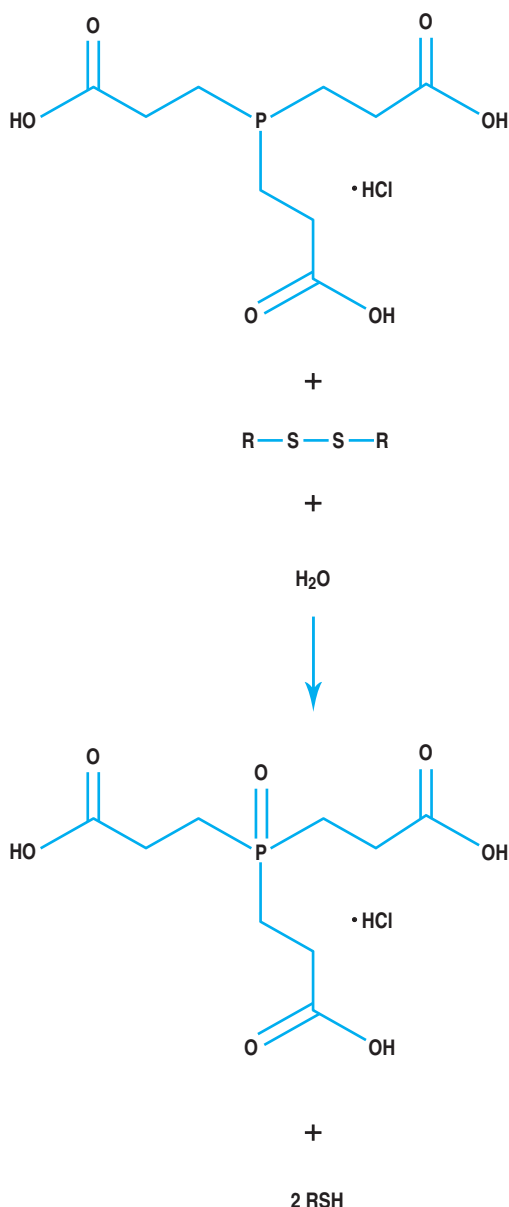


Reduction of organic disulfides bonds using TCEP



power at acid pH (pH 5) and at pH above 7.5. TCEP hydrochloride is unreactive towards other functional groups found in proteins. TCEP hydrochloride concentrations in the reservoir and drop are typically in molar equivalent or molar excess to the sample concentration. If the sample concentration is 1 mM, one might use a final TCEP hydrochloride concentration of 1 to 3 mM in the drop.

TCEP-HCl Properties

TCEP-HCl is soluble in water to 310 gram per liter. TCEP-HCl is an odorless (non-volatile) reducing agent that has been found to be more stable and effective than dithiothreitol (DTT) and able to work well at lower pH levels. TCEP-HCl is stable in aqueous solutions and have been found to be in effect unreactive toward other functional groups in proteins. TCEP-HCl is resistant to air oxidation. TCEP-HCl reduces disulfide bonds as well as free sulfhydryls in proteins and peptides. TCEP-HCl dissolved in water results in a solution pH of approximately 2.5 but the pH of the solution is readily adjusted with buffers in the range of 10 to 100 mM to the desired experimental pH. TCEP-HCl has been shown to be stable, with 80% of its original reducing ability intact after 21 days at pH values between 1.5 – 11.1. At neutral pH values, phosphate buffered saline and other phosphate containing reagents can facilitate the oxidation of TCEP-HCl, 50 to 100% oxidation after 72 hours. TCEP reduction is effective and rapid when a molar excess is used with the sample. If the crystallization sample concentration is 1 mM, one might consider using TCEP hydrochloride concentrations of 2 mM. Molar equivalent concentrations of TCEP hydrochloride and sample may require an hour or more for complete reduction.

TCEP hydrochloride offered by Hampton Research has a purity greater than or equal to 99.0%. As such, the TCEP hydrochloride is a hydrate and has the physical appearance of a moist granular solid. The production of a dry TCEP hydrochloride requires either an acetone wash or desiccation. When TCEP hydrochloride is washed with acetone, the TCEP hydrochloride reduces the acetone, producing a phosphine oxide product. This lowers the purity (to approximately >95%) of the TCEP hydrochloride since the dry material now contains an oxidized form of TCEP hydrochloride. Drying TCEP hydrochloride by desiccation creates a cake like solid which is difficult to process and weigh. Highly purified TCEP hydrochloride is mildly hygroscopic. Store at room temperature in a sealed container to minimize oxidation.

Additional TCEP-HCl properties include:

Property Test

Product Name

Made From

Results

TCEP hydrochloride

Tris(2-carboxyethyl)phosphine hydrochloride

Description

TCEP hydrochloride can be a viable alternative to DTT as a reducing agent in crystallization set ups. TCEP hydrochloride is soluble in water to 310 grams per liter. TCEP hydrochloride is Tris(2-carboxyethyl)phosphine hydrochloride (Mr 286.65). TCEP hydrochloride is an odorless (non-volatile) reducing agent that is more stable and effective than dithiothreitol (DTT) or 2-Mercaptoethanol. Unlike DTT, TCEP hydrochloride retains its reducing

Property Test**Results**

Product Number	HR2-651 & HR2-801
Lot Number	
Formula	$C_9H_{15}O_6P \cdot HCl$
Mr	286.65
CAS Number	[51805-45-9]
Beilstein Registry Number	3724376
Purity by Elemental Analysis	$\geq 99.0\%$
Filter Test (insoluble matter)	Passes Test
Appearance (starting material)	White crystals
Solubility (50 mg/ml)	Complete, Colorless
IR	Passes
NMR	Passes
Melting Point (Starting Material)	178 °C

Technical Support

Inquiries regarding the TCEP hydrochloride, interpretation of screen results, optimization strategies and general inquiries regarding crystallization are welcome. Please e-mail, fax, or telephone your request to Hampton Research. Fax and e-mail Technical Support are available 24 hours a day. Telephone technical support is available 8:00 a.m. to 4:30 p.m. USA Pacific Standard Time

References

Burns, J.A. et al. Selective reduction of disulfides by tris-(2-carboxyethyl)-phosphine. (1991) J. Org. Chem. 56, 2648-2650.

Levison, M.E. et al. Reduction of biological substances by water soluble phosphines: Gamm-globulin. (1969) Experientia 25, 126-127.

Han, J.C. et al. A procedure for quantitative determination of tris(2-carboxyethyl)phosphine, an odorless reducing agent more stable and effective than dithiothreitol. (1994) Anal. Biochem. 220, 5-10.

Han, J.C. et al (1996) Anal. Biochem. 234, 107-109.

Han, J.C. et al (1996) Anal. Biochem. 242, 150-152.

Related Products

HR2-651 TCEP hydrochloride - 1 gram

HR2-801 TCEP hydrochloride - 10 grams

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