Material Safety Data Sheet
DEXTROSE MONOHYDRATE

Section 1 - Product Identification

Synonyms: D-Glucose hydrated
Molecular Weight: 198.17 g/mol
Chemical Formula: C₆H₁₂O₇
Company Identification: Tradeasia International Pte. Limited
Address: 133 Cecil Street # 12-03 Keck Seng Tower, Singapore
Tel: +65-6227 6365
Fax: +65-6225 6286
Email: contact@chemtradeasia.com

Recommended use of the chemical and restrictions on use
The product is used in industrial manufacturing, in particular in:
- Pharmaceutical
- Food and Beverage
- Medicine Application

Section 2 – Composition/Information on Ingredients

The product contains greater than 99.0 percent (%) Dextrose Monohydrate, C₆H₁₂O₇

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>EC No/CAS No</th>
<th>Purity, %</th>
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<tbody>
<tr>
<td>Dextrose Monohydrate</td>
<td>200-075-1</td>
<td>min. 99.0</td>
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<td>14431-43-7</td>
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Section 3 – Hazards Identification

3.1 Classification of the substance according to GHS
Not a hazardous substance according to GHS.

Cautionary Statement
Read label before use
Keep out of reach of children

3.3. Other hazards which do not result in classification
Dextrose monohydrate is a white odourless, powdered substance that is not flammable, combustible, or explosive, and has low acute oral and dermal toxicity.
Potential health effects

Inhalation and ingestion are the most significant route of exposure in occupational and other settings.

Inhalation
Occasional mild irritation effects to nose and throat may occur from inhalation of dextrose monohydrate dust.

Eye contact
Dextrose monohydrate can be an eye irritant.

Skin contact
Dextrose monohydrate does not cause irritation to intact skin.

Ingestion
Products containing dextrose monohydrate are suitable for ingestion. Dextrose monohydrate has low acute toxicity.

Potential ecological effects
Dextrose monohydrate has minimal effect on the ecology.

Signs and symptoms of exposure
Symptoms of overdose of dextrose monohydrate have been associated with ingestion or injection into the body. These may include hyperglycemia and hypokalemia which may induce headaches, muscle spasms and increased thirst.

Section 4 – First-Aid Measures

4.1. Description of first aid measures

Skin contact
No treatment necessary because non-irritating.

Eye contact
Use eye wash fountain or fresh water to cleanse eye. If irritation persists for more than 30 minutes, seek medical attention.

Inhalation
If symptoms such as nose or throat irritation are observed, remove to fresh air.

Ingestion
If large amounts are ingested or injected in a short time, contact a doctor immediately.

Note to physicians
Dextrose monohydrate should be diluted to an appropriate concentration before administered into the body. It should be administrated into the body slowly. Rapid administration can cause venous infection, hyperglycaemia or hypokalemia.

4.2. Most important symptoms and effects, both acute and delayed
N.A.
4.3. Indication of any immediate medical attention and special treatment needed
N.A.

Section 5 – Fire Fighting Measures

5.1. Suitable Extinguishing media
Any fire extinguishing media may be used on nearby fires.

5.2. Specific hazards arising from the chemical
Dextrose monohydrate is not flammable, combustible or explosive.

5.3. Special protective actions for fire-fighters
N.A.

Section 6 – Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures
Avoid dust formation. In case of exposure to prolonged or high level of airborne dust, wear a personal respirator in compliance with national legislation.

6.2. Environmental precautions
Dextrose monohydrate is a water-soluble white powder that is naturally occurring and stable in the environment.

6.3. Methods and material for containment and cleaning up

Land spill
Vacuum, shovel or sweep up dextrose monohydrate and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during clean up and disposal. No personal protective equipment is needed to clean up land spills.

Spillage into water
Where possible, remove any intact containers from the water. Advise local water authority that none of the affected water should be used for irrigation or for the abstraction of potable water until natural dilution returns to its normal environmental background level.

