Material Safety Data Sheet
Gluconolactone
sc-202632

Hazard Alert Code Key:

EXTREME   HIGH   MODERATE   LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Gluconolactone

STATEMENT OF HAZARDOUS NATURE
Not considered a hazardous substance according to OSHA 29 CFR 1910.1200.

NFPA

SUPPLIER
Company: Santa Cruz Biotechnology, Inc.
Address:
2145 Delaware Ave
Santa Cruz, CA 95060
Telephone: 800.457.3801 or 831.457.3800
Emergency Tel: CHEMWATCH: From within the US and Canada: 877-715-9305
Emergency Tel: From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE
Used in cleaning compounds; in the dairy industry to prevent milkstone; in breweries to prevent beerstone; as latent acid catalyst for acid colloid resins, especially in textile printing.

SYNONYMS
C6-H10-O6, CH2OHCH(CHOH)3C(O)O, "gluconic acid, delta-lactone, D-", "gluconic acid, delta-lactone, D-", deltagluconolactone, "D-gluconic acid delta-lactone", "D-gluconic acid delta-lactone", glucono-delta-lactone

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS
None

EMERGENCY OVERVIEW
RISK

Potential Health Effects
Acute Health Effects

SWALLOWED
■ Although ingestion is not thought to produce harmful effects, the material may still be damaging to the health of the individual following ingestion, especially where pre-existing organ (e.g. liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality (death) rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.
■ Considered an unlikely route of entry in commercial/industrial environments.

EYE
■ Although the material is not thought to be an irritant, direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn).

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.

**INHALED**

The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

**CHRONIC HEALTH EFFECTS**

Principal routes of exposure are by skin contact and inhalation.

- No human exposure data available. For this reason health effects described are based on experience with chemically related materials.

As with any chemical product, contact with unprotected bare skin; inhalation of vapor, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

### Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>gluconolactone</td>
<td>90-80-2</td>
<td>&gt;99</td>
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</table>

### HAZARD RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
</tr>
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<tbody>
<tr>
<td>Flammability</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Toxicity</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Body Contact</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Reactivity</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Chronic</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**SWALLOWED**

- Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor.

**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.
  - If pain persists or recurs seek medical attention.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

**SKIN**

- If skin contact occurs:
  - Immediately remove all contaminated clothing, including footwear
  - 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**

- Treat symptomatically.

### Section 5 - FIRE FIGHTING MEASURES

- **Upper Explosive Limit (%):** 27.5
- **Specific Gravity (water=1):** 1.2
- **Lower Explosive Limit (%):** 2.0
- **Relative Vapor Density (air=1):** Not applicable

**EXTINGUISHING MEDIA**

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
Carbon dioxide.

**FIRE FIGHTING**

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting 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.

**GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS**

- Solid which exhibits difficult combustion or is difficult to ignite.
- 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.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO) and carbon dioxide (CO2).

**FIRE INCOMPATIBILITY**

- Avoid contamination with strong oxidizing agents as ignition may result.

**PERSONAL PROTECTION**

- Glasses: Full face-shield.
- Gloves: Respirator: Particulate

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**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**

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Control personal contact by using protective equipment and dust respirator.
- Prevent spillage from entering drains, sewers or water courses.
- Recover product wherever possible. Avoid generating dust.
- Sweep / shovel up.
- If required, wet with water to prevent dusting.
- Put residues in labelled plastic bags or other containers for disposal.
- Wash area down with large quantity of water and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

**ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)**

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

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**Section 7 - HANDLING AND STORAGE**

**PROCEDURE FOR HANDLING**

- Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
When handling DO NOT eat, drink or smoke.
Always wash hands with soap and water after handling.
Avoid physical damage to containers.
Use good occupational work practice.
Observe manufacturer's storing and handling recommendations.

**RECOMMENDED STORAGE METHODS**
- Multi ply paper bag with sealed plastic liner or heavy gauge plastic bag. NOTE: Bags should be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse. Check that all containers are clearly labelled and free from leaks. Packing as recommended by manufacturer.

**STORAGE REQUIREMENTS**
- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

**SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS**

| + | + | + | + | X | + |

**X**: Must not be stored together
**O**: May be stored together with specific preventions
**+**: May be stored together

### 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>US - Oregon Permissible Exposure Limits (Z3)</td>
<td>gluconolactone (Inert or Nuisance Dust: (d) Total dust)</td>
<td>10</td>
<td>*</td>
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<td>US OSHA Permissible Exposure Levels (PELs) - Table Z3</td>
<td>gluconolactone (Inert or Nuisance Dust: (d) Respirable fraction)</td>
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<td>US OSHA Permissible Exposure Levels (PELs) - Table Z3</td>
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<td>US - Hawaii Air Contaminant Limits</td>
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<td></td>
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<tr>
<td>US - Hawaii Air Contaminant Limits</td>
<td>gluconolactone (Particulates not otherwise regulated - Respirable fraction)</td>
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<tr>
<td>US - Oregon Permissible Exposure Limits (Z3)</td>
<td>gluconolactone (Inert or Nuisance Dust: (d) Respirable fraction)</td>
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<td>*</td>
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<td>US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants</td>
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<tr>
<td>US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants</td>
<td>gluconolactone (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction)</td>
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<td></td>
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<tr>
<td>US - Michigan Exposure Limits for Air Contaminants</td>
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</tbody>
</table>

### MATERIAL DATA

**GLUCONOLACTONE:**
- These “dusts” have little adverse effect on the lungs and do not produce toxic effects or organic disease. Although there is no dust which does not evoke some cellular response at sufficiently high concentrations, the cellular response caused by P.N.O.C.s has the following characteristics:
  - the architecture of the air spaces remain intact,
  - scar tissue (collagen) is not synthesised to any degree,
  - tissue reaction is potentially reversible.
- Extensive concentrations of P.N.O.C.s may:
  - seriously reduce visibility,
  - cause unpleasant deposits in the eyes, ears and nasal passages,
  - contribute to skin or mucous membrane injury by chemical or mechanical action, per se, or by the rigorous skin cleansing procedures necessary for their removal. [ACGIH]
This limit does not apply:
- to brief exposures to higher concentrations
- nor does it apply to those substances that may cause physiological impairment at lower concentrations but for which a TLV has as yet to be determined.

