



(Material) Safety Data Sheet

Transport Symbol 	WHMIS 	NFPA 	Personal Protective Equipment
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Original Preparation Date: 15-Apr-2009

Revision Date: 12-Nov-2012

Revision Number: 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name:

Citric Acid Anhydrous

Synonyms:

2-hydroxy-1,2,3-propanetricarboxylic acid, or
2-hydroxypropane-1,2,3-tricarboxylic acid.

Product Code:

020410, 020420, 020440

Use of the Substance / Preparation:

Chemical intermediate. Personal care products. Cleaning/detergent products and other household products. Paper products. Construction products. Polymers and plastics products. Oil industry. Textile industry. Paints and coatings. Photography products. Laboratory reagents. Water treatment. Treatment of metal surfaces. Agricultural applications. Medical devices. Food additive.

Contact Manufacturer:

Archer Daniels Midland Company
4666 Faries Parkway
Decatur, IL 62526, USA
Telephone Number: (+1) 217-424-5200

Emergency response telephone number:

Chemtrec 1-800-424-9300 (CCN 1635)

2. HAZARDS IDENTIFICATION

Emergency Overview

Warning. Irritating to eyes. Corrosive to metals (as aqueous solution). Product dust may cause mild, mechanical irritation. May form combustible dust concentrations in air.

Appearance

White

Physical State

Solid: Powder / Granular

Odor

Odorless

Classification according to 29 CFR 1910, amended to conform to the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS):

Serious Eye Damage / Eye Irritation	Category 2
Hazards Not Otherwise Classified	Combustible Dust
GHS Label Elements	
Signal Word:	Warning
GHS Hazard Pictogram(s):	
Hazard Statement(s):	H319 Causes serious eye irritation May form combustible dust concentrations in air.
Precautionary Statement(s):	Prevention Precautionary Statement(s): Wash hands and exposed skin thoroughly after handling. Wear eye protection. Response Precautionary Statement(s): If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature of the preparation Substance
 Chemical Family Acids
 Molecular Formula $C_6H_8O_7$

The following component(s) in this product are considered hazardous under applicable OSHA (USA), WHMIS (Canada), and/or NOM-002-SCT-2003 (Mexico) regulations

Chemical Name	CAS-No	Weight %	North American Hazard Indicator
Citric acid	77-92-9	99-100	OSHA / GHS: Eye Irrit. 2; WHMIS: E

4. FIRST AID MEASURES

Description of first aid measures

General Advice If symptoms persist, call a physician. Show this safety data sheet to the doctor in attendance. Use personal protective equipment. For personal protection see section 8.

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.

Inhalation Move to fresh air.

Ingestion Clean mouth with water and afterwards drink plenty of water.

Protection of First-aiders Use personal protective equipment. Avoid contact with skin, eyes and clothing.

Most important symptoms and affects, both acute and delayed

Eyes Irritating to eyes. Contact with eyes may cause mechanical irritation.

Skin According to GHS hazard classification criteria, the product is not considered as being a skin irritant. Product dust may cause mild, mechanical irritation. Health injuries are not known or expected under normal use.

Inhalation May cause irritation of respiratory tract. Based on the low pH, citric acid would be expected to cause irritation to the respiratory tract, resulting in a higher cough response as the inhalation exposure concentration was increased.

Ingestion Oral exposure is not anticipated under normal working conditions. Health injuries are not known or expected under normal use.

Main Symptoms Itching. Redness. Burning sensation.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties

Fine dust dispersed in air may ignite. Risk of ignition followed by flame propagation or secondary explosions should be prevented by avoiding accumulation of dust, e.g. on floors and ledges.

Extinguishing media

Suitable Extinguishing Media Dry chemical. Carbon dioxide (CO₂) Water spray. Foam. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media No information available.

Special hazards arising from the substance or mixture

Hazardous Combustion Products Thermal decomposition can lead to release of irritating gases and vapors, Carbon monoxide (CO), Carbon dioxide (CO₂).

Specific Hazards Arising from the Chemical None known.

Sensitivity to mechanical impact No.

Sensitivity to static discharge Yes. (as dust).

Further information Fine dust dispersed in air may ignite. Dust explosibility class = 1. Weak to moderately explosible.

