

**Citric Acid Anhydrous**

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**SECTION 1. IDENTIFICATION**

Product name                                : Citric Acid Anhydrous  
Substance name                              : Citric Acid Anhydrous  
Molecular formula                           : C6-H8-O7  
Chemical identity                           : 2-hydroxypropane-1,2,3-tricarboxylic acid  
CAS-No.                                        : 77-92-9  
Chemical nature                               : Solid

**Manufacturer or supplier's details****Details of the supplier of the safety data sheet**

Company                                        : Jungbunzlauer Inc.  
    7 Wells Avenue  
    Newton Centre, Massachusetts 02459  
    USA  
    www.jungbunzlauer.com  
  
Telephone                                       : +1 617 969-0900  
Telefax     : +1 617 964-2921  
E-mail address Responsible/issuing person : msds@jungbunzlauer.com

**Emergency telephone number**

Emergency telephone number               : National Chemical Emergency Centre  
    (NCEC)  
    +1 202 464 2554

**Recommended use of the chemical and restrictions on use**

Recommended use                              : Food/ feedstuff additives  
    Cosmetic additive  
    Medical aids  
    Industrial use  
  
Restrictions on use                               : None known.

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**SECTION 2. HAZARDS IDENTIFICATION****GHS classification in accordance with 29 CFR 1910.1200**

Eye irritation                                   : Category 2A

**GHS label elements**

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Hazard pictograms :



Signal word : Warning

Hazard statements : H319 Causes serious eye irritation.

Precautionary statements :

**Prevention:**

P264 Wash hands thoroughly after handling.

**P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.**

**Response:**

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**P337 + P313 If eye irritation persists: Get medical advice/ attention.**

**Hazards Not Otherwise Classified**

May form combustible dust concentrations in air (during processing).

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**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance / Mixture : Pure substance

Substance name : Citric Acid Anhydrous

CAS-No. : 77-92-9

Chemical nature : Solid

**Hazardous components**

| Chemical name         | CAS-No. | Concentration (% w/w) |
|-----------------------|---------|-----------------------|
| Citric acid anhydrous | 77-92-9 | 100                   |

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**SECTION 4. FIRST AID MEASURES**

General advice : Avoid inhalation, ingestion and contact with skin and eyes. Consult a physician.

If inhaled : If breathed in, move person into fresh air. If symptoms persist, call a physician. If not breathing, give artificial respiration.

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- If breathing is difficult, give oxygen.
- In case of skin contact : In case of contact, immediately flush skin with plenty of water. Get medical attention if symptoms occur.
- In case of eye contact : If easy to do, remove contact lens, if worn. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.
- If swallowed : Drink plenty of water. If swallowed, DO NOT induce vomiting.
- Most important symptoms and effects, both acute and delayed : Eye irritation may cause mild and mechanical irritation and thus symptoms which would be redness and pain. Causes serious eye irritation.
- Notes to physician : Treat symptomatically.
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**SECTION 5. FIREFIGHTING MEASURES**

- Suitable extinguishing media : Water spray  
Dry powder  
Foam  
Carbon dioxide (CO<sub>2</sub>)
- Unsuitable extinguishing media : High volume water jet
- Specific hazards during fire-fighting : Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Do not use a solid water stream as it may scatter and spread fire. Hazardous decomposition products formed under fire conditions.
- Hazardous combustion products : Carbon dioxide (CO<sub>2</sub>)  
Carbon monoxide
- Specific extinguishing methods : Standard procedure for chemical fires.
- Further information : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. In the event of fire and/or explosion do not breathe fumes.
- Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear fire resistant or flame retardant clothing.
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**SECTION 6. ACCIDENTAL RELEASE MEASURES**

- Personal precautions, protective equipment and emergency measures : Avoid dust formation. Dust deposits should not be allowed to accumulate on surfaces.

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gency procedures : es, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid breathing dust. Ensure adequate ventilation, especially in confined areas. Wear personal protective equipment. Avoid contact with skin and eyes. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : No special environmental precautions required. Prevent further leakage or spillage if safe to do so.

Methods and materials for containment and cleaning up : Use mechanical handling equipment. Keep in suitable, closed containers for disposal. Clean contaminated surface thoroughly. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

**SECTION 7. HANDLING AND STORAGE**

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Advice on safe handling : Risk of dust explosion. Do not breathe dust. Avoid contact with skin and eyes. Wear personal protective equipment. For personal protection see section 8.

