Catalog #	Aliquot Size
LD01D-E311H-500	500 U
LD01D-E311H-2500	2500 U

D-Lactate Dehydrogenase

Catalog # LD01D-E311H
Lot # A4616-8

Product Description

Recombinant research grade D-lactate dehydrogenase from a microorganism. This enzyme is sold as a lyophilized white powder.

CAS #: 9028-36-8
Enzyme Commission #: EC 1.1.1.28
Molecular Weight: 39.1 kDa

Alternative name (s)

D-LDH, D-specific 2-hydroxyacid dehydrogenase, (R)-Lactate: NAD+ oxidoreductase.

Storage and Stability

Store at –20°C. Once reconstituted, aliquot product into smaller quantities to avoid repeated handling and multiple freeze/thaw cycles and store at -70°C.

Scientific Background

D-Lactate dehydrogenase catalyzes the conversion of pyruvate into D-lactate, via the oxidation of NADH to NAD^+. It can also catalyze the reverse reaction, conversion of D-lactate into pyruvate through the reduction of NAD^+ to NADH (1). This reaction is a principal step in the production of d-lactate in lactic acid bacteria (2). Because D-LDH is elevated in a variety of disorders, analysis of total enzyme activity and predominantly its isoenzyme pattern can significantly contribute to the diagnosis of diseases which are linked to tissue damage (3). Applications of this enzyme include enzymatic determination of metabolites such as ATP, ADP, glucose, creatinine, pyruvate, lactate and glycerol, and of enzyme activities, e.g., GPT, PK, and CPK.

References

1. Farhana A, et al. Biochemistry, Lactate Dehydrogenase. [Updated 2022 May 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557536/
2. Baolei Jia, et al. Catalytic, Computational, and Evolutionary Analysis of the d-Lactate Dehydrogenases Responsible for d-Lactic Acid Production in Lactic Acid Bacteria. *Journal of Agricultural and Food Chemistry* 2018 66 (31), 8371-8381 DOI: 10.1021/acs.jafc.8b02454
3. Klein R, et al. Clinical and Diagnostic Significance of Lactate Dehydrogenase and Its Isoenzymes in Animals. Vet Med Int. 2020 Jun 15;2020:5346483. PMID: 32607139

Activity

Pack Size	Activity
500 U	≥500 U
2500 U	≥2500 U

Unit Definition: One unit causes the oxidation of one micromole of NADH per minute at 37°C pH 7.5.

Enzyme activity was determined using the Lactate Dehydrogenase Activity Assay Protocol provided below.

D-Lactate Dehydrogenase

Catalog #	LD01D-E311H
Lot #	*A4616-8*
Stability	1yr at –20°C from date of shipment
Storage & Shipping	Store at –20°C. Once reconstituted, aliquot product into smaller quantities to avoid repeated handling and multiple freeze/thaw cycles and store at -70°C. Product shipped on ice pack.

To place your order, please contact us by phone 1-778-326-0223 or 1-888-606-3424 (Toll free)
or by email: orders@signalchemdx.com or info@signalchemdx.com - www.signalchemdx.com

Lactate Dehydrogenase Activity Assay Protocol

Reaction Components

(A) 25mM Pyruvate Solution, Sigma P2256 (prepared fresh)
(B) 0.1M K-phosphate buffer, pH 7.5
(C) 2mM NADH solution, Carbosynth NN12622 (prepared fresh)
(D) 50mM Enzyme Dilution Buffer (50mM K-phosphate buffer, pH 7.5 containing 0.1% BSA)

Assay Protocol

Step 1. Reconstitute lyophilized enzyme powder with water to desired concentration.

Step 2. Dilute the reconstituted enzyme preparation with ice-cold Enzyme Dilution Buffer to 0.2-1U/mL immediately before the assay.

Step 3. Prepare reaction mixture by mixing 4 mL pyruvate solution (A), 5 mL K-phosphate buffer (B), and 1 mL NADH solution (C) in an opaque (light proof) bottle.

Step 4. Pipette 3 ml of the reaction mixture into a test tube and equilibrate at 37°C for about 5 minutes. Keep reaction protected from light.

Step 5. Add 0.05 ml enzyme solution to the reaction mixture and mix gently.

