3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone (800) 325-5832 (314) 771-5765
Fax (314) 286-7828
email: techserv@sial.com
sigma-aldrich.com

ProductInformation

DL-Dithiothreitol

Product Number **D9163**
Storage Temperature 2–8 °C

CAS# 3483-12-3
Synonyms: Cleland's Reagent; 1,4-Dithio-DL-threitol; DL-threo-1,4-Dimercapto-2,3-butanediol; (±)-threo-1,4-Dimercapto-2,3-butanediol; DTT

Product Description

Molecular Formula: $C_4H_{10}O_2S_2$
Molecular Weight: 154.3
Redox potential: –0.33 volts (pH 7)[1]

This product is designated as Electrophoresis grade and has been tested for use in electrophoresis buffer systems.

1,4-Dithiothreitol (DTT) is the threo isomer of 2,3-dihydroxy-1,4-dithiolbutane, and an isomer of 1,4-dithioerythritol.[2] DTT is used in molecular biology to maintain sulfhydryl (-SH) groups in the reduced state and for quantitative reduction of disulfide (-S-S-) groups, as described by Cleland in his pioneering publication from the 1960's.[3] Its usefulness as an reducing agent stems from its water solubility and reduced odor compared to previous thiol compounds.[3]

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. DTT is less pungent and less toxic than 2-mercaptoethanol. Typically, a 7-fold lower concentration of DTT (100 mM) is required compared to 2-mercaptoethanol (5% v/v, 700 mM).

Many studies have utilized DTT to investigate disulfide linkages in proteins and immunoglobulins.[4,5,6,7] DTT has been used to investigate α-ketoglutarate dehydrogenase function, flavin cofactors in proteins and protein moieties involved in peroxide reduction.[8,9,10]

DTT has been utilized in the evaluation of thiol-disulfide exchange rates in melamine-based multivalent dendrimers.[11] The preparation of peptide-amphiphiles capable of self-assembly into nanofibers using DTT has been reported.[12]

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.

Preparation Instructions

This product is soluble in water (50 mg/ml), yielding a clear, colorless solution. DTT is also soluble in ethanol, acetone, ethylate, chloroform, and ether.[1]

Storage/Stability

DTT solutions should be prepared fresh daily. The recorded half-life (hours) of DTT solutions at various pH and temperatures are shown in Table 1 (all are in 0.1 M potassium phosphate buffer).[13]

Table 1.
DTT Solution Stability

pH	Temperature	Half Life (hrs)
pH 6.5	20 °C	40
pH 7.5	20 °C	10
pH 8.5	20 °C	1.4
pH 8.5	0 °C	11
pH 8.5	40 °C	0.2
pH 8.5	20 °C (+ 0.1 mM Cu^{2+})	0.6
pH 8.5	20 °C (+ 0.1 mM EDTA)	4

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