SAFETY DATA SHEET

CITRIC ACID ANHYDROUS

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

CAS NUMBER: 77-92-9
PROPER SHIPPING NAME: Not Regulated
UN NUMBER: Not regulated
WEAK ACID

PRODUCT USE: Component acidulant in beverages, confectionery, effervescent salts, in pharmaceutical syrups, medicines, in effervescent powders and tablets. Used to adjust the pH of foods and as synergistic antioxidant. Used in beverages, jellies, jams, preserves and candy to provide tartness. In processing of cheese. In electroplating. As sequestering agent to remove trace metals. As mordant to brighten colours. In analytical chemistry as reagent for albumin, mucin, glucose. Food Additive 330. Citric acid occurs naturally in many fruits. Citric acid occurs naturally in the body as a metabolite in the tricarboxylic acid cycle.

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Section 2 - HAZARDS IDENTIFICATION

Hazardous Substance according to the criteria of the New Zealand Hazardous Substances and New Organisms legislation. EPA Approval number: HSR002503

HAZARD LABELLING
WARNING

HAZARD CLASSIFICATION AND STATEMENTS

HSNO	GHS EQUIVALENT
6.4A	Serious eye irritation – Category 2A

Causes serious eye irritation.

PRECAUTIONARY STATEMENTS

PREVENTION
Wash exposed hands thoroughly after handling.
Wear protective gloves/protective clothing/eye protection/face protection.

RESPONSE
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 attention.

DISPOSAL
Dispose of contents and packaging in accordance with relevant legislation.
See Section 13 of this SDS Document for more information.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%	HAZARDOUS
citric acid anhydrous	77-92-9	>98	Yes

SYNONYMS: Citric acid; 1,2,3-Propanetricarboxylic acid, 2-hydroxy; 2-hydroxypropane-1,2,3-tricarboxylic acid.

Section 4 - FIRST AID MEASURES

SWALLOWED
If swallowed do NOT induce vomiting.
If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. Observe the patient carefully.
Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
Seek medical advice.

EYE
Immediately flush with fresh running water for several minutes.
Ensure complete irrigation of the eye by keeping eyelids apart and away from the eye and moving the eyelids by occasionally lifting the upper and lower lids.
It is recommended to see a doctor after eye injury.
Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
Remove contaminated clothing, including footwear. Wash with soap and water, then flush the affected area with running water for several minutes.
Seek medical attention in event of irritation.

INHALED
If powder, fumes or combustion products are inhaled remove from contaminated area and place at rest.
Keep patient warm. If symptoms such as difficulty breathing persist, call a doctor.

NOTES TO PHYSICIAN
Treat symptomatically based on individual reactions of patient and judgement of doctor.
NOTE: In an emergency dial 111, for advice contact a Poison Centre (0800-764-766).

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
Use extinguishing media suitable for surrounding area; water spray, dry chemical, foam or carbon dioxide.
DO NOT use water jet as it may spread the fire.

FIRE FIGHTING
Alert Fire Brigade and tell them location and nature of hazard.
Clear fire area of all non-emergency personnel.
Stay upwind. Eliminate ignition sources.
Wear breathing apparatus plus protective gloves.
Prevent spillage from entering drains or water courses.
Use firefighting procedures suitable for surrounding area.
DO NOT approach containers suspected to be hot.
Cool fire exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD
Combustible solid which burns but propagates flame with difficulty.
Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion.
Dust explosion class: St1.

HAZARDS FROM COMBUSTION PRODUCTS
Combustion products include carbon monoxide (CO), carbon dioxide (CO2), and other pyrolysis products typical of burning organic material.
May emit poisonous fumes.
May emit corrosive fumes.

PERSONAL PROTECTIVE EQUIPMENT
Firefighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots and gloves).

HAZCHEM CODE
Not applicable.

Section 6 - ACCIDENTAL RELEASE MEASURES

Only fully trained personnel should be involved in handling chemicals.
Personal Protective Equipment advice is contained in Section 8 of the SDS.

MINOR SPILLS
Clean up all spills immediately. Remove all ignition sources.
Wear protective clothing, impervious gloves and safety glasses.
Avoid contact with skin and eyes.
Use spark-proof tools and equipment.
Use dry clean-up procedures and avoid generating dust.
Sweep up and shovel into suitable containers and store for later disposal.
Refer to major spills.

