Safety Data Sheet

Ascorbic Acid

Section 1-----Product and Company Identification

Product name: Ascorbic Acid, Vitamin C (Crystal and fine powder)
Company information: CSPC WEISHENG PHARMACEUTICAL (SHIJIAZHUANG) CO., LTD.
Company's Phone: +86 311 85388577
Company’s Fax: +86 311 85388573
MSDS #: P001-01

Section 2----Composition/Information on Ingredient

Characterization: Water soluble vitamin; pharmaceuticals, food and feed additive
Chemical name: L (+)-Ascorbic acid
Synonyms: Vitamin C, L-Ascorbic acid, (5R)-5-[(1S)-1,2-dihydroxyethyl]-3,4-dihydroxyfuran-2(5H)-one
CAS number: 50-81-7
EINECS number: 200 066 2
Empirical formula: C$_6$H$_8$O$_6$
Molecular mass: 176.13 g/mol
Structure formula:

![Structure formula of Ascorbic Acid]
Section 3----Hazards identification

Most important hazards  - No particular hazards known.

Section 4----First-aid measures

Eye contact  - Rinse immediately with tap water for 10 minutes - open eyelids forcibly
Skin contact  - Remove contaminated clothes, wash affected skin with water and soap - do not use any solvents
Inhalation  - Remove the casualty to fresh air and keep him/her calm
  - In the event of symptoms get medical treatment
Note to physician  - Treat symptomatically

Section 5----Fire-fighting measures

Suitable extinguishing media  - Water spray jet, dry powder, foam, carbon dioxide
Specific hazards  - Severe dust explosion hazard
Protection of fire-fighters  - Precipitate gases/vapors/mists with water spray

Section 6----Accidental release measures

Methods for cleaning up  - Collect solids (avoid dust formation) and hand over to waste removal
  - Rinse with plenty of water

Section 7----Handling and storage

Handling
  Technical measures  - Processing in closed systems, if possible superposed by
inert gas (e.g. nitrogen)
- Local exhaust ventilation necessary
- Take precautionary measures against electrostatic charging
- Avoid dust formation; high dust explosion hazard

Suitable materials - Stainless steel, coated steel (protective lacquer), glass, polyethylene, polypropylene, enamel

Unsuitable materials - Aluminum, copper, zinc, Iron

Storage
Storage conditions - In closed containers
- Protected from humidity
- Below 30 °C

Packaging materials - Tightly closing; material: coated steel (protective lacquer), glass, polyethylene, polypropylene, PVC

Section 8----Exposure controls/Personal protection

Engineering Measures - See Section 7.

Monitoring
Threshold value air 10 mg/m³ (defined as 8-hour time-weighted average)

Analytics - Sampling on glass fibre filter and gravimetric or chemical determination

Personal protective equipment
Respiratory protection - In case of high dust concentrations: particle mask or respirator with independent air supply

Hand protection - Protective gloves (eg. made of Natural Rubber)

Eye protection - Safety glasses
Section 9----Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>White to almost white</td>
</tr>
<tr>
<td>Form</td>
<td>Crystalline powder or colorless crystals</td>
</tr>
<tr>
<td>Odour</td>
<td>Almost odorless, with sharp acidic, pleasant taste</td>
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<tr>
<td>Density</td>
<td>0.9-1.2 g/ml</td>
</tr>
<tr>
<td>Sieve analysis</td>
<td>Retained on 40 mesh NMT 20%, between 40-80 mesh NLT 50%</td>
</tr>
<tr>
<td>Solubility</td>
<td>Free soluble in water</td>
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<tr>
<td></td>
<td>Soluble in ethanol (96 percent)</td>
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<td></td>
<td>Virtually insoluble in ethyl ether</td>
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<tr>
<td></td>
<td>Virtually insoluble in chloroform</td>
</tr>
<tr>
<td>PH value</td>
<td>2.1-2.6 (5 % aqueous solution)</td>
</tr>
<tr>
<td>Dissociation constant</td>
<td>pK$_1$ = 4.17</td>
</tr>
<tr>
<td></td>
<td>pK$_2$ = 11.57 (water)</td>
</tr>
<tr>
<td>Melting temperature</td>
<td>About 190°C (with decomposition)</td>
</tr>
</tbody>
</table>

Section 10----Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
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<tbody>
<tr>
<td>Stability</td>
<td>- Stable at room temperature under exclusion of humidity</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>- Humidity</td>
</tr>
<tr>
<td></td>
<td>- Warming</td>
</tr>
<tr>
<td>Materials to avoid</td>
<td>- Oxidizing agents, atmospheric oxygen, bases, metals, metal salts</td>
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<tr>
<td>Note</td>
<td>- On prolonged storage, a yellow discoloration may occur</td>
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<tr>
<td></td>
<td>Through slow decomposition, which does not noticeably diminish biological activity, however</td>
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<tr>
<td></td>
<td>- In aqueous solutions ascorbic acid is very susceptible to oxidative decomposition, particularly in the presence of alkali resp. heavy metal ions</td>
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</tbody>
</table>
Section 11---- Toxicological information

Acute toxicity
- LD50 11’900 mg/kg (oral, rat)
- LD50 8’000 mg/kg (oral, mouse)
- LD50 518 mg/kg (i.v., mouse)

Local effects
- Eye: may cause irritations
- Mucous membranes: may cause irritations
- Skin: may cause irritations; particularly in conjunction with humidity (perspiration)

Chronic toxicity
- In predisposed individuals 4-12 g/d may cause urinary calculus

Mutagenicity
- No suspicion of human mutagenicity

Carcinogenicity
- Not carcinogenic (several species)

Reproduction toxicity
- Not teratogenic, not embryotoxic

Note
- Oral uptake of up to 9 g per day does not produce any serious toxic effects, however, even lesser quantities may cause diarrhoea
- RDA (recommended daily allowance): 60 mg

Section 12---- Ecological information

Inherent biodegradability
- Well inherently biodegradable
  97 %, 5 d
  100 %, 15 d

Ecotoxicity
Barely toxic for fish (rainbow trout)
LC50 (96 h) 1020 mg/l
- The inhibitory concentration relates to re-attachment to substrate (Dreissena polymorpha)
MIC (48 h) > 50 mg/l (nominal concentration)
Air pollution - Observe local/national regulations

Section 13----Disposal considerations
Waste from residues - Observe local/national regulations regarding waste disposal
- Drain very small quantities into wastewater treatment plant
- Large amounts: incinerate in qualified installation with flue gas scrubbing

Section 14----Transport information
Note - Not classified by transport regulations

Section 15----Regulatory information
Note - No classification and labeling according to EU directives

Section 16----Other information
Use - Additive for use in food and pharmaceuticals
- Feed additive
Biological activity - 1 I.U. (international unit) of vitamin C corresponds to the activity of 50 µg of pure ascorbic acid
Reference literature ISO11014-1
General rules for preparation of chemical safety data sheet (CSDS)
The information in this safety data sheet is based on current scientific knowledge. It should not be taken as expressing or implying any warranty concerning product characteristics.