Iron(III) citrate hydrate

sc-286019

Material Safety Data Sheet

Hazard Alert Code Key: EXTREME HIGH MODERATE LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Iron(III) citrate hydrate

STATEMENT OF HAZARDOUS NATURE

NFPA

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877–715–9305
Outside the US & Canada: +800 2436 2255
(1–800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C6H5FeO7•xH2O, "iron (III) citrate", "citric acid ferric salt", "iron citrate", "iron (III) citrate hydrate (CAS RBN: 207399-12-0)", "iron (III) citrate monohydrate", "1, 2, 3, -propanetricarboxylic acid, 2-hydroxy, iron salt"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability: 1</td>
<td></td>
</tr>
<tr>
<td>Toxicity: 2</td>
<td></td>
</tr>
<tr>
<td>Body Contact: 0</td>
<td>Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4</td>
</tr>
<tr>
<td>Reactivity: 1</td>
<td></td>
</tr>
<tr>
<td>Chronic: 2</td>
<td></td>
</tr>
</tbody>
</table>

CANADIAN WHMIS SYMBOLS

1 of 7
EMERGENCY OVERVIEW

RISK

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
■ Accidental ingestion of the material may be damaging to the health of the individual.
■ Iron poisoning results in pain in the upper abdomen and vomiting, and is followed hours later by shock, in severe cases coma and death. Iron toxicity increases in proportion to their solubility in the gastrointestinal tract.
EYE
■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.
SKIN
■ The material is not thought to produce adverse health effects or skin irritation following contact (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
■ Solution of material in moisture on the skin, or perspiration, may increase irritant effects.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
INHALED
■ The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
■ Not normally a hazard due to non-volatile nature of product.

CHRONIC HEALTH EFFECTS
■ Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
■ Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
■ Chronic excessive intake of iron have been associated with damage to the liver and pancreas. People with a genetic disposition to poor control over iron are at an increased risk.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ferric citrate</td>
<td>207399-12-0</td>
<td>&gt; 98</td>
</tr>
</tbody>
</table>

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.
EYE
■ If this product comes in contact with the eyes: ■ Wash out immediately with fresh running water. ■ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
SKIN
■ If skin or hair contact occurs: ■ Flush skin and hair with running water (and soap if available). ■ Seek medical attention in event of irritation.
INHALED
■ If dust is inhaled, remove from contaminated area. ■ Encourage patient to blow nose to ensure clear passage of breathing. ■ If irritation or discomfort persists seek medical attention.
NOTES TO PHYSICIAN
■ For acute or short term repeated exposures to iron and its derivatives:
■ Always treat symptoms rather than history.
■ In general, however, toxic doses exceed 20mg/kg of ingested material (as elemental iron) with lethal doses exceeding 180 mg/kg.

Section 5 - FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Vapour Pressure (mmHG):</th>
<th>Negligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Explosive Limit (%):</td>
<td>Not Available</td>
</tr>
</tbody>
</table>
Specific Gravity (water=1): > 1.0
Lower Explosive Limit (%): Not Available

EXTINGUISHING MEDIA
· Water spray or fog.
· Foam.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
· 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 clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), metal oxides, other pyrolysis products typical of burning organic material.
May emit poisonous fumes.

FIRE INCOMPATIBILITY
■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION
Glasses:
Chemical goggles.
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Remove all ignition sources.
· Clean up all spills immediately.
· Avoid contact with skin and eyes.
· Control personal contact by using protective equipment.
· Use dry clean up procedures and avoid generating dust.
· Place in a suitable, labelled container for waste disposal.

MAJOR SPILLS
■ Moderate hazard.
· CAUTION: Advise personnel in area.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.
Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
· Do NOT cut, drill, grind or weld such containers.
· In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS
■ Glass container.
· Polyethylene or polypropylene container.
· Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS
· Store in original containers.
· Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

<table>
<thead>
<tr>
<th>Source</th>
<th>Material</th>
<th>TWA ppm</th>
<th>TWA mg/m³</th>
<th>STEL ppm</th>
<th>STEL mg/m³</th>
<th>Peak ppm</th>
<th>Peak mg/m³</th>
<th>TWA F/CC</th>
<th>Notes</th>
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<tr>
<td>Location</td>
<td>Substance Description</td>
<td>Value(s)</td>
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<tr>
<td>Canada - Alberta Occupational Exposure Limits</td>
<td>ferric citrate (Iron salts, soluble, as Fe)</td>
<td>1</td>
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<tr>
<td>Canada - British Columbia Occupational Exposure Limits</td>
<td>ferric citrate (Iron salts - soluble, as Fe)</td>
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<tr>
<td>US NIOSH Recommended Exposure Limits (RELs)</td>
<td>ferric citrate (Iron salts (soluble, as Fe))</td>
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<tr>
<td>Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)</td>
<td>ferric citrate (Iron salts, soluble (as Fe))</td>
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<tr>
<td>US ACGIH Threshold Limit Values (TLV)</td>
<td>ferric citrate (Iron salts - soluble (as Fe))</td>
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<td>US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants</td>
<td>ferric citrate (Iron salts (soluble) (as Fe))</td>
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<td>US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants</td>
<td>ferric citrate (Iron salts (soluble) (as Fe))</td>
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<td>US - Minnesota Permissible Exposure Limits (PELs)</td>
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<tr>
<td>US - California Permissible Exposure Limits for Chemical Contaminants</td>
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<tr>
<td>US - Hawaii Air Contaminant Limits</td>
<td>ferric citrate (Iron salts (soluble) (as Fe))</td>
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<td>US - Alaska Limits for Air Contaminants</td>
<td>ferric citrate (Iron salts (soluble) (as Fe))</td>
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<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>ferric citrate (Iron salts, soluble, (as Fe))</td>
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<tr>
<td>Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances</td>
<td>ferric citrate (Iron salts, soluble (as Fe))</td>
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<tr>
<td>US - Washington Permissible exposure limits of air contaminants</td>
<td>ferric citrate (Iron salts, soluble (as Fe))</td>
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</tbody>
</table>
### Canada - Nova Scotia
**Occupational Exposure Limits**
- *ferric citrate* (Iron salts - soluble (as Fe))