Step 6. Record the decrease of optical density at 340nm for 5 minutes in a spectrophotometer. Keep the reaction protected from light and at a temperature of 37°C.

Note: Blank the spectrophotometer with water.

Step 7. Calculate the ΔOD per minute from the initial linear portion of the curve (ΔOD test).

Step 8. Measure the blank rate (ΔOD blank) by the same method as the test except that the enzyme diluent (D) is added instead of the enzyme solution.

Unit definition: One unit causes the oxidation of one micromole of NADH per minute under the conditions described above.

Calculation: Activity can be calculated by using the following formula:

$$\text{Volume Activity (U/mL)} = \frac{\Delta\text{OD/min (}\Delta\text{OD test - }\Delta\text{OD blank) x Vt x df)}}{(6.22 \times 1.0 \times Vs)} = \Delta\text{OD/min x 9.81 x df}$$

Weight Activity (U/mg) = (U/mL) x 1/C

Vt: Total volume (3.05ml)

Vs: Sample volume (0.05mL)

6.22: Millimolar extinction coefficient of NADH (cm^2/micromole)

1.0: Light path length (cm)

df: Dilution factor

c: Enzyme concentration (mg/mL)

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SAFETY DATA SHEET

Article 1 - Product Identification

Product Name: D-Lactate Dehydrogenase **Catalog # LD01D-E311H**

This product is sold only for research use by qualified laboratory personnel, and is not to be used as a drug, medical device, food additive, cosmetic, nor household chemical. It is not to be used in diagnostic, therapeutic, consumer, agricultural, nor pesticidal applications.

Supplier of Datasheet:	SignalChem Diagnostics Inc.
Street Address:	*190-13160 Vanier Place*
City, Prov. Postal Code:	*Richmond, BC, V6V 2J2*
Country:	*Canada*
Emergency Phone:	1-888-606-3424 (Toll free) 1-778-326-0223 (local)

Article 2 - Hazard Identification

- **WHMIS Classification:** Not WHMIS controlled.
- **GHS classification:** Not GHS classified.
- **Hazard Pictograms:** No labelling applicable.
- **Signal words:** None.
- **Hazard statements:** None.
- **Precautionary statements:** None.
- **Other hazards:** None known.

Article 3 – Composition/Information on Ingredients

Chemical Characterization: Mixture.
Description: This product contains the substances listed below.

Common name	Chemical name	CAS-No.	Concentration
EDTA disodium salt dihydrate	Ethylenediaminetetraacetic acid disodium salt-2-hydrate	6381-92-6	0.01%
Triton X-100	2-[4-(2,4,4-trimethylpentan-2-yl)phenoxy]ethanol	9002-93-1	0.005%
Sodium azide	NaN_3	26628-22-8	0.005%

Article 4 – First-aid Measures

- **General information:** Consult a physician by providing the SDS.
- **After inhalation:** In case of irritation by inhaling this product, move affected person to fresh air and await recovery. If irritation persists, seek immediate medical attention. If casualty cannot breathe, give artificial respiration and seek immediate medical attention.
- **After skin contact:** Immediately wash with soap and plenty of water and rinse thoroughly. Consult a physician.
- **After eye contact:** Rinse opened eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do so. Consult a physician.
- **After swallowing:** Not expected to present a significant ingestion hazard under anticipated conditions of normal use. If you feel unwell, seek medical advice.

Article 5 - Fire-fighting Measures

- **Suitable extinguishing media:** Use water spray, extinguishing powder, carbon dioxide, or other appropriate measure that is suitable to the environment.
- **Specific hazards arising from the substance or mixture:** None known.
- **Special protective equipment and precautions for fire-fighters:** Self-contained breathing apparatus if necessary.

SAFETY DATA SHEET

Article 6 – Accidental Release Measures

- **Personal precautions, protective equipment, and emergency procedures:** Apply standard laboratory practices and personal protective equipment. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation.
- **Environmental precautions:** Do not allow to enter drains.
- **Methods and materials for containment and cleaning up:** Absorb on sand or vermiculite and place in closed containers for disposal.

