

Technical Data Sheet

D-Luciferin free acid

for molecular biology

Order number: 1268

D-Luciferin ((4S)-4,5-Dihydro-2-(6-hydroxy-2-benzothiazolyl)-4-thiazolecarboxylic acid), also known as firefly luciferin or beetle luciferin, is the chemiluminescent substrate of the enzyme luciferase. Catalyzed by luciferase, the membrane-permeable and water-soluble D-Luciferin is first converted to luciferin adenylate and finally breaks down under light emission to form oxyluciferin. The reaction requires ATP and oxygen.

The enzyme luciferase is used as a reporter in plants, bacteria, and mammalian cells. Luciferase reporter assays are a classic method for studying regulatory DNA regions: When the luciferase gene is inserted downstream of a promoter into a coding DNA segment, the intensity of the produced bioluminescence allows conclusions to be made about the promoter/gene activity.

Applications

D-Luciferin free acid is used in bioluminescent imaging of living cells, tissues and animal models. The range of applications of the luciferase/D-Luciferin system is very much the same as that of fluorescent proteins. However, the luciferase/D-Luciferin system has the advantage of operating with virtually no background - specifically emitted light is detected from a previously light-free space. Compared to fluorescence-based reporter assays, luciferase-based assays also show a significantly increased sensitivity and a higher linear range for analysis.

The main applications of D-Luciferin (in combination with luciferase-expressing cells) are:

- x To study intracellular signaling activity in vitro and in vivo
- x To measure transfection/transduction efficacy
- x To evaluate and measure of gene expression
- x To study gene regulation
- x For promotor analysis
- x For compound screenings
- x To study protein-protein interactions (Luciferase Complementation Assay)
- x In ATP assays
- x In Immunoassays
- x To detect very small amounts of ATP or oxygen



Preparation of D-Luciferin solutions

1. For a stock solution of 15 mg/ml (100X) D-Luciferin free acid use D-PBS without Ca^{2+} and Mg^{2+} or other buffered aqueous solution (such as 233.4 mg potassium bicarbonate or 195.8 mg sodium bicarbonate in 66.6 ml sterile water) as a solvent. If indicated, purge the solvent with nitrogen
2. Add 1.0 g of D-Luciferin free acid and mix carefully (any introduction of atmospheric oxygen should be avoided) until D-Luciferin is completely dissolved. In case sterility is required, sterilize by using a $0.2\mu\text{M}$ filter.
3. The solution should be immediately used (within one day) or aliquoted and frozen at -20°C or -80°C .
4. The final D-Luciferin concentration for most experiments is usually $150\mu\text{g/ml}$. Concentration may need to be adjusted to obtain optimal results as conditions will vary depending on the animal, cell culture, route of administration and sensitivity of the assay.

Note: Luciferin is quite unstable at low pH (< 6.5) and high pH (> 7.5), so make sure that the solvent being used is of neutral pH.

Since the stability of D-Luciferin solutions is discussed controversially, we recommend using freshly prepared solutions whenever possible. However, frozen D-Luciferin solutions have been shown to be still working after several months.

Storage and Stability

D-Luciferin is sensitive to light, oxygen and moisture as a powder and in solution.

The powder is shipped at ambient temperature. Upon receipt and for long-term use, store the powder in a tightly closed and desiccated container at -20°C .

Related products

1058	Water for molecular biology
1808	Sodium hydroxide pellets for molecular biology
1510	Penicillin/Streptomycin solution in 0.85 % NaCl for cell biology
1453	Gentamycin sulfate for biochemistry
2098	D-PBS (10X) w/o Ca and Mg for cell biology
1429	D-PBS (1X) w/o Ca and Mg (pH 7.4) for cell biology
1194	HEPES for cell biology
1125	Tris Xtrapure for biochemistry
1165	Tris hydrochloride for biochemistry
2151	Bicine for biochemistry
1269	Tricine for biochemistry
1086	MES monohydrate for biochemistry

