

EZMeta™ Glucose Oxidase Activity (GOD) Colorimetric Activity Kit

Cat #: D-AKC1310

Size: 96T / 480T

Storage: Stored at -20°C for 12 months, protected from light

Product Information

Detection range: 1-40 µM

Sensitivity: 1 µM

Applicable samples: Serum, Plasma, Animal Tissues, Cells, Bacteria, Biological Fluids such as Urine

Assay Principle

The glucose oxidase (GOD) (EC 1.1.3.4) is a dimeric enzyme that catalyzes oxidation of beta-D-glucose into hydrogen peroxide and D-glucono-1,5-lactone, which is hydrolyzed to gluconic acid. This enzyme is produced by certain species of insects, fungi, and bacteria. Glucose oxidase is widely used for the determination of glucose in body fluids and in removing residual glucose and oxygen from beverages, food and other agricultural products. Furthermore, Glucose oxidase is commonly used in biosensors to detect glucose. EZMeta™ Glucose Oxidase Activity (GOD) Colorimetric Activity Kit provides a simple and easy colorimetric assay for the study of Glucose Oxidase activity in a variety of biological samples such as Serum, Plasma, Animal Tissues, Cells, Bacteria, Biological Fluids such as Urine. The principle is that GOD activity is determined by a coupled enzyme assay, in which GOD oxidizes D-glucose resulting in the production of hydrogen peroxide (H₂O₂) that reacts with chromogen in an acid condition, produce a product that can be measured at OD580 nm. Therefore, the glucose oxidase activity present in the sample is proportional to the signal obtained.

Materials Supplied and Storage Conditions

Kit components	Size		Storage conditions
	96 T	480 T	
Assay Buffer (20×)	10 mL	50 mL	4°C
Glucose (0.2 M)	6 mL	30 mL	-20°C
H ₂ O ₂ Standard (0.88 M)	100 µL	100 µL	-20°C, protect from light
Chromogen	5 mL	25 mL	-20°C, protect from light
Glucose Oxidase (Control)	100 µL	100 µL	-20°C, protect from light

Materials Required but Not Supplied

- Microplate reader or visible spectrophotometer capable of measuring absorbance at 580 nm
- 96-well plate or microglass cuvette, precision pipettes, disposable pipette tips
- Incubator, ice maker, refrigerated centrifuge
- Deionized water
- Dounce homogenizer (for tissue samples)

Reagent Preparation

1×Assay Buffer: Equilibrate to room temperature before use. Make a 1:20 dilution of the concentrated Assay Buffer (20×) with deionized water. 1×Assay Buffer should be used to dilute the H₂O₂ standards and samples prior to assay. 1×Assay Buffer is stored at 4°C for at least two months.

Glucose (0.2 M) : Ready to use as supplied. Equilibrate to room temperature before use. Please aliquot the unused reagents and store at -20°C.

H₂O₂ Standard (0.88 M) : Ready to use as supplied. Equilibrate to room temperature before use, protected from light during the assay. Please aliquot the unused reagents and store at -20°C, protect from light.

Chromogen: Ready to use as supplied. Equilibrate to room temperature before use, protected from light during the assay. Please aliquot the unused reagents and store at -20°C, protect from light.

Glucose Oxidase (Control): The vial contains Glucose Oxidase from aspergillus niger, which is used as a positive control. Take 2 µL Glucose Oxidase and dilute with 998 µL 1×Assay Buffer, protected from light on ice during the assay. Please aliquot the unused reagents and store at -20°C, protect from light.

Standard preparation: Prepare 10 mM of H₂O₂ Standard by diluting 10 µL 0.88 M H₂O₂ Standard into 870 µL 1×Assay Buffer. Prepare 40 µM of H₂O₂ Standard by diluting 4 µL 10 mM H₂O₂ Standard into 996 µL 1×Assay Buffer. Using 40 µM standard, prepare standard curve dilution as described in the table:

Standard	Volume of 40 µM Standard (µL)	1×Assay Buffer (µL)	Final Concentration (µM)
1	200	0	40
2	150	50	30
3	100	100	20
4	50	150	10
5	25	175	5
6	10	190	2
7	5	195	1

Note: Always prepare fresh standards for every use. Diluted standard solution is unstable and must be used within 4 h.

Sample Preparation

1. Animal Tissue samples: Perfuse tissue with cold PBS to remove any red blood cells. Homogenize tissue at 1 mL/0.1 g in cold 1×Assay Buffer. Centrifuge at 12,000 g for 5 min at 4°C. Use supernatant for assay, keep on ice during the assay.

2. Cells and Bacteria: Collect 5×10⁶ cells or bacteria into the centrifuge tube, wash cells or bacteria with cold PBS, discard the supernatant after centrifugation; add 1 mL cold 1×Assay Buffer to ultrasonically disrupt the cells or bacteria in ice bath 5 min (power 20% or 200 W, ultrasonic 3 s, interval 7 s, repeat 30 times). Centrifuge at 12,000 g for 5 min at 4°C. Use supernatant for assay, keep on ice during the assay.

