Acetyl Coenzyme A (Acetyl-CoA) Colorimetric Assay Kit

Cat #: orb1173195 (manual)

Product name: Acetyl Coenzyme A (Acetyl-CoA) Colorimetric Assay Kit

Catalog number: orb1173195

Detection Range: 1.5-3,200 nmol/mL

Applicable samples: Animal and Plant Tissues, Cells

Storage: Stored at -20℃ for 6 months, protected from light

Assay Principle

Acetyl Coenzyme A (Acetyl-CoA) is widely presented in animals, plants, microorganisms and cultured cells. It is an important intermediate metabolite produced during the metabolism of biometrics. It is a pivotal substance in the metabolism of energy substances in the body. The three major nutrients-glucose, lipid, protein which could be via acetyl coenzyme A to form a common metabolic pathway - tricarboxylic acid circulation and phosphorylation. Through this path, Acetyl-CoA thoroughly could be oxidize carbon dioxide and water, and release energy for ATP synthesis. Furtherly, Acetyl-CoA a is a precursor material for the synthesis of fatty acid, ketone body, and Cholesterol and its derivatives. Micro Acetyl Coenzyme A (Acetyl-CoA) Assay Kit provides a simple, sensitive, rapid colorimetric Acetyl-CoA detection method. Suitable for various types of samples, especially animals or plant tissues or cells. The detection principle is that malate dehydrogenase can catalyze malate acid and NAD to produce oxaloacetic acid and NADH. Citrate synthase can catalyze Acetyl-CoA and oxaloacetic acid to produce citric acid and CoA. Based on the coupling reaction of malate dehydrogenase and citrate synthase, Acetyl-CoA content is proportional to the generating rate of NADH. NADH has a special absorption peak at 340 nm, and the calculation of the absorbance value of 340 nm can be obtained the content of Acetyl-CoA.

Materials Supplied and Storage Conditions

Kit components	Size		Storage conditions
	48 T	96 T	
Extraction Buffer	50 mL	100 mL	4℃
Reagent I	1	1	-20℃, protected from light
Reagent II	5 µL	10 µL	4℃, protected from light
Reagent III	1	1	-20℃, protected from light
Reagent IV	15 mL	30 mL	4℃
Standard (NADH)	1	1	-20℃, protected from light

Biorbyt Ltd
7 Signet Court, Swann Road, Cambridge, CB5 8LA. United Kingdom
Email: info@biorbyt.com | Phone: +44 (0)1223 859-353 | Fax: +44 (0)1223 280-240

Biorbyt LLC
68 TW Alexander Drive, Durham, NC 27709. United States
Email: info@biorbyt.com | Phone: +1 (415) 906-5211 | Fax: +1 (415) 651-8558

Materials Required but Not Supplied

- Microplate reader or ultraviolet spectrophotometer capable of measuring absorbance at 340 nm
- Ice maker, refrigerated centrifuge
- Water bath
- 96-well UV plate or micro quartz cuvette
- Precision pipettes, disposable pipette tips
- Deionized water
- Homogenizer (for tissue samples)

Reagent Preparation

Extraction Buffer: Ready to use as supplied. Equilibrate to room temperature before use. Store at 4℃.

Working Reagent I: Prepare before use, add 125 µL or 250 µL Reagent IV while using 48 T kit or 96 T kit respectively, mix well. Store and aliquot the surplus Reagent at -20℃, protected from light.

Working Reagent II: Prepare before use, add 125 µL or 250 µL Reagent IV while using 48 T kit or 96 T kit respectively, mix well. Store and aliquot the surplus Reagent at 4℃, protected from light.

Working Reagent III: Prepare before use, add 11.3 mL or 22.5 mL Reagent IV while using 48 T kit or 96 T kit respectively, mix well, Store and aliquot the surplus Reagent at -20℃, protected from light.

Working Solution: Prepare before use, according to the sample numbers, calculate the volume of Working Solution (samples number×0.23 mL). Mix Working Reagent I, Working Reagent II and Working Reagent III according to 1:1:90 ratio. Or directly add

Reagent I and Reagent II to Reagent III and mix well (48 samples or 96 samples can be measured).

Standard (NADH): Prepare before use, add 0.5 mL or 1 mL deionized water while using 48 T kit or 96 T kit respectively, mix well,

get 8,000 nmol/mL Standard. Store and aliquot the surplus Reagent at -20℃, protected from light.

Standard curve setting: Dilute 8,000 nmol/mL Standard with deionized water to 3,200, 1,600, 800, 400, 200, 100, 50,0 nmol/mL standard solution as shown in the table below.