Advice for fire-fighters

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health 1
Flammability 1

Stability and Reactivity 0
Physical hazard None known



6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

Avoid contact with the skin and the eyes. Use personal protective equipment. For personal protection see section 8. Avoid dust formation.

Environmental Precautions

Prevent further leakage or spillage if safe to do so. Prevent product from entering drains.

Methods for Clean-up

Pick up and transfer to properly labelled containers. Avoid dust formation. Keep in suitable, closed containers for disposal. Aqueous spillage should be neutralized and treated prior to discharge. For disposal information see section 13.

7. HANDLING AND STORAGE

Handling

Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Handle in accordance with good industrial hygiene and safety practice. Do not breathe vapours/dust. Use only in area provided with appropriate exhaust ventilation. Avoid dust formation in confined areas. Fine dust dispersed in air may ignite. Ensure adequate ventilation. Refer to NFPA 61, "Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities".

Storage

Keep containers tightly closed in a cool, well-ventilated place. Keep in properly labelled containers. Keep at temperature not exceeding 23.9°C / 75°F. at 55% relative humidity. Keep away from metals. Corrosive to metals (as aqueous solution). Keep away from oxidizing agents. Keep away from strong bases. Keep away from amines.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

As an airborne dust, exposure limits pertaining to "particulates not otherwise regulated" have been provided below. Specific exposure limits have not been identified for this product. However, as an irritant, it is advisable to limit worker exposure to the greatest extent possible.

Chemical Name	ACGIH TLV	OSHA PEL	MEXICO	NIOSH
Particulates not otherwise regulated	TWA: 10 mg/m ³ inhalable particles, recommended TWA: 3 mg/m ³ respirable particles, recommended	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction	not listed	not listed

Engineering Measures**General Hygiene Considerations**

Local exhaust ventilation. Ensure adequate ventilation, especially in confined areas. When using, do not eat, drink or smoke. Regular cleaning of equipment, work area and clothing.

Personal Protective Equipment**Eye/face Protection.**

Safety glasses with side-shields. If airborne dust concentrations are excessive, wear goggles.

Skin and Body Protection

Impervious gloves. Long sleeved clothing. Boots.

Respiratory Protection

Respirator with a dust filter. In case of insufficient ventilation wear suitable respiratory equipment.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	White
Physical State	Solid: Powder / Granular
Odor	Odorless
Odor Threshold	Not applicable
pH	1.8 @ 25°C at 5wt% conc
Dissociation Constants (pKa)	3.13, 4.76, and 6.4 at 25°C
Flash Point	Not applicable (solid)
Autoignition Temperature	Not applicable (No obligation to report where the autoignition temperature is >400°C.)
Boiling point	Not applicable (decomposes before boiling)
Melting/Freezing Point	153.000 °C / 307.000 °F (101.3 kPa)
Decomposition temperature	No information available
Oxidizing Properties	Not oxidizing
Flammability Limits in Air	Not flammable
Explosion Limits	Not explosive
Solubility(ies)	
Water Solubility	590g/l at 20°C
Surface Tension	Not applicable. (no surface tension anticipated).
Evaporation Rate	Not applicable (solid)
Vapor Pressure	2.21E-6 Pa at 25°C Not applicable
Vapor Density	Not applicable
Density	1.665g/m ³ at 20°C
Relative Density	1.665g/m ³ at 20°C
Bulk Density	500-950kg/m ³ at 20°C
Viscosity	Not applicable (solid)
Partition Coefficient (n-octanol/water)	-0.2 to -1.8
Explosive Properties	Not explosive

10. STABILITY AND REACTIVITY

Reactivity Reactions with metal nitrates may be potentially explosive. Aqueous form is corrosive to copper, zinc, aluminum and their alloys.

Stability Not applicable. Stable under normal conditions.

Possibility of Hazardous Reactions None under normal processing.

Conditions to Avoid Avoid dust formation. Heat, flames and sparks.

Incompatible Materials Amines. Heavy metals. Strong oxidizing agents. Strong bases.

