# Silymarin group, mixture of isomers

## sc-301806

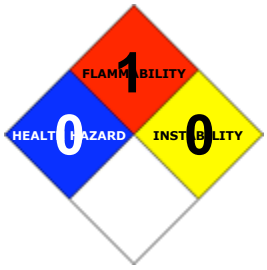
**Material Safety Data Sheet**

| Hazard Alert Code Key: | EXTREME | HIGH | MODERATE | LOW |
|---|---|---|---|---|

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME
Silymarin group, mixture of isomers

### STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

### 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
"purified extract of Silybum marianum (= Carduus marianus)", Ciscolex, DuraSilymarin, Enterohepat, Epacardo, Hepadestal, Laragon, Legalon, Silirex, Silliver, Cordomarin, Cronol, Emil, Eparfit, Escarmine, Halodren, Hepagerina, Hepalar, Hepallolina, Hepato-Framan, Lecemin, Plurapon, Sematron, Silarin, Silgen, Silibancol, Silimazu, "flavonoid-coniferyl alcohol coupled product", flavonolignan, "anti-hepatotoxic principle", "natural product"

## Section 2 - HAZARDS IDENTIFICATION

### CHEMWATCH HAZARD RATINGS

| | | Min | Max |
|---|---|---|---|
| Flammability: | 1 | | |
| Toxicity: | 0 | | |
| Body Contact: | 0 | | |
| Reactivity: | 1 | | |
| Chronic: | 2 | | |

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

### CANADIAN WHMIS SYMBOLS

**EMERGENCY OVERVIEW**
**RISK**

**POTENTIAL HEALTH EFFECTS**

**ACUTE HEALTH EFFECTS**

**SWALLOWED**
■ The material has NOT been classified as "harmful by ingestion".
This is because of the lack of corroborating animal or human evidence.

**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.
■ 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 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.
■ 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.

**CHRONIC HEALTH EFFECTS**
■ Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
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.
Flavonoids, which are found in a range of foods and medicines, has been shown to cause leukemia in infancy, but, if taken at high levels in the diet, they reduce the risk of breast and prostate cancer.
Many pharmacological studies exist which demonstrate the protective effects of silybin against acute liver damage induced by hepatotoxins such as carbon tetrachloride, phalloidin, ethanol, galactosamine, paracetomol, benzo-a-pyrenes and E.Coli endotoxins. Protective effects against chronic liver damage by carbon tetrachloride, ethanol, cadmium, indomethacin. Lorazepam, tolbutamide, oestradiol, thiacetamide (as examples) have also been demonstrated. Silymarin has also been effective in the treatment of hepatic disease resulting from exposure, over several years, to toluene, xylene and halogenated hydrocarbons. Parental administration studies indicate a prefered partitioning of silybin in liver indicating an elevated hepatic tropism and probably a marked first-pass effect.
The antioxidant properties of silymarin-phospholipid complexes has been investigated in vivo (specifically silymarin-phytosome), with demonstration of marked anti-inflammatory actions compared to indomethacin. Topical applications of gels containing the complex have induced reductions in UV-induced skin erythemas suggesting a use in cosmetics as "anti-aging" creams.
[The Flavonoids: New Perspectives in Biological Activies and Therapeutics,
Bombardelli E., & Morrazzoni P., Indena Spa.]

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|---|---|---|
| purified | | |
| Silybum marianum, extract | | |
| containing | | |
| silymarin group | 65666-07-1 | >95 |
| being isomeric flavonolignans as | | |
| silybin | 22888-70-6 | |
| (predominant form - formerly called silymarin) | | |

| |
|---|
| silidianin |
| silicristin |
| 2,3-dehydrosilybin |
| isosilybin |
| and |
| silybinomers |
| (silybin oligomers) |

## Section 4 - FIRST AID MEASURES

### 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 eyes: · Wash out immediately with water. · If irritation continues, seek medical attention.