Section 7 – Handling and Storage

7.1. Precautions for safe Handling
To maintain package integrity and to minimise caking of the product, bags should be handled on a first-in first-out basis. Good housekeeping and dust prevention procedures should be followed to minimise dust generation and accumulation. Your supplier can advise you on safe handling, please contact the supplier.
The product should be kept away from strong reducing agents. Apply above handling advice when mixing with other substances.

7.2. Conditions for safe storage, including any incompatibilities

No special handling precautions are required, but dry, indoor storage is recommended. No specific requirements. Provide appropriate ventilation and store bags such as to prevent any accidental damage.

Section 8 – Exposure Controls/Personal Protection

8.1. Control parameters

Occupational exposure limits for dust (total and respirable) are treated by OSHA, Cal OSHA and ACGIH as “Particulate Not Otherwise Classified” or “Nuisance Dust”

ACGIH/TLV 10 mg/m$^3$
Cal OSHA/PEL 10 mg/m$^3$
OSHA/PEL (total dust) 15 mg/m$^3$
OSHA/PEL (respirable dust) 5 mg/m$^3$

8.2. Appropriate engineering controls

Maintain air concentrations below occupational exposure standards.

Use local exhaust ventilation to keep airborne concentrations of dextrose monohydrate dust below permissible exposure levels. Wash hands before breaks and at the end of the workday. Remove and wash soiled clothing.

8.3. Individual protection measures, such as personal protective equipment (PPE)

Respiratory protection

In case of prolonged exposure to dust wear a personal respirator in compliance with national legislation (make reference to the appropriate CEN standard)

Eye and hand protection

Goggles and gloves are not required for normal industrial exposures, but may be warranted if environment is excessively dusty.

Section 9 – Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance: white solid crystalline powder
Odour: odourless
Odour threshold: N.A.
pH @ 20°C : 9.3 (3 % solution)
Melting point : 146°C
Boiling point : N.A
Flash point : Non flammable
Evaporation rate : N.A.
Flammability : N.A.
Upper/lower flammability or explosive limits : Non explosive
Vapour pressure : Negligible @ 20°C
Vapour density : N.A.
Relative density : 1.54 g/cm³
Solubility in water : 0.91% @ 20°C
Partition coefficient: n-octanol/water : N.A
Auto-ignition temperature : N.A.
Decomposition temperature : H₂O @ 120°C
Viscosity : N.A.

9.2. Other information
Molecular weight : 198.17 g/mol
Specific gravity : 1.56 @ 20°C

Section 10 – Stability and Reactivity

10.1. Reactivity
Dextrose monohydrate is a stable product.

10.2. Chemical stability
Dextrose monohydrate is a stable product.

10.3. Possibility of hazardous reactions
N.A

10.4. Conditions to avoid:
Avoid humid air as dextrose monohydrate may react with water.

10.5. Incompatible materials
N.A

10.6. Hazardous decomposition products
Dextrose monohydrate decomposes into carbon dioxide and water.

Section 11 – Toxicological Information

11.1. Information on toxicological effect
11.1.1. Substances

Acute toxicity

Low acute oral toxicity; LD50 in rats > 25800 mg/kg of body weight. (Sciencelab, 2013)

Skin corrosion / irritation

Non-irritant. (INC, 2012)

Serious eye damage/ irritation

Dextrose monohydrate can be an eye irritant.

Respiratory or skin sensitization

Dextrose monohydrate is not a skin sensitizer.

Germcell mutagenicity

Dextrose monohydrate is not mutagenic.

Carcinogenicity

Dextrose monohydrate is not carcinegenic

Reproductive toxicity

Dextrose monohydrate does not have reproductive toxicity

STOT-single exposure

N.A.

STOT-repeated exposure

N.A.

Aspiration Hazard

Dextrose monohydrate has no aspiration hazard.