Hazardous Decomposition Products Thermal decomposition can lead to release of irritating gases and vapors Carbon monoxide (CO) Carbon dioxide (CO₂)

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity	Based on available data, the classification criteria are not met.			
Chemical Name	Weight %	LD50 Oral	LD50 Dermal	LC50 Inhalation
Citric acid	99-100	5400 mg/kg Mouse 11700 mg/kg Rat	>2000 mg/kg bw Rat	

Skin corrosion/irritation	Based on available data, not, or only slightly irritating.
Serious eye damage/eye irritation	Irritant, causes serious eye irritation.
Method	OECD Guideline 405 (Acute Eye Irritation / Corrosion)
Species	Rabbit (New Zealand White)

Results	Irritating: Overall irritation score for 10% solution: 9.3 of max. 110 (mean (of 3 animals)) (Time point: at 1, 24, 48 or 72 h) (fully reversible within: 7 days) (score achieved at 1 h) Overall irritation score for 30% solution: 16 of max. 110 (mean (of 3 animals)) (Time point: at 1, 24, 48 or 72 h) (not fully reversible within: 14 days) (fully reversible in 14-21 days) (expert opinion) (score achieved at 1 h)
Respiratory or skin sensitisation	Based on available data, not expected to be a skin or respiratory sensitiser.
Germ cell mutagenicity	Based on available data, negative to test/non-mutagenic.
Carcinogenicity	Based on available data, no evidence of carcinogenicity.
Reproductive toxicity	Based on available data, no evidence of reproductive toxicity.
STOT - single exposure	No evidence of toxicity.
STOT - repeated exposure	Based on available data, no toxicity identified at highest exposure levels [NOAEL(rats) 4000mg/kg bw/d].
Aspiration hazard	Based on available data, no known aspiration hazard.

Potential health effects

Eyes	Irritating to eyes. Contact with eyes may cause mechanical irritation.
Skin	According to GHS hazard classification criteria, the product is not considered as being a skin irritant. Product dust may cause mild, mechanical irritation. Health injuries are not known or expected under normal use.
Inhalation	May cause irritation of respiratory tract. Based on the low pH, citric acid would be expected to cause irritation to the respiratory tract, resulting in a higher cough response as the inhalation exposure concentration was increased.
Ingestion	Oral exposure is not anticipated under normal working conditions. Health injuries are not known or expected under normal use.
Main Symptoms	Itching. Redness. Burning sensation.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Not classified for aquatic toxicity. Contains no substances known to be hazardous to the environment. Contains no substances known to be not degradable in waste water treatment plants.

Chemical Name	Fresh Water Algae	Acute Fish Toxicity	Daphnia (Water flea)	Effects on micro-organisms	Other
Citric acid	NOEC(8d): 425mg/l (nominal)*	LC50:440mg/L (Leuciscus idus)	EC50: 1535mg/L (Daphnia magna)		

*Determined by extrapolation (testing of intrinsic toxicity to algae impractical due to nutrient complexing behaviour of citric acid)

Predicted No Effect Concentrations (PNEC) - Determined by extrapolation

Chemical Name	Aqua (fresh water)	Aqua (marine)	Sewage Treatment Plant	Sediment (fresh water)	Sediment (marine)	Soil
Citric acid	0.44mg/l	0.044mg/l	>1000mg/l	34.6mg/kg sediment dw	3.46mg/kg sediment dw	33.1mg/kg

Bioaccumulative Potential Bioaccumulation is unlikely. [Logkow < 0].

Chemical Name	log Kow	BCF
Citric acid	-0.2 to -1.8	BCF ~ 3.2 (estimated)

Persistence/Degradability Readily biodegradable. Inherently biodegradable. 97% and 100% biodegradability in 28d and 19d, respectively (protocols OECD 301E and OECD 301A, respectively).

Mobility Soluble in water.

PBT and vPvB assessment This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

13. DISPOSAL CONSIDERATIONS

Whenever possible, as rules and regulations allow, please recycle or manage materials to minimize waste.

Waste Disposal Methods Dispose of in compliance with the laws and regulations pertaining to this product in your jurisdiction. Rinsewater resulting from cleanup should be collected for treatment before disposal. Solutions with low pH-value should be neutralized before discharge.

Contaminated Packaging Empty containers should be decontaminated and taken for local recycling, recovery or waste disposal.