<table>
<thead>
<tr>
<th>Canada - Nova Scotia</th>
<th>ferric citrate (Iron salts - soluble (as Fe))</th>
<th>1</th>
</tr>
</thead>
</table>

**TLV Basis:** upper respiratory tract & skin irritation

### Canada - Prince Edward Island
**Occupational Exposure Limits**
- *ferric citrate* (Iron salts - soluble (as Fe))

<table>
<thead>
<tr>
<th>Canada - Prince Edward Island</th>
<th>ferric citrate (Iron salts - soluble (as Fe))</th>
<th>1</th>
</tr>
</thead>
</table>

**TLV Basis:** upper respiratory tract & skin irritation

### Canada - Northwest Territories
**Occupational Exposure Limits (English)**
- *ferric citrate* (Iron salts, soluble (as Fe))

<table>
<thead>
<tr>
<th>Canada - Northwest Territories</th>
<th>ferric citrate (Iron salts, soluble (as Fe))</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

### US - Michigan
**Exposure Limits for Air Contaminants**
- *ferric citrate* (Iron salts (soluble) (as Fe))

<table>
<thead>
<tr>
<th>US - Michigan</th>
<th>ferric citrate (Iron salts (soluble) (as Fe))</th>
<th>1</th>
</tr>
</thead>
</table>

### US - Oregon
**Permissible Exposure Limits (Z-1)**
- *ferric citrate* (Iron salts, soluble, as Fe)

<table>
<thead>
<tr>
<th>US - Oregon Permissible Exposure Limits (Z-1)</th>
<th>ferric citrate (Iron salts, soluble, as Fe)</th>
<th>-</th>
<th>1</th>
</tr>
</thead>
</table>

**Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits.**

### PERSONAL PROTECTION

#### RESPIRATOR
- particulate.

#### EYE
- Safety glasses with side shields
- Chemical goggles.

#### HANDS/FEET
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and 
  - dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.
- polychloroprene
- nitrile rubber
- butyl rubber
- fluororubber
- polyvinyl chloride
Gloves should be examined for wear and/ or degradation constantly.

#### OTHER

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**END OF TABLE**
· Overalls.
· P.V.C. apron.
· Barrier cream.
· Skin cleansing cream.
· Eye wash unit.

ENGINEERING CONTROLS
· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES
Solid.
Mixes with water.

<table>
<thead>
<tr>
<th>State</th>
<th>Divided solid</th>
<th>Molecular Weight</th>
<th>244.95 (anhydrous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>Not available</td>
<td>Viscosity</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>Not applicable</td>
<td>Solubility in water (g/L)</td>
<td>Miscible</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>Not Available</td>
<td>pH (1% solution)</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition Temp (°F)</td>
<td>Not available</td>
<td>pH (as supplied)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition Temp (°F)</td>
<td>Not Available</td>
<td>Vapour Pressure (mmHG)</td>
<td>Negligible</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not Available</td>
<td>Specific Gravity (water=1)</td>
<td>&gt; 1.0</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not Available</td>
<td>Relative Vapor Density (air=1)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>Negligible</td>
<td>Evaporation Rate</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

APPEARANCE
Red brown crystals, soluble in water. No odour. Decomposed by light. Insoluble in alcohol. BP grade needs an assay of 18% Fe min.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY
Avoid reaction with oxidizing agents.
For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

ferric citrate

TOXICITY AND IRRITATION
FERRIC CITRATE:
· No significant acute toxicological data identified in literature search.

CARCINOGEN
US - Rhode Island Hazardous Substance List
IARC

Section 12 - ECOLOGICAL INFORMATION

No data

Ecotoxicity
Ingredient          Persistence: Water/Soil Persistence: Air Bioaccumulation Mobility
ferric citrate       LOW     No Data Available LOW          HIGH

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
Legislation addressing waste disposal requirements may differ by country, state and/or territory. Each user must refer to laws operating in...
their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate:
· Reduction
· Reuse
· Recycling
· Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION

ferric citrate (CAS: 2338-05-8,3522-50-7,207399-12-0) is found on the following regulatory lists;
"Canada Domestic Substances List (DSL)","US Food Additive Database","US Toxic Substances Control Act (TSCA) - Inventory"

Section 16 - OTHER INFORMATION

Ingredients with multiple CAS Nos
Ingredient Name CAS ferric citrate 2338-05-8, 3522-50-7, 207399-12-0

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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