MATERIAL SAFETY DATA SHEET

CHEMICAL PRODUCT FOR INDUSTRIAL USE

According to Regulation EC No 1907/2006 of the European Parliament and of the Council of 18 December 2006 (REACh).

SUCCINIC ACID

1. PRODUCT AND COMPANY IDENTIFICATION

Product name :	SUCCINIC ACID
Chemical name :	SUCCINIC ACID
Company :	Bioamber S.A.S. Route de Pomacle F-51110 Bazancourt, France
Telephone :	+33 3 26 89 48 90
Emergency Phone # :	+33 6 75 72 88 87
Email :	patrick.piot@bio-amber.com
MSDS Contact :	Patrick Piot

2. HAZARDS IDENTIFICATION

Classification Regulation	**Classification, Symbols, R Phrases, S Phrases, Signal Words, Hazard Statements, and Precautionary Statements**
According to Regulation (EC) 1272/2008	Skin irritation (category 2) Serious eye damage (category 1) Xi: Irritant R Phrases: R36/37/38, R41 S Phrases: S26, S36/37/39 
According to Directive 67/548/CEE	Skin and respiratory irritation. May cause serious eye damage.
GHS	Pictogram:  Signal word: Danger Hazard statements: H315, H318, H335 Precautionary statements: P261, P280, P305 + P351 + P338
OSHA Hazards	Irritant
HMIS Classification	Health hazard: 2 Flammability: 0 Physical hazards: 0
NFPA Rating	Health hazard: 2 Fire: 0 Reactivity Hazard: 0
WHMIS Classification	Class D2B (eye irritation) 

Most Important Hazards : May be harmful if inhaled. Causes respiratory tract irritation. May be harmful if swallowed. May be harmful if absorbed through skin. May cause skin irritation. Causes eye irritation.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Butanedioic acid
Formula : C4H6O4
Molecular Weight : 118.09 g/mol

CAS-No	EC-No	Index-No	Classification	Concentration
Succinic Acid				
110-15-6	203-740-4	---	Skin Irrit. 2; Eye Dam. 1; STOT SE 3; H315, H318, H335 Xi, R36/37/38 – R41	90%-100%

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flash point No data available
Flammable Limits in Air
Lower (LFL): No data available
Upper (UFL): No data available
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Fire-Fighting Instructions
Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters
Wear self contained breathing apparatus for firefighting if necessary.
Hazardous Combustion Products
Hazardous decomposition products formed under fire conditions. - Carbon oxides.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.
Environmental precautions
Do not let product enter drains.
Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.
Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.
Exposure Limit
ACGIH: Not established
OSHA: Not established
Engineering Measures:
No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
Personal protective equipment
Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P3 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Hand protection
Handle with gloves.
Eye protection
Safety glasses with side-shields conforming to EN166.
Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Powder
Color white

Odor/Odor threshold	Odorless

Safety data

pH (1% in water)	2.4 – 2.8
Melting point	184 - 192°C
Boiling point	No data available
Decomposition temperature	No data available

Auto-ignition temperature	No data available
Explosion properties	
– Sensitivity to mechanical impact	No data available
– Sensitivity to static discharge	No data available
Density/Specific gravity	No data available
Evaporation rate	No data available
Coefficient of water/oil distribution	No data available
Vapor pressure	No data available
Vapor density	No data available
Kst, Pmax	Kst = 51 bar.m/s - Pmax = 7,4 bar
Min. Flammability Energy	> 1 000 mJ
Min. Flammability Temp. (cloud)	620°C
Water solubility	Moderately soluble

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.
Conditions to avoid
No data available.
Materials to avoid
Bases, Oxidizing agents, Reducing agents.
Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides.
Hazardous polymerization
Under normal conditions of storage and use, hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Entry
Inhalation, ingestion, and dermal and eye contact.
Acute toxicity

Chemical Name/CAS No.	Route & Species	Value
Succinic acid/ 110-15-6	Oral (Rat)	LD50 = 2,260 mg/kg

Skin corrosion/irritation
Causes skin irritation.
Serious eye damage/eye irritation
Eyes – rabbit - Severe eye irritation.
Respiratory or skin sensitization
No data available.
Germ cell mutagenicity
Genotoxicity in vitro - Human - fibroblast.
DNA inhibition.
Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available.
Teratogenicity/Embryotoxicity

No data available.
Specific target organ toxicity - single exposure (GHS)
Inhalation - May cause respiratory irritation.
Specific target organ toxicity - repeated exposure (GHS)
No data available.
Aspiration hazard
No data available.
Toxicologically synergistic materials
No data available.
Potential health effects
Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion May be harmful if swallowed.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.

12. ECOLOGICAL INFORMATION

Toxicity
Not available.
Persistence and degradability
Not available.
Bioaccumulative potential
Not available.
Mobility in soil
Not available.
PBT and vPvB assessment
Not available.
Other adverse effects
Not available.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.
Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

Regulation	Proper Shipping Name	UN Number	Hazard Class	PG
DOT (US)	Not regulated	---	---	---
TDG (Canada):	Not regulated	---	---	---
IMDG (International - Maritime):	Not regulated	---	---	---
IATA	Not regulated	---	---	---

15. REGULATORY INFORMATION

Country	Regulatory Information
Succinic Acid	
EU	According to **Regulation EC No 1907/2006** of the European Parliament and of the **Council of 18 December 2006 (REACh)**. **Substance classifying** According to Regulation (EC) 1272/2008 Skin irritation (category 2) Serious eye damage (category 1)  **Xi** **Irritant** **R Phrases** **R36/37/38** Irritating to eyes, respiratory system and skin **R41** Risk of serious damage to eyes **S Phrases** **S26** In case of contact with eyes, rinse immediately with plenty of water and seek medical advice**.** **S36/37/39** Wear suitable protective clothing, gloves and eye/face protection. **According to Directive 67/548/CEE** Skin and respiratory irritation. May cause serious eye damage.
GHS	Pictogram   Signal word Danger Hazard statement(s) H315 Causes skin irritation. H318 Causes serious eye damage. H335 May cause respiratory irritation. Precautionary statement(s) P261 Avoid breathing dust/fume/gas/mist/vapours/spray. 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.
US	**OSHA Hazards** Irritant **SARA 302 Components** SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302. **SARA 313 Components** SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313. **SARA 311/312 Hazards** Acute Health Hazard **Massachusetts Right To Know Components** No components are subject to the Massachusetts Right to Know Act. **Pennsylvania Right To Know Components** Succinic acid CAS-No. 110-15-6 Revision Date

	New Jersey Right To Know Components Succinic acid CAS-No. 110-15-6 Revision Date **California Prop. 65 Components** This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
Canada	**WHMIS** Class D2B (Eye irritation)  **DSL Status** All components of this product are on the Canadian DSL list. This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the MSDS contains all the information required by the *Controlled Products Regulations*.

16. OTHER INFORMATION

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Bioamber shall not be held liable for any damage resulting from handling or from contact with the above product.