Tyrosine Ammonia Lyase(TAL) Activity Assay Kit

Product Code: 112880

Tyrosine Ammonia Lyase (TAL) Activity Assay Kit - Spectrophotometric Method

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Package size: 50T

1. Product Introduction

Tyrosine ammonia lyase (TAL) is widely found in plants and microorganisms and is a key enzyme in the phenylalanine metabolic pathway.

TAL can bypass cinnamic acid-4-hydroxylase (C4H) and directly convert tyrosine into p-coumaric acid, which can then be converted into resveratrol, naringenin, and other phenylpropanoid natural products with antioxidant and anti-aging effects.

TAL decomposes tyrosine to produce p-coumaric acid, causing the absorbance of the reaction solution at 333 nm to increase over time. The rate of absorbance change is used to calculate TAL activity.

2. Package Contents

Catalog No.	Item	Quantity
112880.1	Reagent I	1 bottle
112880.2	Reagent II	2 bottles
112880.3	Reagent III	1 bottle
112880.4	Extraction Solution	1 bottle
112880.m	Manual	1 copy

3. Quality Standards and Safety Instructions

Raw Material and Packaging Name	Quality Standard	Main Toxicity
Reagent I	—	—
Reagent II	—	—
Reagent III	—	—
Extraction Solution	—	—

4. Transportation and Storage

Transportation: Ship with ice packs.

Storage: Store at 2-8°C, protected from light. Shelf life: 180 days.

5. Instructions for Use

5.1 Crude Enzyme Extract Preparation

5.1.1 Bacterial, Cell, or Tissue Samples

Bacteria or cultured cells: Collect the bacteria or cells into a centrifuge tube, centrifuge, and discard the supernatant.

Use a bacteria or cell count (10^4) to extraction solution volume (mL) ratio of 500-1000:1. It is recommended to add 1 mL extraction

solution to 500 × 10^4bacteria or cells.

Ultrasonically disrupt the bacteria or cells in an ice bath at 20% power or 200 W, with 3 s sonication and 10 s intervals, repeated 30 times.

Centrifuge at 8000g and 4°C for 10 min. Collect the supernatant and keep it on ice for testing.

Tissue: Use a tissue mass (g) to extraction solution volume (mL) ratio of 1:5-10. It is recommended to weigh about 0.1 g tissue and add 1 mL extraction solution. Homogenize in an ice bath.

Centrifuge at 8000g and 4°C for 10 min. Collect the supernatant and keep it on ice for testing.

5.1.2 Liquid Samples

Liquid samples such as serum (plasma) and fruit juice can be tested directly.

5.2 Assay Procedure

1. Preheat the spectrophotometer for at least 30 min, set the wavelength to 333 nm, and zero with distilled water.
2. Prepare Reagent II before use by adding 15 mL of Reagent I and dissolving completely. Incubate in a water bath for at least 10 min at 37°C for mammals or 25°C for other species. Unused prepared reagent may be stored at 4°C for one week; prepare fresh when possible and use immediately.
3. Add the following reagents to EP tubes in sequence:

Component	Assay Tube	Control Tube
Sample supernatant (μL)	100	100
Reagent I (μL)	—	900
Reagent II (μL)	900	—

Mix thoroughly and incubate at 40°C for 60 min.

Component	Assay Tube	Control Tube
Reagent III (μL)	50	50

Mix well and centrifuge at 10000g and 4°C for 5 min. Transfer 0.8-1.0 mL of supernatant to a 1 mL quartz cuvette. Measure absorbance at 333 nm and record $A_{assay}$and $A_{control}$.

$\Delta A = A_{assay} - A_{control}$

6. TAL Activity Calculation

6.1 Serum (Plasma) or Juice

Unit definition: One unit of TAL activity is defined as the amount of enzyme that causes the absorbance at 333 nm to change by 0.01 per minute in each mL of reaction system per mL of serum (plasma) or juice.

$TAL\ (U/mL) = \Delta A \times V_{total\ reaction} \div (V_{sample} \div V_{total\ sample}) \div 0.01 \div T = 17.5 \times \Delta A$

6.2 Tissue, Bacteria, or Cells

6.2.1 Calculated by Sample Protein Concentration

Unit definition: One unit of TAL activity is defined as the amount of enzyme that causes the absorbance at 333 nm to change by 0.01 per minute in each mL of reaction system per mg of tissue protein.

TAL (U/mg prot) = $\Delta A \times V_{total\ reaction} \div (V_{sample} \times Cpr) \div 0.01 \div T = 17.5 \times \Delta A \div Cpr$

This method requires determination of the sample protein concentration.

6.2.2 Calculated by Sample Fresh Weight

Unit definition: One unit of TAL activity is defined as the amount of enzyme that causes the absorbance at 333 nm to change by 0.01 per minute in each mL of reaction system per g of tissue.

TAL (U/g fresh weight) = $\Delta A \times V_{total\ reaction} \div (W \times V_{sample} \div V_{total\ sample}) \div 0.01 \div T = 17.5 \times \Delta A \div W$

6.2.3 Calculated by Bacterial or Cell Density

Unit definition: One unit of TAL activity is defined as the amount of enzyme that causes the absorbance at 333 nm to change by 0.01 per minute in each mL of reaction system per 10^4bacteria or cells.

TAL (U/10^4cells) = $\Delta A \times V_{total\ reaction} \div (500 \times V_{sample} \div V_{total\ sample}) \div 0.01 \div T = 0.035 \times \Delta A$

6.3 Parameter Definitions

- $V_{total\ reaction}$: total reaction volume, 1.05 mL
- V_{sample}: sample volume added, 0.1 mL
- $V_{total\ sample}$: volume of extraction solution added, 1 mL
- T: reaction time, 60 min
- Cpr: sample protein concentration, mg/mL
- W: sample mass, g
- 500: total number of cells or bacteria, 500×10^4

7. Notes

> Before formal testing, select 2-3 samples with large expected differences for a preliminary test.
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> Required instruments and supplies: UV spectrophotometer, benchtop centrifuge, adjustable pipettes, 1 mL quartz cuvette, mortar, ice, and distilled water.