### 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
■ Treat symptomatically.

## Section 5 - FIRE FIGHTING MEASURES

| | |
|---|---|
| Vapour Pressure (mmHG): | Negligible |
| Upper Explosive Limit (%): | Not available. |
| Specific Gravity (water=1): | Not available |
| Lower Explosive Limit (%): | Not available |

### EXTINGUISHING MEDIA
· Foam.
· Dry chemical powder.

### 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 ($CO_2$), 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
· Clean up all spills immediately.
· Avoid breathing dust and contact with skin and eyes.
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

· 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

| Source | Material | TWA ppm | TWA mg/m³ | STEL ppm | STEL mg/m³ | Peak ppm | Peak mg/m³ | TWA F/CC | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Canada - Ontario Occupational Exposure Limits | silybin (Particles (Insoluble or Poorly Soluble) Not Otherwise) | | 10 (I) | | | | | | |
| Canada - British Columbia Occupational Exposure Limits | silybin (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC)) | | 10 (N) | | | | | | |
| Canada - Ontario Occupational Exposure Limits | silybin (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs) | | 3 (R) | | | | | | |
| US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants | silybin (Particulates not otherwise regulated Respirable fraction) | | 5 | | | | | | |
| US - California Permissible Exposure Limits for Chemical Contaminants | silybin (Particulates not otherwise regulated Respirable fraction) | | 5 | | | | | | (n) |
| US - Oregon Permissible Exposure Limits (Z-1) | silybin (Particulates not otherwise regulated (PNOR) (f) Total | - | 10 | | | | | | Bold print identifies substances for which the Oregon |

| | | | | | |
|---|---|---|---|---|---|
| | Dust) | | | | Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means “particles not otherwise regulated.” |
| US - Michigan Exposure Limits for Air Contaminants | silybin (Particulates not otherwise regulated, Respirable dust) | | 5 | | |
| US - Oregon Permissible Exposure Limits (Z-1) | silybin (Particulates not otherwise regulated (PNOR) (f) Respirable Fraction) | - | 5 | | Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means “particles not otherwise regulated.” |
| US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants | silybin (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction) | | 5 | | |
| Canada - Prince Edward Island Occupational Exposure Limits | silybin (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles) | | 10 | | See Appendix B current TLV/BEI Book |

ENDOELTABLE

The following materials had no OELs on our records

• silymarin group: CAS:65666-07-1

## PERSONAL PROTECTION

## RESPIRATOR

•Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

## 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, AS/NZS 2161.1 or national equivalent).
· 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, AS/NZS 2161.10.1 or national equivalent) 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, AS/NZS 2161.10.1 or national equivalent) 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
· fluorocaoutchouc
· polyvinyl chloride
Gloves should be examined for wear and/ or degradation constantly.

### OTHER

· 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.
Does not mix with water.

| | | | |
|---|---|---|---|
| State | Divided solid | Molecular Weight | 482.44 |
| Melting Range (°F) | Not applicable | Viscosity | Not Applicable |
| Boiling Range (°F) | Not applicable | Solubility in water (g/L) | Immiscible |
| Flash Point (°F) | Not available | pH (1% solution) | Not available |
| Decomposition Temp (°F) | Not available | pH (as supplied) | Not applicable |
| Autoignition Temp (°F) | Not available | Vapour Pressure (mmHG) | Negligible |
| Upper Explosive Limit (%) | Not available. | Specific Gravity (water=1) | Not available |
| Lower Explosive Limit (%) | Not available | Relative Vapor Density (air=1) | Not applicable |
| Volatile Component (%vol) | Negligible | Evaporation Rate | Not applicable |

### APPEARANCE

Crystalline powder; does not mix well with water.

## 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

silymarin group

### TOXICITY AND IRRITATION

**SILYMARIN GROUP:**
■ Not available. Refer to individual constituents.
**SILYBIN:**
■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
No significant acute toxicological data identified in literature search.

## Section 12 - ECOLOGICAL INFORMATION

No data

**Ecotoxicity**

| Ingredient | Persistence: Water/Soil | Persistence: Air | Bioaccumulation | Mobility |
|---|---|---|---|---|
| silymarin group | No Data Available | No Data Available | | |
| silybin | HIGH | No Data Available | LOW | MED |

## 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

**Regulations for ingredients**
**silybin (CAS: 22888-70-6) is found on the following regulatory lists;**
"Canada - British Columbia Occupational Exposure Limits","Canada - Ontario Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada National Pollutant Release Inventory (NPRI)","US - California Permissible Exposure Limits for Chemical Contaminants","US - Michigan Exposure Limits for Air Contaminants","US - Oregon Permissible Exposure Limits (Z-1)","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants"
**No data for silymarin group (CAS: , 65666-07-1)**

## Section 16 - OTHER INFORMATION

**LIMITED EVIDENCE**

■ Cumulative effects may result following exposure*.
■ Limited evidence of a carcinogenic effect*.
* (limited evidence).

**Denmark Advisory list for selfclassification of dangerous substances**

Substance CAS Suggested codes silybin 22888- 70- 6 Mut3; R68

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■ 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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