

## MATERIAL SAFETY DATA SHEET

### 1. General Information

<b>Supplier :</b>	D&J Chemicals Co., Ltd.
<b>Trade Name :</b>	Fumaric Acid
<b>Molecular Formula:</b>	C <sub>4</sub> H <sub>4</sub> O <sub>4</sub>
<b>Molecular Weight:</b>	
<b>CAS No:</b>	110-17-8
<b>EINECS No:</b>	203-743-0
<b>Chemical family :</b>	Unsaturated aliphatic carboxylic acid, alkene dioic acid Unsaturated aliphatic dicarboxylic acid,
<b>Chemical Name:</b>	Allomaleic Acid, Boletic Acid, 2-Butenedioic Acid, (E)-2-Butenedioic Acid, 1,2-Ethylenedicarboxylic Acid ,Acide Fumarique Uchenic Acid, Trans-butenedioic Acid, Trans-1, 2-ethenedicarboxylic Acid Trans-1, 2-ethytenedicarboxylic Acid,

### 2. Physical Data Information

<b>Appearance:</b>	White, crystalline, combustible dust.
<b>Odor:</b>	Odorless
<b>Water Solubility:</b>	Slightly soluble (0.7 g/100 g water at 25 °C)
<b>Solvent: solubility:</b>	Moderately soluble in ethanol and acetone at 30 °C ; slightly soluble in diethyl ether at 25 °C very slightly soluble in chloroform; almost insoluble in benzene and xylene.
<b>Specific Gravity:</b>	1.64
<b>pH:</b>	No information found.
<b>% Volatiles by volume @ 21°C (70°F):</b>	
<b>Density (g cm<sup>-3</sup>):</b>	1.43
<b>Boiling Point:</b>	201 °C
<b>Melting Point:</b>	230(decomposes)
<b>Flash point( °C ):</b>	230 (closed cup)
<b>Vapor Density (Air=1):</b>	
<b>Vapor Pressure (mm Hg):</b>	Very low at 25 °C ; 0.23 kPa (1.7 mm Hg) at 165 °C .

Evaporation Rate (BuAc=1): No information found.

### 3. Hazards Identification

**Emergency Overview:**

**DANGER! CORROSIVE. CAUSES SEVERE EYE IRRITATION AND POSSIBLE BURNS. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN..**

**Potential Health Effects**

**Inhalation:**

Inhalation of dust is irritating to the mucous membrane and upper respiratory tract. May cause coughing, sore throat, shortness of breath.

**Ingestion:**

Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. May cause mild burning of mouth, throat, and stomach.

**Skin Contact:**

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin. Wet skin may exacerbate skin exposure.

**Eye Contact:**

Causes severe eye irritation with redness and pain. May cause burns. May cause conjunctivitis or corneal damage.

**Chronic Exposure:**

Abnormalities of kidney function with protein in the urine may develop from chronic exposure.

**Aggravation of Pre-existing Conditions:**

No information found.

### 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

## 5. Fire Fighting Measures

**Fire:**

As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.

**Explosion:**

Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802..

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

Avoid dust formation and control ignition sources. Employ grounding, venting and explosion relief provisions in accord with accepted engineering practices in any process capable of generating dust and/or static electricity. Empty only into inert or non-flammable atmosphere. Emptying contents into a non-inert atmosphere where flammable vapors may be present could cause a flash fire or explosion due to electrostatic discharge.

## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

None established.

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

### **Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

### **Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Stability and Reactivity

### **Stability:**

Stable under ordinary conditions of use and storage.

### **Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers.

**Conditions to Avoid:**

Heat, dusting and incompatibles.

## 10. Toxicology Information

Harmful if swallowed. Corrosive - causes irritation.

ORL-RAT LD50 708 mg kg-1

ORL-MUSLD50 2400 mg kg-1

## 11. Ecological Information

**Environmental Fate:**

When released into the soil, this material is expected to leach into groundwater.

When released into the soil, this material is expected to readily biodegrade.

When released into water, this material is expected to readily biodegrade.

When released into water, this material is not expected to evaporate significantly. When released into the air, this material is expected to exist in the aerosol phase with a short half-life. When released into the air, this material is not expected to be subject to wet deposition. When released into the air, this material is expected to be degraded by reaction with ozone and photochemically produced hydroxyl radicals. This material is not expected to significantly bioaccumulate. This material has an estimated bioconcentration factor (BCF) of less than 100.

**Environmental Toxicity:**

TLm /Fathead minnow/5ppm/96 hr./fresh water

TLm/Mosquito fish/240 ppm/24-48 hr./fresh water

## 12. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with

federal, state and local requirements.

## 13. Transport Information

### Domestic (Land, D.O.T.)

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**Proper Shipping Name:** MALEIC ACID

**Hazard Class:** 8

**UN/NA:** NA2215

**Packing Group:** III

**Information reported for product/size:** 1KG

### International (Water, I.M.O.)

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**Proper Shipping Name:** CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.  
(MALEIC ACID)

**Hazard Class:** 8

**UN/NA:** UN3261

**Packing Group:** III

**Information reported for product/size:** 1KG

### International (Air, I.C.A.O.)

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**Proper Shipping Name:** CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.  
(MALEIC ACID)

**Hazard Class:** 8

**UN/NA:** UN3261

**Packing Group:** III

**Information reported for product/size:** 1KG

## 14. Other Information

**NFPA Ratings:** Health: 3 Flammability: 1 Reactivity: 0

**Label Hazard Warning:**

DANGER! CORROSIVE. CAUSES SEVERE EYE IRRITATION AND POSSIBLE BURNS. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN.

**Label Precautions:**

Do not get in eyes, on skin, or on clothing.

Avoid breathing dust.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

**Label First Aid:**

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before re-use. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

The information above is believed to be accurate. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, of damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, even if the company has been advised of the possibility of such damages.