Conditions for safe storage : Keep in an area equipped with acid resistant flooring. Keep container tightly closed in a dry and well-ventilated place. Minimize dust generation and accumulation. Take measures to prevent the build up of electrostatic charge.

Materials to avoid : Incompatible with strong bases and oxidizing agents.

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Components with workplace control parameters**

Contains no substances with occupational exposure limit values.

**Engineering measures** : Provide adequate ventilation. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

**Personal protective equipment**

Respiratory protection : In the case of dust or aerosol formation use respirator with an approved filter. Use NIOSH approved respiratory protection.

Hand protection

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- Remarks : Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work.  
For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer.
- Eye protection : Safety glasses  
Ensure that eyewash stations and safety showers are close to the workstation location.
- 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 immediately after handling the product.  
Remove contaminated clothing and protective equipment before entering eating areas.
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**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

- Appearance : crystalline
- Colour : white
- Odour : odourless
- Odour Threshold : Not relevant
- pH : 1.8 (77 °F)  
Concentration: 5 %
- Melting point/range : ca. 307 °F
- Boiling point/boiling range : Not applicable
- Flash point : Not applicable
- Evaporation rate : Not applicable
- Flammability (solid, gas) : does not ignite
- Upper explosion limit : No data available
- Lower explosion limit : No data available
- Vapour pressure : Not applicable
- Relative vapour density : Not applicable
- Relative density : No data available
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Density                                   : 1.665 g/cm<sup>3</sup> (68 °F)

Solubility(ies)  
Water solubility                       : ca. 1,450 g/l (68 °F)

Partition coefficient: n-               : log Pow: -1.8 - -0.2  
octanol/water                           : Calculation

Ignition temperature                 : No data available

Decomposition temperature         : No data available

Viscosity  
Viscosity, dynamic                   : Not applicable

Viscosity, kinematic                 : Not applicable

Explosive properties                 : Not explosive

Oxidizing properties                 : No oxidising effect.

Molecular weight                     : 192.12 g/mol

Dust explosion class                 : St1

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**SECTION 10. STABILITY AND REACTIVITY**

Reactivity                             : No decomposition if stored and applied as directed.

Chemical stability                    : Stable under normal conditions.

Possibility of hazardous reac-     : No dangerous reaction known under conditions of normal use.  
tions

Conditions to avoid                  : Avoid dust formation.

Incompatible materials               : Strong bases  
Oxidizing agents

Hazardous decomposition            : Build-up of dangerous/toxic fumes possible in cases of  
products                                : fire/high temperature.  
Carbon dioxide (CO<sub>2</sub>)  
Carbon monoxide

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**SECTION 11. TOXICOLOGICAL INFORMATION****Acute toxicity****Components:****Citric acid anhydrous:**

Acute oral toxicity                    : LD50 Oral (Mouse): 5.400 mg/kg body weight

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Method: OECD Test Guideline 401

LD50 Oral (Rat): 11.700 mg/kg body weight  
Method: OECD Test Guideline 401

Acute dermal toxicity            : LD50 Dermal (Rat): > 2.000 mg/kg body weight

Acute toxicity (other routes of : LD50 (Rat): 725 mg/kg  
administration)                : Application Route: i.p.

LD50 (Mouse): 940 mg/kg  
Application Route: i.p.

**Skin corrosion/irritation****Components:****Citric acid anhydrous:**

Species: Rabbit  
Method: OECD Test Guideline 404  
Result: No skin irritation  
May cause skin irritation in susceptible persons.

**Serious eye damage/eye irritation****Components:****Citric acid anhydrous:**

Species: Rabbit  
Result: Irritating to eyes.  
Method: OECD Test Guideline 405

**Respiratory or skin sensitisation****Components:****Citric acid anhydrous:**

No data available

**Germ cell mutagenicity****Components:****Citric acid anhydrous:**

Genotoxicity in vitro            : Test Type: Ames test  
Species: Salmonella typhimurium  
Concentration: 0 - 5 mg/plate  
Method: Mutagenicity (Salmonella typhimurium - reverse mu-  
tation assay)  
Result: negative

Genotoxicity in vivo            : Test Type: in vivo assay  
Species: Rat  
Application Route: Oral

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Method: OECD Test Guideline 475

Result: negative

Germ cell mutagenicity - Assessment : In vitro tests did not show mutagenic effects

**Carcinogenicity****Components:****Citric acid anhydrous:**

Carcinogenicity - Assessment : Not classifiable as a human carcinogen.

