

Product Information

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Triosephosphate Isomerase from rabbit muscle

Catalog Number **T6258**

Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS RN 9023-78-3

EC 5.3.1.1

Synonyms: TPI; D-Glyceraldehyde-3-phosphate ketolisomerase

Product Description

Triosephosphate Isomerase (TPI) catalyzes the interconversion of D-glyceraldehyde 3-phosphate (GAP) and dihydroxyacetone phosphate (DHAP). TPI plays a role in the glycolytic pathway and in gluconeogenesis. While the reaction is reversible, the formation of dihydroxyacetone phosphate is favored by a ratio of 20:1 over the reverse reaction.¹

A deficiency in TPI is an autosomal recessive disorder in children under five characterized by cardiomyopathy, congenital hemolytic anemia, and susceptibility to bacterial infection. Most children with this disorder do not survive beyond age five.¹

Molecular mass: 53.2 kDa (calculated)

TPI is a homodimeric protein with two 25 kDa subunits.^{2,3}

Isoelectric Point (pI):⁴ 9.85

pH Optimum:⁵ 6.5

K_M :⁵ 0.42 mM (D-Glyceraldehyde 3-phosphate)
0.75 mM (Glycerone phosphate)

K_i :⁶ 13 mM (arsenate)
4.5 μM (phosphoglycoloamidoxine)

Inhibitors:^{3,5,6}

2,4-dinitrofluorobenzene	phosphate
5,5'-dithiobis(2-nitrobenzoate)	NEM
D- α -glycerophosphate	acetylphosphate
D-erythrose 4-phosphate	p-benzoquinone
iodoacetate	iodoacetamide
methyl methanethiosulfonate	PCMB
o-iodosobenzoate	AsO ₂
phosphoenolpyruvate	phosphoglycolate
S-phenyl-p-toluenethiosulfonate	

This product is purified from rabbit muscle and is supplied as an essentially sulfate-free lyophilized powder.

Protein: ~70% (biuret), balance primarily EDTA and borate buffer salts

Specific Activity: $\geq 3,500$ units/mg protein

Unit Definition: One unit will convert 1.0 μmole of D-glyceraldehyde-3-phosphate to dihydroxyacetone phosphate per minute at pH 7.6 at 25 $^{\circ}\text{C}$.

TPI is assayed spectrophotometrically in a 3.0 ml reaction mixture containing 0.5 mM Tris, pH 7.6, 280 mM triethanolamine, 0.132 mM β -NADH, 4.9 mM DL-glyceraldehyde 3-phosphate, 4 units of α -glycerophosphate dehydrogenase, and 0.02–0.04 unit of triosephosphate isomerase.

This product contains no detectable activity for the following enzymes (detection limit: 0.01% of TPI activity):

phosphoglucose isomerase
 α -glycerophosphate dehydrogenase
3-phosphoglyceric phosphokinase
glyceraldehyde-3-phosphate dehydrogenase
aldolase
L-lactic dehydrogenase
pyruvate kinase

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 (1 unit/ml) in 15 mM Tris buffer, pH 7.6, with 0.02% (w/v) BSA at 25 $^{\circ}\text{C}$. Solutions should be prepared immediately before use.

Storage/Stability

Store product at –20 °C. When stored at –20 °C, the enzyme retains activity for at least two years.

This enzyme may be stable for up to 15 minutes when diluted 10-fold in cold 15 mM Tris, pH 7.2, containing 0.02% BSA and kept on ice.

References

1. Ationu, A., *et al.*, Reversal of metabolic block in glycolysis by enzyme replacement in triosephosphate isomerase-deficient cells. *Blood*, **94**, 3193-98 (1999).
2. Esnouf, M.P., *et al.*, Triosephosphate isomerase from chicken and rabbit muscle. *Methods Enzymol.*, **89**, 579-83 (1982).
3. Hartman, F.C., and Norton, I.L., Triosephosphate isomerase from rabbit muscle. *Methods Enzymol.*, **41**, 447-53 (1975).
4. Gao, X.G., *et al.*, Reactivation of triosephosphate isomerase from three trypanosomatids and human: effect of Suramin. *Biochem. J.*, **332**, 91-96 (1998).
5. Krietsch, W.K.G., Triosephosphate isomerase from rabbit liver. *Methods Enzymol.*, **41**, 438-42 (1975).
6. Garza-Ramos, G., *et al.*, Species-specific inhibition of homologous enzymes by modification of nonconserved amino acids residues. The cysteine residues of triosephosphate isomerase. *Eur. J. Biochem.*, **241**, 114-20 (1996).
7. Straus, D., *et al.*, Active site of triosephosphate isomerase: *in vitro* mutagenesis and characterization of an altered enzyme. *Proc. Natl. Acad. Sci. U.S.A.*, **82**, 2272-76 (1985).
8. Fonvielle, M., *et al.*, New Inhibitors of rabbit muscle triose-phosphate isomerase. *Bioorg. Med. Chem. Lett.*, **15**, 2906-09 (2005).

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