Product Information

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Glycerol 3-phosphate Oxidase
from *Streptococcus thermophilus*

Catalog Number **G4388**
Storage Temperature –20 °C

CAS RN 9046-28-0
EC 1.1.3.21
Synonyms: GPO; α-Glycerophosphate oxidase; sn-glycerol-3-phosphate:oxygen 2-oxidoreductase

Product Description
Many bacteria and yeast can utilize glycerol as a carbon source. After uptake by the cell glycerol is phosphorylated to α-glycerol-3-phosphate, which in turn is oxidized to enter the glycolytic pathway. α-Glycerophosphate oxidase (GPO) catalyzes the oxidation of α-glycerol-3-phosphate to dihydroxyacetone phosphate by the following reaction:

$$\text{Glycerol-3-PO}_4 + O_2 \xrightarrow{\text{GPO}} \text{dihydroxyacetone-PO}_4 + H_2O_2$$

GPO has been used for sensitive metabolite assays of starch and lipid synthesis, pyrophosphate, ATP, ADP, and most glycolytic intermediates in *Arabidopsis* seeds.[1] GPO is part of the dihydroxyacetone phosphate:glycerol-3-phosphate cycle in the bloodstream form of *Trypanosoma brucei*.[2]

Molecular weight:[3] 131 kDa (gel filtration, sucrose density centrifugation) GPO is a dimeric protein with two 72 kDa subunits.[3]

Cofactor:[4] FAD

Optimum pH:[3] 7.5–8.0

Optimum temperature:[2] 37 °C

K_M:[5] 4 mM

Inhibitors:[6]
benzylformic acid
glyoxylic acid
methylglyoxal

This product is purified from *Streptococcus thermophilus*. It is supplied as a lyophilized powder.

Protein: ≥60% (Lowry), balance primarily sucrose

Specific activity: ≥10 units/mg solid

Unit definition: One unit will oxidize 1.0 μmole of L-glycerol-3-phosphate to dihydroxyacetone phosphate with the formation of hydrogen peroxide per minute at pH 7.0 at 37 °C.

GPO is assayed spectrophotometrically in a 1.01 ml reaction mixture containing 99 mM potassium phosphate, 0.03% (w/v) 4-aminoantipyrene, 0.02% (w/v) phenol, 5 units peroxidase, 990 mM DL-α-glycerophosphate, 0.01% bovine serum albumin, and 0.02-0.03 unit GPO, at pH 7.0 at 37 °C.

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
GPO is soluble (0.45 unit/ml) in cold 20 mM Tris HCl, pH 7.5 at 37 °C, containing 0.2% (w/v) bovine serum albumin. Dissolve immediately before use.

Storage/Stability
The product ships on wet ice and storage at –20 °C is recommended. When stored at –20 °C, GPO should retain activity for two years.

References

1. Gibon, Y., *et al.*, Sensitive and high throughput metabolite assays for inorganic pyrophosphate, ADPGlc, nucleotide phosphates, and glycolytic intermediates based on a novel enzymic cycling system. Plant Journal, **30**, 221-35 (2002).
2. Opperdoes, P., *et al*., Localization of glycerol-3-phosphate oxidase in the mitochondrion and particulate NAD^+-linked glycerol-3-phosphate dehydrogenase in the microbodies of the bloodstream form of *Trypanosoma brucei.* Eur. J. Biochem., **76**, 29-39 (1977).
3. Esders, T.W., and Michrina, C.A., Purification and properties of L-alpha-glycerophosphate oxidase from *Streptococcus faecium* ATCC 12755. J. Biol. Chem., **254**, 2710-15 (1979).
4. Finnerty, C.M., *et al.*, Crystallization and preliminary crystallographic analysis of the soluble α-glycerophosphate oxidase from *Streptococcus* sp. Acta Crystallogr. Sect. D, **58**, 165-66 (2002).
5. Jacobs, N.J., and VanDemark, P.J., The purification and properties of the alpha-glycerophosphate oxidizing enzyme of *Streptococcus faecalis* 10C1. Arch. Biochem. Biophys., **88**, 250-55 (1960).
6. Mackova, M., *et al.*, Properties and stability of glycerophosphate oxidase isolated from mutant strain of *Aerococcus viridans*. Lett. Appl. Microbiol., **30,** 188-91 (2000).

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