

# **$\alpha$ -L-Arabinofuranosidase ( $\alpha$ -L-Af) Activity Assay Kit**

**Operation Equipment:** Spectrophotometer

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

**Catalog Number:** NA0247

**Size:** 50T/24S

## **Components:**

Extract solution: 80mL $\times$ 1. Storage at 4°C.

Reagent I: Powder $\times$ 2. Storage at 4°C. Add 2.667 mL of distilled water to fully dissolve when the solution will be used. It is recommended to store the reagent at - 20°C for one week after subpackage to avoid repeated freezing and thawing.

Reagent II: 70 mL $\times$ 1. Storage at 4°C.

Standard solution: 1mL $\times$ 1, 5  $\mu$ mol/mL p-nitrophenol solution.

## **Product Description**

$\alpha$ -L-Arabinofuranosidase ( $\alpha$ -L-Af) belongs to the family of glycosyl hydrolases, which can be hydrolyzed from the non-reducing ends of polymers containing arabinose residues such as arabinoxylan, arabinan and arabinose galactosan etc. to form an L-arabinose molecule. This enzyme plays an important role in the degradation of hemicellulose, the ripening and softening of fruits.

$\alpha$ -L-Af decomposes p-nitrophenyl- $\alpha$ -L-arabinofuranoside to produce p-nitrophenol, p-nitrophenol has a maximum absorption peak at 400 nm, which can be calculated by measuring the change in absorbance at 400 nm.

## **Reagents and Equipment Required but Not Provided**

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

## **Procedure**

### **1. Sample Extraction:**

(1) Tissue sample:

According to the mass of the tissue (g): the volume of the extract solution (mL) is 1: 5-10. Suggested 0.1g of tissue with 1mL of extract solution. Fully grind on ice, centrifuge at 15000g and 4°C for 10min. Supernatant is placed on ice for test. (For stems, leaves, buds and other tissues of green plants, it is recommended to dilute the supernatant with the extraction solution 5 times before testing; for tissues such as pulp, the supernatant can be directly tested or diluted after a corresponding multiple according to the predicted result)

(2) Bacteria or cells:

According to the number of cells ( $10^4$ ): the volume of the extract solution (mL) is 500-1000: 1. Suggest

5 million with 1mL of extract Solution. Use ultrasonication to split bacteria or cells (power 300W, work time 3s, interval 7s, total time 3 min). centrifugated at 15000g and 4°C for 10min. Supernatant is placed on ice for test.

(3) Liquid: direct measurement.

## 2. Determination steps and sample adding table:

- Preheat spectrophotometer more than 30 min, adjust wavelength to 400 nm and set zero with distilled water.
- Dilute the 5  $\mu\text{mol/mL}$  p-nitrophenol standard solution into 250, 125, 62.5, 31.25, 15.625, 7.8125 nmol/mL standard solutions with the extraction solution for later use.
- Operate according to the following table:

Reagent Name	Control tube (C)	Test tube (T)	Standard tube (S)	Blank tube (B)
Reagent I ( $\mu\text{L}$ )	-	200	-	-
Distilled water	200	-	200	500
sample (g)	300	300	-	-
Standard solution ( $\mu\text{L}$ )	-	-	300	-
Reacting for 30min at 37°C in a water bath.			-	-
Reagent II ( $\mu\text{L}$ )	1000	1000	1000	1000

Mix well and determined by 1 mL glass cuvette, record the absorption value  $a$  of each tube at 400 nm, calculate  $\Delta A = A_T - A_C$ ,  $\Delta A_S = A_S - A_B$

### Calculation of $\alpha$ -L-Af activity:

1. Drawing of standard curve:

Taking the concentration of each standard solution as the x-axis and its corresponding  $\Delta A_S$  as the y-axis, draw a standard curve to obtain a standard equation  $y=kx+b$ , bring  $\Delta A_S$  into the equation to get x (nmol/mL)

2. Calculation of  $\alpha$ -L-Af activity:

1) Tissue protein concentration

Unit definition: One unit of enzyme activity is defined as the amount of enzyme that catalyzes the production of 1  $\mu\text{mol}$  of p-nitrophenol every mg of protein in the reaction system per hour.

$$\alpha\text{-L-Af Activity (U/mg prot)} = \frac{x \times V_E}{(C_{pr} \times V_E) \div T} = 2x \div C_{pr}$$

2) Tissue weight

Unit definition: One unit of enzyme activity is defined as the amount of enzyme that catalyzes the production of 1  $\mu\text{mol}$  of p-nitrophenol every gram of tissue in the reaction system per hour.

$$\alpha\text{-L-Af Activity (U/g weight)} = \frac{x \times V_E}{W \div T} = 2x \div W$$

3) Bacteria or cultured cells

Unit definition: One unit of enzyme activity is defined as the amount of enzyme that catalyzes the production of 1  $\mu\text{mol}$  of p-nitrophenol every  $10^4$  cells or bacteria in the reaction system per hour at.

$$\alpha\text{-L-Af Activity (U/104 cell)} = \frac{x \times V_E}{\text{cell amount} \div T} = 2x \div \text{cell amount};$$

4) Liquid

Unit definition: One unit of enzyme activity is defined as the amount of enzyme that catalyzes the production of 1  $\mu\text{mol}$  of p-nitrophenol every milliliter of liquid sample in the reaction system per hour.

$$\alpha\text{-L-Af Activity (U/mL)} = x \times V_S \div V_S \div T = 2x$$

$V_S$ : Sample volume, 0.3 mL

$V_e$ : Extract solution volume, 1 mL;

$C_{pr}$ : Supernatant sample protein concentration (mg/mL);

$T$ : Reaction time (min), 30 min;

$W$ : Sample weight, g;

Cell amount:  $10^4$  cells as a unit.

### Note

1. If the absorbance value is greater than 1, it is recommended to dilute the supernatant with extract solution.
2. Before the formal determination, 2-3 samples with large expected difference should be selected for prediction. If the concentration is too high, it is recommended to dilute the sample with the extract solution for an appropriate multiple before determination, and multiply the dilution multiple in the calculation formula; if the concentration is too low, it is recommended to increase the tissue mass during sample extraction.
3. After adding Reagent II, it is recommended to read the OD value within 5 minutes.

### Experimental example:

1. Take 0.1g banana for sample treatment, take the supernatant to dilute 2 times, operate according to the determination steps, use 96 well plate to measure and calculate  $\Delta A = A_T - A_C = 0.234 - 0.105 = 0.129$ , bring in the standard curve  $y = 0.0037x + 0.0029$ , calculate  $x = 34.08$ , calculate the enzyme activity according to the sample mass

$$\alpha\text{-L-AF activity (U/g mass)} = 2x \div W = 2 \times 34.08 \div 0.1 = 681.6 \text{ U/g mass.}$$

### Related products:

NA0284/NA0283 Hemicellulose Content Assay Kit

NA0685/NA0444  $\alpha$ -galactosidase ( $\alpha$ -GAL) Activity Assay Kit

NA0684/NA0443  $\beta$ -galactosidase ( $\beta$ -GAL) Activity Assay Kit

NA0687/NA0446  $\alpha$ -glucosidase ( $\alpha$ -GC) Activity Assay Kit

NA0686/NA0445  $\beta$ -glucosidase ( $\beta$ -GC) Activity Assay Kit