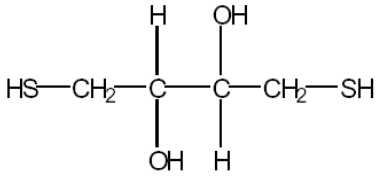
43815 1,4-Dithio-DL-threitol

(Cleland Reagent racemic[1],
(±)-threo-1,4-Dimercapto-2,3-butanediol, DTT)

CAS number: 3483-12-3



Product Description:

Appearance:	White Powder
Molecular formula:	$C_4H_{10}O_2S_2$
Melting Point:	42-43°C
Molecular weight:	154.1 g/mol
Solubility:	0.1 M in H_2O, 20°C, complete, colorless
pH:	4.0-6.5 (0.1 M in H_2O, 25°C)

This product is designated as BioChemika Ultra for Molecular Biology grade and is suitable for applications in the molecular biology, specially if high purity is required. It has been analyzed for low contaminating impurity and the absence of nucleases.

DTT is synthetic. A method of preparation has been described in J. Chem. Soc. 253 (1949)

DTT is an agent for reducing -S-S- to -SH. Redox potential: -0.33 volts at pH 7. DTT acts as a protective agent for -SH groups of other species in solution. In this reaction the DTT is oxidized to the cyclic disulfide, and thereby ensures the reduction of other disulfides in solution. The disulfide reduction is complete in minutes at pH 8. A specific and sensitive assay for disulfide groups is based on determination of resulting monothiols with DTNB (Fluka 43760).[2]

Applications:
It is used in buffers for isolation of RNA[5] or buffers used for RT-PCR starting with mRNA[6,7].

Preparation Instructions:
The solubility of DTT has been tested by Fluka at 50 mg/ml in water, resulting in a clear colorless solution. It has been described as freely soluble in water, ethanol, acetone, ethylate, chloroform and ether.
Solutions oxidize relatively slowly in air.[3] It is recommended to make solutions fresh daily. Recorded half-life (hours) of DTT solutions at various pH and temperatures are as follows:[4]

Conditions (all in 0.1 M KPO_4 buffer)	Half life (Hours)
pH 6.5 at 20°C	40
pH 7.5 at 20°C	10
pH 8.5 at 20°C	1.4
pH 8.5 at 0°C	11
pH 8.5 at 40°C	0.2
pH 8.5 at 20°C +0.1 mM Cu^{2+}	0.6
pH 8.5 at 20°C +0.1 mM EDTA	4

Storage/Stability:
Storage Temperature: 4°C
When stored as indicated, this product is stable for years.

References:

1. Biochemistry 3, 480 (1964)
2. J. Biol. Chem. 243, 716 (1968)
3. Merck Index 12th ed. #3441
4. Biochemical Education 11, 70 (1983)
5. R.J. MacDonald, Isolation of RNA using guanidinium salts. Inclusion of a reductant enhances denaturation by breaking intramolecular protein disulfide bonds, Meth. Enzymol. 152, 219 (1987)
6. A.L. Esterman, L.A. Sylvers, Optimizing Direct mRNA Isolation, Lablink, Vol. 1, No. 2, (1997)
7. C.A. Johansen, R.A. Hall, A.F. van den Hurk, S.A. Ritchie, J.S. Mackenzie, Detection and stability of Japanese encephalitis virus RNA and virus viability in dead infected mosquitoes under different storage conditions, Am. J. Trop. Med. Hyg., 67, 656-661 (2002)

Precautions and Disclaimer:
This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.