SECTION 1. Product and company identification

Chemical type: Substance
Substance name: Succinic acid
Trade name: Succinic acid
CAS No.: 110-15-6
Formula: C4H6O4
Synonyms: Butanedioic acid / 1,2-Ethanedicarboxylic acid / Amber acid
Company identification: Myriant Corporation
66 Cummings Park
Woburn MA 01801
Emergency number: +781-569-6250

SECTION 2. Hazards identification

2.1. Emergency Overview
Physical state: Solid
Appearance: Crystalline solid
Colour: White to yellow
Odour: Not available.

Succinic acid (if) 110-15-6
IARC group 3 - Not Classifiable

2.2. OSHA Regulatory Status
OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

2.3. Potential health effects
Symptoms/injuries after inhalation: May be harmful if inhaled. Causes respiratory tract irritation.
Symptoms/injuries after skin contact: Causes skin irritation. May be harmful if absorbed through the skin.
Symptoms/injuries after eye contact: Severely irritating to the eyes.
Symptoms/injuries after ingestion: May be harmful if swallowed.

2.4. Potential environmental effects
No additional information available

SECTION 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUCCINIC ACID</td>
<td>110-15-6</td>
<td>&gt; 99</td>
</tr>
</tbody>
</table>

4.1. First aid procedures
First-aid measures general: Consult a doctor/medical service. If possible show this sheet, if not available show packaging or label.
First-aid measures after inhalation: Remove victim to fresh air. If a cough or other respiratory symptoms develop, consult medical personnel.
First-aid measures after skin contact: Wash skin immediately with plenty of soap and water for at least 15 minutes. If redness, itching or a burning sensation develops, get medical attention. Wash contaminated clothing and decontaminate footwear before reuse.
First-aid measures after eye contact: Immediately flush with plenty of water for at least 15 minutes. If redness, itching, or a burning sensation develops, have eyes examined and treated by medical personnel.
First-aid measures after ingestion: DO NOT INDUCE VOMITING. Give one or two glasses of water to drink and refer to medical personnel or take direction from either a physician or a poison control center. Never give anything by mouth to an unconscious person.

4.2. Note to physicians
No additional information available

SECTION 5. Firefighting measures

5.1. Flammable properties
Explosion hazard: Not determined.
Reactivity: No available data.
General measures: Evacuate area.
### Extinguishing media

Suitable extinguishing media: Dry chemical powder, alcohol-resistant foam, carbon dioxide (CO2), water spray.

### Protection for firefighters

Protection during firefighting: Wear self-contained breathing apparatus with full facepiece and full protective clothing. If contact occurs with material or its solutions, immediately flush with water and remove contaminated clothing.

Other information: Dusts can form explosive mixtures with air. Irritating and highly toxic gases may be generated by thermal decomposition or combustion in a fire.

### 6. Accidental release measures

#### 6.1. Personal precautions

##### 6.1.1. For non-emergency personnel

No additional information available

##### 6.1.2. For emergency responders

Protective equipment: Wear self-contained breathing apparatus with full facepiece and full protective clothing. If contact occurs with material or its solutions, immediately flush with water and remove contaminated clothing.

Emergency procedures: Use proper personal protective equipment during clean up. Ventilate area. Avoid creating dusty conditions.

#### 6.2. Environmental precautions

Sweep up dry powder and dispose properly.

#### 6.3. Methods for containment

No additional information available

#### 6.4. Methods for clean up

Methods for cleaning up: Sweep up material and dispose of properly. Avoid creating dusty conditions.

#### 6.5. Other information

Other information: Prevent product from entering drains. For further information refer to section 8: Exposure-controls/personal protection.

### 6.6. Spill or leak statements by type of chemical

No additional information available

### 7. Handling and storage

#### 7.1. Handling

Additional hazards when processed: Use only with adequate ventilation. Avoid creating or spreading dust.

Precautions for safe handling: Reduce/avoid exposure and/or contact.

Hygiene measures: Wash hands and other exposed areas with mild soap and water before eat, drink or smoke and when leaving work.

#### 7.2. Storage

Storage conditions: Keep container tightly closed and in a well-ventilated place.

Incompatible materials: Strong oxidizing and reducing agents, strong bases.

Storage area: Keep container tightly closed and dry. Keep in a cool, well-ventilated place away from acids.

### 8. Exposure controls/personal protection

#### 8.1. Exposure guidelines

No additional information available

#### 8.2. Engineering controls

Appropriate engineering controls: Provide adequate ventilation to minimize dust and/or vapour concentrations.

#### 8.3. Personal protective equipment (PPE)


Hand protection: Protective gloves.

Eye protection: In case of dust production: protective goggles.

Skin and body protection: Use chemically protective clothing.
**Succinic acid**  
**Safety Data Sheet**  
according to Regulation (EC) No. 453/2010

Respiratory protection: In case of inadequate ventilation wear respiratory protection: N100, P3.

