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Product Information

Glucose Oxidase
from *Aspergillus niger*

Catalog Number **G6125**
Storage Temperature –20 °C

CAS RN 9001-37-0
EC 1.1.3.4
Synonyms: β-D-Glucose:oxygen 1-oxidoreductase, GOx
Molecular mass:[1] ~160 kDa (gel filtration)
pI:[2] 4.2
Extinction coefficient:[3] $E^{1\%}$ = 16.7 (280 nm)

Product Description

Glucose oxidase from *Aspergillus niger* is a dimer consisting of 2 equal subunits with a molecular mass of 80 kDa each. Each subunit contains one flavin adenine dinulceotide moiety and one iron. The enzyme is a glycoprotein containing approximately 16% neutral sugar and 2% amino sugars.[1] The enzyme also contains 3 cysteine residues and 8 potential sites for *N*-linked glycosylation.[4]

Glucose oxidase oxidizes D-aldohexoses, monodeoxy-D-glucoses, and methyl-D-glucoses at varying rates, in the following qualitative, decreasing order:

D-glucose > 2-deoxy-D-glucose > 4-*O*-methyl-D-glucose > 6-deoxy-D-glucose > 4-deoxy-D-glucose > 3-deoxy-D-glucose > 3-*O*-methyl-D-glucose

The pH optimum for glucose oxidase is 5.5, while it has a broad activity range of pH 4-7.[2] Glucose oxidase is specific for β-D-glucose with a K_M of 33–110 mM.[5,6]

Glucose oxidase does not require any activators. Inhibitors of glucose oxidase include Ag^{+}, Hg^{+2}, Cu^{+2}, phenylmercuric acetate, and *p*-chloromercuribenzoate. Nonmetallic SH-alkylating reagents such as *N*-ethylmaleimide, iodoacetate, and iodoacetamide do not inhibit the enzyme.[7]

Glucose oxidase can be utilized in the enzymatic determination of D-glucose in solution. As glucose oxidase oxidizes β-D-glucose to D-gluconolactate and hydrogen peroxide, horseradish peroxidase is often used as the coupling enzyme for glucose determination. Although glucose oxidase is specific for β-D-glucose, solutions of D-glucose can be quantified, as α-D-glucose will mutorotate to β-D-glucose as the β-D-glucose is consumed by the enzymatic reaction.[8]

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

This enzyme is soluble in 50 mM sodium acetate buffer, pH 5.1, (1 mg/mL), yielding a clear solution.

References

1. Tsuge, H. *et al*., *J. Biochem.*, **78(4)**, 835-843 (1975).
2. Pazur, J.H., and Kleppe, K., *Biochemistry*, **3(4)**, 578-583 (1964).
3. Fasman, G.D., in *CRC Handbook of Biochemistry and Molecular Biology*. CRC Press (Boca Raton, FL), p. 244 (1990).
4. Frederick, K.R. *et al*., *J. Biol. Chem.*, **265(7)**, 3793-3802 (1990).
5. Swoboda, B.E.P., and Massey, V., *J. Biol. Chem.*, **240(5)**, 2209-2215 (1965).
6. Gibson, Q.H. *et al*., *J. Biol. Chem.*, **239(11)**, 3927-3934 (1964).
7. Nakamura, S., and Ogura, Y., *J. Biochem.*, **64(4)**, 439-447 (1968).
8. Bergmeyer, H.U., in *Methods of Enzymatic Analysis*, Volume 2 (3rd ed.). Academic Press (Deerfield Beach, FL), pp. 201-202 (1983).

TMG,GCY,AJH,MAM 10/18-1