA FOR DANGER AND HAZARDOUSNESS

No applicable hazardous criteria.

Danger, Hazardousness and Ecological Influence: Highly safe material enzymatically produced from starch similar to glucose or corn syrups. Found naturally in insects, plants, organisms such as mushrooms and baker's yeast. Has a long history of consumption by humans.

FIRST AID MEASURES

Eye Contact: Irrigate surfaces thoroughly with water
Skin Contact: Rinse areas thoroughly with water

FIRE AND EXPLOSION HAZARD DATA

Not flammable. If a fire occurs in the surrounding area use an extinguishing media appropriate to the surrounding fire conditions. A water spray may be used.

Special Fire Fighting Procedures: Ordinary extinguishing process can be taken in case of fire.

Extinguishing Media: No prohibited media.

LEAKS AND SPILL PROCEDURE

Sweep up the spill and wash the area with water.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

The product is stable at room temperature and does not produce hazardous decomposition products. There are no known incompatible materials that would produce a hazardous substance. Storage at room temperature 15-30°C is recommended.

PREVENTIVE MEASURES AT EXPOSURE

Generally, protective apparel such as gloves or goggles is not required.

Desirable Concentration:	Not established
Acceptable Concentration:	Not established
Facility Care:	No special care required
Protective Care:	Not necessary with usual handling

PHYSICAL AND CHEMICAL CHARACTERISTICS

Appearance:	White crystalline powder ¹
Melting Point:	97°C ¹
Solubility in Water:	68.9g/100g - Water (20°C) ¹

DANGER INFORMATION

Flashing Point:	No data
Ignition Point:	No data
Combustibility:	No data
Reactivity:	Stable at ordinary storage condition. No hazardous decomposition. No incompatible substances.

TOXICITY INFORMATION

Irritancy to Product:	Possible physical irritation because of crystalline structure of product similar to sugar. Not a known chemical irritant.
Mutagenicity:	No mutagenicity reported ² . Standardized mutagenicity assays performed.
Carcinogenicity:	No carcinogenicity reported. ^{3,4} Standardized mouse micronucleus and CHO chromosome aberration assays performed.
Acute Toxicity:	No toxicity was observed in male or female rats given a single dose of 16g/kg bw of trehalose in distilled water by oral administration. ⁵
Subacute Toxicity:	A no-toxic-effect-level of 50,000 ppm was reported after 13 weeks in feed of mice (7.27 g/kg bw/day for males and 9.27 g/kg bw/day for females). ⁶
Embrototoxicology/Teratology:	Trehalose was given at up to 10% of the diet to mated female rats and rabbits. No material or developmental toxicity was noted. ^{7,8} The NOAEL was 6.94 g/kg bw/day in rats and 1.99 g/kg bw/day in rabbits.
Two-generation Reproduction:	Two generations of male and female rats were fed a maximum of 10% trehalose in the diet. ⁹ No trehalose associated toxicity was reported. The NOAEL for male rats was 7.09 g/kg bw/day, while it was 6.16 g/kg bw/day for females.

ENVIRONMENTAL IMPACTS

Decomposition: No data

Accumulation: No data

Notes: Trehalose is a material commonly found in animals and plants.^{10,11,12}

CAUTION AT DISPOSITION

Shall meet local disposition rules.

CAUTION WITH TRANSPORTATION

To be kept in sealed container, refrain from moist, high temperatures and direct sunlight. Container shall be protected from breakage. Additional care shall be taken to comply with the conditions listed under HANDLING AND STORAGE.

APPLICABLE REGULATIONS

None

OTHERS

Source information:

- 1) Trehalose Technical Information, Hayashibara Biochemical Labs., Inc., Okayama, Japan
- 2) Trehalose (Crystals) Bacterial Mutation Assay. Huntington Research Centre Ltd., Cambridgeshire, England. Study No. HBL 3/941649.
- 3) Evaluation of Trehalose in the Mouse Micronucleus Assay. SRI International, Menlo Park, California, U.S.A. Study Number G019-97.
- 4) Evaluation of Trehalose in the CHO Chromosome Aberration Assay. SRI International, Menlo Park, California, U.S.A. Study Number G018-97.
- 5) Trehalose Crystals Acute Oral Toxicity in the Rat. Huntington Research Centre Ltd., Cambridgeshire, England. Study Number HBL4/940826/AC.
- 6) Subchronic 13-Week Oral Toxicity (Feeding) Study with Trehalose in Mice. RCC Registration and Consulting, Itingen, Switzerland, Study Number 639213.

- 7) Oral Embryotoxicity/Teratogenicity Study with Trehalose in Rats. TNO Nutrition and Food Research Institute, Zeist, Netherlands. Study Number 471003.
 - 8) Oral Embryotoxicity/Teratogenicity Study with Trehalose in New Zealand White Rabbits. TNO Nutrition and Food Research Institute, Zeist, Netherlands. Study Number 471005.
 - 9) Oral Two-Generation Study with Trehalose in Rats. TNO Nutrition and Food Research Institute, Zeist, Netherlands. Study Number 471004.
 - 10) Clegg J.S., *Comp. Biochem. Physiol.*, 14, 135 (1965)
 - 11) Yoshida H., *Journal of Japan Food Engineering* 29(8), 451 (1982)
 - 12) Yoshikawa Y., *Chemical Engineering*, 17(3), 601 (1991)
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CAUTION: The instructions given above only applicable to ordinary handling. Appropriate safety measure shall be taken if any extra-ordinary situation arises. This sheet is to provide information, but not to guarantee safety.