14. TRANSPORT INFORMATION

Domestic transport regulations (USA)

DOT Not regulated

Domestic transport regulations (Canada)

TDG Not regulated

Domestic transport regulations (Mexico)

MEX Not regulated

International transport regulations

ICAO Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

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

Chemical Name	TSCA	DSL	NDSL	EINECS	ELINCS	AICS	ENCS ISHL	CHINA	PICCS	KECL	NZLoC
Citric acid	Yes	Yes	No	Yes 201-069-1	No	Yes	Yes (2)-1318	Yes	Yes	Yes KE-20831	No

USA**Federal Regulations****Ozone Depleting Substances:**

No Class I or Class II material is known to be used in the manufacture of, or contained in, this product.

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product is not known to contain any chemicals which are subject to the reporting requirements of the Act or regulations contained in 40 CFR 372.

SARA 302

Section 302 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product is not known to contain any chemicals which are subject to the reporting requirements of the Act or regulations contained in 40 CFR 302.

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product is not known to contain any HAPS.

State Regulations**State Right-to-Know**

No known components subject to "Right-To-Know" legislation in the following States: Massachusetts. Minnesota. New Jersey. Pennsylvania.

Canada**WHMIS Product Classification**

Class E: Corrosive Material.

WHMIS Ingredient Disclosure List IDL

Component Information

Chemical Name	Weight %	WHMIS IDL	WHMIS Threshold limits
Citric acid	99-100	Listed	1%

(NPRI) Canadian National Pollutant Release Inventory

No known component is listed on NPRI.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

Mexico**Mexico - Grade**

Moderate risk, Grade 2

16. OTHER INFORMATION

Prepared By: ADM Specialty Food, Corn
Original Preparation Date: 15-Apr-2009
Revision Date: 12-Nov-2012
Revision Number: 1
Reason for revision: New SDS format. This version replaces all previous versions.

Abbreviations and acronyms

- AICS - Australian Inventory of Chemical Substances (Australia)
- CAS - Chemical Abstract Service
- CHINA - Chinese Inventory of Existing Chemical Substances (China)
- DNEL - Derived No Effect Level
- DOT - U.S. Department of Transportation
- DSL - Domestic Substance List (Canada)
- EC50 - Half maximal effective concentration
- EINECS - European Inventory of Existing Commercial Chemical Substances (EU)
- ELINCS - European List of Notified Chemical Substances (EU)
- ENCS - Existing and New Chemical Substances (Japan) / ISHL - Industrial Health and Safety Law (Japan)
- GHS - Globally Harmonized System of Classification and Labelling of Chemicals
- IATA - International Air Transport Association Dangerous Goods Regulations
- ICAO - International Civil Aviation Organisation
- IMDG - International Maritime Dangerous Goods Code
- IMO - International Maritime Organization
- KECL - Korean Existing and Evaluated Chemical Substances (Korea)
- LC50 - Lethal concentration that produces fatalities in 50% of a given test population
- LD50 - Median lethal dose of a given test population
- MEX - NOM-002-SCT/2003 List of Hazardous Substances and Materials Most Commonly Transported
- MEXICO - Mexico Occupational Exposure Limits
- NDSL - Non Domestic Substances List (Canada)
- NFPA - National Fire Protection Association
- NIOSH - National Institute of Occupational Safety and Health
- NZLoC - New Zealand Inventory of Chemicals (New Zealand)
- OECD - Organisation for Economic Co-operation and Development
- OSHA - Occupational Safety & Health Administration
- OSHA PEL - Occupational Safety and Health Administration Permissible Exposure Limits
- PICCS - Inventory of Chemicals and Chemical Substances (Philippines)
- PNEC - Predicted No-Effect Concentration
- STOT - Specific Target Organ Toxicity
- TSCA - Toxic Substances Control Act, Section 8(b) Inventory (USA)
- TWA - Time Weighted Average: Average concentration that should not be exceeded during a work day (usually 8-hours)
- vPvB - Very Persistent and Very Bioaccumulative
- WGK - Wassergefährdungsklasse (German: Water Hazard Class)
- WHMIS - Workplace Hazardous Materials Information System

The information provided on this (M)SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of sheet