Beta-Glucosidase

Microplate Assay Kit

Cat #: orb390803 (manual)

Detection and Quantification of Beta-Glucosidase (β-GC) 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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INTRODUCTION

β-Glucosidase is a glucosidase enzyme which acts upon β1->4 bonds linking two glucose or glucose-substituted molecules. β-Glucosidases are required by organisms (some fungi, bacteria, termites) for consumption of cellulose. Lysozyme is also a β-glucosidase and is present in tears to prevent bacterial infection of the eye. In humans, lower activity of a β-glucosidase isoform (lysosomal gluco-cerebrosidase) has been related to Gaucher's disease and Parkinson's disease.

The assay is initiated with the enzymatic hydrolysis of the glucoside by β-Glucosidase. The enzyme catalysated reaction products p-nitrophenol, can be measured at a colorimetric readout at 405 nm.

KIT COMPONENTS

Component	Volume	Storage
96-Well Microplate	1 plate	
Assay Buffer	30 ml x 4	4 °C
Reaction Buffer	5 ml x 1	4 °C
Substrate	Powder x 1	-20 °C
Dye Reagent	15 ml x 1	4 °C
Standard (1 mmol/L)	1 ml x 1	4 °C
Positive Control	Powder x 1	-20 °C
Plate Adhesive Strips	3 Strips	
Technical Manual	1 Manual	

Note:

Substrate: Add 2 ml Reaction Buffer to dissolve before use.

Positive Control: add 1 ml distilled water to dissolve before use, then add 0.25 ml into 0.75 ml distilled water, mix.

MATERIALS REQUIRED BUT NOT PROVIDED

1. Microplate reader to read absorbance at 405 nm
2. Distilled water
3. Pipettor, multi-channel pipettor
4. Pipette tips
5. Mortar
6. Centrifuge
7. Timer
8. Ice

SAMPLE PREPARATION

1. For cell and bacteria samples

Collect cell or bacteria into centrifuge tube, discard the supernatant after centrifugation, add 1 ml Assay buffer for 5×10^6 cell or bacteria, sonicate (with power 20%, sonicate 3s, interval 10s, repeat 30 times) ; centrifuged at 10, 000g 4 °C for 20 minutes, take the supernatant into a new centrifuge tube and keep it on ice for detection.

2. For tissue samples

Weigh out 0.1 g tissue, homogenize with 1 ml Assay buffer on ice, centrifuged at 10, 000g 4 °C for 20 minutes, take the supernatant into a new centrifuge tube and keep it on ice for detection.

ASSAY PROCEDURE

Add following reagents into the microplate:

Reagent	Sample	Control	Standard	Blank	Positive Control
Sample	10 µl	--	--	--	--
Distilled water	--	10 µl	--	--	--
Positive Control	--	--	--	--	10 µl
Substrate	20 µl	20 µl	--	--	20 µl
Reaction Buffer	20 µl	20 µl	--	--	20 µl
Mix, put it in the oven, 37 °C for 30 minutes.					
Standard	--	--	50 µl	--	--
Dye Reagent	150 µl	150 µl	150 µl	200 µl	150 µl
Mix, record absorbance measured at 405 nm.					

Note:

1) Perform 2-fold serial dilutions of the top standards to make the standard curve.

2) 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 sample into the reaction system; or increase the reaction time; if the enzyme activity is higher, please dilute the sample, or decrease the reaction time.

CALCULATION

Unit Definition: One unit of β-Glucosidase activity is defined as the enzyme generates 1 μmol of p-nitrophenol per hour.

