

Trehalase(THL) Activity Assay Kit

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

Operation Equipment: Spectrophotometer

Cat No: NA0691

Size:50T/24S

Components:

Extract solution: Liquid 50 mL×1. Storage at 4°C.

Reagent I: Liquid 30 mL×1. Storage at 4°C.

Reagent II: Powder×1. Storage at 4°C. Dissolve with 2.5 mL of Reagent I before use. Prepare when the solution will be used.

Reagent III: Liquid 30 mL×1. Storage at 4°C.

Reagent IV: Liquid 30 mL×1. Storage at room temperature.

Standard: Powder×1. Storage at 4°C. Contain 10 mg of anhydrous glucose (dry weight loss < 0.2%). Dissolve the standard with 1 mL of distilled water to generate a 10 mg/mL glucose solution standard, store at 4 °C and use within one week. Or it can be dissolved in saturated benzoic acid solution for a longer time. Standard solution: Dilute the 10 mg/mL glucose solution standard to 1, 0.8, 0.6, 0.4, 0.2 mg/mL with distilled water.

Product Description:

Trehalase(THL, EC 3.2.1.28) is an enzyme found broadly in animals, plants, microorganisms and cultured cells. The main function of THL is to break down trehalose to produce glucose and directly use it for the energy supply of organism.

THL converts soluble trehalose to reducing sugar. 3,5-Dinitrosalicylic acid is reduced to brown-red amino compound by co-heating with reducing sugar. The brown-red amino compound has a maximum absorption peak at 540 nm and the absorbance ratio is in direct proportion to the contents of reducing sugar. In this kit, the THL activity is quantified by measuring the color development at 540 nm.

Reagents and Equipments Required but Not Provided:

Spectrophotometer, water bath, desk centrifuge, adjustable transferpeltor, 1 mL glass cuvette, mortar/homogenizer, ice and distilled water.

Procedure:

1. Bacteria or cells

Collecting bacteria or cells into the centrifuge tube, after centrifugation discard supernatant. Suggest add 1 mL of Extract solution to 5 million of bacteria or cells. Use ultrasonication to splitting bacteria and cells (placed on ice, ultrasonic power 20%, working time 3s, interval 10s, repeat for 30 times). Centrifuge at 8000×g for 10 minutes at 4°C to remove insoluble materials and take the supernatant on ice before testing.

2. Tissue

Add 1 mL of Extract solution to 0.1 g of tissue, and fully homogenized on ice bath. Centrifuge at 8000×g for 10 minutes at 4°C to remove insoluble materials, and take the supernatant on ice before testing.

3. Serum (plasma)

Add 0.9 mL of Extract solution to 0.1 mL of liquid sample, and fully homogenized on ice bath. Centrifuge at 8000 g for 10 minutes at 4°C to remove insoluble materials, and take the supernatant on ice before testing

II. Detection

1) Preheat spectrophotometer for 30 minutes, adjust the wavelength to 540 nm, set zero with distilled water.

2) Add the following reagents in 1.5 mL EP tubes:

Reagent	Contrast tube (C)	Test tube (T)	Standard tube (S)	Blank tube (B)
Sample (μL)	180	180	-	-
Standard solution (μL)	-	-	180	-
Distilled water (μL)	-	-	-	180
Reagent I (μL)	300	220	300	300
Reagent II (μL)	-	80	-	-
Mix thoroughly and incubate accurately at 37°C(mammal) or 25°C(other species) water bath for 10minutes.				
Reagent III (μL)	400	400	400	400
Reagent IV (μL)	400	400	400	400
Mix thoroughly and place the tubes in a boiling water (100°C) bath for 5 minutes (cover tightly to prevent moisture loss) and rapid cooling by ice bath. Detect the absorbance at 540 nm, record as A _C , A _T , A _S and A _B respectively. $\Delta A_T = (A_T - A_C)$, $\Delta A_S = (A_S - A_B)$. Standard curve: The concentration of standard solution as y-axis, ΔA_S as x-axis, obtain the equation $y = kx + b$. Take ΔA_T to the equation to acquire y (mg/mL) value.				

III. Calculation:

1) Tissue protein concentration

Unit definition: One unit of enzyme activity is defined as the amount of enzymes catalyzes the generation of 1 μg of glucose in the reaction system per minute every mg protein.

$$\text{THL Activity (U/mg prot)} = 1000 \times y \div T \div C_{pr} = 100 \times y \div C_{pr}$$

2) Tissue weight

Unit definition: One unit of enzyme activity is defined as the amount of enzymes catalyzes the generation of 1 μg of glucose in the reaction system per minute every g tissue.

$$\text{THL Activity (U/g weight)} = 1000 \times y \div T \div (W \div V_e) = 100 \times y \div W$$

3) Bacteria or cultured cells

Unit definition: One unit of enzyme activity is defined as the amount of enzymes catalyzes the generation of 1 μg of glucose in the reaction system per minute every 10⁴ bacteria or cultured cells.

$$\text{THL Activity (U/10}^4 \text{ cell)} = 1000 \times y \div T \div (500 \div V_e) = 0.2 \times y$$

4) Serum (plasma)

Unit definition: One unit of enzyme activity is defined as the amount of enzymes catalyzes the generation of 1 µg of glucose in the reaction system per minute every mL serum(plasma).

$$\text{THL Activity(U/mL)}=1000\times y\div T\div(Vs\div Ve)=1000\times y$$

1000: 1 mg/mL=1000 µg/mL

T: Reaction time (min), 10 minutes;

Ve: Extract solution volume, 1 mL;

Vs: Sample volume (mL), 0.1 mL;

Cpr: Supernatant sample protein concentration (mg/mL);

W: Sample weight, g;

500: 5 million cells or bacteria;

Recent Product Citations:

[1] Yan P, Wen C, Zhang S, et al. A toxicological, metabonomic and transcriptional analysis to investigate the property of mulberry 1-deoxynojirimycin against the growth of *Samia cynthia ricini*[J]. *Pesticide biochemistry and physiology*, 2018, 152: 45-54.

[2] Jing Li, Yabing Duan, Chuanhong Bian, et al. Effects of validamycin in controlling *Fusarium head blight* caused by *Fusarium graminearum*: Inhibition of DON biosynthesis and induction of host resistance. *Pesticide Biochemistry and Physiology*. January 2019;153:152-160.(IF2.87)

[3] Goddijn O J M, Verwoerd T C, Voogd E, et al. Inhibition of trehalase activity enhances trehalose accumulation in transgenic plants[J]. *Plant physiology*, 1997, 113(1): 181-190.

[4] Küenzi M T, Fiechter A. Changes in carbohydrate composition and trehalase-activity during the budding cycle of *Saccharomyces cerevisiae*[J]. *Archiv für Mikrobiologie*, 1969, 64(4): 396-407.

References:

[1] Goddijn O J M, Verwoerd T C, Voogd E, et al. Inhibition of trehalase activity enhances trehalose accumulation in transgenic plants[J]. *Plant physiology*, 1997, 113(1): 181-190.

[2] Küenzi M T, Fiechter A. Changes in carbohydrate composition and trehalase-activity during the budding cycle of *Saccharomyces cerevisiae*[J]. *Archiv für Mikrobiologie*, 1969, 64(4): 396-407.

Related Products:

NA0840/NA0598 Glucogen Content Assay Kit

NA0688/NA0447 Cellulase(CL) Activity Assay Kit

NA0841/NA0599 Trehalose Content Assay Kit

NA0693/NA0452 Blood Glucose Content Assay Kit

NA0689/NA0448 Sorbitol Dehydrogenase(SDH) Activity Assay Kit