



Granule Bound Starch Synthase Activity Colorimetric Microplate Assay Kit User Manual

Catalog # CAK1130

(Version 1.5C)

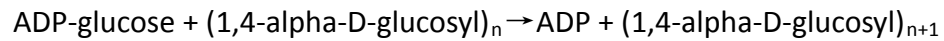
Detection and Quantification of Granule Bound Starch
Synthase Activity in Tissue extracts, Cell lysate, Cell culture media and
Other biological fluids Samples.

For research use only. Not for diagnostic or therapeutic procedures.

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I. INTRODUCTION

In enzymology, a starch synthase (EC 2.4.1.21) is an enzyme that catalyzes the chemical reaction.



Thus, the two substrates of this enzyme are ADP-glucose and a chain of D-glucose residues joined by 1,4- α -glycosidic bonds, whereas its two products are ADP and an elongated chain of glucose residues. Plants use these enzymes in the biosynthesis of starch.

Granule Bound Starch Synthase Activity Colorimetric Microplate Assay Kit provides a sensitive and convenient method for Granule Bound Starch Synthase activity determination. The enzyme catalysed reaction product NADPH can be measured at a colorimetric readout at 450 nm.

II. KIT COMPONENTS

Component	Volume	Storage
96-Well Microplate	1 plate	
Assay Buffer	30 ml x 7	4 °C
Diluent	30 ml x 1	4 °C
Enzyme A	Powder x 1	-20 °C
Enzyme B	Powder x 1	-20 °C
Coenzyme	Powder x 1	-20 °C
Substrate	Powder x 1	-20 °C
Dye Reagent A	Powder x 1	4 °C
Dye Reagent B	1 ml x 1	4 °C
Standard	Powder x 1	-20 °C
Technical Manual	1 Manual	

III. MATERIALS REQUIRED BUT NOT PROVIDED

1. Microplate reader to read absorbance at 450 nm
2. Distilled water
3. Pipettor, multi-channel pipettor
4. Pipette tips
5. Mortar
6. Centrifuge
7. Timer
8. Ice

IV. REAGENT PREPARATION

Standard: Briefly centrifuge prior to opening. Dissolve in 1 ml distilled water to generate 2 mmol/L of standard stock solution, store at 4 °C for 1 day or -20°C for 3 days after reconstitution. Then dilute to 400 µmol/L standard top solution by adding 0.2 ml stock solution into 0.8 ml distilled water. Perform 2-fold serial dilutions of the top standard solution using distilled water to make the standard curve. The concentration of standard curve could be 400/200/100/50/25/12.5/6.25 µmol/L.

Enzyme A: Add 5 ml Diluent to dissolve before use. Prepare for immediate use or store at 4 °C for 24-48 hours or -80°C for 1 month after reconstitution.

Enzyme B: Briefly centrifuge prior to opening. Add 1 ml Diluent to dissolve before use. Prepare for immediate use or store at 4 °C for 24-48 hours or -80°C for 1 month after reconstitution.

Coenzyme: Add 4.5 ml Diluent to dissolve before use. Keep in dark and store at 4 °C for 4-5 days or -20°C for 1 month after reconstitution.

Substrate: Add 10 ml Diluent to dissolve before use. Store at 4 °C for 4-5 days or -20°C for 1 month after reconstitution.

Dye Reagent A: Briefly centrifuge prior to opening. Add 4 ml distilled water to dissolve before use, mix, store at 4°C for 1 month after reconstitution.

Note: Divide into small aliquots to avoid repeated freeze-thaw cycles.

V. SAMPLE PREPARATION

1. For tissue samples

Weigh out 0.1 g tissue, homogenize with 1 ml Assay Buffer on ice, centrifuged at 10000g 4°C for 10 minutes, discard the supernatant, then add 1 ml Assay Buffer into the precipitate, mix and keep it on ice for detection.

VI. ASSAY PROCEDURE

Add following reagents into the centrifuge tube:

Reagent	Sample	Control	Standard	Blank
Sample	50 μ l	--	--	--
Distilled water	--	50 μ l	--	--
Substrate	100 μ l	100 μ l	--	--
Mix, incubate at 30°C for 30 minutes, put it into boiling water for 2 minutes. Then keep it on ice for cold.				
Enzyme A	50 μ l	50 μ l	--	--
Mix, incubate at 30°C for 30 minutes, put it into boiling water for 2 minutes. Then keep it on ice for cold. Centrifuged at 10000g 4°C for 10 minutes, add the supernatant into the microplate.				
Supernatant	100 μ l	100 μ l	--	--
Standard	--	--	100 μ l	--
Distilled water	--	--	50 μ l	150 μ l
Coenzyme	40 μ l	40 μ l	--	--
Enzyme B	10 μ l	10 μ l	--	--
Dye Reagent A	40 μ l	40 μ l	40 μ l	40 μ l
Dye Reagent B	10 μ l	10 μ l	10 μ l	10 μ l
Mix and incubate at room temperature for 2 minutes, record absorbance measured at 450 nm.				

Note:

*Reagents must be added sequentially and should not be premixed prior to addition.

