SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance
Trade name : Succinic acid
EC no : 203-740-4
CAS No. : 110-15-6
Formula : C4H6O4
Synonyms : Butanedioic acid / 1,2-Ethanedicarboxylic acid / Amber acid
Product group : Raw material

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses
Main use category : Industrial use
Industrial/Professional use spec. : intermediate
on-site isolated intermediate
Used in closed systems
isolated intermediate
transported isolated intermediate
Function or use category : Intermediates, Laboratory chemicals, Polymers

1.2.2. Uses advised against
No additional information available

1.3. Details of the supplier of the safety data sheet

Myriant Corporation
66 Cummings Park
Woburn MA 01801

1.4. Emergency telephone number

Emergency number : +781-569-6250
For Chemical Emergency Spill Leak Fire Exposure or Accident Call CHEMTREC Day or Night
DOMESTIC NORTH AMERICA 800-424-9300 INTERNATIONAL, CALL 703-527-3887 (collect
calls accepted)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

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

Adverse physicochemical, human health and environmental effects
No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

Signal word (CLP) : Danger
Hazard statements (CLP) :
H315 - Causes skin irritation
H318 - Causes serious eye damage
H335 - May cause respiratory irritation
H302 - Harmful if swallowed

Precautionary statements (CLP) :
P261 - Avoid breathing dust, fume, gas, mist.
P280 - Wear protective gloves, eye protection, face protection.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove
contact lenses, if present and easy to do. Continue rinsing

2.3. Other hazards
No additional information available
SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification according to Directive 67/548/EEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUCCINIC ACID</td>
<td>(CAS No.) 110-15-6</td>
<td>&gt; 99</td>
<td>Not classified</td>
</tr>
<tr>
<td></td>
<td>(EC no) 203-740-4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Name                  | Product identifier | %  | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
-----------------------|--------------------|----|-------------------------------------------------------------|
SUCCINIC ACID          | (CAS No.) 110-15-6 | > 99 | Not classified                                               |
|                       | (EC no) 203-740-4  |    |                                                             |

Full text of R-, H- and EUH-phrases: see section 16.

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

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. Most important symptoms and effects, both acute and delayed

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.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

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

5.2. Special hazards arising from the substance or mixture

Explosion hazard : Not determined.

Reactivity : No available data.

5.3. Advice 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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area.

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 and material for containment and cleaning up

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

Other information
Prevent product from entering drains.

6.4. Reference to other sections

For further information refer to section 8: Exposure-controls/personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe 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. Conditions for safe storage, including any incompatibilities

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.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

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

Personal protective equipment

Hand protection
Protective gloves.

Eye protection
In case of dust production: protective goggles.

Skin and body protection
Use chemically protective clothing.

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

Other information
No specific measures are required provided the product is handled in accordance with the general rules of occupational hygiene and safety.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state
Solid

Appearance
Crystalline solid.

Molecular mass
118.09 g/mol

Colour
White to yellow.

Odour
Not available.

Odour threshold
No data available

pH
No data available

Melting point
185 - 187 °C

Solidification point
No data available

Boiling point
235 °C

Flash point
160 °C
**Succinic acid**  
**Safety Data Sheet**  
according to Regulation (EC) No. 453/2010

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<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 @ 250C</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>Log Kow</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, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</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>

**9.2. Other information**  
No additional information available

**SECTION 10: Stability and reactivity**

**10.1. Reactivity**  
No available data.

**10.2. Chemical stability**  
The product is stable at normal handling- and storage conditions.

**10.3. Possibility of hazardous reactions**  
No additional information available

**10.4. Conditions to avoid**  
Refer to Section 10 on Incompatible Materials.

**10.5. Incompatible materials**  
Strong oxidizing and reducing agents, strong bases.

**10.6. Hazardous decomposition products**  
carbon oxides (CO and CO2).

**SECTION 11: Toxicological information**

**11.1. Information on toxicological effects**

**Acute toxicity**  
LD50 oral rat: 2260 ml/kg

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

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
<td>(Based on available data, the classification criteria are not met) Causes skin irritation. May be harmful if absorbed through the skin.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
<td>(Based on available data, the classification criteria are not met) Severe eye irritant.</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td>Not classified</td>
<td>(Based on available data, the classification criteria are not met) Dust from this product may cause irritation to the respiratory tract.</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
<td>(Based on available data, the classification criteria are not met)</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
<td>(Based on available data, the classification criteria are not met)</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
<td>(Based on available data, the classification criteria are not met)</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Not classified</td>
<td>(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</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>Not classified</td>
<td></td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
<td></td>
</tr>
<tr>
<td>Potential Adverse human health effects and symptoms</td>
<td>Irritation: severe irritant to eyes.</td>
<td></td>
</tr>
</tbody>
</table>
Succinic acid
Safety Data Sheet
according to Regulation (EC) No. 453/2010

Other information : Likely routes of exposure: inhalation, skin and eye.

SECTION 12: Ecological information

12.1. Toxicity
Succinic acid (110-15-6)
EC50 Daphnia 1 374.3 g/l 48 h
EC50 other aquatic organisms 1 115 g/l EC 50 (Algae) / 96 h

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
Succinic acid (110-15-6)
Bioconcentration factor (BCF REACH) 0.21

12.4. Mobility in soil
No additional information available

12.5. Results of PBT and vPvB assessment
Succinic acid (110-15-6)
Results of PBT assessment No data 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
No dangerous good in sense of transport regulations.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
15.1.1. EU-Regulations
Contains no REACH candidate substance

15.1.2. National regulations
Regional legislation : Listed on the United States TSCA (Toxic Substances Control Act) inventory.
Listed on the Canadian DSL (Domestic Sustances List) inventory.
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).
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).

15.2. Chemical safety assessment
No additional information available

SECTION 16: Other information
Data sources : SDS. Supplier.

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.