MATERIAL SAFETY DATA SHEET

Product: Citric Acid Anhydrous

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

COMMERCIAL PRODUCT NAME: Citric Acid Anhydrous
COMPANY/SUPPLIER: Jungbunzlauer Canada Inc.
1555 Elm Street
Port Colborne, Ontario L3K 5V4
Emergency Phone 905-835-5444
Fax 915-835-0061
24 Hour Emergency Phone Number: CANUTEC 1-613-996-6666

PRODUCT USE: Widely used acidulant for flavoring, beverages, food, and as a basic chemical.

2. COMPOSITION, INFORMATION ON INGREDIENTS

Chemical Name Of The Material: 2-hydroxy-1,2,3-propane tricarboxylic acid
Chemical Formula: C₆H₈O₇
Chemical Family: Organic Acid
SYNONYMS: Citric Acid, Beta-hydroxytricarboxylic acid.

<table>
<thead>
<tr>
<th>COMPOSITION:</th>
<th>CAS Reg No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citric Acid Anhydrous</td>
<td>77-92-9</td>
<td>100</td>
</tr>
<tr>
<td>EC-No. 201-069-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Food Additive E330</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HAZARDOUS IMPURITIES:</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

Emergency Overview: Odorless, colorless translucent crystals with strong acidic taste. Citric acid is a skin and mucous membrane irritant and an eye irritant. It may cause allergic reactions in some individuals.

Most Important Hazard: Irritating to eyes.

Potential Health Effects:

Inhalation: May cause mucous membrane irritation with sore throat, coughing and shortness of breath.
Eye contact: May cause irritation with redness, pain, possible eye burns, conjunctivitis, ulceration and permanent cloudiness.
Skin contact: May cause irritation with swelling, redness and pain.
Ingestion: May cause acute gastrointestinal irritation with abdominal pain.
Chronic: Repeated or prolonged skin contact may result in dermatitis. Prolonged or repeated eye contact may result in conjunctivitis. Long term oral overexposure may cause damage to tooth enamel.
Carcinogen status: None

4. FIRST AID MEASURES

General advice: Consult a physician.
Major effects of exposure: Irritating to eyes and skin.
Inhalation: Move to fresh air.
Skin contact: Wash of immediately with soap and plenty of water. If skin irritation persists, call a physician.
Eye contact: Rinse immediately with plenty of water and seek medical advice.
Ingestion: Drink plenty of water. Do not induce vomiting. Consult a physician if necessary
Protection of first-aiders: Use personal protective equipment.
### 5. FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLASH POINT</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>FLAMMABLE LIMITS</td>
<td>Lower 8 gm/FT³, Upper 65 gm/FT³</td>
</tr>
<tr>
<td>Autoignition temperature:</td>
<td>1010°C / 1850°F</td>
</tr>
<tr>
<td>Suitable extinguishing media</td>
<td>water, water spray, dry powder, foam, carbon dioxide (CO2), remove containers if possible. Cool container exposed to fire with water spray.</td>
</tr>
<tr>
<td>Extinguishing media which must not be used for safety reasons</td>
<td>None</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>carbon oxides</td>
</tr>
<tr>
<td>Special protective equipment for firefighters</td>
<td>Use personal protective equipment including self-contained breathing apparatus when fighting fire in enclosed area.</td>
</tr>
<tr>
<td>Specific methods</td>
<td>Standard procedure for chemical fires.</td>
</tr>
</tbody>
</table>

### 6. ACCIDENTAL RELEASE MEASURES

**General:** Wear dust respirator and protective clothing. Keep unnecessary personnel away. Sweep or vacuum into closed containers for disposal. Dispose in compliance with local, state, and federal regulations.

### 7. HANDLING AND STORAGE

**Handling:** Avoid contact with eyes and prolonged contact with skin. Avoid breathing large amounts of dust. Wash away splashes and spillages with water.

**Storage Temperature:** Ambient storage pressure: atmospheric

**General:** Store in cool dry area away from incompatible materials and protected from moisture. Protect containers from damage.

**Incompatible products**

**Empty Containers:** Empty containers retain product residue and vapors. Observe all label precautions even after container is emptied. Do not reuse unless thoroughly cleaned.

### 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

**Engineering measures**

Provide general dilute ventilation.

**Exposure limit(s)**

None established for this ingredient, use OSHA PEL, ACGIH TLV for Nuisance dusts of 5 mg/ m³.