MAJOR SPILLS
Personnel involved in the clean-up should wear full protective clothing.
Evacuate all unnecessary personnel.
Use spark-proof tools and equipment.
Increase ventilation. Avoid generating dust.
Stop leak if safe to do so.
If necessary, wet down with water and dike for later disposal.

Do not let product reach drains or waterways. If large quantities of this substance enter a waterway advise emergency services or your local waste authority.
Recover product wherever possible. Transfer to a labelled chemical waste container and seal for disposal.
Wash spill area with plenty of water after removal of contaminant.

EMERGENCY RESPONSE PLANNING GUIDELINES (AIHA 2016)
No ERPGs have been set for this substance by the American Industrial Hygiene Association.

PROTECTIVE ACTION CRITERIA (PAC 29)
No PAC values assigned for Citric Acid Anhydrous.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
Operators should be trained in procedures for safe use of this material.
Use good occupational work practice.
Avoid generating and breathing dust. Avoid contact with skin and eyes.
Avoid contact with incompatible materials.
Avoid sources of heat.
Avoid physical damage to containers.
When handling, DO NOT eat, drink or smoke.
Handle and open container with care. Use in a well-ventilated area.
Always wash hands with soap and water after handling or if accidental exposure occurs.
Work clothes should be laundered separately. Launder contaminated clothing before re-use.
Ensure an eye bath and safety shower are available and ready for use.
Observe good personal hygiene practices.

SUITABLE PACKAGING
Original packaging. Polyethylene or polypropylene packaging.
Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY
Incompatible with oxidising agents and strong bases.

STORAGE REQUIREMENTS
Store in original packaging.
Keep containers securely sealed.
Store in a cool, dry, well-ventilated area, out of direct sunlight.
Store away from incompatible materials and foodstuffs.
Protect containers against physical damage and check regularly for leaks.

Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	Measurement	Limit
New Zealand WES 2019	total dust	time weighted average (TWA)	10 mg/m^3
New Zealand WES 2019	respirable dust	time weighted average (TWA)	3 mg/m^3

No exposure limits have been set for Citric Acid Anhydrous by WorkSafe New Zealand or Safe Work Australia.

ENGINEERING CONTROLS

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. Refer to 'A simple guide to local exhaust ventilation' found on the WorkSafe New Zealand website.

PERSONAL PROTECTION EQUIPMENT (PPE)

PERSONAL RESPIRATORS
An approved respirator with a *P2* filter is recommended when using this product in dusty conditions. For more information see Australian/New Zealand Standard, AS/NZS 1715:2009 and AS/NZS 1716:2012.
If in doubt, seek expert occupational hygiene advice.

SKIN PROTECTION
Wear impervious protective clothing, including chemical resistant boots, rubber gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Refer to AS/NZS 2161.1:2016 Occupational Protective Gloves – Selection, use and maintenance; AS/NZS 2210.1:2010 for Safety footwear; AS/NZS 4501.1:2008 Occupational protective clothing – Guidelines on the selection, use, care and maintenance of protective clothing.
Maintain a safety shower in the work area.

EYE PROTECTION
Use approved chemical safety goggles and a full-face shield where splashing is possible. Refer to Personal eye protection Part 1: Eye and face protectors for occupational applications, Australian/New Zealand Standard: AS/NZS 1337.1:2010.
Maintain an eye wash fountain in work area.

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE
White, odourless crystals, granules or powder.

PHYSICAL PROPERTIES

PROPERTY	VALUE
State:	Solid
Odour:	Odourless
Molecular Weight:	192.12
Melting Range (°C):	~153
Boiling Range (°C):	Not available
Solubility in water (g/L, 20°C):	1450
pH (5% solution, 20°C):	~1.8
Specific Gravity (water=1, 20°C):	Not available
Bulk Density (g/cm^3, 20°C):	1.665
Volatile Component (%vol):	Not available
Relative Vapor Density(air=1):	Not available
Vapour Pressure (kPa, 160°C):	Not available
Autoignition Temp (°C):	Not applicable
Flash Point (°C):	Not applicable
Lower Explosive Limit (%):	0.28
Upper Explosive Limit (%):	2.29
Dust explosion class	St1
Decomposition Temp (°C):	~153
Viscosity:	Not applicable
Evaporation Rate:	Not applicable

Section 10 - CHEMICAL STABILITY AND REACTIVITY

CHEMICAL STABILITY
Product is stable under normal conditions of use, storage and temperature.