**Reproductive toxicity****Components:****Citric acid anhydrous:**

Reproductive toxicity - Assessment : No toxicity to reproduction

**STOT - single exposure****Components:****Citric acid anhydrous:**

No data available

**STOT - repeated exposure****Components:****Citric acid anhydrous:**

No data available

**Repeated dose toxicity****Components:****Citric acid anhydrous:**

Species: Rat  
NOAEL: 4,000 mg/kg  
LOAEL: 8,000 mg/kg  
Application Route: Oral  
Exposure time: 10 d  
Dose: 2, 4, 8, 16 g/kg bw/day



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**Aspiration toxicity****Components:****Citric acid anhydrous:**

No aspiration toxicity classification

**Experience with human exposure****Product:**

Inhalation : Target Organs: Respiratory system  
Symptoms: No information available.

Skin contact : Target Organs: Skin  
Symptoms: May cause skin irritation in susceptible persons.

Eye contact : Target Organs: Eyes  
Symptoms: Redness, Itching

Ingestion : Target Organs: Digestive organs  
Symptoms: No information available.

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**SECTION 12. ECOLOGICAL INFORMATION****Ecotoxicity****Components:****Citric acid anhydrous:**

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 440 mg/l  
Exposure time: 48 h  
Test Type: static test  
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 1,535 mg/l  
Exposure time: 24 h  
Test Type: static test

Toxicity to algae : NOEC (Scenedesmus quadricauda (Green algae)): 425 mg/l  
Exposure time: 8 d  
Test Type: static test

Toxicity to microorganisms : TT (Pseudomonas putida): > 10,000 mg/l  
Exposure time: 16 h

**Persistence and degradability****Components:****Citric acid anhydrous:**

Biodegradability : Biodegradation: 97 %  
Testing period: 28 d  
Method: OECD Test Guideline 301B  
Readily biodegradable.

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Biodegradation: 100 %  
Testing period: 19 d  
Method: OECD Test Guideline 301E  
Readily biodegradable.

Biochemical Oxygen Demand (BOD) : 526 mg/g

Chemical Oxygen Demand (COD) : 728 mg/g

Physico-chemical removability : Readily biodegradable.

**Bioaccumulative potential****Product:**

Partition coefficient: n-octanol/water : log Pow: -1.8 - -0.2  
Calculation

**Components:****Citric acid anhydrous:**

Bioaccumulation : The product is miscible in water and readily biodegradable in both water and soil. Accumulation is not expected.

**Mobility in soil**

No data available

**Other adverse effects****Components:****Citric acid anhydrous:**

Results of PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

Additional ecological information : This product has no known ecotoxicological effects.

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**SECTION 13. DISPOSAL CONSIDERATIONS****Disposal methods**

Waste from residues : Where possible recycling is preferred to disposal or incineration.  
Can be landfilled or incinerated, when in compliance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.  
Dispose of as unused product.

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**SECTION 14. TRANSPORT INFORMATION****International Regulations****IATA-DGR**

Not regulated as a dangerous good

**IMDG-Code**

Not regulated as a dangerous good

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Not applicable for product as supplied.

**National Regulations****DOT**

Not regulated as a hazardous material

**SECTION 15. REGULATORY INFORMATION****EPCRA - Emergency Planning and Community Right-to-Know Act**

**SARA 311/312 Hazards** : Acute Health Hazard  
Fire Hazard

**SARA 302** : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**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.

**Clean Water Act**

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

**California Prop. 65** This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

**The components of this product are reported in the following inventories:**

EINECS : On the inventory, or in compliance with the inventory

TSCA : On TSCA Inventory

TSCA\_12b : Not applicable

DSL : All components of this product are on the Canadian DSL

REACH : On the inventory, or in compliance with the inventory

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**SECTION 16. OTHER INFORMATION**

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**Full text of other abbreviations**

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

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