**Personal protection equipment**

**Respiratory protection**

NIOSH approved dust respirator

**Hand protection**

Gloves

**Eye Protection**

Safety glasses

**Skin and body protection**

Lightweight protective clothing

**Hygiene measures**

Handle in accordance with good industrial hygiene and safety practice.
### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>crystalline powder</td>
</tr>
<tr>
<td>Color</td>
<td>colorless / white</td>
</tr>
<tr>
<td>Odor</td>
<td>none</td>
</tr>
<tr>
<td>pH (5 % solution)</td>
<td>1.8</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>3.70E-009 mm Hg@25°C</td>
</tr>
<tr>
<td>Vapor density</td>
<td>not applicable</td>
</tr>
<tr>
<td>Boiling point</td>
<td>175°C</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>essentially 0</td>
</tr>
<tr>
<td>Coefficient of water/oil distrib Log P (oct)</td>
<td>-1.72 (measured)</td>
</tr>
<tr>
<td>Log P (oct)</td>
<td>-1.25 to -1.80 (calculated)</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>153 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>&gt; 170 °C</td>
</tr>
<tr>
<td>Relative density</td>
<td>1,665 g/cm³</td>
</tr>
<tr>
<td>Bulk density</td>
<td>650 - 950 kg/m³</td>
</tr>
<tr>
<td>Solubility, Water solubility (25 °C)</td>
<td>576 g/kg</td>
</tr>
<tr>
<td>Solubility in other solvents, Alcohol (25 °C)</td>
<td>383 g/l</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>192.12</td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

- **Stability**: Stable at normal conditions
- **Conditions to avoid**: Avoid dust formation and moisture. Take precautionary measures against static discharges.
- **Materials to avoid**: Incompatible with strong bases and oxidizing agents.
- **Hazardous polymerization**: Does not occur.
- **Corrosion**: May corrode metals. 316 Stainless Steel recommended for handling.

### 11. TOXICOLOGICAL INFORMATION

- **Acute toxicity**
  - LD50/p.o./rat: 11,700 mg/kg
  - LD50/i.p./rat: 885 mg/kg
  - LD50/p.o./mouse: 5,040 mg/kg
  - LD50/l.p./mouse: 961 mg/kg
- **Local effects**: Irritating to eyes and skin
- **Chronic toxicity**: None
- **Human experience**: Health injuries are not known or expected under normal use.

### 12. ECOLOGICAL INFORMATION

- **Mobility**: Completely soluble
- **Persistence and degradability**
  - Chemical oxygen demand: (COD) = 728 mg O2/g
  - Biological oxygen demand/5 days: (BOD) = 528 mg O2/g
- **Readily biodegradable**: 98% after 2 days
- **Bioaccumulation**: None
- **Ecotoxicity effects**
  - Toxicity to fish (LC50/96h/goldfish) = 440-706 mg/l
  - Toxicity to bacteria (EC0) = >10,000 mg/l
13. DISPOSAL CONSIDERATIONS
Waste from residues/unused products
Any disposal practice must be in compliance with local, state and federal laws and regulations (contact local or state environmental agency for specific rules).

14. TRANSPORT INFORMATION
Not Regulated
Not classified as dangerous according to TDG (Transportation of Dangerous Goods) and US DOT (Department of Transportation)

15. REGULATORY INFORMATION
Citric acid is generally regarded as safe (GRAS) by USA FDA. 21 CFR 184.1033

The material is listed on the TSCA Inventory List.
CERCLA (Comprehensive Response Compensation, and Liability Act): Not hazardous
SARA Title III (Superfund Amendments and Reauthorization Bill): Not Considered Hazardous

Foreign Inventory Status
Canadian DSL (Domestic Substance List) WHMIS – Class E
IDL – Citric Acid (CAS-No. 77-92-9) is listed on the Ingredient Disclosure List
DSL – Citric Acid (CAS-No. 77-92-9) is listed on the Domestic Substance List

To the best of our knowledge, Jungbunzlauer Citric Acid Anhydrous does not contain any contaminants or bi-products known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act.

16. OTHER INFORMATION
HMIS* Rating Health = 1, Fire = 0, Reactivity =0
0=Minimal, 1=slight, 2=moderate, 3=serious, 4=severe

MSDS Status: Reviewed 8/10/2010 to update section 1

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