

Product Information

Glucose Oxidase from *Aspergillus niger*

Product Number **G 6766**
Storage Temperature -0 °C

Product Description

EC Number: 1.1.3.4
CAS Number: 9001-37-0
Molecular Weight: 160 kDa (gel filtration)¹
Isoelectric Point: 4.2²
Extinction coefficient: $E^{1\%} = 16.7$ (280 nm)³

Glucose oxidase from *Aspergillus niger* is a dimer consisting of 2 equal subunits with a molecular weight of 80 kDa each. Each subunit contains one mole of flavin adenine dinucleotide and one mole of 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 is capable of oxidizing D-aldoheptoses, monodeoxy-D-glucoses, and methyl-D-glucoses at varying rates. D-glucose, 2-deoxy-D-glucose, 4-O-methyl-D-glucoses, 6-deoxy-D-glucose, 4-deoxy-D-glucose, 3-deoxy-D-glucose and 3-O-methyl-D-glucose are oxidized at decreasing rates and in the order listed. 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, but it is inhibited by Ag^+ , Hg^{+2} , Cu^{+2} , phenylmercuric acetate and p-chloromercuribenzoate. It is not inhibited by the nonmetallic SH reagents: N-ethylmaleimide, iodoacetate, and iodoacetamide.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 in glucose

determinations. Although glucose oxidase is specific for β -D-glucose, solutions of D-glucose can be quantified as α -D-glucose will mutarotate to β -D-glucose as the β -D-glucose is consumed by the enzymatic reaction.⁸

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This enzyme is soluble at 0.2 mg/ml in 50 mM sodium acetate buffer, pH 5.1, yielding a clear solution.

References

1. Tsuge, H. J., et al, Purification, properties, and molecular features of glucose oxidase from *Aspergillus niger*. *J. Biochem.*, **78**, 835-843 (1975).
2. Pazur, J. H., and Kleppe, K., The Oxidation of Glucose and Related Compounds by Glucose Oxidase from *Aspergillus niger*. *Biochemistry*, **3**, 578-583 (1964).
3. Fasman, G. D., *CRC Handbook of Biochemistry and Molecular Biology*, CRC Press (Boca Raton, FL), p. 244 (1990) (Product Code C 3671)
4. Frederick, K. R., et al., Glucose oxidase from *Aspergillus niger*. Cloning, gene sequence, secretion from *Saccharomyces cerevisiae* and kinetic analysis of a yeast-derived enzyme. *J. Biol. Chem.*, **265**, 3793-3802 (1990).
5. Swoboda, B. E. P., and Massey, V., Purification and properties of glucose oxidase from *Aspergillus niger*. *J. Biol. Chem.*, **240**, 2209-2215 (1965)
6. Gibson, Q. H., et al., Kinetics and Mechanism of Action of Glucose Oxidase. *J. Biol. Chem.*, **239**, 3927-3934 (1964).

7. Nakamura, S., and Ogura, Y., Mode of inhibition of glucose oxidase by metal ions. J. Biochem., **64**, 439-447 (1968).

8. Bergmeyer, H. U., Methods of Enzymatic Analysis, Weinheim (Deerfield Beach, Fla) 3rd ed., **2**, 201-202 (1983).

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