### SECTION: 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Crystalline solid.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>118.09 g/mol</td>
</tr>
<tr>
<td>Colour</td>
<td>White to yellow.</td>
</tr>
<tr>
<td>Odour</td>
<td>Not available.</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>185 - 187 °C</td>
</tr>
<tr>
<td>Solidification point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>235 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>160 °C</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>0.00000019 mm Hg @ 25oC</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Density</td>
<td>1.57 g/cm³</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: 121 g/ml @ 100 C</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Self ignition temperature</td>
<td>630 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
</tbody>
</table>

No additional information available

### SECTION: 10. Stability and reactivity

10.1. Chemical stability

No available data.

The product is stable at normal handling- and storage conditions.

10.2. Conditions to avoid

Refer to Section 10 on Incompatible Materials.

10.3. Incompatible materials

Strong oxidizing and reducing agents, strong bases.

10.4. Hazardous decomposition products

Carbon oxides (CO and CO2).

10.5. Possibility of hazardous reactions

No additional information available

### SECTION: 11. Toxicological information

**Information on toxicological effects**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification/LD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Not classified/2260 ml/kg</td>
</tr>
<tr>
<td><strong>Succinic acid (110-15-6)</strong></td>
<td></td>
</tr>
<tr>
<td>LD50 oral rat</td>
<td>2260 ml/kg</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

No additional information available.
Specific target organ toxicity (single exposure): Not classified (Based on available data, the classification criteria are not met)
  Irritation: may cause irritation to the respiratory system.
  Dust from this product may cause eye irritation.
  Repeated or prolonged contact may cause slight irritation to the skin

Specific target organ toxicity (repeated exposure): Not classified
Aspiration hazard: Not classified
Potential Adverse human health effects and symptoms: Irritation: severe irritant to eyes.
Other information: Likely routes of exposure: inhalation, skin and eye.

SECTION: 12. Ecological information

12.1 Ecotoxicity

<table>
<thead>
<tr>
<th>Succinic acid (if)</th>
<th>110-15-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 Daphnia 1</td>
<td>374.3 g/l 48 h</td>
</tr>
<tr>
<td>EC50 other aquatic organisms 1</td>
<td>115 g/l EC 50 (Algae) / 96 h</td>
</tr>
</tbody>
</table>

12.2.12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulation/Accumulation

<table>
<thead>
<tr>
<th>Succinic acid (if)</th>
<th>110-15-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioconcentration factor (BCF REACH)</td>
<td>0.21</td>
</tr>
</tbody>
</table>

12.4. Mobility in environmental media
No additional information available

12.6. Other adverse effects
Other adverse effects: No data available.

SECTION: 13. Disposal considerations

13.1. Waste treatment methods
Regional legislation (waste): Collect all waste in suitable and labelled containers and dispose according to local legislation.
Waste disposal recommendations: This material and its container must be disposed of in a safe way, and as per local legislation.
Additional information: Not considered hazardous under US RCRA regulations.

SECTION: 14. Transport information

14.1. Basic shipping description
Department of Transportation (DOT) Hazard Classes: Not regulated

14.2. Additional information
Other information: No supplementary information available.

Overland transport
No additional information available

Transport by sea
No additional information available

Air transport
No additional information available

SECTION: 15. Regulatory information

15.1. US Federal regulations

<table>
<thead>
<tr>
<th>Succinic acid (110-15-6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
</tbody>
</table>

15.2. International regulations

CANADA

<table>
<thead>
<tr>
<th>Succinic acid (110-15-6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the Canadian DSL (Domestic Substances List) inventory, Uncontrolled product according to WHMIS classification criteria</td>
</tr>
</tbody>
</table>
**Succinic acid**  
Safety Data Sheet  
according to Regulation (EC) No. 453/2010

### EU-Regulations

**Succinic acid (110-15-6)**

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)- EEC Directive 79/831, sixth Amendment of the directive 67/548 (dangerous substances).

#### Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not classified

#### Classification according to Directive 67/548/EEC or 1999/45/EC
Not classified

### 15.2.2. National regulations

**Succinic acid (110-15-6)**

Listed on the Korean ECL (Existing Chemical List) inventory.

Listed on the Japanese ENCS (Existing & New Chemicals Substances) inventory.

Listed on the AICS (the Australian Inventory of Chemical Substances).

Listed on New Zealand - Inventory of Chemicals (NZIoC)

Listed on Inventory of Existing Chemical Substances (IECSC)

Listed on KECI (Chemical Inventory of Korea)

### 15.3. US State regulations

No additional information available

### SECTION: 16. Other information

Data sources : SDS, Supplier.

**HMIS III Rating**

Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

Personal Protection : F

The information contained in this Material Safety Data Sheet has been compiled from reliable sources and is believed to be correct as of the date issued.

It is the responsibility of the user to determine the appropriateness and applicability to their situation. Myriant Corporation disclaims any expressed or implied warranty as to the accuracy of the above information and shall not be held liable for any direct, incidental, or consequential damages from use or reliance on the above information.