**For unknown samples, we recommend doing a pilot experiment & testing several doses to ensure the readings are within the standard curve range. If the enzyme activity is lower, please add more samples into the reaction system; or increase the reaction time; if the enzyme activity is higher, please dilute the sample, or decrease the reaction time.

******For colored samples, we recommend setting a parallel sample background control well with same volume of sample only. Other reagents were replaced by distilled water to the same total volume. Subtract the OD value of the sample background control from the OD value of the sample to correct for interference from the sample's own color.

VII. CALCULATION

Unit Definition: One Unit of Granule Bound Starch Synthase activity is defined as the enzyme produces 1 μmol NADPH per minute.

1. According to the slope of the standard curve

$$\text{Activity} = \frac{(\text{OD}_{\text{Sample}} - \text{OD}_{\text{Control}}) - \text{Intercept}}{\text{Slope} \times T} \times \frac{V_{\text{Standard}}}{V_{\text{Sample}}} \times n (\text{U/mL})$$

2. According to one point of the standard OD value and concentration

2.1 According to the protein concentration of sample

$$\text{Activity} = \frac{(C_{\text{Standard}} \times V_{\text{Standard}}) \times (\text{OD}_{\text{Sample}} - \text{OD}_{\text{Control}})}{(\text{OD}_{\text{Standard}} - \text{OD}_{\text{Blank}}) \times V_{\text{Sample}} \times C_{\text{Protein}} \times T} (\text{U/mg})$$

2.2 According to the quantity of cells or bacteria

$$\text{Activity} = \frac{(C_{\text{Standard}} \times V_{\text{Standard}}) \times (\text{OD}_{\text{Sample}} - \text{OD}_{\text{Control}})}{(\text{OD}_{\text{Standard}} - \text{OD}_{\text{Blank}}) \times N \times (V_{\text{Sample}} / V_{\text{Assay}}) \times T} (\text{U}/10^4)$$

2.3 According to the weight of sample

$$\text{Activity} = \frac{(C_{\text{Standard}} \times V_{\text{Standard}}) \times (\text{OD}_{\text{Sample}} - \text{OD}_{\text{Control}})}{(\text{OD}_{\text{Standard}} - \text{OD}_{\text{Blank}}) \times W \times (V_{\text{Sample}} / V_{\text{Assay}}) \times T} (\text{U/g})$$

2.4 According to the protein concentration of sample

$$\text{Activity} = \frac{(C_{\text{Standard}} \times V_{\text{Standard}}) \times (\text{OD}_{\text{Sample}} - \text{OD}_{\text{Control}})}{(\text{OD}_{\text{Standard}} - \text{OD}_{\text{Blank}}) \times V_{\text{Sample}} \times T} (\text{U/mL})$$

Slope: the absorbance slope of standard curve

n: the dilution factor

C_{Protein} : the protein concentration of sample, mg/mL

W: the weight of total sample, g

N: the quantity of total cell or bacteria sample, 10^4

C_{Standard} : the concentration of standard, $\mu\text{mol/mL}$

V_{Standard} : the volume of standard in assay procedure, mL

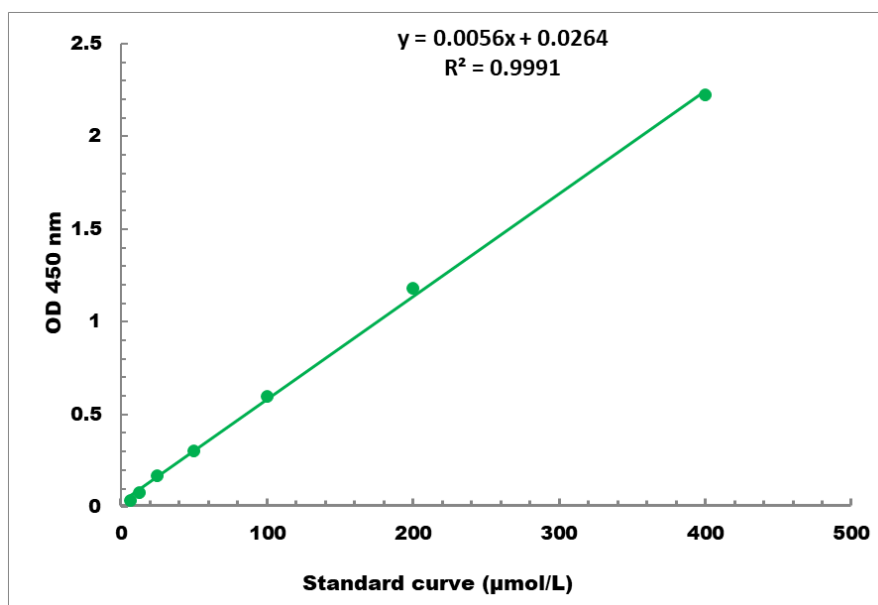
V_{Sample} : the volume of sample in assay procedure, mL

V_{Assay} : the volume of Assay Buffer in sample preparation, mL

T: the reaction time, minute

VIII. TYPICAL DATA

The standard curve is for demonstration only. A standard curve must be run with each assay.



Detection Range: 4μmol/L - 400 μmol/L