Num.	Standard Volume	Deionized Water (µL)	Concentration (nmol/mL)
Std.1	100 µL 8,000 nmol/mL	150	3,200
Std.2	100 µL of Std.1 (3,200 nmol/mL)	100	1,600
Std.3	100 µL of Std.2 (1,600 nmol/mL)	100	800
Std.4	100 µL of Std.3 (800 nmol/mL)	100	400
Std.5	100 µL of Std.4 (400 nmol/mL)	100	200
Std.6	100 µL of Std.5 (200 nmol/mL)	100	100
Std.7	100 µL of Std.6 (100 nmol/mL)	100	50
Std.8	0	200	0

Note: Std.8 is Blank Well.

Sample Preparation

Note: Fresh samples are recommended, If not assayed immediately, samples can be stored at -80℃ for one month.

1. Cells: Collect 5×10^6 cells pellet, and add 1mL Extraction Buffer, Ultrasonic broken cells (power 20%, ultrasonic 3 s, interval 10 s, repeat 30 times), then centrifuge with 13,000 g for 10 min at 4°C, collect the supernatant, stand by on ice, waiting for test.
2. Tissues: Weigh 0.1 g tissue and mix with 1 mL Extraction Buffer. Homogenize on ice. Then centrifuge the homogenate with 13,000 g for 10 min at 4°C. Stand by on ice, waiting for test.

Assay Procedure

1. Preheat the microplate reader or ultraviolet spectrophotometer for more than 30 min, and adjust the wavelength to 340 nm. Ultraviolet spectrophotometer was returned to zero with deionized water.
2. Incubate Working Solution for 10 min at 37°C (mammal) or 25°C (other species).
3. Operating table: in the 96-well UV plate or micro quartz cuvette, follow the table below to set the test

Reagent	Test Well（μL）	Standard Well（μL）
Sample	25	0
Different Concentration Std.	0	25
Working Solution	230	230

4. Mix well, immediately read 340 nm absorbance value of the test well at 20 s and 1 min and 20 s, recorded as A1, A2, respectively. Then calculate the test well ΔATest =A2-A1. Read 340 nm absorbance value of the standard well at 1 min and 20 s, recorded as AStandard, then calculate the standard well, ΔAStandard=AStandard-ABlank.

Note: To guarantee the accuracy of experimental results, need to do a pre-experiment with 2-3 samples. Please reduce the sample quantity appropriately if the OD values is higher than 1.5, or reduce the volume of Extraction Buffer if the OD values is too low.

Data Analysis

Note: We provide you with calculation formulae, including the derivation process and final formula. The two are exactly equal. It is suggested that the concise calculation formula in bold is final formula.

Take the $\Delta A_{Standard}$ as the x axis and the standard concentration as the y axis, make the standard curve, get the equation, finally, get the y value by calculate the ΔA_{Test} in the equation.

1. Calculated by protein concentration:

   Acetyl-CoA (nmol/mg prot)=$(y\times V_{Sample})\div(V_{Sample}\times Cpr)$**=y÷Cpr**
2. Calculated by fresh weight of samples:

   Acetyl-CoA (nmol/g fresh weight)=$(y\times V_{Sample})\div(W\times V_{Sample}\div V_{Extraction})$**=y÷W**
3. Calculated by cell density:

   Acetyl-CoA ($U/10^4$ cells) =$(y\times V_{Sample})\div(500\times V_{Sample}\div V_{Extraction})$**=y÷500**

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Where: V_{Sample}: sample volume added, 0.025 mL; Cpr: sample protein concentration, mg/mL; W: sample weight, g; $V_{Extraction}$: sample extract volume, 1 mL; 500: total number of cells, 5×10^6.

Typical Data

Typical standard curve:

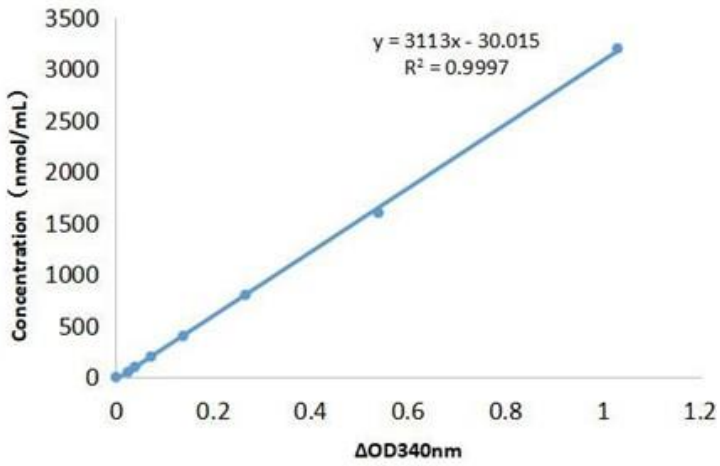

Figure 1. Standard curve for NADH

Disclaimer

The reagent is only used in the field of scientific research, not suitable for clinical diagnosis or other purposes.

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