

## Soil $\beta$ -glucosidase (S- $\beta$ -GC) Activity Assay Kit

**Note:** Take two or three different samples for prediction before test.

**Operation Equipment:** Spectrophotometer/ Microplate reader

**Catalog Number:** AK0585

**Size:**100T/48S

### Components:

**Reagent I:** Methylbenzene, liquid 5 mL $\times$ 1. Storage at 4°C . Required but not provided.

**Reagent II :** Powder $\times$ 1. Storage at -20°C . Add 13 mL of distilled water to per bottle before use, and dissolve it fully. The left reagent store at 20°C .

**Reagent III:** Liquid 30 mL $\times$ 1. Storage at 4°C .

**Reagent IV :** Liquid 20 mL $\times$ 1. Storage at 4°C .

**Standard:** Liquid  $\times$  1, 5 mmol/L p-nitrophenol solution. Take 100  $\mu$ L of standard solution and add it to 400  $\mu$ L of Reagent III to get 1 mmol/L standard solution. Dilute the solution for 10 times to 100  $\mu$ mol/L.

### Product Description

Soil  $\beta$ -glucosidase (S- $\beta$ -GC) can catalyze the hydrolysis of glycoside bonds between aryl or hydroxyl groups and glycosylated atomic groups to generate glucose. It is an important component of cellulose decomposition enzyme system and has important physiological functions in the carbohydrate metabolism of soil microorganisms.

S- $\beta$ -GC can catalyze the p-nitrophenyl- $\beta$ -D-glucopyranoside to p-nitrophenol. The product is slightly yellow and has characteristic of absorption at 400 nm.

### Reagents and Equipment Required but Not Provided.

Table centrifuge, water-bath, transferpettor, spectrophotometer/microplate reader, 30 mesh sieve (or smaller), micro cuvette/96 well flat-bottom plate, methylbenzene (express delivery is not allowed), ice and distilled water.

### Preparation

#### I. Sample processing:

Air dry the fresh soil sample naturally or in an oven at 37°C, and sieve it through 30~50 meshes.

#### II. Determination procedure:

1. Preheat the spectrophotometer for more than 30 minutes, adjust the wavelength to 400 nm, set zero with distilled water.

2. **Preparation of standard samples:** Dilute it to 50, 25, 12.5, 6.25  $\mu$ mol/L with the distilled water. Detect the standard solutions of 100, 50, 25, 12.5 and 6.25  $\mu$ mol/L.

3. Add reagents with the following list:

Reagent	Test Tube (T)	Contrast Tube (C)	Standard Tube (S)	Blank Tube (B)
Air-dried soil sample (g)	0.02	0.02	-	-
Reagent I (μL)	10	10	-	-
The soil samples are all wetted by oscillating mixing and store at room temperature for 15 minutes.				
Reagent II (μL)	130	-	-	-
Reagent III (μL)	160	160	-	-
Mix thoroughly and incubate the reaction for 1 hour at 37°C water bath, then take the reaction solution in a boiling water bath for 5 minutes immediately (tightly closed to prevent moisture loss), flowing water to cool.				
Reagent II (μL)	-	130	-	-
Mix thoroughly, centrifuge at 10000 ×g for 10 minutes at room temperature and take the supernatant.				
Supernatant (μL)	70	70	-	-
Standard (μL)	-	-	70	-
Distilled water (μL)	-	-	-	70
Reagent IV (μL)	130	130	130	130

Mix thoroughly and stand at room temperature for 2 min. Detect the absorbance of each tube at 400 nm and noted as  $A_T$ ,  $A_C$ ,  $A_S$  and  $A_B$ . Calculate  $\Delta A = A_T - A_C$ . Each test tube should be provide with one contrast tube.

### Calculation

Standard curve established: according to the concentration of the standard tube (y) and absorbance  $\Delta A = A_S - A_B$  (x), establish standard curve. According to standard curve, take the  $\Delta A$  (x) to the equation to acquire the sample concentration (μmol/L).

Unit definition: One unit of enzyme activity is defined as the amount of enzyme catalyzes the production of 1 μmol of p-nitrophenol in the reaction system per day every gram soil sample.

$$S\text{-}\beta\text{-GC (U/g soil sample)} = y \times V_{ra} \div W \div T = 0.36 \times y$$

T: Reaction time, 1 hour = 1/24 day;

$V_{ra}$ : Total volume of the reaction system,  $3 \times 10^{-4}$  L;

W: Sample weight, 0.02 g.

### References:

[1] Dick W A, Thavamani B, Conley S, et al. Prediction of  $\beta$ -glucosidase and  $\beta$ -glucosaminidase activities, soil organic C, and amino sugar N in reflectance spectroscopy[J]. Soil Biology & Biochemistry, 2013, 56(9): 9e104.

[2] Sestelo A B F, Poza M, Villa T G.  $\beta$ -Glucosidase activity in a *Lactobacillus plantarum* wine strain[J]. World Journal of Microbiology and Biotechnology, 2004, 20(6): 633.

**Related Products:**

AK0566/AK0565 Soil Alkaline Phosphatase(S-AKP/ALP) Activity Assay Kit

AK0594/AK0593 Soil Polyphenoloxidase Activity Assay Kit

AK0116/AK0115 Soil Neutral Invertase(S-NI) Activity Assay Kit

AK0118/AK0117 Soil  $\beta$  - 1,4-Glucanase Activity Assay Kit

AK0122/AK0121 Soil  $\beta$  -Xylosidase(S-  $\beta$  -XYS) Activity Assay Kit