This exposure standard applies to particles which
- are insoluble or poorly soluble* in water or, preferably, in aqueous lung fluid (if data is available) and
- have a low toxicity (i.e., are not cytotoxic, genotoxic, or otherwise chemically reactive with lung tissue, and do not emit ionizing radiation, cause immune sensitization, or cause toxic effects other than by inflammation or by a mechanism of lung overload)

PERSONAL PROTECTION

Consult your EHS staff for recommendations

EYE
- Safety glasses with side shields.
- Chemical goggles.
- Full face shield.
- Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET
- Wear general protective gloves: i.e. Disposable polythene gloves or Cotton gloves or Light weight rubber gloves, with Barrier cream preferably Safety footwear.

OTHER
- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

RESPIRATOR

<table>
<thead>
<tr>
<th>Protection Factor</th>
<th>Half-Face Respirator</th>
<th>Full-Face Respirator</th>
<th>Powered Air Respirator</th>
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</thead>
<tbody>
<tr>
<td>10 x PEL</td>
<td>P1</td>
<td>-</td>
<td>PAPR-P1</td>
</tr>
<tr>
<td>50 x PEL</td>
<td>Air-line*</td>
<td>P2</td>
<td>PAPR-P2</td>
</tr>
<tr>
<td>100 x PEL</td>
<td>-</td>
<td>P3</td>
<td>-</td>
</tr>
<tr>
<td>100+ x PEL</td>
<td>Air-line**</td>
<td>-</td>
<td>Air-line**</td>
</tr>
</tbody>
</table>

* - Negative pressure demand ** - Continuous flow

Explanation of Respirator Codes:
- Class 1 low to medium absorption capacity filters.
- Class 2 medium absorption capacity filters.
- Class 3 high absorption capacity filters.
- PAPR Powered Air Purifying Respirator (positive pressure) cartridge.
- Type A for use against certain organic gases and vapors.
- Type AX for use against low boiling point organic compounds (less than 65°C).
- Type B for use against certain inorganic gases and other acid gases and vapors.
- Type E for use against sulfur dioxide and other acid gases and vapors.
- Type K for use against ammonia and organic ammonia derivatives

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

ENGINEERING CONTROLS
- General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear an approved respirator.
- Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.
direct spray, spray painting in shallow booths, drum filling, conveyor loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) 1-2.5 m/s (200-500 f/min)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion). 2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

1: Room air currents minimal or favorable to capture 1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only 2: Contaminants of high toxicity
3: Intermittent, low production. 3: High production, heavy use
4: Large hood or large air mass in motion 4: Small hood - local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

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>178.16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>311</td>
<td>Boiling Range (°F)</td>
<td>Decomposes.311</td>
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<tr>
<td>Solubility in water (g/L)</td>
<td>Soluble.</td>
<td>Flash Point (°F)</td>
<td>Not applicable</td>
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<tr>
<td>pH (1% solution)</td>
<td>Not available</td>
<td>Decomposition Temp (°F)</td>
<td>Not available.</td>
</tr>
<tr>
<td>pH (as supplied)</td>
<td>Not applicable</td>
<td>Autoignition Temp (°F)</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapour Pressure (mmHG)</td>
<td>Not applicable</td>
<td>Upper Explosive Limit (%)</td>
<td>27.5</td>
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<tr>
<td>Specific Gravity (water=1)</td>
<td>1.2</td>
<td>Lower Explosive Limit (%)</td>
<td>2.0</td>
</tr>
<tr>
<td>Relative Vapor Density (air=1)</td>
<td>Not applicable</td>
<td>Volatile Component (%vol)</td>
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</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable</td>
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</table>

APPEARANCE
White, odourless crystalline powder with a sweet taste; soluble in water. Slightly soluble in alcohol.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY
- Avoid storage with oxidizers.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION
gluconolactone

TOXICITY AND IRRITATION
None available.

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:
GLUCONOLACTONE:
BOD 5 if unstated: 0.613
COD: 0.93
ThOD: 0.99

Ecotoxicity
Ingredient Persistence: Water/Soil Persistence: Air Bioaccumulation Mobility

Table 1

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
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</thead>
<tbody>
<tr>
<td>GLUCONOLACTONE</td>
<td>0.613</td>
<td></td>
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</tbody>
</table>
Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury residue in an authorized landfill.
- Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION

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

Section 15 - REGULATORY INFORMATION

gluconolactone (CAS: 90-80-2) is found on the following regulatory lists:
- "Canada Domestic Substances List (DSL)",
- "CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP",
- "International Council of Chemical Associations (ICCA) - High Production Volume List",
- "OECD Representative List of High Production Volume (HPV) Chemicals",
- "US EPA High Production Volume Program Chemical List",
- "US Food Additive Database",
- "US Toxic Substances Control Act (TSCA) - Inventory"

Section 16 - OTHER INFORMATION

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 mixture 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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