## SECTION-1: Identification of the substance / mixture and the company / undertaking

| | |
|---|---|
| **Catalogue Number** | CS-O-30577 |
| **Product Name** | DL-Citrulline |
| **CAS No.** | 627-77-0 |
| **Category** | API |
| **Synonyms** | DL-Citrulline; DL-2-Amino-5-ureidovaleric Acid |
| **Brand** | Clearsynth Labs Ltd. |
| **Identified uses** | Laboratory Chemicals |
| **Uses advised against** | Not available |
| **Company** | Clearsynth Labs Ltd.<br>Mumbai, India |
| **Emergency Phone #** | +91-22-245045900 |
| **REACH No.** | Not available |

## SECTION 2: Hazards identification

**Disclaimer:** This is sample MSDS. Please email **sales@clearsynth.com** for more details.

### 2.1 Classification of the substance or mixture-Regulation (EC) No 1272/2008:

Not available

### 2.2 Label Elements

**Signal Word:** Not available

Not available

**Hazard Statement(s)**

| Code | Statement |
|---|---|
| Not available | Not available |

**Precautionary Statement(s)**

| Code | Statement |
|---|---|
| Not available | Not available |

## SECTION 3: Composition / information on ingredients

3.1 Substance

Component : DL-Citrulline
CAS Number : 627-77-0
Molecular Formula : C6H13N3O3
Molecular Weight : 175.19
Parent Chemical : Citrulline
Synonyms : DL-Citrulline; DL-2-Amino-5-ureidovaleric Acid
Concentration : Not available

## SECTION 4: First aid measures

SECTION 4: First-aid measures

4.1 Description of first aid measures
- General advice: Seek medical advice if symptoms persist. Show this SDS to the physician.
- Inhalation: Move person to fresh air. If breathing is difficult, seek medical attention.
- Skin contact: Wash with soap and water. Remove contaminated clothing and wash before reuse.
- Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical attention if irritation persists.
- Ingestion: Rinse mouth with water. Do not induce vomiting unless directed by medical personnel. Seek medical attention if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
- Not available.

4.3 Indication of any immediate medical attention and special treatment needed
- Treat symptomatically.
- Not available.

## SECTION 5: Firefighting measures

SECTION 5: Fire-fighting measures

5.1 Extinguishing media
- Suitable extinguishing media: Water spray, alcohol-resistant foam, dry chemical, carbon dioxide.
- Unsuitable extinguishing media: Not available.

5.2 Special hazards arising from the substance or mixture
- Specific hazards: Not available.
- Hazardous combustion products: Not available.

5.3 Advice for firefighters
- Wear self-contained breathing apparatus (SCBA) and full protective gear.
- Use water spray to cool unopened containers.
- Avoid inhalation of combustion products.

## SECTION 6: Accidental release measures

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- Avoid dust formation and breathing dust.
- Provide adequate ventilation.
- Use appropriate personal protective equipment (see Section 8).

6.2 Environmental precautions
- Avoid release to the environment. Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up
- Sweep up or vacuum without generating dust; place in a suitable, closed container for disposal.
- Clean contaminated area with water and detergent as appropriate.

6.4 Reference to other sections
- Disposal considerations: see Section 13.
- Exposure controls/personal protection: see Section 8.

## SECTION-7: Handling and storage

SECTION 7: Handling and storage

7.1 Precautions for safe handling
- Handle in accordance with good industrial hygiene and safety practice.
- Avoid dust generation and accumulation.
- Avoid contact with eyes, skin, and clothing.
- Use with adequate ventilation.

7.2 Conditions for safe storage, including any incompatibilities
- Store in a tightly closed container.
- Store in a cool, dry, well-ventilated place.
- Protect from moisture.
- Incompatible materials: Not available.

7.3 Specific end use(s)
- API / laboratory and industrial use. Not available.

## SECTION 8: Exposure controls / personal protection

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
- Occupational exposure limits: Not available.
- Biological limit values: Not available.

8.2 Exposure controls
- Engineering controls: Provide appropriate exhaust ventilation to control dust.
- Personal protective equipment (PPE):
- Eye/face protection: Safety glasses with side shields or chemical goggles.
- Skin protection: Protective gloves. Protective clothing as appropriate.
- Respiratory protection: If dust is generated and ventilation is inadequate, use a suitable particulate respirator.
- Hygiene measures: Wash hands after handling. Do not eat, drink, or smoke when using this product.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| Test | Result |
|---|---|
| Appearance | No data available |
| IR spectrum | No data available |
| pH | No data available |
| Solubility | No data available |

| Property | Value |
|---|---|
| a) Physical State | No data available |
| b) Color | No data available |
| c) Odor | No data available |
| d) pH | No data available |
| e) Vapour Pressure | No data available |
| f) Viscosity | No data available |
| g) Initial Boiling Point and boiling range | No data available |
| h) Melting Point / Freezing Point | No data available |
| i) Auto Ignition Temperature | No data available |
| j) Flash Point | No data available |
| k) Explosion Limit, Lower | No data available |
| l) Explosion Limit, Upper | No data available |
| m) Decomposition Temperature | No data available |
| n) Loss on Drying | No data available |
| o) Relative Density | No data available |
| p) Solubility (in DMSO) | No data available |
| q) Oxidizing Properties | No data available |

