

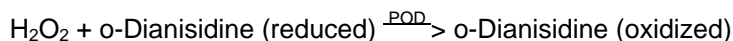
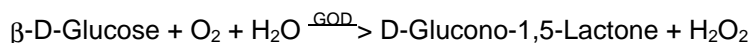


## Product Information

### SIGMA QUALITY CONTROL TEST PROCEDURE

#### Enzymatic Assay of GLUCOSE OXIDASE (EC 1.1.3.4)

##### PRINCIPLE:



Abbreviations used:

GOD = Glucose Oxidase

POD = Peroxidase

**CONDITIONS:** T = 35°C, pH = 5.1, A<sub>500nm</sub>, Light path = 1 cm

**METHOD:** Continuous Spectrophotometric Rate Determination

##### REAGENTS:

- A. 50 mM Sodium Acetate Buffer, pH 5.1 at 35°C  
(Prepare 200 ml in deionized water using Sodium Acetate, Trihydrate, Sigma Prod. No. S-8625. Adjust to pH 5.1 at 35°C with 1 M HCl.)
- B. 0.21 mM o-Dianisidine Solution  
(Dissolve the contents of one 50 mg vial of o-Dianisidine Dihydrochloride, Sigma Stock No. 510-50, in 7.6 ml of deionized water. Dilute 1.0 ml to 100 ml with Reagent A.)
- C. 10% (w/v) β-D(+)-Glucose Substrate Solution  
(Prepare 10 ml in deionized water using β-D(+)-Glucose, Sigma Prod. No. G-5250.)
- D. 0.17 mM o-Dianisidine and 1.72% (w/v) Glucose Solution (Reaction Cocktail)  
(Immediately before use, prepare 29 ml by combining 24.0 ml of Reagent B with 5.0 ml of Reagent C. Equilibrate to 35°C and adjust to pH 5.1 if necessary with 1 M HCl or 1 M NaOH. **PREPARE FRESH.**)

**Enzymatic Assay of GLUCOSE OXIDASE  
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**REAGENTS:** (continued)

- E. Peroxidase Enzyme Solution (POD)  
(Immediately before use, prepare a solution containing 60 Purpurogallin units/ml of Peroxidase, Type II, Sigma Prod. No. P-8250, in cold deionized water.)
  
- F. Glucose Oxidase Enzyme Solution  
(For all Glucose Oxidase product numbers, except for crude products (Sigma Prod. Nos. G-6766 and G-1262) prepare an initial solution of 20 - 40 units/ml in cold Reagent A. Then immediately prior to use, further dilute to 0.4 - 0.8 unit in cold Reagent A. For crude products (Sigma Prod. Nos. G-6766 and G-1262), immediately prior to use prepare a solution of 0.4 - 2 units/ml in cold Reagent A.)<sup>1</sup>

**PROCEDURE:**

Pipette (in milliliters) the following reagents into suitable cuvettes:

	<u>Test</u>	<u>Blank</u>
Reaction Cocktail	2.90	2.90
Reagent E (POD)	0.10	0.10

Mix by inversion and equilibrate to 35°C. Monitor the  $A_{500nm}$  until constant, using a suitably thermostatted spectrophotometer. Then add:

Reagent F (Enzyme Solution)	0.10	-----
Reagent A (Buffer)	-----	0.10

Immediately mix by inversion and record the increase in  $A_{500nm}$  for approximately 5 minutes. Obtain the  $\Delta A_{500nm}/\text{minute}$  using the maximum linear rate for both the Test and Blank.

**CALCULATIONS:**

$$\text{Units/ml enzyme} = \frac{(\Delta A_{500nm}/\text{min Test} - \Delta A_{500nm}/\text{min Blank})(3.1)(df)}{(7.5)(0.1)}$$

3.1 = Volume (in milliliters) of assay

df = Dilution factor

7.5 = Millimolar extinction coefficient of oxidized o-Dianisidine at 500 nm

0.1 = Volume (in milliliters) of enzyme used

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**CALCULATIONS:** (continued)

$$\text{Units/mg solid} = \frac{\text{units/ml enzyme}}{\text{mg solid/ml enzyme}}$$

$$\text{Units/mg protein} = \frac{\text{units/ml enzyme}}{\text{mg protein/ml enzyme}}$$

**UNIT DEFINITION:**

One unit will oxidize 1.0  $\mu$ mole of  $\beta$ -D-glucose to D-gluconolactone and  $\text{H}_2\text{O}_2$  per minute at pH 5.1 at 35°C (equivalent to an  $\text{O}_2$  uptake of 22.4  $\mu$ l per minute). If the reaction mix is saturated with oxygen, the activity may increase by up to 100%.

**FINAL ASSAY CONCENTRATION:**

In a 3.10 ml reaction mix, the final concentrations are 48 mM sodium acetate, 0.16 mM o-dianisidine, 1.61% (w/v) glucose, and 6 units peroxidase (concentration will vary as to which glucose oxidase is used.)

**REFERENCE:**

Bergmeyer, H.U., Gawehn, K. and Grassl, M. (1974) in *Methods of Enzymatic Analysis* (Bergmeyer, H.U. ed) Volume I, Second Edition, 457-458, Academic Press Inc., New York, NY

**NOTES:**

1. a. Initial Enzyme Solutions: Prepare enzyme solutions in cold Reagent A in the concentrations indicated for the product numbers listed:  
Crude - Sigma Prod. Nos. G-1262 and G-6766, 0.2 mg solid/ml (no further dilutions are required)  
Type II - Sigma Prod. Nos. G-6125 and G-6641,  
1.0 mg solid/ml Solution - Sigma Prod. Nos. G-6891 and G-9010, 0.1 ml solution and 5.00 ml Reagent A  
Type VII - Sigma Prod. Nos. G-2133 and G-7016 0.2 mg solid/ml  
Type X - Sigma Prod. No. G-7141, 0.2 mg solid/ml

**Enzymatic Assay of GLUCOSE OXIDASE  
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**NOTES:** (continued)

1. Continued
  - b. Final Dilutions: Immediately prior to use dilute the initial enzyme solutions to the following concentrations:  
Type II - 0.1 ml of 1.0 mg solid/ml and 5.00 ml of Reagent A  
Solutions - 0.1 ml of initial dilution and 3.00 ml of Reagent A  
Type VII - 0.1 ml of 0.2 mg solid/ml and 5.00 ml of Reagent A  
Type X - 0.1 ml of 0.2 mg solid/ml and 5.00 ml of Reagent A
2. Peroxidase Unit Definition: One POD unit will form 1.0 mg purpurogallin from pyrogallol in 20 seconds at pH 6.0 at 20°C.
3. This assay is based on the cited reference.
4. Where Sigma Product or Stock numbers are specified, equivalent reagents may be substituted.

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