

TCEP HCl

M116 Tris(2-carboxyethyl)phosphine hydrochloride in water (0.5molar)

CAS # [51805-45-9]

| amt | price |
|-------|--------|
| 1ml | \$20 |
| 2ml | \$38 |
| 5ml | \$85 |
| 10ml | \$150 |
| 25ml | \$360 |
| 100ml | \$1200 |

Introduction

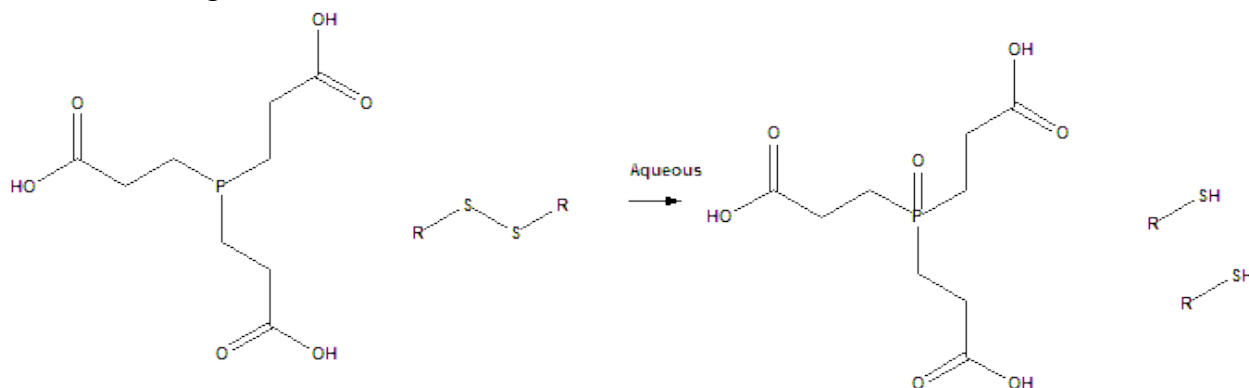
TCEP is a potent versatile odorless thiol-free reducing agent with many applications in protein chemistry and proteomic research centered in the quantitative ease of reducing disulfide bonds. The versatile compound is readily soluble and very stable in aqueous solutions. In fact TCEP is stable in aqueous, acidic and basic solutions. TCEP reduces disulfide bonds as effectively as dithiothreitol (DTT), but unlike dithiothreitol (DTT) and other thiol reducing agents, it does not need to be removed prior to certain sulfhydryl reactive cross linking reactions. These are but a few of the reasons TCEP is a superior reagent than dithiothreitol (DTT) for use in reducing disulfide bonds in protein chemistry and proteomic research.

The ability of trialkylphosphines to reduce disulfide bonds have been known for many years. This class of compounds are stable in aqueous solution, selectively reduce disulfide bonds and are essentially non reactive toward other functional groups commonly found in proteins. The widespread use of trialkylphosphine reducing agents in protein research was hindered due to their poor solubility in water and their disagreeable odor. These obstacles were eliminated with the discovery of TCEP.

TCEP selectively and quantitatively reduces even the most water soluble resistive alkyl disulfides over a wide pH range. Reductions typically require less than 5 minutes and are conducted at room temperature. TCEP is odorless and unlike other reducing agents stable to air oxidation. Compared to dithiothreitol (DTT) TCEP is more stable, more effective and is easily the reagent of choice for most researchers.



Reduction of organic disulfide bonds with TCEP



Product Information

Preparation of Stock Solution

The TCEP hydrochloride solution is prepared by adding 5.733gm (0.02moles). Add 35 ml molecular biology grade water and dissolve the TCEP with shaking. The resulting solution is strongly acidic (pH 2.5). Bring the pH to 6.6-7.0 with 10N ammonium hydroxide. The resulting solution is then diluted to the 40ml mark. The resulting solution is then flushed with argon and stored in a tightly closed container.

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

Stability of Solution

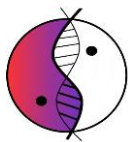
The product as supplied is stable at room temperature for two years. Once the product has been opened any unused solution in the bottle should be flushed with argon and recapped. The shelf life of a opened solution would then be six months. Flushing with argon ensures the remaining product is not oxidized to the phosphine oxide.

Compatibility

TCEP does not contain thiols and does not have to be removed from solutions before performing reactions involving maleimide labeling or other cross linking reagents. TCEP concentrations of <10-20 mM are compatible with most maleimide reaction chemistry.

TCEP References:

1. K. C., Dixon, J.E., *Anal. Biochem*, **161**, 524-528 (1987).
2. Schonberg, A., *Chem Ber.*, 163-164 (1935).
3. Rauhut, M., et. al., *JACS*, **81**, 1103-1107 (1959).
4. Chen, C.S., Fujimoto, Y, Girdoukas, G., Sih, C.J., *JACS*, **109**, 6825-6309 (1987).
5. Kirley, T.L., *Anal. Biochem*, **180**, 231-236 (1989).
6. Andrews, P C., Dixon, J.E., *Anal. Biochem.*, **161**, 524-528 (1987).
7. Y., Girdoukas, G.Sih, C.J., *JACS*, **109**, 6825-6309 (1987).
8. Houk, J., Whitesides, G.M., *JACS*, **109**, 6825-6836 (1987).
9. Grayson, M., Farley, C.E., *Chimie Organique du Phosphore*, Colloques Int'l du Centre



10. Nat'l de la Recherche Scientifique, No. 182 CNRS, Paris, 275-284 (1970).
11. Overman, L.E., O'Conner, E.M., *JACS*, **98**, 771-775 (1977).
12. Rosenfield, R.E., Parthasarthy, R., Dunitis, J.D., *JACS*, **99**, 4860-4862 (1977).
13. Ruegg, U.T. and Rudinger, J., *Methods Enzymology*, **47**, 111-126, (1977).
14. Burns, J.A., et al, *J. Org. Chem*, **56**, 2648-2650, (1991).
15. Mery, J., et al,, *Peptide Protein Research*, **42**, 44-52, (1993).
16. Gray, W. R., *Protein Science*, **2**, 1732-1748, (1993).
17. Fisher, W.H., et al, *Mass Spectrometry*, **7**, 225-228, (1993).
18. Bieri, S, et al, *Biochemistry*, **34**, 13059-13065, (1995).
19. Tam, J., P.,, et al, *Proc. Natl Acad. Sci. USA*, **92**, 12485-12489, (1995).
20. Blauenstein, P., et al, *Eur. J. Nucl. Med.*, **22**, 690-698 (1995).
21. Gorman, J.J., et al, *Rapid Communications Mass Spectrometry*, **10**, 529-536 (1996).
22. Kiirsch, T., et al, *Protein Expression Purification*, **8**, 75-84 (1996).
23. Wu, J. and Watson, J.T., *Protein Science*, **6**, 391-398 (1997).
24. Bernard, C. L., et al, *Exp. Brain Res.*, **113**, 343-352 (1997).
25. Huh, K. and Wenthold, R.J., *Journal Biological Chemistry*, **274**, 151-151 (1999).
26. Oda, Y. et al, *Nature Biotech*, **19**, 379-382 (2001).