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ProductInformation

Glucose Oxidase Aspergillus niger

Product Number **G 6891**
Storage Temperature 2-8 °C

Product Description
Enzyme Commission (EC) Number: 1.1.3.4
CAS Number: 9001-37-0
Molecular Weight: 160 kDa (gel filtration)[1]
Isoelectric Point: 4.2[2]
Extinction coefficient: $E^{1\%}$ = 16.7 (280 nm)[3]
Synonyms: GOD, Gox, β-D-Glucose: oxygen 1-oxidoreductase

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-aldohexoses, 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 containing α-D-glucose will mutorotate 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.

Storage/Stability
This product is offered as a solution in 100 mM sodium acetate buffer, pH approximately 4, containing 0.002% thimerosal. It is not recommended that dilute solutions be used as stock solutions.

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. CRC Handbook of Biochemistry and Molecular Biology, Fasman, G. D., ed., CRC Press (Boca Raton, FL:1990), pp. 244.
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. Methods of Enzymatic Analysis, 3rd ed., vol. 2, Bergmeyer, H. U., ed., Weinheim (Deerfield Beach, Fl: 1983), pp. 201-202.

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