

NADH Oxidase(NOX) Activity Assay Kit

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

Operation Equipment: Spectrophotometer

Catalog Number: BC0630

Size: 50T/24S

Product Composition: Before use, please carefully check whether the volume of the reagent is consistent with the volume in the bottle. If you have any questions, please contact Solarbio staff in time.

Reagent Name	Size	Preservation Condition
Reagent I	Liquid 25 mL×1	2-8°C
Reagent II	Liquid 5 mL×1	2-8°C
Reagent III	Liquid 0.5 mL×1	-20°C
Reagent IV	Liquid 70 mL×1	2-8°C
Reagent V	Liquid 10 mL×1	2-8°C
Reagent VI	Powder×2	-20°C

Solution Preparation:

Reagent VI: Add 9 mL distilled water before use, and dissolve it fully before use. The reagent that can not be used up is stored at -20°C.

Product Description:

NADH oxidase (NOX) (EC 1.6.99.3) exists widely in animals, plants, microorganisms and cultured cells, which can direct the oxidation of NADH to NAD under oxygen. This enzyme is not only involved in the regeneration of NAD, but also closely related to immune response.

NOX can oxidize NADH to NAD, oxidation of NADH is coupled to the reduction phase of 2,6-dichlorophenol indigo (DCPIP) and the blue DCPIP is restored to colorless DCPIP. The NOX activity can be quantified by measuring the decrease in the color development at 600 nm.

Reagents and Equipment Required but Not Provided:

Visible spectrophotometer, desk centrifuge, mortar/homogenizer/cel ultrasonic crusher, 1 mL micro glass cuvette, water bath, adjustable pipette, ice, distilled water.

Operation procedure:

I. Sample preparation: (The sample size to be tested can be adjusted appropriately, and the specific proportion can be referred to the literature.)

Isolation of cytoplasmic and mitochondrial proteins from tissues, bacteria or cells:

- 1) Collecting 0.1 g of tissue or 5 million cells, add 1 mL of Reagent I solution and 10 μ L Reagent III, grinding on ice with mortar/homogenizer.
- 2) Centrifuge at 600 \times g for 5 minutes at 4°C. Take the supernatant to other tube and centrifuge at 11000 g for 10 minutes at 4°C.
- 3) Take the supernatant to other tube. It's a cytoplasmic extract. The supernatant can be used to detect NOX activity.
- 4) The precipitate is mitochondria. Add 200 μ L of Reagent II and 2 μ L of Reagent III to the

sediment and used to detect the enzyme activity of NOX. It is also used for protein concentration determination.

II. Determination procedure:

- 1) Preheat spectrophotometer for 30 minutes, adjust the wavelength to 600 nm, set zero with distilled water.
- 2) Preheat reagent IV at 37°C water bath.
- 3) Add the following reagents in 1 mL glass cuvette:

Reagent (μL)	Test tube (T)	Control tube (C)
Reagent IV	700	700
Reagent V	100	100
Sample	40	40
Distilled water	-	160
Reagent VI	160	-

Operate the above reagents in the 1 mL glass cuvette in sequence. Mix thoroughly and timing after add Reagent VI, detect the absorbance at 600 nm at the time of 20 seconds record as A_{T1} or A_{C1} . Then place dishes with the reaction solution in a 37°C water bath for 1 minutes. Take it out and wipe it clean, immediately measure the absorbance of final reaction at the time of 80s which record as A_{T2} or A_{C2} , $\Delta A_T = A_{T1} - A_{T2}$, $\Delta A_C = A_{C1} - A_{C2}$. $\Delta A = \Delta A_T - \Delta A_C$.

III. Calculation:

Tissue protein concentration:

Unit definition: One unit of enzyme activity is defined as the amount of enzyme catalyzes the absorbance at 600 nm changed 0.01 in the reaction system per minute every milligram of protein.

$$\text{NOX Activity (U/mg prot)} = \Delta A \div 0.01 \times V_{rv} \div C_{pr} \times V_s \div T = 2500 \times \Delta A \div C_{pr}$$

V_{rv} : Total reaction volume, 1 mL;

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

V_s : Sample volume (mL), 0.04 mL;

T : Reaction time (min), 1 minute.

Note:

1. Sample preparation processes should be operated at 0°C-4°C to prevent denaturation and deactivation of enzyme.
2. Keep 37°C of the react solution in cuvette, add 37°C water to a beaker, put this beaker in 37°C water bath and put the cuvette in this beaker.
3. It is better for two people to do this experiment at the same time, one for colorimetric and the other for timing to ensure the accuracy of the experimental results.
4. During the tests, keep Reagent VI on ice to avoid denaturation and deactivation.
5. It is recommended to use the sample protein concentration to calculate the enzyme activity. If the fresh weight of the sample is used for calculation, the enzyme activity of the cytoplasmic extract should be measured. The sum of supernatant and precipitation enzyme activity is the total enzyme

activity.