## SECTION 10: Stability and reactivity

SECTION 10: Stability and reactivity

10.1 Reactivity
- Not available.

10.2 Chemical stability
- Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
- Not available.

10.4 Conditions to avoid
- Avoid dust formation. Avoid moisture exposure.

10.5 Incompatible materials
- Not available.

10.6 Hazardous decomposition products
- Not available.

**SECTION 11: Toxicological information**

11.1 Information on toxicological effects
- Acute toxicity: No data available.
- Skin corrosion/irritation: No data available.
- Serious eye damage/eye irritation: No data available.
- Respiratory or skin sensitization: No data available.
- Germ cell mutagenicity: No data available.
- Carcinogenicity: No data available.
- Reproductive toxicity: No data available.
- STOT-single exposure: No data available.
- STOT-repeated exposure: No data available.
- Aspiration hazard: No data available.

Likely routes of exposure
- No data available.

Symptoms related to the physical, chemical and toxicological characteristics
- L-citrulline is converted to L-arginine by argininosuccinate synthase. L-arginine is in turn responsible for citrulline's therapeutic affects. Many of L-arginine's activities, including its possible anti-atherogenic actions, may be accounted for by its role as the precursor to nitric oxide or NO. NO is produced by all tissues of the body and plays very important roles in the cardiovascular system, immune system and nervous system. NO is formed from L-arginine via the enzyme nitric oxide synthase or synthetase (NOS), and the effects of NO are mainly mediated by 3',5' -cyclic guanylate or cyclic GMP. NO activates the enzyme guanylate cyclase, which catalyzes the synthesis of cyclic GMP from guanosine triphosphate or GTP. Cyclic GMP is converted to guanylic acid via the enzyme cyclic GMP phosphodiesterase. <br/><br/>NOS is a heme-containing enzyme with some sequences similar to cytochrome P-450 reductase. Several isoforms of NOS exist, two of which are constitutive and one of which is inducible by immunological stimuli. The constitutive NOS found in the vascular endothelium is designated eNOS and that present in the brain, spinal cord and peripheral nervous system is designated nNOS. The form of NOS induced by immunological or inflammatory stimuli is known as iNOS. iNOS may be expressed constitutively in select tissues such as lung epithelium. <br/><br/>All the nitric oxide synthases use NADPH (reduced nicotinamide adenine dinucleotide phosphate) and oxygen (O<sub>2</sub>) as cosubstrates, as well as the cofactors FAD (flavin adenine

dinucleotide), FMN (flavin mononucleotide), tetrahydrobiopterin and heme. Interestingly, ascorbic acid appears to enhance NOS activity by increasing intracellular tetrahydrobiopterin. eNOS and nNOS synthesize NO in response to an increased concentration of calcium ions or in some cases in response to calcium-independent stimuli, such as shear stress. In vitro studies of NOS indicate that the Km of the enzyme for L-arginine is in the micromolar range. The concentration of L-arginine in endothelial cells, as well as in other cells, and in plasma is in the millimolar range. What this means is that, under physiological conditions, NOS is saturated with its L-arginine substrate. In other words, L-arginine would not be expected to be rate-limiting for the enzyme, and it would not appear that supraphysiological levels of L-arginine which could occur with oral supplementation of the amino acid would make any difference with regard to NO production. The reaction would appear to have reached its maximum level. However, in vivo studies have demonstrated that, under certain conditions, e.g. hypercholesterolemia, L-arginine could enhance endothelial-dependent vasodilation and NO production.

## SECTION 12: Ecological information

SECTION 12: Ecological information

12.1 Toxicity
- Not available.

12.2 Persistence and degradability
- Not available.

12.3 Bioaccumulative potential
- Not available.

12.4 Mobility in soil
- Not available.

12.5 Results of PBT and vPvB assessment
- Not available.

12.6 Endocrine disrupting properties
- Not available.

12.7 Other adverse effects
- Not available.

## SECTION 13: Disposal considerations

SECTION 13: Disposal considerations

13.1 Waste treatment methods
- Dispose of contents/container in accordance with local/regional/national/international regulations.
- Do not discharge to drains or the environment.
- Recommended disposal method: Not available.

## SECTION 14: Transport information

SECTION 14: Transport information

- UN number: Not available.

- UN proper shipping name: Not available.
- Transport hazard class(es): Not available.
- Packing group: Not available.
- Environmental hazards: Not available.
- Special precautions for user: Not available.
- Transport in bulk according to IMO instruments: Not available.

## SECTION 15: Regulatory information

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
- Not available.

15.2 Chemical safety assessment
- Not available.

## SECTION 16: Other information

SECTION 16: Other information

- Product name: DL-Citrulline
- Catalog No.: CS-O-30577
- CAS No.: 627-77-0
- Synonyms: DL-Citrulline; DL-2-Amino-5-ureidovaleric Acid
- Supplier: Clearsynth Labs Ltd., Mumbai, India
- Emergency phone: +91-22-245045900

Disclaimer
- The information provided is believed to be accurate based on available data; however, it is provided without warranty. Users must determine suitability for their particular application and comply with all applicable laws and regulations.

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