ALPHA DIAGNOSTIC INTERNATIONAL

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Product Data Sheet

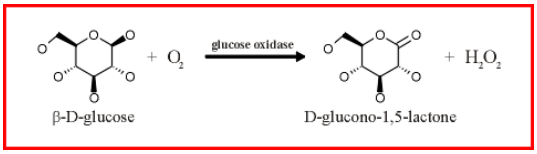
Glucose Oxidase Enzyme (GOx/Glucose oxyhydrase/ beta-D-glucose:oxygen 1-oxidoreductaase)

Cat# GO11-N-250 **Size:** 250 mg **Form:** Powder **Storage**: Desscicated at -20oC

Description

The glucose oxidase enzyme (GOx) (EC 1.1.3.4; CAS #9001-37-0; EINECS #232-601-0) binds to beta-D-glucose (an isomer of the six-carbon sugar glucose) and aids in breaking the sugar down into its metabolites. GOx is a dimeric protein (605-aa; protein accession #P13006; ~160 Kda wutg one tightly bound FAD per monomer, $K=1x10^{-10}$). Gox is glycosylated with a carbohydrate content of 16% (w/w). The carbohydrate moiety is designated as high mannose type with 80% (w/w) of the carbohydrate being mannose. The mannose is N and O glycosidically linked to Asn, Thr and Ser. The protein is readily soluble in 0.1M potassium phosphate pH 7.0 giving a clear, yellow solution. The molar extinction coefficient of a 1% (w/v) solution at 280 nm is 13.8. The enzyme shows a very high degree of specificity for b-D-glucose although 2-deoxy-D-glucose, D-mannose and D-fructose are also oxidised, albeit at a much reduced rate. The native protein is acidic having an isoelectric point (pI) of 4.2.

GOx catalyzes the oxidation of beta-D-glucose into D-glucono-1,5-lactone, which then hydrolyzes to gluconic acid.



In order to work as a catalyst, GOx requires a cofactor, flavin adenine dinucleotide (FAD). FAD is a common component in biological oxidation-reduction (redox reactions). Redox reactions involve a gain or loss of electrons from a molecule. In the GOx-catalyzed redox reaction, FAD works as the initial electron acceptor and is reduced to FADH2. Then FADH2 is oxidized by the final electron acceptor, molecular oxygen (O2), which can do so because it has a higher reduction potential. O2 is then reduced to hydrogen peroxide (H2O2).

The glucose oxidase enzyme is commonly used in biosensors to detect levels of glucose by keeping track of the number of electrons passed through the enzyme by connecting it to an electrode and measuring the resulting charge. When produced commercially for this application, it is often extracted from Aspergillus niger.

Glucose oxidase is widely used for the determination of glucose in body fluids and in removing residual glucose and oxygen from beverages and foodstuffs. Furthermore, Glucose oxidase-producing moulds such as Aspergillus and Penicillum Species are used for the biological production of gluconic acid.

Source: Aspergillus niger

Form and Storage

The product is supplied freeze dried (powder) form. It should be stored in the freezer (–20oC or below in dessicated form). Allow the product to achieve room temp. before opening the vials. Re-dessicate under vaccume over silica gel or a minimum of 4-hrs and store at -20oC or below. If properly stored, these products have a shelf life of at least two years. Solutions are reasonably stable under a variety of conditions

Unit Definition: One unit producing oxidation of 1 umole of glucose per minute at 25oC and pH 7.0. 1 Unit is 0.6 units in the system below, but without oxygenation.0.6 units using 4-AA-phenol coupled with HRP at pH 5.6 and 30°C. 0.63 titrimetric units at pH 5.1 and 35°C

Enzyme Activity: Approx. 300 units per mg protein or ~200 units/mg solid material), average 225-275 (lot specific activity on the vial).

Solubility: Dissolve readily at 5 mg/ml in 0.1M potassium phosphate buffer, pH 7.0. Clear, yellowish solution.

Contaminants:

Alpha-amylase, Saccharase, Maltase, <0.2%
Catalase <10 U/mg
GO/Cat: >25

Inhibitors: Ag+, Hg2+, Cu2+. FAD binding is inhibited by several nucleotides

References

Kriechbaum, M (1989) FEBS Lett. 255, 63-66; Frederick KR (1990) JBC 265, 3793-3802; Aubree-Lecat, A (1989) Anla. Biochem. 178, 427; Berg T (1992) Drug Devt Ind Pharm 18, 1813; Debaetselier A (1991) Biotechnology 9, 559; Swoboda, B (1965) JBC 240, 2209; Williams D (1976) Clin Chem. 22, 372

For in vitro research use only

Related Material available for ADI

HRP, Glucose Oxidase, Alk Phosphatase, Urease, purified bulk package

Anti-HRP, GO, Urease, HRP conjugates; Anti-Mouse, human, rat, and Monkey IgG-HRP and subisotype specific conjugates

Chemiluminescence Substrates and Western blot kits.

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