CONDITIONS TO AVOID
Avoid excessive heat, direct sunlight, static discharges, moisture, and temperature extremes. Slightly deliquescent (absorbs moisture) in moist air.

INCOMPATIBLE MATERIALS
Incompatible with strong oxidizing agents and strong bases. Keep containers dry and tightly closed to avoid moisture absorption and contamination.

HAZARDOUS DECOMPOSITION
Thermal decomposition can lead to release of dangerous/toxic fumes.
Combustion products include carbon monoxide (CO), carbon dioxide (CO2).

HAZARDOUS REACTIONS
None known.

Section 11 - TOXICOLOGICAL INFORMATION

ACUTE HEALTH EFFECTS

SWALLOWED
Accidental ingestion of the material may cause minor gastrointestinal disturbances. May cause diarrhoea, indigestion and nausea. Ingestion of large amounts may lead to more serious consequences.

EYE
Causes serious eye irritation including pain, redness and itching.

SKIN
This material may cause mild skin irritation in susceptible persons.

INHALED
Irritating to the respiratory system, may cause coughing, shortness of breath and sore throat.

CHRONIC HEALTH EFFECTS
Long-term or repeated exposure may cause erosion of tooth enamel. Citric acid is a powerful chelating agent and there is evidence that dietary citric acid may reduce the biological availability of iron and calcium.

TOXICITY AND IRRITATION DATA

TOXICITY
Acute Oral Toxicity, Rat, LD_{50}: 3000 mg/kg
Acute Dermal Toxicity, Rat, LD_{50}: >2000 mg/kg
Acute Inhalation Toxicity, LC_{50}: No data.

IRRITATION
Skin (rabbit): No irritation [OECD Test Guideline 404, manufacturer's SDS]
Eye (rabbit): Irritating to eyes [OECD Test Guideline 405, manufacturer's SDS]

Carcinogenic effects: Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.
Mutagenic effects: Not a mutagen.
Reproductive effects: Not classified.
Aspiration hazard: No information available.
Sensitizer: Not classified.

Section 12 - ECOLOGICAL INFORMATION

ECOTOXICITY
Not classified as a hazard to the environment.

ECOTOXICITY DATA
Fish, (*Leuciscus idus*), Golden orfe, 48hr LC_{50}: 440 mg/L [OECD Test Guideline 203]
Aquatic Invertebrates, (*Daphnia magna*), water flea, 24hr EC_{50}: 1535 mg/L
Algae (*Senedesmus quadricauda),* green algae, 168h: 425 mg/l static test.

Persistence and Biodegradability:
Readily biodegradable (97% 28d) [OECD Test Guideline 301B]
Readily biodegradable (100% 19d) [OECD Test Guideline 301E]
Mobility: Soluble in water and will partition to the aquatic environmental compartment.
BOD: 526 mg/g
COD: 728 mg/g
Bioaccumulation: Citric acid is miscible in water and readily biodegradable, therefore accumulation is not expected.
Log Pow: -1.72 at 20°C.
PBT and vPvB: This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

DO NOT discharge into sewer or waterways.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal of Hazardous Substances is subject to the Resource Management Act and Council By-Laws in addition to HSNO requirements. Do not dispose with household rubbish.

PRODUCT
Recycle wherever possible. Special hazard may exist - specialist advice may be required.
The product may be treated so that it is no longer hazardous by a means other than dilution. This includes incineration at an approved site or burial in a landfill in such a manner that it will not lead to any adverse health effects to any person or exceed any TEL (tolerable exposure limit) set by the Authority for this substance.
Treatment in a biological wastewater treatment system with prior approval and arrangement is also permissible providing that the substance is rendered non-hazardous and does not pose any adverse effects to human health or the environment. Alternatively consult an approved Waste Management company for disposal options.

PACKAGING
Recycle wherever possible. Special hazard may exist - specialist advice may be required.
Packaging should be rendered incapable of containing any material.
Puncture containers to prevent re-use and bury at an authorised landfill.
Empty containers may be decontaminated. The residual contents of the package must be diluted to below the thresholds for the respective hazard and the diluted residue is 1% or less of the volume of the package.
Alternatively, consult an approved Waste Management company for disposal options or dispose of at an approved waste disposal facility.
Observe all label safeguards until containers are cleaned and destroyed.
Where possible retain label warnings and SDS and observe all notices pertaining to the product.