3. Plasma, Serum, Urine (and other biological fluids): Tested directly. However, to find the optimal values and ensure your readings will fall within the standard values, it is recommended that the sample be diluted in 1×Assay Buffer into different concentrations to test.

Note: Fresh samples are recommended. If not assayed immediately, samples can be stored at -80°C for one month. If the protein concentration of the sample is need to determined, it is recommended to use EZMeta™ Glucose Oxidase Activity (GOD) Colorimetric Activity Kit to measure the protein concentration of the sample.

Assay Procedure

1. Preheat the microplate reader or visible spectrophotometer for more than 30 min, and adjust the wavelength to 580 nm, Visible spectrophotometer was returned to zero with deionized water.

2. Add the following reagents to the EP tube:

Reagent	Blank Tube (μL)	Standard Tube (μL)	Test Tube (μL)	Control Tube (μL)
1×Assay Buffer	50	0	0	0
Std	0	50	0	0
Sample	0	0	50	0
Control	0	0	0	50
Glucose (0.2 M)	50	50	50	50

Cover tightly and mix well. Incubate for 20 min at 37°C, add 60 μL of the above mixture into a 96-well plate or microglass cuvette, and quickly add 40 μL Chromogen to each well (a multi-channel pipette is recommended). Tap the plate and mix thoroughly, and incubating at 37°C for 10 min protect from light, measure the absorbance A at 580 nm, recorded as A_{Blank} , A_{Standard} , A_{Test} and A_{Control} respectively. Finally, calculate $\Delta A_{\text{Standard}} = A_{\text{Standard}} - A_{\text{Blank}}$, $\Delta A_{\text{Test}} = A_{\text{Test}} - A_{\text{Blank}}$.

Note: In order to guarantee the accuracy of experimental results, need to do a pre-experiment with 1-2 samples. If ΔA is greater than 0.5, the sample can be appropriately diluted, the calculated result multiplied by the dilution factor.

Data Analysis

1. Drawing of standard curve

With the concentration of the H₂O₂ Standard (μM) as the y-axis and the ΔA_{Standard} as the x-axis, draw the standard curve.

Substitute the ΔA_{Test} into the equation to obtain the y value (1 μM=1 nmol/mL). It's the H₂O₂ content.

2. Calculate the Activity of GOD in sample

(1) Calculated by fresh weight of samples

Unit Definition: 1 nmol H₂O₂ produced per min in 1 g tissue reaction system is defined as a unit of enzyme activity.

$$\text{GOD (U/g)} = y \div W \div T \times n = 0.05 \times y \div W \times n$$

(2) Calculated by bacteria or cell number

Unit Definition: 1 nmol H₂O₂ produced per min in 10⁴ bacteria or cell reaction system is defined as a unit of enzyme activity.

$$\text{GOD (U/10}^4\text{)} = y \div \text{number of bacteria or cells} \div T \times n = y \div 500 \div T \times n = 0.0001 \times y \times n$$

(3) Calculated by volume of liquid sample

Unit Definition: 1 nmol H₂O₂ produced per min in 1 mL Liquid sample reaction system is defined as a unit of enzyme activity.

$$\text{GOD (U/mL)} = y \div V_{\text{Sample}} \div T \times n = y \times n$$

(4) By protein concentration

Unit Definition: 1 nmol H₂O₂ produced per min in 1 mg tissue protein reaction system is defined as a unit of enzyme activity.

$$\text{GOD (U/mg prot)} = y \div \text{Cpr} \div T \times n = 0.05 \times y \div \text{Cpr} \times n$$

Where: W: sample weight, g; T: reaction time, 20 min; n: dilution factor; 500: Total number of bacteria or cells; V_{Sample}: sample volume added, 0.05 mL; Cpr: sample protein concentration, mg/mL.

Typical Data

Typical standard curve

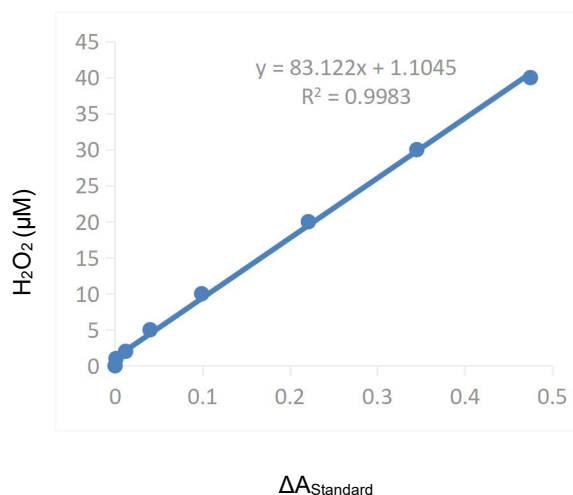


Figure 1. Standard curve of GOD in 96-well plate assay—data provided for demonstration purposes only. A new standard Curve must be generated for each assay.

Disclaimer

The reagent is only used in the field of scientific research, not suitable for clinical diagnosis or other purposes.