

# Product Information

sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103 USA

Tel: (800) 521-8956 (314) 771-5765 Fax: (800) 325-5052 (314) 771-5757

email: techservice@sial.com sigma-aldrich.com

## Glycerol 3-phosphate Oxidase from *Streptococcus thermophilus*

Catalog Number **G4388**

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

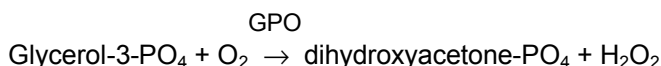
CAS RN 9046-28-0

EC 1.1.3.21

Synonyms: GPO;  $\alpha$ -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  $\alpha$ -glycerol-3-phosphate, which in turn is oxidized to enter the glycolytic pathway.  $\alpha$ -Glycerophosphate oxidase (GPO) catalyzes the oxidation of  $\alpha$ -glycerol-3-phosphate to dihydroxyacetone phosphate by the following reaction:



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

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

Cofactor:<sup>4</sup> FAD

Optimum pH:<sup>3</sup> 7.5–8.0

Optimum temperature:<sup>2</sup> 37  $^{\circ}\text{C}$

$K_M$ :<sup>5</sup> 4 mM

Inhibitors:<sup>6</sup>

benzylformic acid  
glyoxylic acid  
methylglyoxal

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

Protein:  $\geq 60\%$  (Lowry), balance primarily sucrose

Specific activity:  $\geq 10$  units/mg solid

Unit definition: One unit will oxidize 1.0  $\mu\text{mole}$  of L-glycerol-3-phosphate to dihydroxyacetone phosphate with the formation of hydrogen peroxide per minute at pH 7.0 at 37  $^{\circ}\text{C}$ .

GPO is assayed spectrophotometrically in a 1.01 ml reaction mixture containing 99 mM potassium phosphate, 0.03% (w/v) 4-aminoantipyrine, 0.02% (w/v) phenol, 5 units peroxidase, 990 mM DL- $\alpha$ -glycerophosphate, 0.01% bovine serum albumin, and 0.02-0.03 unit GPO, at pH 7.0 at 37  $^{\circ}\text{C}$ .

### 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  $^{\circ}\text{C}$ , containing 0.2% (w/v) bovine serum albumin. Dissolve immediately before use.

### Storage/Stability

The product ships on wet ice and storage at  $-20\text{ }^{\circ}\text{C}$  is recommended. When stored at  $-20\text{ }^{\circ}\text{C}$ , 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<sup>+</sup>-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  $\alpha$ -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).

GRO,JWM,MAM 12/07-1

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.