Article 7 - Handling and Storage

- **Precautions for safe handling:** Wear chemical safety goggles and compatible chemical-resistant gloves. Avoid inhalation, contact with eyes, skin or clothing.
- **Conditions for safe storage:** Store according to product label instructions. Keep container upright and tightly closed.

Article 8 - Exposure Controls/Personal Protection

- **Components with limit monitoring values at workplace:**
  NA
- **Appropriate engineering controls:**
  Apply adequate ventilation including mechanical exhaust or laboratory fume hood. Follow standard laboratory practices.
- **Individual protection measures:**

Respiratory protection:
Use appropriate respirator if there is inadequate ventilation by following the government standards.

Hand protection:
Wear gloves and use proper glove removal technique to avoid skin contact. Discard gloves after use by following the applicable laboratory regulations. Wash and dry hands.

Eye/face protection:
Safety goggles with side-shields approved under appropriate government standards.

Skin/body protection:
Use appropriate clothing, footwear and any additional protection measures to protect from splashing or contamination.

Article 9 – Physical and Chemical Properties

Appearance: White Powder	**Danger of explosion:** Product does not present an explosion hazard.
Odour/Odour Threshold: Not determined.	**Explosion limits:** Not available.
pH: Not available.	**Decomposition temperature:** Not available.
Melting point/freezing point: Not determined.	**Vapor pressure at 20 °C:** Not available.
Boiling point/Boiling range: Not determined.	**Density:** Not determined.
Flash point: Not determined.	**Relative density:** Not determined.
Flammability (solid, gaseous): Not determined.	**Vapor density:** Not determined.
Ignition temperature: Not determined.	**Evaporation rate:** Not determined.
Auto-igniting: Product is not self-igniting.	**Solubility in / Miscibility with Water:** Fully miscible.

Article 10 - Stability and Reactivity

- **Reactivity:** Stable under recommended transport and storage conditions.
- **Chemical stability:** Stable under recommended transport and storage conditions.
- **Possible hazardous reactions:** No dangerous reactions known.
- **Conditions to avoid:** Heat and moisture.
- **Incompatible materials:** Not determined.
- **Hazardous decomposition products:** Not determined.

SAFETY DATA SHEET

Article 11 - Toxicological Information

- **Acute toxicity:** Not available.
- **LD/LC50:** Not available.
- **Skin corrosion/irritation:** Not available.
- **Serious eye damage/eye irritation:** Not available.
- **Respiratory or skin sensitization:** Not available.
- **Germ cell mutagenicity:** Not available.
- **Carcinogenicity:** No components are listed in IARC, or NTP, or OSHA, or ACGIH.
- **Reproductive toxicity:** Not available.
- **Teratogenicity:** Not available.
- **Specific target organ toxicity - single exposure/ - repeated exposure (GHS):** Not available.
- **Aspiration hazard:** Not available.
- **Potential health effects:**
  Inhalation: No data available
  Ingestion: No data available
  Skin: No data available
  Eyes: No data available
- **Signs and Symptoms of Exposure:** No data available
- **Synergistic effects:** Not available.

Article 12 - Ecological Information

- **Eco-toxicity:** No data available.
- **Biodegradability:** Not applicable.
- **Bio-accumulative potential:** Not applicable.
- **Mobility in soil:** Not applicable.
- **PBT and vPvB assessment:** Not applicable.
- **Other adverse effects:** Not applicable.

Article 13 - Disposal Considerations

- **Disposal methods:** In accordance to applicable national, regional, or local laws and regulations. For additional handling information and protection of employees please refer to Article 7 and 8.
- **Contaminated packaging:** Disposal should be made in accordance to official regulations. Use water or cleansing agents to clean the area.

Article 14 - Transport Information

- **DOT:** Not dangerous goods.
- **IMDG:** Not dangerous goods.
- **IATA:** Not dangerous goods.

Article 15 – Regulatory Information

- **WHMIS Classification:** Non-hazardous.
- **GHS label elements:** Not applicable.
- **Signal word:** Not applicable.
- **Hazard statements:** Not applicable.

Article 16 - Other Information

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. SignalChem shall not be held liable for any damage resulting from handling or from contact with the above product. See the Technical Specification, Packing Slip, Invoice, and Product Catalog for additional terms and conditions of sale.