Section 12 – Ecological Information

12.1. Toxicity

Dextrose monohydrate occurs naturally in many organisms like plants and animals.

Phytotoxicity

Dextrose monohydrate is an essential metabolite in organisms like animals and plants to produce energy. However, it can cause hyperglycemia and hypokalemia in animals and hyperosmolar in plants in high concentrations.

Algal toxicity

No known algal toxicity.

Invertebrate toxicity

No known invertebrate toxicity.

Fish toxicity
No known fish toxicity.

12.2. Persistence and degradability
Dextrose monohydrate is naturally occurring and ubiquitous in the environment. Dextrose monohydrate decomposes in the environment to carbon oxides and water.

12.3. Bioaccumulative potential
Not significantly bioaccumulative.

12.4. Mobility in soil
The product is soluble in water and is leachable through normal soil.

12.5. Other adverse effects
No Data Available

Section 13 – Disposal Considerations
13.1. Disposal methods
Small quantities of dextrose monohydrate can usually be disposed of at landfill sites. No special disposal treatment is required, but local authorities should be consulted about any specific local requirements. Tonnage quantities of product are not recommended to be sent to landfills. Such product should, if possible, be used for an appropriate application.

Section 14 – Transport Information
Dextrose monohydrate has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

14.1. UN number : N.A.
14.2. UN proper shipping name : N.A
14.3. Transport of hazard classes : N.A
14.4. Packing group : N.A
14.5. Environmental hazards : N.A.
14.6. Special precautions for user : N.A
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: N.A.

Section 15 – Regulatory Information
15.1. Safety, health and environmental regulations
It should be noted that dextrose monohydrate are safe under conditions of normal handling and use, besides, they are essential nutrients to plants, and research shows that they play a beneficial role in human health. Clean Air Act (Montreal Protocol)
Dextrose monohydrate was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

Chemical inventory listing
Section 16 : Additional Information

16.1. Mainly changes made to the previous version of this Material Safety Data Sheet (MSDS):

- This MSDS complies with ISO 11014; the requirements of UN-GHS

<table>
<thead>
<tr>
<th>Revision No</th>
<th>Revision content</th>
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| 05          | • This SDS is updated in accordance with the GHS (Rev.6) (2015)-Guidance on the Compilation of Safety data Sheets.  
              • This SDS is updated in line with Eti Maden Corporate identity. |

16.2. List of abbreviation and acronyms used in this MSDS

- SDS : Safety Data Sheets
- Index N° : atomic number of the element most characteristic of the properties of the substance
- CAS No : Chemical Abstracts Service number
- EC No : EINECS Number : European Inventory of Existing Commercial Substances
- GHS : Globally Harmonised System of Classification and Labelling
- LD_{50} : Median Lethal Dose
- LC_{50} : Lethal Concentration, 50%
- N.A. : Not Applicable
- OSHA : Occupational Safety & Health Administration
- Cal OSHA : The State of California Division of Occupational Safety and Health (DOSH)
- PEL : Permissible Exposure Limits
- ACGIH : American Conference of Governmental Industrial Hygienists
- TLV : Threshold Limit Value
- Japanese MITI : Japanese Ministry of International Trade and Industry
- EC_{50} : Half maximal effective concentration
- UN : United Nations
U.S. EPA TSCA Inventory: Inventory of the chemical substances manufactured or processed in the United States according to Toxic Substances Control Act compiled and published under the authority of the Environmental Protection Agency

Canadian DSL: Canadian Domestic Substances List

16.3. List of relevant hazard statements and precautionary statements used in this MSDS

Hazard Statement
Dextrose monohydrate is not hazardous according to GHS.

Cautionary Statement
Read label before use
Keep out of reach of children

16.4. References

16.5. Disclaimer of Liability
The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its accuracy, reliability or completeness. The conditions or methods of handling, storage use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. It is the user’s responsibility to satisfy himself as to the suitableness and completeness of such information for his own particular use. This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.