6. Attachment: calculation formula of fresh weight of samples

Tissue weight:

Unit definition: One unit of enzyme activity is defined as the amount of enzyme catalyzes the absorbance at 600 nm changed 0.01 in the reaction system per minute every gram of tissue.

$$\text{NOX Activity supernatant (U/g weight)} = \Delta A1 \div 0.01 \times V_{rv} \div (W \div V_e \times V_s) \div T = 2525 \times \Delta A1 \div W$$

$$\text{NOX Activity sediment (U/g weight)} = \Delta A2 \div 0.01 \times V_{rv} \div (W \div V_{ST} \times V_s) \div T = 505 \times \Delta A2 \div W$$

$$\text{NOX Activity (U/g weight)} = \text{NOX supernatant} + \text{NOX sediment} = 2525 \times \Delta A1 \div W + 505 \times \Delta A2 \div W$$

$\Delta A1$: Supernatant absorbance;

$\Delta A2$: Sediment absorbance;

V_{rv} : Total reaction volume, 1 mL;

V_e : Extract solution volume, 1.01 mL;

V_s : Sample volume (mL), 0.04 mL;

T : Reaction time (min), 1 minute;

W : Sample weight, g;

V_{ST} : Sediment heavy suspension volume, 0.202 mL.

Experimental example:

1. 0.1g of lung sample is taken for sample processing. According to the determination steps, the results showed that $\Delta A1 = \Delta A_T - \Delta A_C = (0.841 - 0.094) - (0.956 - 0.849) = 0.64$, $\Delta A2 = \Delta A_T - \Delta A_C = (0.945 - 0.471) - (1.009 - 0.982) = 0.447$

$$\text{NOX supernatant (U/g mass)} = 2525 \times \Delta A1 \div W = 2525 \times 0.64 \div 0.1 = 16160$$

$$\text{NOX precipitation (U/g mass)} = 505 \times \Delta A2 \div W = 505 \times 0.447 \div 0.1 = 2257.35$$

$$\text{NOX (U / g mass)} = \text{NOX supernatant} + \text{NOX precipitation} = 2525 \times \Delta A1 \div W + 505 \times \Delta A2 \div W = 2525 \times 0.64 \div 0.1 + 505 \times 0.447 \div 0.1 = 16160 + 2257.35 = 18417.35 \text{ U/g mass.}$$

2. Take 0.1g of leaf sample for sample treatment, and operate according to the determination steps.

The results show that $\Delta A1 = \Delta A_T - \Delta A_C = (0.875 - 0.812) - (0.903 - 0.888) = 0.048$, $\Delta A2 = \Delta A_T - \Delta A_C = (0.919 - 0.868) - (0.91 - 0.879) = 0.02$

$$\text{NOX supernatant (U/g mass)} = 2525 \times \Delta A1 \div W = 2525 \times 0.048 \div 0.1 = 1212$$

$$\text{NOX precipitation (U / g mass)} = 505 \times \Delta A2 \div W = 505 \times 0.02 \div 0.1 = 101$$

$$\text{NOX (U / g mass)} = \text{NOX supernatant} + \text{NOX precipitation} = 2525 \times \Delta A1 \div W + 505 \times \Delta A2 \div W = 2525 \times 0.048 \div 0.1 + 505 \times 0.02 \div 0.1 = 1313 \text{ U/g mass.}$$

Recent Product Citations:

[1] Dou S, Liu S, Xu X, et al. Octanal inhibits spore germination of *Penicillium digitatum* involving membrane peroxidation[J]. *Protoplasma*, 2017, 254(4): 1539-1545.

[2] Liu P, Zhang H M, Hu K, et al. Sensory plasticity of carotid body is correlated with oxidative stress in paraventricular nucleus during chronic intermittent hypoxia[J]. *Journal of cellular physiology*, 2019, 234(8): 13534-13543.

- [3] Yongtao Du, Mengjie Zhao, Changtao Wang, et al. Identification and characterization of GmMYB118 responses to drought and salt stress. BMC Plant Biology. December 2018;(IF3.67)
- [4] Youqiang Xu, Chunyan Xu, Xiuting Li, et al. A combinational optimization method for efficient synthesis of tetramethylpyrazine by the recombinant Escherichia coli. Biochemical Engineering Journal. January 2018;(IF3.371)
- [5] Weida Li, Kai Wang, Nanfang Jiang, et al. Antioxidant and antihyperlipidemic activities of purified polysaccharides from Ulva pertusa. Journal of Applied Phycology. April 2018;(IF4.784)

References:

[1] Kawai S, Mori S, Mukai T, et al. Cytosolic NADP phosphatases I and II from Arthrobacter sp. strain KM: implication in regulation of NAD⁺/NADP⁺ balance[J]. Journal of Basic Microbiology: An International Journal on Biochemistry, Physiology, Genetics, Morphology, and Ecology of Microorganisms, 2004, 44(3): 185-196.

Related Products:

- BC0310/BC0315 Coenzyme I NAD(H) Content Assay Kit
- BC1030/BC1035 NAD Kinase(NADK) Activity Assay Kit
- BC1040/BC1045 NAD-Malate Dehydrogenase(NAD-MDH) Activity Assay Kit