Section 14 - TRANSPORT INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: UN, IATA, IMDG.
Not classified as a Dangerous Good under NZS 5433:2012 Transport of Dangerous Goods on Land.

Section 15 - REGULATORY INFORMATION

REGULATIONS
Classified as hazardous according to the criteria of the New Zealand Hazardous Substances and New Organisms Act and GHS 7th revised edition.
This product has been assigned to the following Group Standard by Interchem Agencies Limited: Additives, Process Chemicals and Raw Materials (Subsidiary Hazard) Group Standard 2020.
EPA Approval number: HSR002503

Certified handler, tracking and location compliance certification regulations do not apply.

For full HSNO controls and Health and Safety at Work regulations for this substance refer to New Zealand EPA and Worksafe websites.

Citric Acid Anhydrous (CAS 77-92-9) is found on the following inventories:
NZIoC, AICS, ENCS, EINECS, TSCA, DSL.

Section 16 - OTHER INFORMATION

NEW ZEALAND POISON CENTRE 0800 POISON (0800 764 766)
NZ EMERGENCY SERVICES: 111

Interpretation and Abbreviations
ACGIH – American Conference of Governmental Industrial Hygienists.
ACVM – Agricultural Chemicals and Veterinary Medicines.
AICS – Australian Inventory of Chemical Substances.
AOX – Absorbable organic halogens.
APF – Assigned Protection Factor.
BOD – Biochemical Oxygen Demand.
China IECSC – Inventory of Existing Chemical Substances Produced or Imported in China.
COD – Chemical Oxygen Demand.
DSL – Canadian Domestic Substances List.
EINECS – European Inventory of Existing Commercial Chemical Substances.
ENCS – Japanese Existing and New Chemical substances.
IDLH – Immediately Dangerous to Life or Health Concentrations.
IARC – International Agency for Research on Cancer.
ISHL – Japanese Industrial Safety and Health Law List of Chemicals.
Koc – soil organic carbon-water partition coefficient
Kow - octanol/water partition coefficient
LOEL – Lowest Observed Effect Level.
LD_{LO} – Lethal Dose Low (the lowest dosage per unit of bodyweight of a substance known to have resulted in fatality in a particular animal species).
MAK – Maximum workplace concentration in the workplace air that generally does not have known adverse effects on the health of the employee nor cause unreasonable annoyance when a person is repeatedly exposed during long periods, usually 8 hours daily, 40hour working week).
NOAA – National Oceanic and Atmospheric Administration.
NOEC – No Observed Effect Concentration.
NTP – National Toxicology Program.
NZ EPA CCID – New Zealand Environmental Protection Authority Chemical Classification and Information Database.
NZIoC – New Zealand Inventory of Chemicals.
OECD HPV – The Organisation for Economic Co-operation and Development High Production Volume Chemicals.
PEL – Permissible exposure limit.
PPE – Personal Protective Equipment.
Prop 65 – California Proposition 65 List of Chemicals.
RTECS – Registry of Toxic Effects of Chemical substances.

SCAPA – Subcommittee on Consequence Assessment and Protective Actions.
STEL – Short term exposure limit.
TOC – Total Organic Carbon.
TSCA – US Toxic Substances Control Act Existing Chemicals.
TWA - The time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.
VOC – Volatile Organic Compounds.

Sources of key data used to compile the datasheet:
Manufacturer's SDS
NZ EPA CCID
OECD SIDS - SIDS Initial Assessment Report for Citric acid
UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS) 7th revised edition.

Date of first issue: 2008.04
Date of Preparation/Review: 2020.07.14
Amendments: The classification has been revised and the substance assigned to a Group Standard in accordance with the NZ EPA's proposal to revoke the individual approval for this substance.
Consequential amendments have been made.
5 yearly review of all data.

***DISCLAIMER**: The information contained in this safety data sheet was obtained from current and reliable sources. This data is supplied without warranty, expressed or implied, regarding its correctness and accuracy. It is the user's responsibility to determine safe conditions for use of this product and to assume liability for loss, injury, damage or expense resulting from improper use of this product.*

End of SDS