

Product Information

Tris(2-carboxyethyl)phosphine Hydrochloride Solution

0.5 M, pH 7.0

Catalog Number **646547**
Store at Room Temperature

CAS RN 51805-45-9

Synonyms: TCEP

Molecular Formula: $C_9H_{15}O_6P \cdot HCl$

Molecular Weight: 286.65

Product Description

Tris(2-carboxyethyl)phosphine has been reported to be a very effective reagent for cleaving disulfide bonds in aqueous solution.¹ As a trialkylphosphine, TCEP effectively reduces disulfide linkages in proteins, while leaving other functional groups intact.² However, unlike other trialkylphosphines (tributylphosphine), TCEP is water-soluble and odorless. These properties provide advantages over other reducing agents. Also, TCEP is considerably less toxic than 2-mercaptoethanol.

TCEP can be used for a wide variety of downstream applications, including SDS-PAGE, mass spectrometry, labeling with cysteine-specific tags, and modification of cysteine-containing compounds. Its ability to prevent oxidation of protein samples makes it a useful buffer component because it helps to preserve enzymatic activity.⁶ TCEP does not have to be removed prior to labeling if maleimides are used, because it does not contain a sulfhydryl group.⁶

TCEP concentration can be quantitatively determined by reaction with 5,5'-dithiobis(2-nitrobenzoic acid) (DTNB). In this procedure, the TCEP completely reduces the disulfide bond of the DTNB to produce two molecules of the thiol NTB, which can be measured at 412 nm.²

This product is a ready-to-use 0.5 M tris(2-carboxyethyl)phosphine (TCEP) solution. The pH has been adjusted to 7.0 with ammonium hydroxide, to make this product compatible with most mass spectrometry applications with concomitant sample clean-up.

Several references cite use of this product.⁷⁻⁹

Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

The product, as supplied, is stable for at least two years at room temperature. Once the product is opened, any unused material should be flushed with argon and capped tightly. The opened product should be stable for 1 week at room temperature.

Procedure

SDS-PAGE sample preparation with TCEP

1. Dilute the 0.5 M TCEP Solution to 50 mM by adding 100 μ L of the 0.5 M TCEP Solution to 900 μ L of ultrapure water.
2. Aliquots of the 50 mM TCEP solution can be added to the samples to a final concentration of 5 mM.
3. Boil the samples for five minutes.
4. Allow the samples to cool.
5. Load the samples onto an SDS-PAGE gel.

References

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3. Gray, W.R., *Protein Sci.*, **2(10)**, 1732-1748 (1993).
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9. Rose, C.M. *et al.*, *Cell Syst.*, **3(4)**, 395-403.e4 (2016).

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