1. According to the protein concentration of sample

$$\beta\text{-GC (U/mg)} = (C_{Standard} \times V_{Standard}) \times (OD_{Sample} - OD_{Control}) / (OD_{Standard} - OD_{Blank}) / (C_{Protein} \times V_{Sample}) / T$$
$$= 10 \times (OD_{Sample} - OD_{Control}) / (OD_{Standard} - OD_{Blank}) / C_{Protein}$$

2. According to the weight of sample

$$\beta\text{-GC (U/g)} = (C_{Standard} \times V_{Standard}) \times (OD_{Sample} - OD_{Control}) / (OD_{Standard} - OD_{Blank}) / (V_{Sample} \times W / V_{Assay}) / T$$
$$= 10 \times (OD_{Sample} - OD_{Control}) / (OD_{Standard} - OD_{Blank}) / W$$

$$\beta\text{-GC (U/10}^4\text{)} = (C_{Standard} \times V_{Standard}) \times (OD_{Sample} - OD_{Control}) / (OD_{Standard} - OD_{Blank}) / (V_{Sample} \times N / V_{Assay}) / T$$
$$= 10 \times (OD_{Sample} - OD_{Control}) / (OD_{Standard} - OD_{Blank}) / N$$

$C_{Protein}$: the protein concentration, mg/ml;

$C_{Standard}$: the concentration of Standard, 1 mmol/L = 1 μmol/ml;

W: the weight of sample, g;

N: the quantity of cell or bacteria, N × 10^4;

$V_{Standard}$: the volume of standard, 0.05 ml;

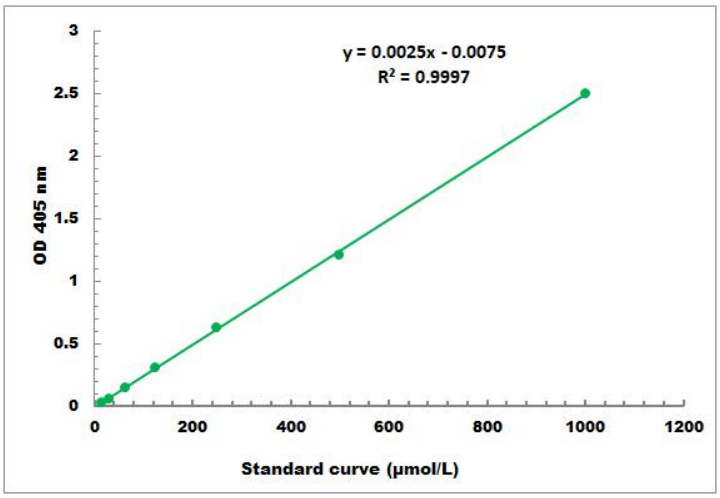
V_{Sample}: the volume of sample, 0.01 ml;

V_{Assay}: the volume of Assay buffer, 1 ml;

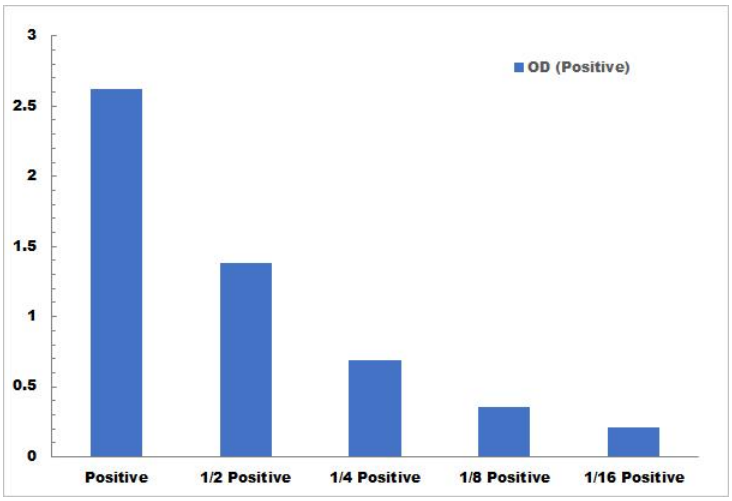
T: the reaction time, 0.5 hour.

TYPICAL DATA

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



Detection Range: 10 µmol/L - 1000 µmol/L



Positive Control reaction in 96-well plate assay with decreasing the concentration

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